TRACKER™
VERSION 5 SOFTWARE
SOFTWARE MANUAL

JTECHMEDICAL
MEASURING HUMAN PERFORMANCE

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Contents

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JTECH Medical Tracker™ Version 5 Software Manual

Publication Information

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EC | REP

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CE
2797

Graphic Symbol Definitions

Symbol		Meaning
	An ISO 7010-M002 symbol	Consult Instructions
	An ISO 7000-0434A symbol	Caution
CE 2797	"Conformité Européenne" ("European Conformity")	Products meet the provisions of the Council Directive 93/42/EEC
		Information symbol
	An EN 980 symbol	Identifying the Manufacturer
EC REP	An EN 980 symbol	Identifying the Authorized Representative for European Communities

Conventions and Useful Definitions Used Throughout This Manual

CV - The coefficient of variation (CV) is defined as the ratio of the standard deviation (σ) to the mean (μ), or in mathematical terms, $CV = \sigma / \mu$. In probability theory and statistics, CV serves as a normalized measure of variability to help describe the relative scatter or spread of a data sample. A smaller CV suggests a higher level of consistency. A calculated CV less than 15% (0.15) is often used as an indicator of consistent effort by subjects during biometric strength tests. Tracker 5 calculates CV using population standard deviation. Note that this differs from CV calculated using the sample standard deviation, which can give a very different result.

Product Registration

Please register your Tracker System as soon as possible. Your registration ensures that you have easy access to JTECH Medical Customer Service and Support. Software registration is required to receive your site key, which is necessary to run the software.

Product Return Policy

- No software returns will be allowed after the seal on the software package is broken.
- New hardware may only be returned for credit within 15 days of receipt. No cash refunds will be issued.
- No returns of used or purchased demonstration inventory will be accepted.

Hardware items returned for credit within 15 days will be subject to a 20% restocking fee*, provided the items are in new condition and in the original packaging. If items require refurbishing or repair, the cost of service or repair will be deducted from the amount of credit. A Return Material Authorization (RMA) number must be obtained from JTECH Customer Service prior to returning any merchandise. When phoning or writing for an authorization number to return merchandise, please provide the Customer Service Department with:

1. Your name or customer number as it appears on the invoice or packing slip.
2. Your telephone number and person to contact.
3. Your P.O. number if applicable.
4. The part or catalog number(s) and description.
5. The reason for the return.

JTECH reserves the right to refuse or to return-collect any merchandise sent back without prior authorization from our Customer Service Department. Authorized returns must be shipped pre-paid to:

JTECH Medical
7633 Main Street
Midvale, UT 84047
ATTN: RMA# (insert number)

Shipping charges will be reimbursed if the return was due to JTECH's error. When returning merchandise, please include a copy of your original invoice or packing slip to ensure prompt issuing of credit.

*Restocking fee does not apply to government contracts.

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Chapter 1

Customer Support

JTECH Medical provides customer support for all the products we sell. You may register up to three individuals from your office to serve as eligible customer support contacts anytime during your support agreement. The three contacts are registered for the life of your support agreement and support will only be available to the registered individuals from your office.

Support Policies

Software

a. Your three registered users are eligible to receive software support for six (6) months from the date of purchase.
b. An extended service contract may be purchased to provide you with unlimited assistance after your initial six-month support period expires. Please contact JTECH Medical Customer Service for more information on Extended Service Plans.

Hardware

a. Your hardware is shipped with a one-year warranty (Please refer to warranty section).
b. After the initial one-year time period, you will be charged for any hardware issues (repair, replacement, shipping, etc.).
c. You can buy extended warranties for your Tracker hardware. Please contact JTECH Medical Customer Service for more information.

Before Calling for Support

1. If your question deals with software usage, refer to the software user's manual first. The manual was written to acquaint you with the software and explains how to use the program. Please read through this documentation carefully.

2. Refer to the troubleshooting section in your documentation. Many software and hardware issues can be resolved by referring to this section.

3. If you are unable to solve your problem using the documentation, please have a registered support contact call JTECH Medical Customer Support at 1-800-985-8324 or 1-(385) 695-5000, ext. 4.

To receive more accurate and efficient support, please be ready with the following:

1. Name of clinic and support contact
2. Customer number
3. Product name or type and date of purchase
4. Product serial number
5. Software version
6. Computer specifications
7. Description of the problem

Software License Agreement

PLEASE READ THIS SOFTWARE LICENSE AGREEMENT CAREFULLY BEFORE INSTALLING THE SOFTWARE.

BY CLICKING ON THE "ACCEPT" BUTTON DURING INSTALLATION YOU ARE CONSENTING TO BE BOUND BY THIS AGREEMENT. IF YOU DO NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT, CLICK THE "DO NOT ACCEPT" BUTTON AND THE INSTALLATION PROCESS WILL NOT CONTINUE, RETURN THE PRODUCT TO THE PLACE OF PURCHASE.

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1.3

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HIPAA Information
HIPAA Compliance
Tracker Version 5 Software contains new features to help you comply with the requirements of the Health Insurance Portability and Accountability Act (HIPAA). There are also basic guidelines you should follow as a regular practice to help your clinic stay compliant. The guidelines provided here are suggestions specific to the operation of Tracker Version 5 Software. For more information about HIPPA regulations and how they affect you, contact your legal counsel or the Department of Health and Human Services.

1. Position computer screens so they cannot be seen from other parts of your clinic.
2. Keep your Tracker Software closed when not using it.
3. Password protect your computers to prevent unauthorized use.
4. Do not leave reports or other documents with protected patient information in unsecured areas of the clinic.

1.4

Software Installation

Computer System Specifications

For system requirements please visit: https://www.jtechmedical.com/system-requirements

Loading Tracker Version 5 Software

❶ Notice: A site key is required to open and run Tracker Version 5 Software and is only issued for a legally purchased and registered system. Please call JTECH Customer Service to register your system and receive a site key.

Installing USB Drivers For Echo

USB drivers are required for Echo Wireless Instruments to communicate with Tracker Version 5 Software. Please refer to the Echo Manual for more information. If you installed Tracker Version 5 Software as part of your Echo Installation, you can skip this section.

Installation From USB Drive

1. Insert the Tracker Version 5 USB drive into your computer's USB 2.0 port.
2. Browse the USB drive and select autorun.exe to continue.
3. At the Tracker Welcome screen, select the "Install Software" option.
4. Follow on-screen instructions to complete the install.

Auto Installation From CD Media

1. Insert the Tracker Version 5 Software CD into your computer's CD-ROM or DVD-ROM drive. Your computer should automatically initialize the Tracker Welcome screen (Note: Newer computers may first display an "AutoPlay" menu for security purposes. Choose the option to "Run autorun.exe" to continue).
2. At the Tracker Welcome screen, select the "Install Software" option.
3. Follow on-screen instructions to complete the install.

Manual Installation from CD Media

If your computer does not automatically initialize the Tracker Welcome screen, use the following instruction to manually begin the installation process:

1. Insert the Tracker Version 5 Software CD into your computer's CD-ROM or DVD-ROM drive.
2. Click on "Start" (depending on your version of Windows, this may be designated by a Microsoft Windows logo), then click "Run"...
3. You can type in the following, substituting the letter of your CD-ROM drive for X:
   X:\setup.exe
   or
   click on "Browse" and locate your CD-ROM or DVD-ROM drive, highlight the **setup.exe** file, and click "Open." Choose "OK" at the bottom of the window.
4. Follow the on-screen prompts to complete the installation.

License Agreement

As part of the install you are asked to read the Tracker Software license agreement, which contains the terms of use for Tracker Version 5 Software. Clicking "I Accept" and completing the Tracker Version 5 Software installation indicates you agree to abide by the licensing agreement. If you do not accept the license agreement, do not click "I Accept" or complete the installation. If you do not accept the license agreement, contact JTECH Customer Service.

Registration and Site Key

Before using your software you must call JTECH Customer Service to register your software and receive a site key. You will perform the following steps while talking to our Customer Service Representative.

1. Click on the Tracker Version 5 icon on your desktop or open the software through your programs menu.
2. Click the Register button and a Registration screen appears.
3. Our Customer Service representative will ask you to read the "Site Code" displayed on the screen.
4. Once the Site Code is confirmed, our Customer Service representative will read you a "Site Key." Type the numbers and letters exactly as provided by the Customer Service Representative into the Site Key field.
5. Click the Authorize button to complete the registration and activate your Site Key.
6. Click Continue and you can begin running your Tracker Version 5 Software.

1.6

Chapter 2

Software Setup

Opening the Program

Tracker Version 5 Software opens just like other applications on your computer.

1. Double click the Tracker Version 5 icon on your desktop, or
2. Click on the Tracker icon on your Quicklaunch, or
3. Use the Start menu, go to All Programs, then to JTECH Medical Software and select Tracker Version 5 and Start Tracker Version 5 Software.

Button Conventions

Specific functions for buttons and icons are assigned throughout the Tracker Version 5 Software program.

Close without Saving.

Save and Close - only displayed when data has changed on a form, it saves the data and closes the form.

Add - used to open data entry fields for list items in evaluation forms.

Edit Information - opens a window for editing check-list items and drop-down menu items.

Delete - removes the highlighted item from a list.

Delete All - removes all data from a list or form.

Play - starts a queued test sequence or timer.

Stop - ends a queued test sequence or timer.

Pause - temporarily pauses a queued test sequence or timer.

Load - opens a form for selecting available item sets.

Save Set - opens a form for saving the item set, such as a test sequence for reuse.

Move Up - moves highlighted item up in a list.

Move Down - moves highlighted item down in a list.

Show Reps - Displays repetition data for tests.

Software Help Menus

Tracker software forms include a "Help" button, which provides you with software operation information. To access help information about a form, click on the button.

Multimedia Help

Tracker Version 5 features an exclusive Multimedia Help System that provides video and text information on test protocols. Multimedia Help is accessed at the testing forms using the "Video" button.

Additional Buttons

Buttons that are used in specific sections of the software are described in those sections of this manual.

System Menu

The initial software window provides access into two areas of Tracker Version 5 Software: system management functions through the top menu and patient files for data collection, processing and reporting through the bottom menu.

System Drop-down Menu

The System drop-down menu accesses basic system functions like instrument calibration, wireless links, data ports, etc. To access the menu click on "System."

Tracker Interface

This option identifies if you are using Tracker wired instruments or wireless instruments.

If "Wired" is selected, a Communications Port option is displayed to select the communications port for the Tracker Interface Box.

Menu if Wired is selected
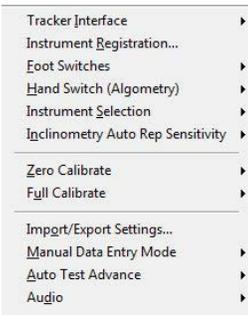
If "Wireless" is selected, "Instrument Registration" is available from the System menu. The "registration" form is also used to import factory calibration and test instrument communications.

Menu if Wireless is selected

2.4

Communications Port (Wired Systems Only)
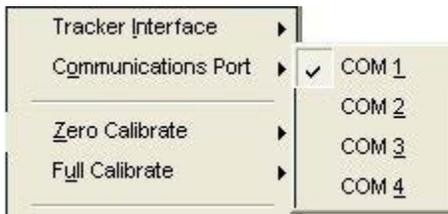
This option is only available if "Wired" is selected for the Tracker Interface. This section is used to designate the serial port where the Tracker Interface Box is connected. The default serial communications port is COM 1.

Instrument Registration (Wireless Systems Only)
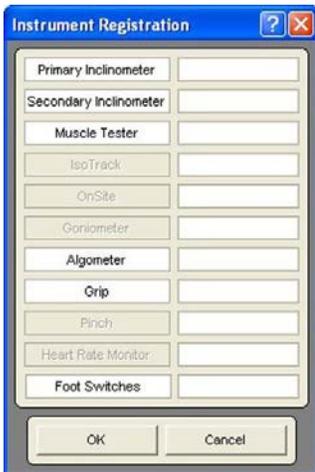
Tracker wireless instruments must be registered with the software to insure proper communications. Tracker Version 5 Software will not establish communications with instruments that are not registered with the software.

1. Select Instrument Registration from the system drop-down menu.
2. At the Instrument Registration screen, place the cursor in the field beside the instrument for registration.
3. Type in the serial number located on the instrument label. The software will only accept valid serial numbers.
4. Complete the registration for all instruments, including foot switches, included with your system.

Importing Factory Calibration of Wireless Instruments

Another feature of the Instrument Registration screen is the ability to import factory calibration into Tracker Version 5 Software. Using the factory-supplied calibration helps insure your instruments are providing the most accurate data possible. All Tracker dynamometers are factory calibrated using certified weights.

Factory calibration is only required for dynamometers or force measurement devices, such as the muscle tester, grip gauge and algometer. Tracker inclinometers and foot switches do not require factory calibration. To import factory calibration for a dynamometer:

1. After entering the instrument's serial number, click on the instrument name, such as grip, in the Instrument Registration screen. Clicking on the inclinometer and foot switches will not import any factory calibration information, but will test communication with the instrument.
2. If the instrument is not awake, the Instrument Wake-Up screen appears. Gently press the "ON" button on the instrument to turn it on. When the instrument is on, the green LED turns on, and the LED flashes when communications are established between the instrument and the software. The Instrument Wake-Up screen will also close automatically when communications are established.
3. The Import Calibration screen will appear and automatically imports the factory calibration data. The top of the screen will say "Import Calibration Successful" when the process is finished. Click the OK button to complete the calibration import.

❶ Notice: If the calibration importation does not complete successfully, contact JTECH Customer Service.

4. Import the factory calibration for all of your system's instruments.

❶ Notice: "Wired" system factory calibration is imported by inserting the calibration CD in the CD drive and following the on-screen instructions.

Foot Switches (Wireless Systems Only)
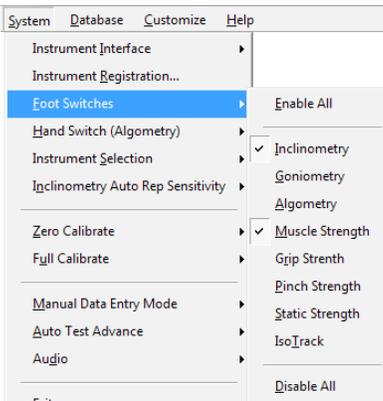
Wireless system users have the option to enable the foot switches for any of the instrumented portions of the software. JTECH recommends using the foot switches for inclinometry range of motion measurements to keep your hands free to support and hold the inclinometers more securely. Footswitches may be required for entering data in the Goniometry module depending on the style of goniometer you have. The foot switches also allow you to advance through test sequences without returning to the computer.

1. Select Foot Switches from the system drop-down menu.
2. Select Enable to turn the foot switches on, select ROM Only for use only with inclinometers and goniometer, or select GON Only for use only with the goniometer.

ⓘ Notice: When the Tracker Version 5 Goniometry module is enabled, the foot switches are required to enter range of motion data using the goniometer. Therefore, the minimum selection for the foot switches is GON Only (goniometer only). When ROM only is selected, the foot switches are enabled for goniometry and inclinometry if both modules are installed.

Hand Switch (Algometry) (Wireless Systems Only)
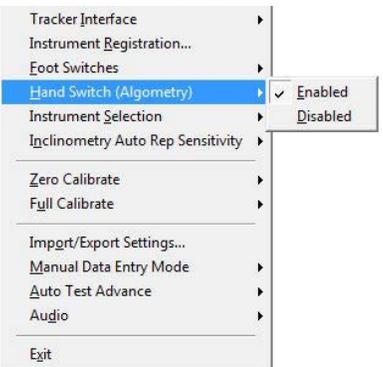
If your wireless system included a hand switch or you purchased an optional hand switch you can enable or disable the Algometry Hand Switch for testing. The hand switch allows patients to control the end of the test using the Enter button rather than just saying "stop," this helps increase objectivity and overall test reliability.

Instrument Selection (Wireless Systems Only)
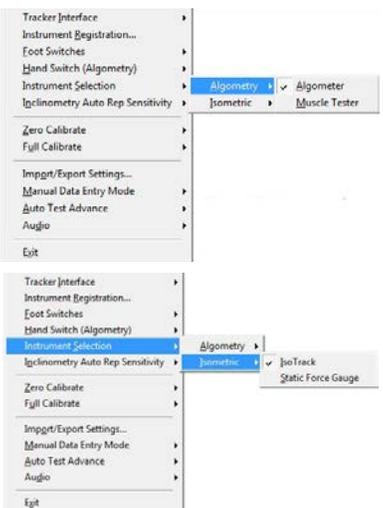
Depending on your wireless system you may have the option to use different instruments for some tests. The Instrument Selection section allows you to specify which instrument will be used for that particular test.

1. Select Instrument Selection from the system drop-down menu.
2. For Algometry tests, select Algometry then select algometer for use only with the algometer or Muscle Tester for use with the muscle tester.
3. For Isometric tests, select Isometric then IsoTrack for use with the IsoTrack or Static Force Gauge for use with the static force gauge.

Inclinometry Auto Rep Sensitivity
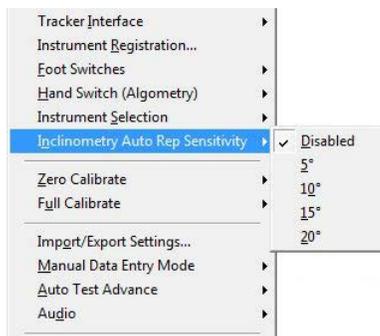
Enabling this setting removes the need to press the ENTER button during each test repetition. Instead, the maximum range of motion is automatically recorded.

The sensitivity value determines the angular threshold used to detect maximum range of motion. Smaller values result in increased sensitivity. You should conduct your own testing to determine the Auto Rep Sensitivity which works best with your protocols and various patient testing requirements.

Zero Calibrate
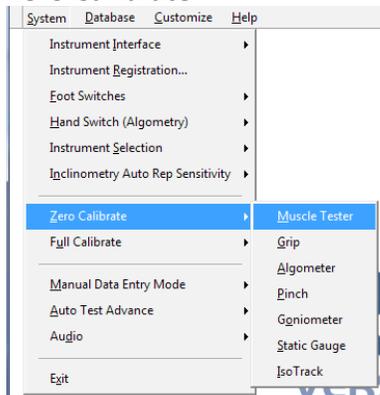
Tracker Software will request a zero calibration of an instrument the first time it is used in a 24 hour period to insure the accuracy of data collected. (See the Tracker Help system or instrument sections of this manual for additional zero calibration information.) This item is used to perform zero calibration outside of the standard prompted zero calibrations.

1. Select Zero Calibrate from the system drop-down menu and the instrument for zero calibration.
2. Press the "On" button to wake up the instrument.
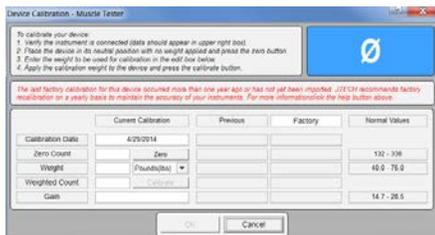
❶ Notice: The value displayed in the upper right-hand corner of the Zero Calibration screen is the raw value that will be captured when the zero calibration is performed. A Ø symbol indicates that communication with the instrument has not been established.

❶ Notice: JTECH recommends factory recalibration on a yearly basis to maintain the accuracy of your instruments. A red text notice will appear in the device calibration screen when your last factory calibration was more than one year ago.

3. Make sure there is no weight or force applied to the instrument. For example, make sure the muscle tester is turned so the testing pad faces up and nothing is touching it.
4. Click the Zero button to zero calibrate the device.
5. Compare the current zero calibration data with the previous calibration data and the factory calibration data. If the data varies more than 5%, contact JTECH Customer Service.
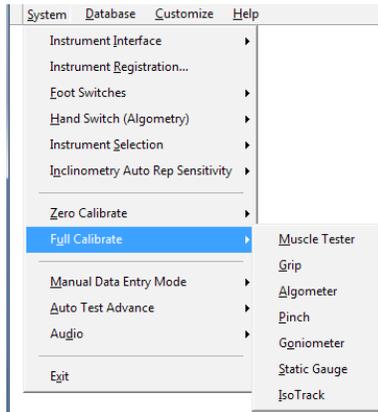
Full Calibration

A full calibration is recommended for all JTECH force gauges on a yearly basis with certified weights. For information on JTECH factory calibration, contact JTECH Customer Service.

1. Select Full Calibration from the system drop-down menu and the instrument for calibration.
2. Wake up a wireless instrument by gently pressing the "On" button. For wired instrument calibration, make sure the Tracker Box is turned on.

ⓘ Notice: The value displayed in the upper right-hand corner of the Calibration screen is the raw value that will be captured when the calibration is performed. A Ø symbol indicates that communication with the instrument has not been established.

3. Make sure there is no weight or force applied to the instrument and click the Zero button to zero calibrate the device.
4. Enter the amount of weight for the calibration into the Weight field and select the "Units" (pounds, metric or newtons) from the drop-down list. Normal ranges for weight calibrating the device are displayed in the screen's right-hand column.
5. Apply the weight to the instrument and click the Calibrate button.
6. Compare the current calibration data with the previous calibration data and the factory calibration data. If the data varies more than 5%, contact JTECH Customer Service.
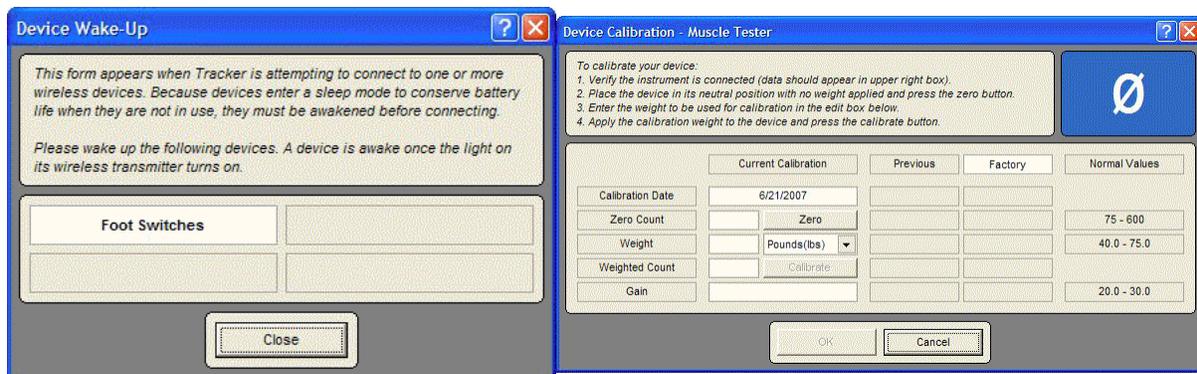
Import/Export Settings

This is a custom option for integrating Tracker Version 5 Software with Electronic Medical Records (EMR) systems. For more information on this feature, contact your JTECH sales representative

2.8
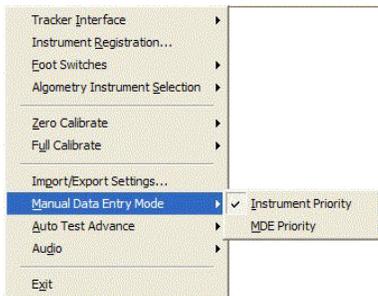
Manual Data Entry

This is an optional module that must be purchased from JTECH to be active. The Manual Data Entry (MDE) module allows you to enter test data collected with non-computerized instruments into Tracker Version 5 test screens. If you have purchased the MDE module, this menu option allows you to control when MDE takes precedence.

Instrument Priority - This selection gives priority to Tracker instruments installed with your system. When it is selected, manual data entry is only available for modules for which an instrument has not been installed.
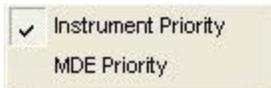
MDE Priority - This selection turns manual data entry on for all Tracker instrument modules. When MDE priority is selected, all test data must be manually entered as the software will not collect instrument data automatically.

See more on using Manual Data Entry (MDE) in the chapters for each instrument.

Auto Test Advance

This feature enables or disables the software's automatic advance when using a test sequence. When this option is enabled, the software automatically advances from test to test in the series as soon as validity or consistency is met. If the feature is disabled, you must manually advance through a testing sequence using the "Next" foot switch or by closing the test screen. Disabling the Auto Test Advance feature provides time for you to view test data and enter notes before advancing to the next test screen.

Audio

This selection enables or disables the audio portion of the Tracker software (voice prompts and sounds).

Exit

Click this selection to close Tracker Version 5 Software.

Database Management

Database Drop-down Menu

| System | Database | Customize | Help | | 📎 Attachments | Software maintenance active until 8/31/2015 |

The Database drop-down menu allows you to manage multiple databases for collecting and storing patient data. For example, if two clinicians use the same Tracker system, each can have a separate patient database. This drop-down is also used for backing up and restoring databases.

Manage
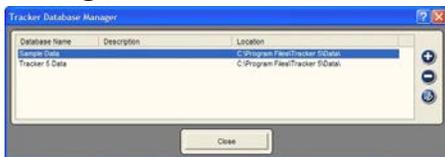
This option is used to add new databases; edit database names, descriptions or paths; and to remove databases from the active database list. Active databases are displayed in the window. The buttons on the right are used to manage databases:

⊕ Creating new or restoring inactive databases.

⊖ Deleting (inactivating) the highlighted database.

📝 Editing information for the highlighted database.

Creating or Re-activating Databases
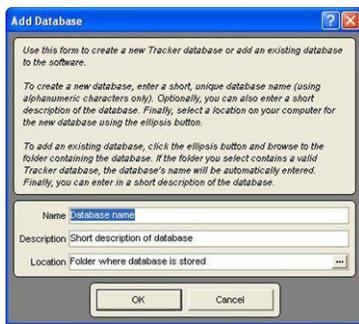
Click the + button at the Tracker Database Manager screen and the Add Database screen appears. Use the instructions to create a new database.

1. Type in a name into the "Name" field.
2. Type in a description (optional).
3. Click the browse button to map a path to the database location.
4. Click "OK" to add the database or "Cancel" to exit without adding the database.

Editing Database Setup Information
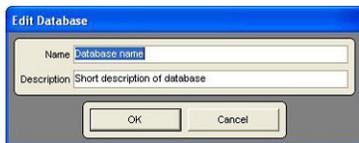
The edit feature is used to change the name or description of active databases. To change the name or description, click on the field and type in the new information.

Select

This menu options allows you to select the active database. It provides the same functionality as opening a database when selecting a patient file.

2.10

User Administration

This option is available when the User Accounts module is installed for your Tracker Version 5 Software. User administration allows you to control access to Tracker Version 5 databases using assigned user names and passwords. For information on the User Administration module, contact your JTECH sales representative.

❶ Notice: The administrator account is only used to control access to Tracker Version 5 databases by assigning user names and passwords. The administrator account does not have access rights to a password controlled database.
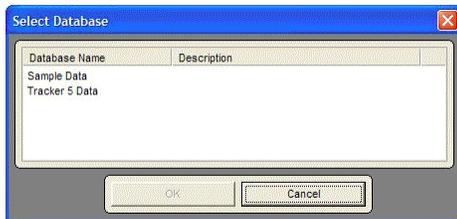
With User Administration you can password protect a single Tracker Version 5 database or all Tracker Version 5 databases. To set up the administrator password:

1. Click on the Database menu item and select the User Administration option.
2. At the Select Database form, highlight the database to password protect and click OK. You must perform this operation for each database you want to password protect.
3. When the Add User Account form is displayed, type in a password for the administrator account, enter it a second time in the Confirm Password field, and click OK.
4. When the User Account Manager form is displayed you can set up user accounts with user names and passwords.

❶ Notice: If you do not set up at least one user account, no one will be able to access the protected database because the administrator does not have access rights to password protected databases.

Once an administrator is set up for a database you can access the User Account Manager by clicking on the Database menu item, selecting the User Administration option and selecting a database. This allows you to add users, delete user accounts, edit user account names or passwords, arrange the user list, and turn off the database password protection.

Unchecking the User Accounts Enabled box turns off password protection for the database.

Setting Up User Accounts

Once a Tracker Version 5 database is password protected, you have to set up user accounts to allow access to the database for testing and printing reports.

1. Open the User Accounts Manager form by clicking the Database drop-down menu and selecting User Administration. Enter the administrator password at the User Login form.
2. At the User Account Manager form, Click the Add button to open the Add User Account form.
3. Enter a user account name of up to 15 characters. The user name can include letters and numbers, but not spaces or control characters like slashes or dashes. The user account name is not case sensitive.
4. Enter a user password, which can contain letters, numbers and other characters like spaces, slashes and dashes. The user password is case sensitive.

In addition to adding user accounts, the User Account Manager form allows the administrator to edit user names and passwords, delete user accounts and to arrange the user list.

ⓘ Notice: Once a database is password protected, a User Login form is displayed when anyone attempts to open the database. A valid user name and password must be entered to open the database and access patient files.

To prevent unauthorized access password protected databases, users should use the Logout User button in the bottom right-hand corner of the Tracker Version 5 Software screen when not working with patient files.

Change User Password

This option is only available when the User Accounts module is active and a user is logged into a password protected database. Clicking on the item allows the currently logged in user to change the password for their account.

1. Click on the Database drop-down menu and select the Change User Password item.
2. Enter the user's current password in the Old Password field.
3. Enter the new password, up to 15 characters using any combination of letters, numbers and symbols. Passwords are case sensitive.
4. Re-enter the password in the confirmation field and click OK.

2.12

Backup

Use this item to backup Tracker databases to your hard drive or to other media, such as a Zip disc or USB flash drive.

1. Select the database to back up.
2. Use the "Select Path" button to identify the path to the backup location.
3. Click "OK" to start backup.

Restore

This selection was designed for use in an emergency situation, such as a hard drive crash. If you have backed up a database to media other than your hard drive, you can use the restore function to return the backed up database to your new hard drive.

ⓘ Notice: Before restoring a backed-up database, create a new, blank database using the Database Manager. Then restore the backed-up database to the newly created database. This will eliminate any opportunity to overwrite or lose data in an existing database.

⚠ Warning: Restoring a backed-up database over an existing database overwrites the existing database and may result in a loss of data. If you have questions about restoring a backed-up database, contact JTECH Customer Service.

1. Highlight the database to restore the backed-up data to (see Important Tip).
2. Click the "Select Path" button to locate the backed-up database.
3. Click "OK" to restore the backed-up database.

Auto Backup
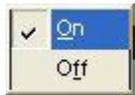
When turned on, this feature automatically creates a backup file of all currently active databases in the database folder under **Auto Backup/Tracker Auto Backup #########.t5d**. The # symbols stand for a number assigned to the backup file. The assigned numbers increase with each backup, so highest number is the most recent backup. Automatically backed-up files can be saved to alternate media for safe keeping. They can also be reopened using the "Restore" command in the system database drop-down menu.

Customize Menu

Customize Drop-down Menu

System   Database   Customize   Help   📎 Attachments   Software maintenance active until 8/31/2015

This menu option is used to create custom tests and setup custom questionnaires. Custom tests can only be created for installed Tracker Version 5 modules.

Tests...
Questionnaires...

❶ Notice: Custom tests and questionnaires are database specific. Therefore, a custom test or questionnaire created for a patient or test sequence in one database is not available in another database.

Select Database
Database Name   Description
Sample Data
Tracker 5 Data
OK   Cancel
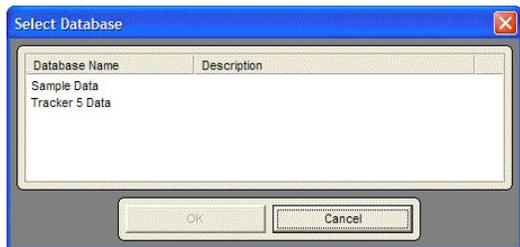
❶ Notice: If a database is not open, the software prompts you to select a database when creating a custom test. Highlight the database and click "OK." If you are unsure of the database, you can open it through Patient File where more information is available.

Managing Custom Tests
When Customize/Tests is selected, the Custom Test Manager form is displayed. The Custom Test Manager form can also be accessed using the Edit button titled "Manage Custom Tests" in test selection forms.

1. Open the Manage Custom Tests form and select the test category, such as inclinometry, using the icons on the left side of the form.
2. Use the buttons on the right side of the Manage Custom Tests form to add, delete, edit and arrange custom tests.

2.14

Add Custom Test Form

The Add Custom Test form is displayed when the Add button is selected in the Custom Test Manager form. The Add Custom Test form is unique for each test category. Standard features of the form are described below, see test category chapters for more information.

Test Name: This area is used to enter a unique name for the custom test. Click on the field and type in the test name (up to 25 characters).

Test Type: This drop-down appears for test categories that use different types of testing forms and/or groupings within the test selection form. Dynamic lifting, for example, uses different forms for occasional and for frequent lifting tests. Other categories, such as Postures, use one test form, but group tests by regions for easier selection. Click on the drop-down and select the most appropriate test type.

Active Check Box: This check box determines whether or not the custom test is displayed in the test selection form. Check the box to display the test in the Test Selection form's available test list.
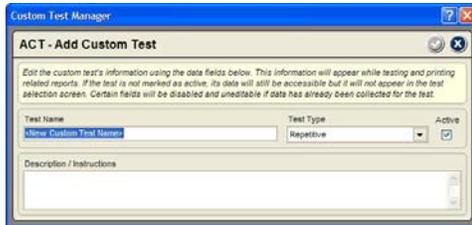
Description/Instructions: This text field allows you to enter details about how the custom test is performed. The information serves as a reference only and is not printed in reports.

Details: These appear in many configurations depending on the test category. They can be text fields, check boxes or drop-downs. They allow you to define the parameters of the test and are printed in test details reports.

Edit/Delete Custom Tests
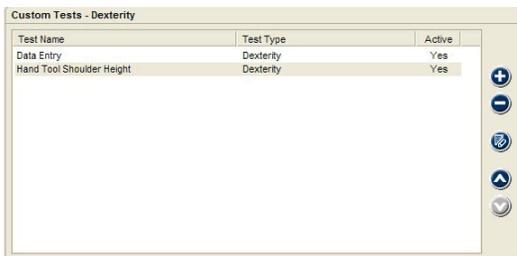
The Custom Test Manager form allows you to edit and delete custom tests under certain circumstances. You can delete a custom test if it has not been used to collect patient data. Likewise, parts of the custom test setup may not be editable if data exists for the test.

To delete an unused custom test: Highlight the test and click the Delete button.
To edit a custom test: Highlight the test and click the Edit button. Only the editable items will be active for tests with existing data.

ⓘ Notice: Make custom tests that cannot be deleted "inactive" to keep them from showing up in the available test list.

Questionnaires

When the Questionnaires item is selected from the Customize drop-down menu, the Questionnaires Setup form is displayed. This form allows you to create questionnaire categories, add a questionnaire to a category, add items to the questionnaire and set up scoring for the questionnaire. You can also use this feature to edit custom questionnaires that have created.

Category
This list helps to organize questionnaires by purpose or anatomical area. When adding a questionnaire, you can use the categories supplied by JTECH or create a new one.

To use an existing category: Highlight the category in the list and the software displays all custom questionnaires in the Questionnaires list.

To create a new category: Click the Add button to open the Add Category form, enter a name for the category and click OK.

The arrangement of JTECH supplied categories cannot be changed, but you can organize custom questionnaire categories using the up and down arrows.

Questionnaire

This list box displays the names of custom questionnaires created for the selected category. The questionnaire type, displayed at the bottom of the list, refers to the scoring method used for the questionnaire. Scoring can be sum of items, average of items or no scoring (N/A).

1. Click the Add button to open the Edit Questionnaires form.
2. Enter the questionnaires title in the Questionnaire Name field.
3. If you want an introduction or interpretation information to print in narrative reports, type it into the Interpretation/Intro field. You can enter up to 215 characters into the field.
4. Click Yes or No for Bilateral to indicate if the questionnaire compares the left and right sides.
5. Results determines how the overall questionnaire is scored. Sum adds the results from all items scored. Average adds the results from all items scored and divides by the number of items scored. N/A does not provide a total score for the questionnaire.
6. Click OK to save questionnaire.

When custom questionnaires are set up for a category, you can use the up and down arrows to arrange the list and the Edit button to make changes to the questionnaire setup.

Questionnaire

This list box displays the names of custom questionnaires created for the selected category. The questionnaire type, displayed at the bottom of the list, refers to the scoring method used for the questionnaire. Scoring can be sum of items, average of items or no scoring (N/A).

1. Click the Add button to open the Edit Questionnaires form.
2. Enter the questionnaires title in the Questionnaire Name field.
3. If you want an introduction or interpretation information to print in narrative reports, type it into the Interpretation/Intro field. You can enter up to 215 characters into the field.
4. Click Yes or No for Bilateral to indicate if the questionnaire compares the left and right sides.
5. Results determines how the overall questionnaire is scored. Sum adds the results from all items scored. Average adds the results from all items scored and divides by the number of items scored. N/A does not provide a total score for the questionnaire.
6. Click OK to save questionnaire.

When custom questionnaires are set up for a category, you can use the up and down arrows to arrange the list and the Edit button to make changes to the questionnaire setup.

Items

This list is used to enter the types of things evaluated by the questionnaire. For example, items in a depression inventory might include sleep, mood, social interaction, and so forth.

1. Click on the Add button to open the Add Item form.
2. Enter a name or title for the item.

Once items are created you can use the up and down arrows to organize the list and the Edit button to edit the item's name.

Ranges

This section is used to set up the scoring parameters for the questionnaire. You can set up a total score for the questionnaire if the Sum or Average type is selected. You can also set up scoring for each item in the questionnaire.

Questionnaire Ranges

1. Make sure the questionnaire is highlighted in the Questionnaire item list and the Questionnaire button is clicked in the Ranges section.
2. Click the Add button to open the Add Questionnaire Range form.
3. Enter the beginning and ending range. For example, If normal expected range for the questionnaire is between 0 and 4, the beginning range is 0 and the ending range is 4.
4. Enter a description for the range, such as normal for the above example.
5. If the range is the norm for the questionnaire, click the norm button. The norm button can only be check for one range per questionnaire.
6. Click OK to save the range.

Repeat the steps above as necessary to completely score the questionnaire. For example, a depression inventory may have ranges for normal, slightly depressed, depressed, severely depressed, etc.

Item Ranges

1. Make sure the item is highlighted in the Item list and the Item button is clicked in the Ranges section.
2. Click the add button to open the Add Item Range form.
3. Enter the beginning and ending numbers for the range. For example, if you are entering the normal range of 20 to 30 for sleep disorder on a depression questionnaire, the beginning range is 20 and the ending range is 30.
4. Enter a description for the range, such as normal sleep patterns for the example above.
5. If the range is the norm for this item on the questionnaire, check the Norm checkbox. Only one norm range can be assigned per item on the questionnaire.
6. Click OK to save the range.
7. Repeat the procedure to complete the scoring ranges for each item in the questionnaire.
8. Once you have enter at least one range for a questionnaire or item, the edit button is activated. You can use the edit to change ranges or range descriptions.

2.18
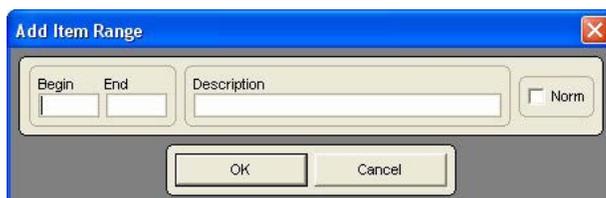
Help Information
Help Drop-down Menu
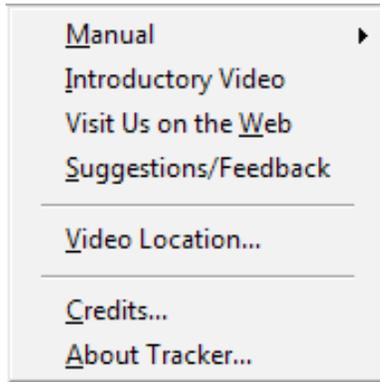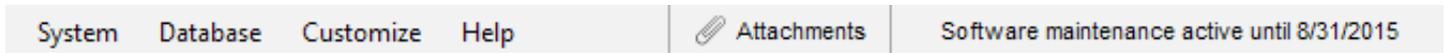
Manual

This menu item provides access to electronic versions of this manual, the Echo Wireless manual and the Tracker Wired Instrument Setup in Adobe Acrobat format.

Visit Us on the Web

If you have an active internet connection, clicking this item will take you to the JTECH Medical home page.

Video Location
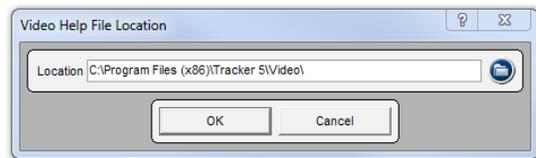
This menu option is used to identify the location of Tracker Version 5 Multimedia Help files so you can copy them to your server or other location

1. Make sure the video help files are in an accessible folder
2. Click on the "Select Path" button to map the location of the video help files.
3. Click "OK."

Credits

This option displays credits for the design of graphic elements used in Tracker Version 5 Software.

About Tracker

This menu option provides important access to registration and support information, enabled modules and JTECH contact information.

Modules Enabled

This area displays all the active modules in your Tracker Version 5 Software. If a module is grayed out, it is not installed on your system. For more information on Tracker Version 5 modules, contact JTECH Medical.

License Button

The license button is used to enter your unique registration site key. A new key must be entered when Tracker Version 5 Software is first registered and when new modules are activated. To receive a site key for your software you must contact JTECH Customer Service.
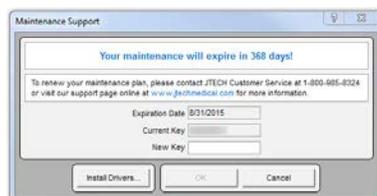
Support Button

The support button is used to show the time remaining if you purchased a Guardian maintenance software support Membership from JTECH Medical. For more information on JTECH Guardian software support plans, contact JTECH Customer Service.

Attachments Information

Attachments Drop-down Menu

The Attachments menu items allows you to attach files to a Tracker Version 5 database for quick, easy access. Attached files can include things like exercise instructions, self care information, or other types of files you may print or review regularly in relationship to Tracker 5 evaluations.
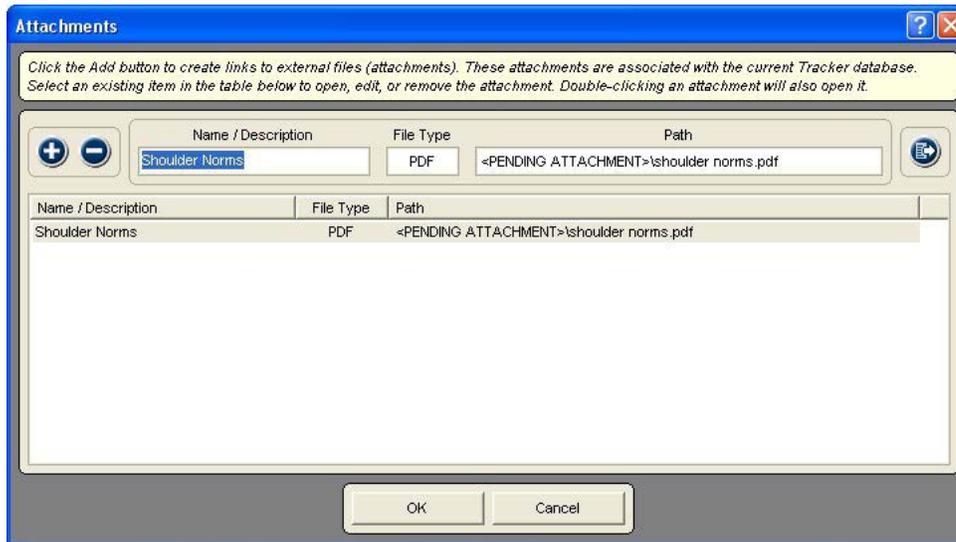
To add an attachment

1.   Click the Attachments menu item to open the Attachments form.
2.   To add an attachment to the current database, click the Add button to open a browser window.
3.   Use the browser window to locate the file, highlight it and click Open.
4.   Enter a name for the new attachment in the Name/Description field.

To open an attachment

1.   Click the Attachments menu item to open the Attachments form.
2.   Highlight the attachment in the list.
3.   Click the Go To File button to open the file in its native program.

To delete an attachment

1.   Click the Attachments menu item to open the Attachments form.
2.   Highlight the attachment for deletion in the list.
3.   Click the Delete button.
4.   Click OK at the confirmation prompts.

Important Note: Deleting a Tracker Version 5 attachment only deletes the link to the attachment. It does not delete the attached file from the computer.

2.20

Chapter 3

Opening and Using Patient Files

Tracker Version 5 Software Organization
Tracker Version 5 Software primary divisions allow you to manage patient files, collect exam data, analyze exam data, and generate documentation. An Impairments button is also displayed when that module is enabled. These buttons are located at the bottom of the initial Tracker window.

Patient Files	Perform Exam	Analyze Data	Impairments	Create Reports	Close Patient

Patient Files
Like most clinics, all the patient information and test data collected in Tracker Software is contained in the patient file. The "Patient Files" selection in the software is where general patient information, such as address, phone number, insurance and employer, is located.

Patient File Organization
Patient files are organized to help you maintain and find information easily. There are three levels within the patient file:

1. "Patient" is the first level. With the first level the patient's name and contact information is stored. It also provides the basis for the rest of the patient file.
2. "Incident" is the second level. This level contains contact information such as employer, insurance company, attorney, and care providers. You can have multiple "Incidents" for a single patient, such as a patient hurt on the job, then in a car accident.
3. "Exam" is the third level. As indicated above, exams are tied to a specific "Incident." Evaluation and test data is stored under the Exam. Each time a patient is evaluated using your Tracker System, the data is stored as a separate exam.

ⓘ Notice: Make custom tests that cannot be deleted "inactive" to keep them from showing up in the available test list.

Getting Started
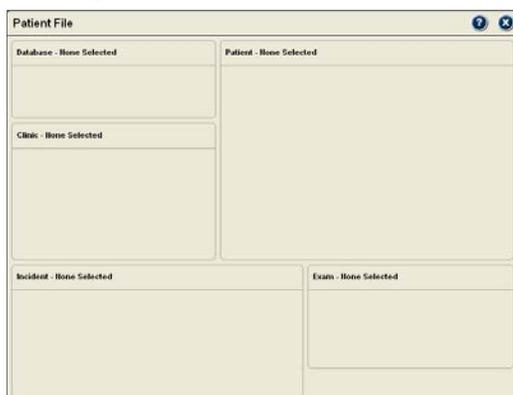
The first time you click the "Patient Files" button, the screen may appear "empty" like the one to the right. Accessing information and getting going is quick and easy.

Information Location
On the left-hand side of the "Patient Files" window is a large area that contains a "tree structure," which is used to access databases, patient files, incident files and exam files. The elements within the tree structure can be opened up to display the various levels of information available.

On the right, the tree structure displays the Tracker 5 database (at top), the patient file for New Patient (second line), incident file for Back Injury, and an exam file for Initial exam. A second incident file is present for the patient called Car Accident.
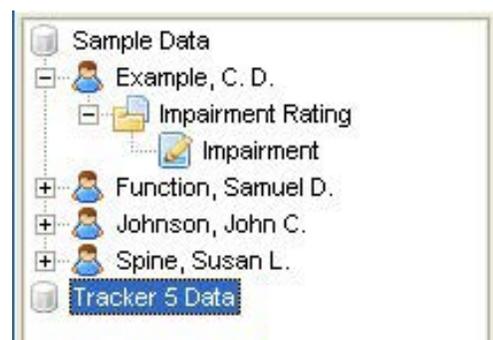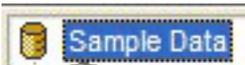
 If your software only displays a database icon and name, like the one at the left, click on it to select the database. This database contains sample data you can use while learning Tracker Version 5 Software.
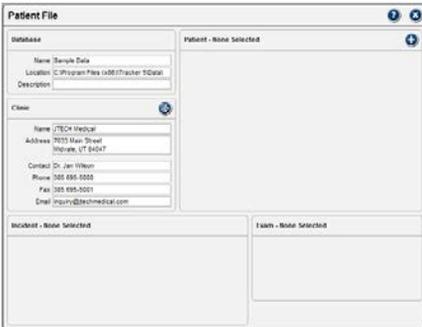
 Once you have selected a database, options will be available in the Patient Files window, such as the Clinic section and a Add button above the Patient section.

If you click on the levels within the tree structure, information from the sample patient file will populate the appropriate fields.

Clinic Information
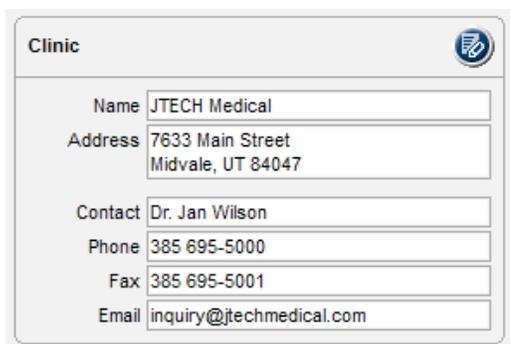
 Clinic information is maintained at the database level in the software, so it needs to only be entered once. It can then be used with any patient within the database. You can complete as much or as little of the Clinic Information section you desire. You can also designate a clinic logo to go on narrative reports and on data report cover sheets.
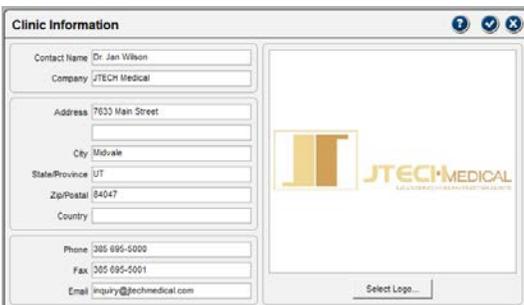
To Remove Logo
Right click anywhere in the logo window, and click on the "clear" pop-up.

1. To begin entering clinic information, click on the edit button and the Clinic Information screen appears.
2. At the Clinic Information screen, click on a field and type in the information. To speed up the process, you can click on the "Contact" field, enter a contact name, then use the Tab key to progress through the fields.
3. To add a logo for reports, click on the "Select Logo" button and browse to find the logo. Once you find the logo file, highlight it and click "Open."

ℹ Notice: Tracker only uses .jpg, .jpeg, or .bmp file formats.

4. When you are finished entering information, click on the Close and Save button to close and save the data. To close without saving, click on the Close without Saving button.

You can edit or change clinic information any time by clicking on the Edit button.

Patient

Creating a New Patient File

Click on the Add button to access the Patient Information screen and enter patient data.
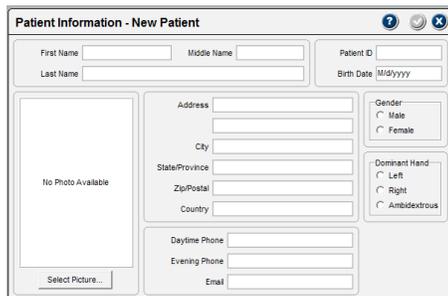
Entering information in this section creates a patient file. You will then be able to access the "Incident," then the "Exam" levels to enter information and begin an evaluation.

1. Within the Patient Information screen, data is entered by clicking on a field and typing in the information. The Tab key can be used to progress through the fields. The minimum requirement for creating a patient file is an entry into one of the name fields.
2. To add a patient picture to the file, click on the "Select Picture" button and browse to find the patient's picture file. Once you find the picture file, highlight it and click "Open."

ⓘ Notice: Tracker only uses .jpg, .jpeg, or .bmp file formats.

3. When you are finished entering information, click on the Close and Save button to close and save the data. To close without saving, click on the Close without Saving button.

ⓘ Notice: When a patient file is created, it is displayed in the tree list, like "New, Patient" below. The patient file can then be opened by clicking on it in the tree list.

Alternative Method for Creating and Opening Patient Files

If you attempt to access the "Perform Exam," "Analyze Data," or "Create Reports" sections without a patient file open, the software opens a "quick select" screen. You can use this screen to open an existing patient file and as a convenient way to create a new patient file, incident file or exam file.

Opening Existing Files

1. At the Quick Select screen, ensure the correct database is highlighted.
2. Click on the name in the patient list.
3. Click on the incident in the incident list.
4. Click on the exam in the exam list.
5. Click "OK" to open the file.

Creating New Files

1. At the Quick Select screen, ensure the correct database is highlighted.
2. Click in the Name field and enter a name.
3. Enter an incident name in the Incident field.
4. Enter an exam name in the Exam field.
5. Click "OK" to create the file.
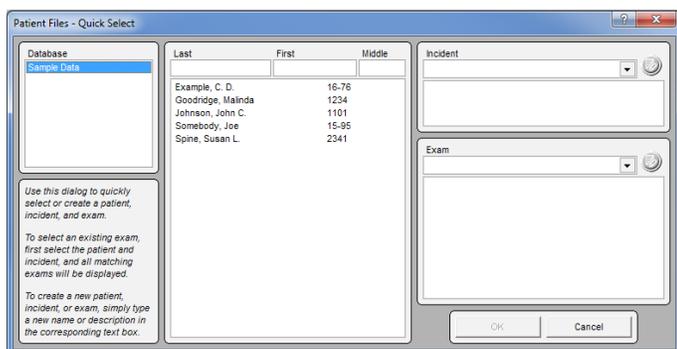
ⓘ Notice: After creating a patient file with the Quick Select screen, you can go to the "Patient Files" area at a later time to enter additional patient, incident or exam information.

◔ *Working with Existing Files*

After an existing patient's name is selected, you can use this screen to create a new incident file and/or a new exam file for the patient.

3.4

Incident

Incident - None Selected ⊕

Creating a New Incident File

Click on the Add button to access the Incident Information screen and enter Incident data.
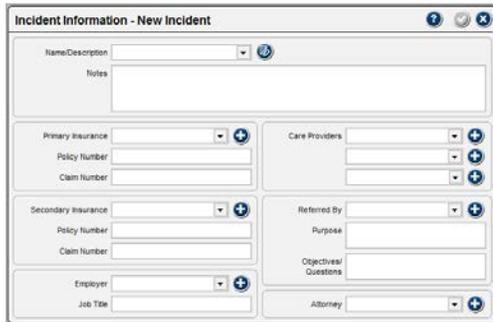
The incident level corresponds to why the patient is being evaluated or seeking treatment. Serial examinations are stored under an incident to allow comparison over time.

The incident file also allows you to enter information about the patient's primary/secondary insurance, employer, care providers, referral, and attorney related to the incident.

To create an incident file you must enter a Name/Description in the first field. All other information is optional. You can enter notes about the incident by placing the cursor in the Notes field and typing in the data.

Incident - Additional Information Sections

The information sections (insurance, employer, care givers, etc) all function in the same manner:

1. Open a new information screen in any of the areas by clicking on the Add button.
2. When the information screen opens, click on a field and type in the information. To speed up the process, you can use the Tab key to progress through the fields.
3. When you are finished, click the Close and Save button to close and save the data.

ℹ Notice: Right clicking on the information field brings up a menu for creating a new entry and editing the current information. Clear removes the name from the field, but does not delete it from the list
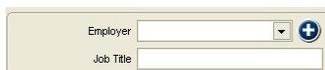
Reusing Information

Once an information screen is complete, a name (company name, attorney name or care giver) is added to a list that can be accessed using the drop down button.

Editing Information

ℹ Notice: When data in the information screens is edited, it is changed globally, not just for the current patient.

1. Open an information screen by clicking on the Edit button.
2. When the information screen opens, click on a field and type in the new information. To speed up the process, you can use the Tab key to progress through the fields.
3. When you are finished, click the Close and Save button to close and save the data.

Special Information
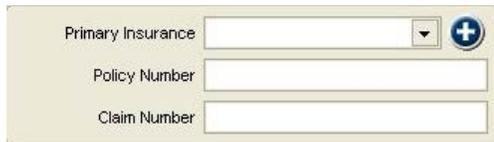
Some of the incident information areas require you to enter special information directly at the Incident Information screen:

Example

Insurance Policy and Claim numbers are entered in the Incident screen.

1. Policy and Claim Numbers for Primary and Secondary Insurance.
2. Job Title under Employer Information.
3. Purpose and Questions/Objectives under Referrer information.

To enter information, click on the field and type in the information.

Exam

Click on the Add button to create an exam file for the patient or to open an existing exam

The exam level is where the data collected during the evaluation is stored. Exams are organized by Description and Date.

ⓘ Notice: An exam can only be created or opened within an incident. If the Add button is not available, you must open an incident.
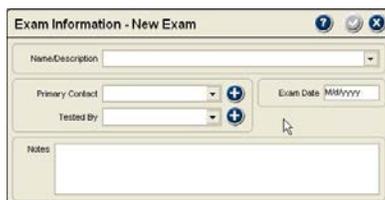
1. To create a new exam, type in a name or description.

   ⓘ Notice: Only an exam name is required to open an exam file. If no date is entered, the software defaults to the current date.

2. Select a Primary Contact (see information below) from the drop-down list or add a new on using the Add button.
3. Select a Tester (see information below) from the drop-down list or add a new one using the Add button.
4. Enter an exam date. If no date is entered, the software defaults to the computer's current date.
5. When finished, click the Save and Close button to create the exam file.

Primary Contact

The name in this field should be the treating or supervising clinician responsible for the evaluation. Names in the drop-down list come from information entered here and through the Care Provider information.

Tester

The name in this field is to indicate if someone other than the Primary Contact performed tests, such as measuring range of motion. Like Primary Contact, names in the drop-down list come from information entered here and through the Care Provider information.

ⓘ Notice: Only a contact name is required to be able to save the Care Provider Information screen. Names from Care Provider Information screens are available in the Exam's Primary Contact and Tester drop-down lists.

3.6

Chapter 4

Perform Exam Organization

Perform Exam
To access the "Perform Exam" section a patient file must be open. You can open a patient file using the "Patient Files" section or by clicking on "Perform Exam" and using the Quick Select screen.

The "Perform Exam" section is opened using the button located at the bottom of the initial Tracker window.

The "Perform Exam" section is used to collect all evaluation data from intake to computerized objective testing.
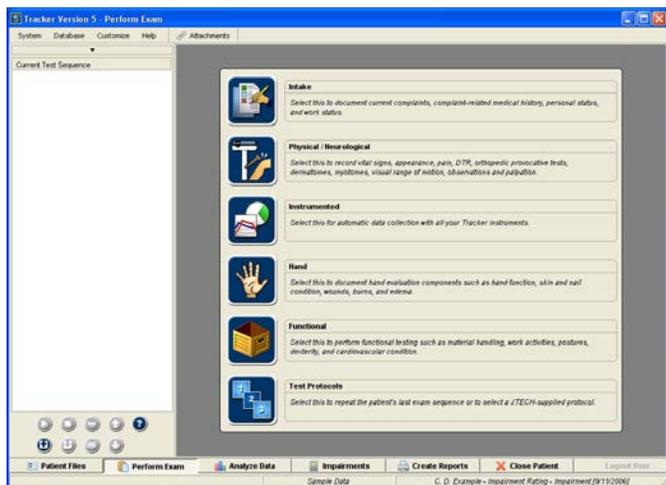
Perform Exam Organization
The Perform Exam window has two primary features: the exam selection buttons and the Exam Sequence Queue.

Exam Selection Buttons
Located in the center of the screen, the exam selection buttons are used to access components of the exam.

Exam Sequence Queue
Located on the left-hand side of the screen, the Exam Sequence Queue is used to organize and run the selected exam elements.

Using Exam Selection Buttons
The exam selection buttons function as follows:

1. Intake - Facilitates documentation of complaints, work status and complaint related medical history. See Intake (Chapter 5) for more information.
2. Physical - Includes sections for documenting vital signs, pain, orthopedic tests, sensory tests and more. See Physical (Chapter 6) for more information.
3. Instrumented - Features objective testing with automatic data collection using Tracker instruments. This section also allows you to enter information when using the optional Tracker Manual Data Entry module. (See chapters 8-10 on individual Tracker Instruments.)
4. Hand - This option is used to document hand and upper extremity evaluations. See Hand (Chapter 16) for more information.
5. Functional - This option provides documentation of functional capacity tests for work postures, work activities, material handling, dexterity, cardiovascular endurance and more.
6. Test Protocols - This options allows you to recall and apply the last exam sequence performed with the patient or to use a JTECH-supplied testing sequence if one is available for your system. (See the end of this chapter for more information.)
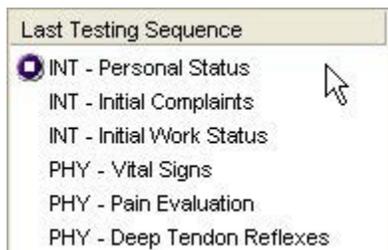
How exam elements are displayed in the queue.

Exam Sequence Queue Operation
The Exam Sequence Queue is a very powerful part of Tracker Version 5 Software. It helps make the examination process more efficient and easily repeatable.

Placing Elements into the Queue

Exam elements are placed into the queue as you select them from the Intake, Physical, Instrumented, and Functional sections. You can then click a single button to have the software automatically walk you through the sequence. You can also click on an individual item in the queue to open that documentation screen.

Queue Button Functions

Below the queue is a group of buttons that control the queue operation. From left to right the function of the top row of buttons is:

Play - Starts the automatic progression through the items in the queue. The play button is also used to restart the sequence if it is stopped or paused. Using the play button skips any instrumented testing items that have been completed.

Stop - This button stops the automatic progression through the exam sequence.

Delete - This button deletes highlighted items from the queue. Use the mouse to highlight a single item or a group of items, then press the delete button.

Move Up - Use this button to reorganize items in the queue. To move an item up in the queue, highlight it and click the Move Up button until the item is in the correct position.

Help - Click this button for more information.

Second row, left to right:

Load Sequence - This button is used to load saved exam sequences into the queue.

Save Sequence - This button is used to save the exam sequence in the queue for reuse with the patient or other patients.

Clear - Clears all items from the queue.

Move Down - Highlight an item in the queue and click this button to move it down in order.

ⓘ Notice: When the play button is clicked, it turns into a pause button. Pausing the sequence allows you to add or rearrange items then continue with the sequence.

Saving an Exam Sequence

If you have created an exam sequence in the queue that you would like to reuse at a later date with the current patient or with other patients, click the Save Protocol button.

❶ Notice: You can change an exam sequence from Patient Specific to Global, or vice versa, by opening the exam sequence protocol and re-saving it.

❶ Notice: If you modify a JTECH-supplied protocol, you can save it as test sequence for future application using the instructions below.

1. At the Exam Sequence screen, type a name into the Name field.
2. Select Global or Patient Specific under Type. Global allows you to use the test sequence with any patient. Patient Specific only allows you to use the sequence with the same patient.
3. Click the Save button.

Loading an Exam Sequence

Click on the Load Sequence button to open a selection screen.

1. Select Global or Patient Specific under Type to see the available exam sequences.
2. Highlight a name in the list.
3. Click the Load button to place the items associated with the sequence in the queue.

❶ Notice: You can load multiple exam sequences into the queue for expanded evaluations, such as a cervical and a lumbar sequence.

Deleting an Exam Sequence

You can remove an exam sequence from the list in either the Save or Load Exam Sequence screens by highlighting the exam sequence and clicking the Delete button.

Protocols Button

Test Protocols

Select this to repeat the patient's last exam sequence or to select a JTECH-supplied protocol.

The Protocols button provides an easy way to perform a repeat or serial exam and to use test sequence guides developed by JTECH Medical. When you click the button, the Protocols Selection form is displayed.

On the left side of the form is are buttons that allow you select either the repeat exam function (Repeat button) or a protocol category, if JTECH protocols are installed on your system.

Repeat
Repeat is the default selection. Click the Start Protocol button and the last exam sequence used with the currently selected patient is loaded into the Exam Sequence Queue. You can perform the sequence as displayed or edit the sequence using the Exam Queue functions.

JTECH Protocols
If JTECH test sequence protocols are installed on your system, category buttons will be active below the Repeat button.
1. Select a protocol category button to display a list of pre-programmed test sequence protocols in the form's Protocol box.
2. Highlight a protocol in the list and a brief summary of the protocol is displayed in the Protocol Description box.
3. Click the Start Protocol button to load the pre-programmed test sequence into the Exam Sequence Queue.

ⓘ Notice: Once a pre-programmed test sequence is loaded into the queue you can add, remove or change the order of elements using the queue functions. You can save the edited exam sequence for future use, but it must be recalled into the queue using the Load Sequence button function instead of the Protocols button.

4. Use the Exam Sequence Queue Play button to begin the exam sequence.

ⓘ Notice: Test Sequence Protocols from JTECH are provided as guides and cannot account for specific patient conditions, symptoms or diagnoses and should not be considered a testing prescription. Your clinical judgment is important in determining appropriate tests based on the patient's presentation and your clinical decision-making requirements.

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Chapter 5

Intake

Intake
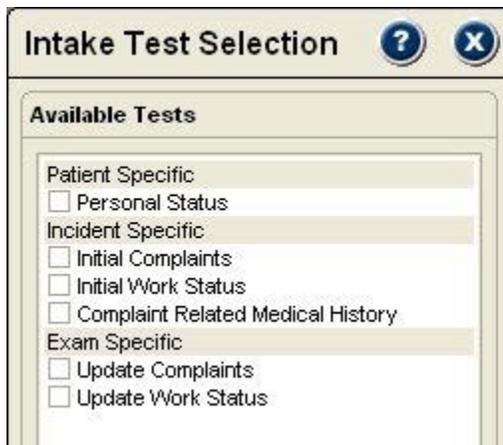
The Intake button is used to access data entry screens for personal status, complaints, job status, and complaint related medical history.

Selecting Intake Sections
When you click on the Intake button, the Intake Test Selection window is displayed.

1. Click on the item or items you want to document. To select a group, click on the header.
2. To open the item, double click on the item in the Exam Queue or click the Play button.

ℹ Notice: You can place items from Intake into the Exam Queue along with items from the Physical and Instrumented sections, then "play" them as an exam sequence to streamline the exam process.

Patient Specific

This item is used to document Personal Status information, such as marriage status, education level, and habits. Personal Status data is maintained at the patient level, so it is available for future incidents, exams and reports.

ℹ Notice: Only items with information are included in narrative reports.

1. To document any of the Personal Status information, click on the drop-down arrow.
2. Highlight your selection from the list.
3. To remove an entry, click the drop-down arrow and select the "blank" space at the top of the list.

Incident Specific
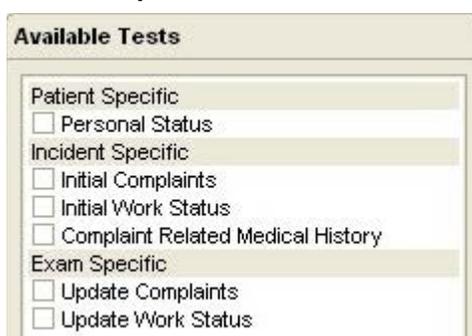
This item is used to document the patient's complaints (reason for examination), work status and complaint related medical history. This information is maintained at the incident level so it is available for future examinations and reports.

ℹ Notice: Only items with information are included in narrative reports.

Editing Lists

Many of the documentation forms in Tracker Version 5 provide check box and drop down lists that you can edit to meet your needs.

1. Click on the Edit button located in the upper right-hand corner of pages with editable text.
2. Select the category from the List Type drop-down.
3. Click the "Add" button to activate the <new item> option and type the item name as you want it to appear in the list and in reports.
4. Click "OK" to save and exit the screen.

To delete items from the list, highlight the item and click to "Delete" button.

Rearrange items in the list by highlighting the item and moving it up or down with the "Arrow" buttons.

Items in checkbox lists can be sorted alphabetically by clicking the "Sort Alphabetically" button.

The "Reset to Default" button removes changes and returns the list to the factory supplied version.

Initial Complaints

This item is used to document the patient's description of the complaint, location, severity, aggravating and relieving factors. The chief complaint plus up to three secondary complaints can be documented. Secondary complaint options are not available until an entry is made in the Chief Complaint field.

Description, Location and Notes are text fields. Place the cursor in the field and type in data. Use the "Enter" key and "Space" bar like a word processor. The "Tab" key advances to the next item.

Symptom Descriptors are entered using drop-down combo boxes. Click on the arrow and highlight an item from the list.

Other Factors/Qualifications are entered by clicking on the Check box beside the factor. You can click up to 10 boxes.

Initial Work Status
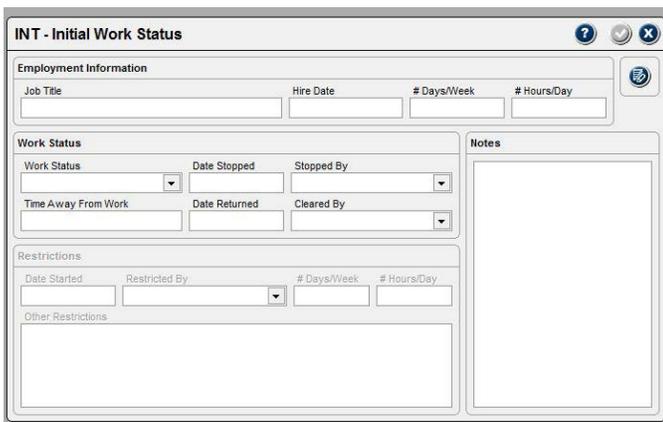
This item is used to document the patient's work status resulting from the complaint.

Employment Status information is entered into short text fields. Place the cursor in the field and type in the data. Use the Tab key to advance to the next field.

Work Status uses both short text fields and drop-down boxes for data entry. For text fields, place the cursor in the field and type in the data. For drop-down boxes, click on the arrow and highlight an item in the list. Drop-down boxes with an Add button allow you to add items to the list.

Restrictions is only available if either "Full-Time Restricted" or "Part-Time Restricted" is selected in Work Status. All data is entered in text fields, except "Restricted by."

Complaint Related Medical History

This item provides a means of documenting over-the-counter medications, prescriptions, examinations, surgeries, etc. that the patient has used to seek relief for the condition.

❶ Notice: Information is entered in the same manner for all items in Complaint Related Medical History.

1. Click on the button for the item to document, such as OTC Medications.
2. To add an item to the list, click on the Add button.
3. When the Add button is clicked, the cursor is placed in the data entry fields and "New Item" is displayed. Type in the data and use the Tab key to move to the next field.
4. Use the above process to add as many entries as necessary.
5. To delete an entry in any of the Complaint Related Medical History sections, highlight the entry in the list and click on the Delete button.

Exam Specific

These items allow you to update the patient's complaints and work status if they have changed since the last exam. These items are maintained on the exam level, so they are only available for current exam reports.

Update Complaints

This item allows you to update complaint status for each complaint entered. The screen displays initial complaint status and a listing of complaint updates. "Updated Status" and Notes are the only areas that can be changed.

1. Under "Updated Status," click the drop-down box arrow of the item to update and highlight the new descriptor from the list.

2. To add items to a drop down list, click on the Edit button, select the list type, click the Add button, enter the new item, and click "OK."

Update Work Status

If the patient's work status has changed since the last examination, use this item to update information. The top field shows the initial work status and any documented changes to the patient's work status. Work status changes are documented using fields in the "Work Status" and "Restrictions" areas.

Work Status uses both short text fields and drop-down boxes for data entry. For text fields, place the cursor in the field and type in the data. For drop-down boxes, click on the arrow and highlight an item in the list. Drop-down boxes with an Add button allow you to add items to the list.

Restrictions is only available if either "Full-Time Restricted" or "Part-Time Restricted" is selected in Work Status. All data is entered in text fields, except "Restricted by." Use the Add button to add items to the "Restricted by" list.

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Chapter 6

Physical/Neurological

Physical/Neurological

The Physical/Neurological section is used to document findings such as vital signs, pain, outcome questionnaires, deep tendon reflexes, sensory perceptions, orthopedic tests, palpation and visual examination for range of motion.
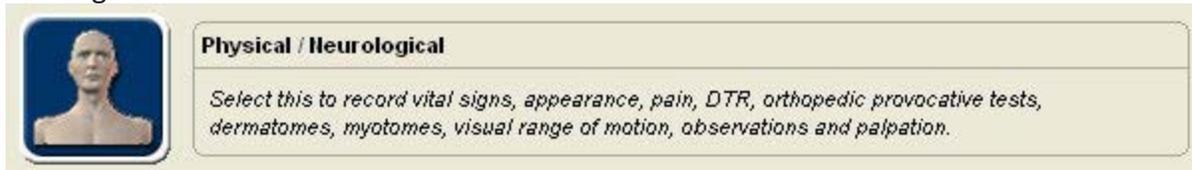
1. To access the Physical/Neurological section, open Perform Exam and click on the Physical/Neurological button.
2. The selection form is divided into two categories: physical and neurological. Select the items by clicking on the "header" to select all its items or click on the box beside individual items.

ℹ Notice: When items are selected, they are placed in the Perform Exam Queue where they can be "played" or arranged with other items for a broader examination.

3. "Deselect" items in the queue by clicking the header, the item's check box or by using the queue's delete buttons.

Vital Signs

This section is used to document the patient's height, weight, blood pressure, pulse, respiration and temperature.

1. Place the cursor in a field and type in the information. Use the Tab key to advance through the fields.
2. To change the units (such as inches to centimeters for height) or other settings, click on the units label.

Pain

This section is used to document the patient's pain complaints in a manner similar to a pain drawing and a visual analog scale.

Pain Drawing

1. Click on the description that matches the patient's pain complaint.
2. Place the cursor at the location of the patient's pain on the anterior or posterior pain model. Click and hold the mouse button while dragging the cursor over the affected area.
3. You can repeat steps 1 and 2 until the pain drawing matches the patient's pain complaint.
4. Use the Delete All button to clear the drawing.

Visual Analog

This area of the Pain dialog allows you to record the patient's perception of the pain at different times.

1. Click and hold the slider graphic and slide it to the desired level or
2. Place the cursor on the bar above the number and click the mouse to advance the slider.

General Appearance

This section provides cursory documentation of the patient's presentation.

1. Drop-down combo boxes allow a single selection from the list. To add a selection, click on the Add button.
2. The areas in the form with check boxes allow multiple selections. Click on a check box to select an item. Click on the Add button to add items to the list.

Questionnaires

This section is used to score and document the results of outcomes questionnaires administered with the patient. Tracker Software does not include the actual questionnaires because they are copyright protected.

1. Use the tabs across the top to select the category of the questionnaire.
2. Enter the values for the sections of the questionnaire.

ⓘ Notice: Some extremity questionnaires require that you click on the left or right button to designate the side.

3. Enter comments about a questionnaire in the Notes field at the bottom of the questionnaire.

ⓘ Notice: A scroll bar on the side of the Questionnaire dialog indicates additional information or additional questionnaires are available.

Setup Button

The "Setup" button allows you to see scoring information and the introductory statement that accompanies the questionnaire score in narrative reports.

1. Place the cursor in any of the questionnaire's fields.
2. Click the "Setup" button.

Orthopedic Tests

Orthopedic tests are selected by anatomical region, such as the neck or shoulder. The form allows you to create and use test sequences and to recall the last exam for fast, convenient test selection.

Individual Tests

1. Click the Plus button to open an orthopedic test.
2. Select the Region and Test Name from the drop-down menus. Test data is displayed in the item list at the bottom of the form.

ⓘ Notice: Information on performing the test is displayed in the Description/Information box.

3. Document test results using the Result drop-downs. Bilateral tests have left and right results, unilateral tests have a single result.

ⓘ Notice: You can edit the Result drop-down list using the List Item button in the upper right-hand corner of the form.

4. To enter test notes, click on the Notes/Comments field.
5. To document another test, click the Plus button and complete steps 2-4. Repeat as many times as necessary.
6. When you are finished, you can click the Check button to save and exit the form or you can save the list of tests as an Orthopedic Test Sequence for future use before exiting. See below for information on Orthopedic Test Sequences.

To add test result list items, click the Plus button and type in the item name. Use the Up and Down arrows to arrange items in the list. Highlight an item and click the Minus button to delete it from the list.

Orthopedic Test Sequences

Orthopedic test sequences allow you to arrange tests in groupings that you use often based on any criteria you choose. You can create specific sequences or save a sequence following a patient examination.

Creating Test Sequences

1. Add tests to the list using instructions for individual tests.
2. When the list is complete, click the Down Arrow button in the lower right-hand portion of the form.
3. At the Save Orthopedic Test Sequence form, type a name into the Test Sequence Name box.
4. Click the Save button the save the sequence.

ⓘ Notice: You can delete sequences from the list by highlighting the name and clicking the Minus button.

6.4

Using Orthopedic Test Sequences

Tracker Version 5 Software gives you great flexibility when uploading orthopedic test sequences. For example, you can upload a single sequence or you can upload multiple sequences. You can even open and perform several individual tests then upload a test sequence.

1. To upload a test sequence, click the Up Arrow button.
2. At the Load Orthopedic Test Sequences form, highlight the sequence in the list and click the Load button. Repeat the procedure to load additional sequences.
3. Click on a test in the list to document results.

Recall Last Exam

Tracker's unique "Recall Last Exam" feature provides a very quick way to document follow-up examinations. When you click the Recall Last Exam button, all the Orthopedic tests and results from the patient's previous examination are loaded into the Orthopedic Tests form. You simply edit test results that have changed since the last exam and your documentation is complete.

ℹ Notice: You can use Recall Last Exam and add additional tests or test sequences, but you should always recall the last exam first as it will overwrite any duplicate tests.

Custom Orthopedic Tests

The custom test feature in Tracker Version 5 Software insures the tests you need are available. Creating custom Orthopedic tests is quick and easy

1. Click the Custom Test button in the Physical/Neurological Test Selection form.
2. At the Custom Test Manager form, select the Physical/Neurological button.
3. Click the Plus button to add a new orthopedic test.
4. In the Custom Test Manager form, enter the test's name.
5. Select the Region from the drop-down.
6. Check bilateral if the test has left- and right-side components.
7. Check Active to display the test for selection.
8. Enter descriptive information about performing the test in the Description field.
9. Click the Check button in the upper right-hand corner to save the custom test and exit.

Palpation

This section provides documentation of palpation performed around the spine regions.

1. When the form opens, click on a region button to select the area being palpated.
2. Use drop-downs to select results for Tone/ Hypertonicity, Tenderness, Trigger Points and Spinous Process Pain.
3. For Segmental Motion Restrictions, click on a field and type in results.
4. For repeat exams, click the Recall Last Exam button to load data from the previous exam. Edit changes since last exam to complete your documentation.
1. Click on the Check button to save and exit the form.

Amputation
This section is used to document extremity and digit amputation.

Upper Extremity

To document an upper extremity amputation:

1. Click on the button for the side where the amputation occurred.
2. Click on a check box corresponding to the amputation level.
3. For greater precision in amputation level, click on the Impairment Details field and type up to 50 characters of description.

Digits (Thumb and Fingers)

The digit amputation form is accessed through the upper extremity amputation form. It allows you to document amputation to any or all of the fingers and thumb.

1. Click on the button for the side where the amputation(s) occurred.
2. Click on the Digit button to open the digit form. Click on one check box per digit corresponding to the amputation level(s).
3. For greater precision in amputation level, click on the Impairment Details field below the digit and type up to 50 characters of description.

Lower Extremity

The lower extremity selection is used to document amputation from the pelvis through the toes.

1. Click on the button for the side where the amputation occurred.
2. Click on a check box corresponding to the amputation level.
3. For greater precision in amputation level, click on the Impairment Details field and type up to 50 characters of description.

Toes

The toe amputation form is accessed through the lower extremity amputation form. It allows you to document amputation to any or all of the toes.

1. Click on the button for the side where the amputation(s) occurred.
2. Click on the Toe button to open the toe amputation form.
3. Click on one check box per toe corresponding to the amputation level(s).
4. For greater precision in amputation level, click on the Impairment Details field below the digit and type up to 50 characters of description.

Range of Motion

This section provides a convenient means to document visual inspection of range of motion. You can use this screen to note where range of motion deficits are seen or suspected for further objective evaluation using an inclinometer or goniometer.

1. Click on the box for the joint or spine region with limited motion. Unilateral spine motions, such as flexion, only have one check box. Bilateral motions, such as left and right elbow flexion, have a check box for each side.

To select both sides for a bilateral test, click on the test name.

To select all the motions for a side, click on Left or Right.

Deep Tendon Reflexes

This section provides convenient documentation of the patient's deep tendon reflexes (DTR). You can document responses on both sides, or just one. The legend provides information on how tests are scored in Tracker Version 5 Software.

1. Click on the drop-down arrow for the test you want to score.
2. From the list, click on the score.
3. To clear a score, click on the drop-down arrow and select the blank portion of the list.

❶ Notice: Only scored tests appear in narrative reports.

Sensory

This section is used to document sensory testing of dermatomes, cutaneous sensation and digit sensory nerves.

Dermatomes

Nerve root dermatome sensation for the upper extremities is documented by selecting Sensory, then upper from the Physical Selection list, and clicking on Dermatomes at the Sensory screen.

1. Click on the button for the side being evaluated.
2. Click on the Evaluation button or the Impairment button.

❶ Notice: Impairment allows you to grade the sensation according to the American Medical Association's (AMA) *Guides to the Evaluation of Permanent Impairment.*

3. Click on the drop-down to select how sensation was evaluated. This option is not available if impairment was selected.
4. Click on a color that represents the patient's sensory response.
5. Move the mouse over the area in the graphic and click.

❶ Notice: You can "paint" areas by holding down the left mouse button and dragging

❶ Notice: The root level is displayed when you move the cursor over an area.

6. To clear a result, click on "Not Tested" then move the mouse over the area and click.

Cutaneous

Select the Cutaneous button from the Sensory Selection screen.
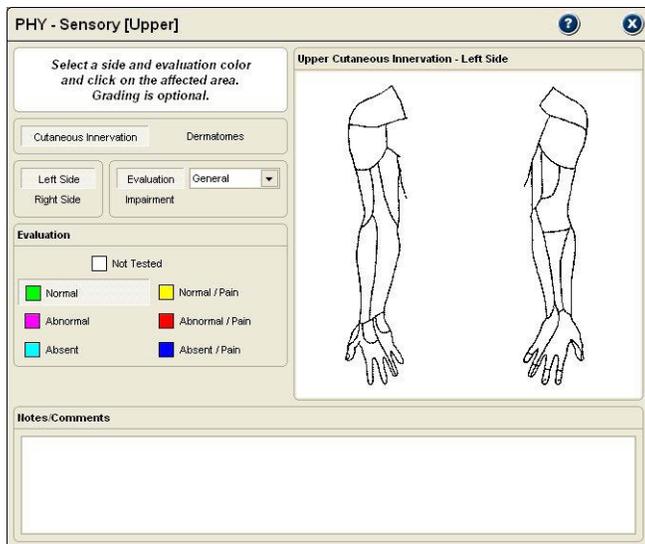
1. Click on the button for the side being evaluated.
2. Click on the Evaluation button or the Impairment button.

Note: Impairment allows you to grade the sensation according to the AMA *Guides to the Evaluation of Permanent Impairment.*

3. Click on the drop-down to select how sensation was evaluated. "General" provides a quick method of documentation. This option is not available if impairment was selected.
4. Click on a color that represents the patient's sensory response.
5. Move the mouse over the area in the graphic and click. To "paint" multiple areas, hold down the left mouse button and drag the cursor over the areas. The peripheral nerve is displayed when the cursor is over an area.
6. To clear a result, click on "Not Tested" then move the mouse over the area and click.

Hand Sensory Testing
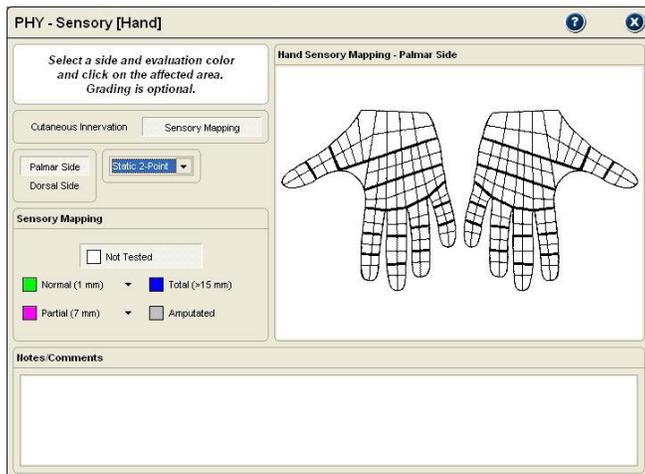
The Hand Sensory screen provides sensory mapping of the hand using two-point discrimination (impairment rateable), moving two-point discrimination and monofilament testing.

❶ Notice: The documentation screen displays both the left and right hands. Instead of the side, you must select the dorsal or palmar surface. The default is palmar.

1. Click Palmar or Dorsal surface under "Side."
2. Click on the drop-down arrow under "Mapping" to select the evaluation method (Static 2-Point, Moving 2-Point or Monofilament).
3. Click on the color related to the evaluation result. Colors with more than one 2-point width or monofilament size have a black down arrow and display a menu list when you click on the color. Select the size from the list.

❶ Notice: You can also select width and tip sizes by right clicking on the hand graphic and selecting from the resulting list.

4. With a color selected, click on an area of the hand graphic to fill it. To "paint" multiple areas with the same color, hold down the left mouse button and drag the cursor over the areas.

❶ Notice: To see the value assigned to a filled hand "section," move the cursor over the section and the value is displayed.

Myotomes

This section offers a quick method for documenting cursory muscle strength tests. You can use this screen to note where a hands on test or patient report indicates muscle weakness for further objective evaluation using the Tracker muscle testing dynamometer.

1. Click on the box for the motion identified by hands on testing or by patient report as being weak. Unilateral motions, such as cervical flexion, only have one check box. Bilateral motions, such as elbow flexion, have a left and right check box.

To select both sides for a bilateral test, click on the test name.

To select all the motions for a side, click on Left or Right.

Chapter 7

Instrumented Testing
Instrumented

The Instrumented section is used to collect objective testing data with JTECH proprietary instruments. It is also used if you have the Manual Entry module and collect data with a non-computerized device.
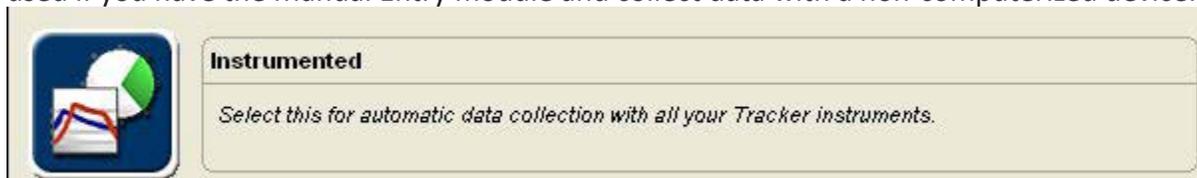
1. Click on the Instrumented button and the instrument selection buttons appear above the Exam Sequence Queue.

Instrumented Button Selections

Grayed-out instrument buttons indicate that the module is not enabled with your Tracker System. If a module you own is not available, contact JTECH Customer Service.

The instrument buttons are as follows:

Inclinometry - Select tests for evaluating range of motion of the spine and extremities, excluding hands, using inclinometry protocols.

Goniometer - Select tests for evaluating extremity and hand range of motion with goniometer protocols.

Muscle Testing - Select tests for evaluating muscle strength using a dynamometer and traditional grading.

Grip - Select tests for evaluating grip strength and consistency of effort.

Algometry - Select tests for pressure pain thresholds and tolerance, such as for evaluating fibromyalgia.

Pinch - Select tests for evaluating pinch strength using a pinch dynamometer.

Static Strength Testing - Select tests for NIOSH static lifting, pushing and pulling.

IsoTrack Pro - Provides the ability to test and document isometric muscle tests, lift tests, push tests and pull tests.

Multimedia Help System
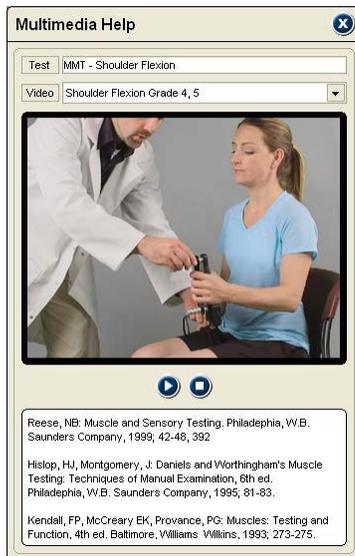
The Tracker Version 5 Multimedia Help System provides video and audio instructions for each test included in the Instrumented and Functional Testing sections of the software. Multimedia Help files are opened for specific tests from the testing screen using the Multimedia Help button at the top of the screen.

1.   From a testing screen, click on the Multimedia button.
2.   The top field displays the test name for the Multimedia Help. The second field shows the video that is queued up to play (many tests have more than one video available). Click on the drop-down arrow to select other available videos.
3.   To play the Multimedia Help, click on the Play button below the video display area.
4.   To stop the video, click on the Stop button.
5.   The bottom area includes references for the test protocol.
6.   To exit the Multimedia Help System, click the Close button at the top right of the screen.

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Chapter 8

Inclinometry

Inclinometry

This Instrumented section is used to evaluate range of motion of the spine and the large extremities. Standard range of motion protocols provided with Tracker Software are published in the *Guides* to the Evaluation of Permanent Impairment, 5th edition and *The Practical Guide to Range of Motion Assessment*, both published by the American Medical Association.

Selecting Inclinometry ROM Tests
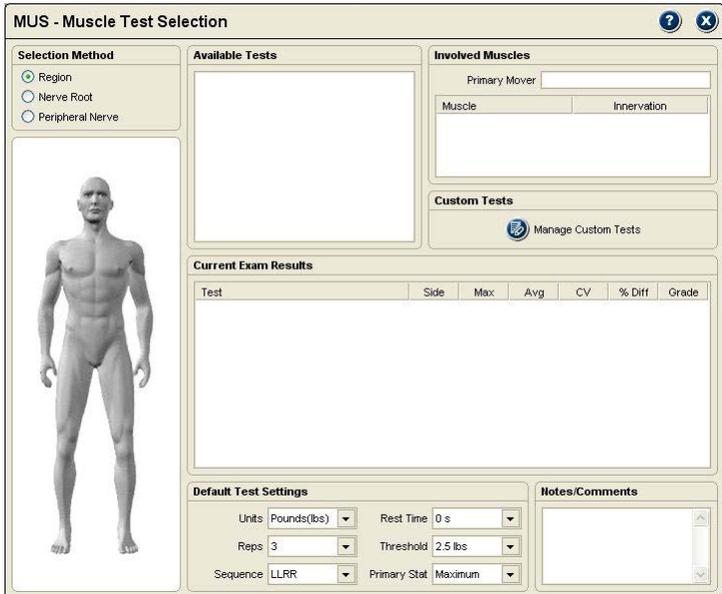
1. Click on the Inclinometry button under Instrumented Categories.
2. Click on an anatomical region on the Test Selection Model, such as the shoulder or center of body for spine tests.
3. Tests for the selected anatomical region are displayed in the Available Tests window. Click on the item header to place all associated tests in the Perform Exam Queue or on a box to select an individual tests.

   ❶ Notice: You can perform individual range of motion tests as you place them in the Exam Queue or you can add other exam items to build a test sequence. You can then perform the entire test sequence with the patient.

4. Items can be "deselected" by clicking the header to remove associated items, clicking the check box for individual items, or by using the queue's delete buttons.
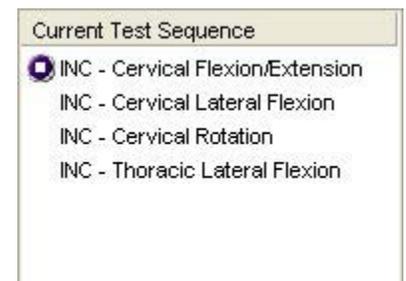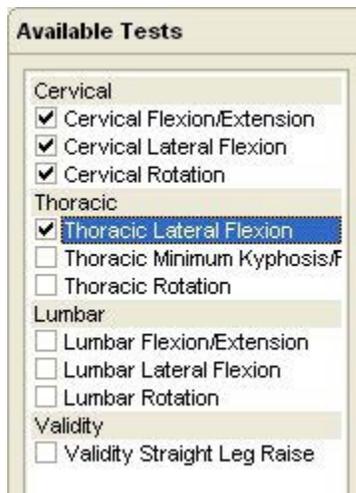
❶ Notice: Move the cursor over an anatomical region to highlight and click to select.

❶ Notice: Checks indicate tests are selected from the Available Tests list.

❶ Notice: Tests as they appear in the queue.
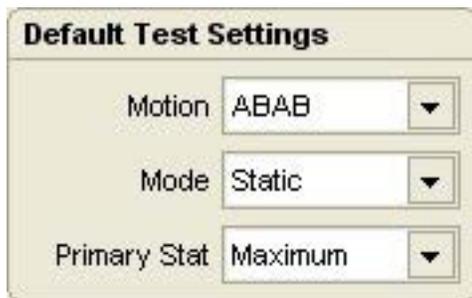
8.2

Default Settings

The default settings at the bottom of the Inclinometry Selection screen are used to control various aspects of the testing process. There are three inclinometry default categories: general default settings, spine settings and extremity settings.

General Default Settings

Motion: This controls the sequence of agonist/antagonist tests, such as Cervical Flexion/Extension. This allows you to select alternating test repetitions, which significantly speeds up spine ROM measurements, or to complete all reps for one motion before starting the next.

Mode: This controls the inclinometry test method used. Dynamic mode is used for dual inclinometry tests, especially in the spine, where the subject can reach the anatomical neutral starting position. Static is used with single inclinometry tests of spine ankylosis and large extremity joints.

Primary Stat: This allows you to use either the maximum value from the repetitions, required for impairment rating, or the average for statistical calculations and comparisons.

Spine Defaults
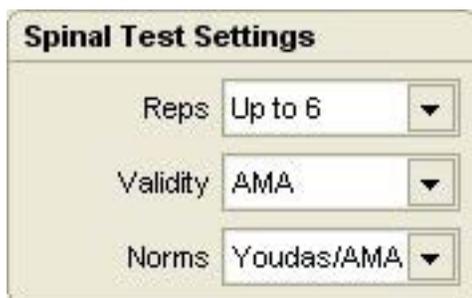
Reps allows you to set the maximum number of test repetitions.

Validity allows you to choose a validity criteria for Spine ROM tests.

AMA requires that three consecutive repetitions fall within 5° or 10%, whichever is greater, of the mean for test validity (AMA *Guides*, 5th edition; 399). AMA Validity sets Reps to "Up to 6," as the AMA *Guides* allow up to six repetitions to meet the validity requirement.

CV uses coefficient of variation, with a CV of 14% or less considered consistent. CV calculation requires at least two repetitions and allows a maximum of three.

None imposes no validity criteria.

Norms sets the normative value comparison. AMA is based on the AMA *Guides*, 5th Edition. Youdas/AMA uses age/gender adjusted norms published by Youdas, et al for cervical ROM and AMA norms for thoracic and lumbar. None applies no norm comparison.

Extremity Defaults

Mode: Allows you to choose static or dynamic testing modes. Static uses a single inclinometer for testing much like a goniometer and is the recommended mode. Dynamic tests use dual inclinometry protocols and require strapping the inclinometers to the extremity. Dynamic tests cannot be performed if the patient is unable to move the joint to the neutral position.

Reps: For most extremity measurements a single repetition is adequate. However, the *Guides* 5th edition recommends using three repetitions when measuring motion for impairment rating.

Side: Allows you to perform bilateral measurements or to only measure range of motion for one side.

Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

When MDE screens are opened, the cursor is placed in the first data box according to the settings (A or B, Left or Right) you have chosen for defaults. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

Spine ROM Testing Screen

The Inclinometer Testing Screen is virtually the same for all spine motions. This section of the manual provides a general overview of the software's operation.

ⓘ Notice: At the top right of the testing screen, are the battery status indicators for each active instrument.

Green - full charge

Yellow - 20 minutes left

Red - charge immediately

Place the cursor on a battery icon to see which instrument it represents.

Testing Screen Button Functions

This button at the top of the screen opens the Tracker Multimedia Help System that presents detailed information about subject positioning and instrument placement for all standard ROM tests.

This button provides context help related to the screen.

This button is used to close the screen and automatically save any changes to the data.

This button exits the screen without saving changes to the data.

This button identifies spine ankylosis, defined by the AMA *Guides*, 5th edition as "when an individual cannot reach the neutral (0°) position, the position or angle of restriction closest to neutral is considered the position of ankylosis or end-restricted movement."

This button is used to remove a single repetition.

This button is used to remove all repetitions for the test.

Battery Status

The battery status indicators are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

If the data transfer from an instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the area for total range and for one or both inclinometers. This prevents incorrect data from being displayed. If a data interruption occurs at the end of a repetition, you will not be able to use the Enter button until the system catches up.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the symbol at the left appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

To delete a repetition, highlight the repetition and click on the delete button. For spine range of motion tests, deleting all repetitions and restarting the test may be preferable.

Using Inclinometers

For most spine motions Tracker uses dual inclinometry protocols outlined in all editions of the AMA *Guides*. The exceptions are cervical rotation, straight leg validity test and measurements of ankylosis.

Inclinometer Orientation
The orientation of the inclinometers is important to achieving accurate, repeatable range of motion measurements. For positioning of inclinometers for specific tests, please see the Tracker Multimedia Help System.

1. Tracker inclinometers measure changes in motion relative to gravity. They should always be positioned so they move in the same rotational orientations as the arrows on the labels.
2. Do not tip the inclinometer more than 40 degrees from the vertical position when testing.
3. Always place the inclinometer marked "Primary" in the superior position, such as on the head for cervical flexion/extension.
4. Use the "Enter" foot switch for entering the neutral position and the end ranges of motion. This allows you to hold the inclinometers securely and reduce potential slippage.

Front view: Correct motion

Side view: Incorrect motion

Side View

Keep inclinometers in vertical plane when measuring ROM. Tipping the inclinometer (above right) can cause inaccurate measurements.

Using the Testing Screen
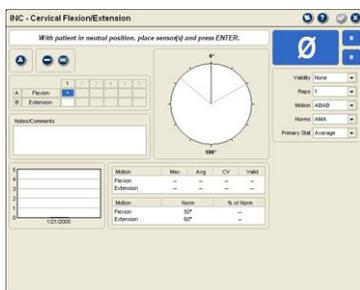
When you open the Inclinometer Testing Screen for most tests, the voice prompt asks you to enter the "neutral" position. The neutral position is the anatomical neutral or zero position, such as the point between flexion and extension, from which the motion is measured. See the Multimedia Help System for neutral positions of specific tests.

Collecting Data

Use these instructions for entering data for non-ankylosed subjects.

1. Position patient in neutral position.
2. Place inclinometers on the subject.
3. Click the "Enter" foot switch or "Enter" button on the Primary inclinometer to zero the inclinometer in the neutral position.
4. Have patient move to end range of motion. Which motion is measured first depends on the "Motion" default selected.
5. At the end range, click "Enter" foot switch or button to record the angle.
6. If ABAB or BABA are selected as the motion default, have the patient move in the opposite direction to the maximum end range of motion, such as going from flexion into extension, and click "Enter."

If AABB or BBAA are selected as the motion default, have patient move back to the neutral starting position, then back to the first motion end-point, such as flexion - neutral - flexion, and click "Enter."

Tip: With most spine ROM measurements you do not need to re-enter the neutral value. Two exceptions are thoracic minimum kyphosis/flexion and the validity straight leg raise.

7. Complete the required number of repetitions.

❶ Notice: If you selected AMA as the validity criteria, the software will continue prompting for repetitions until three consecutive reps are within 5° or 10% of the mean or until six repetitions have been completed.

		1	2	3	4	5	6
A	Flexion	42	40	42			
B	Extension	20	19	22			

As repetitions are completed, the data boxes are populated with the true range of motion.
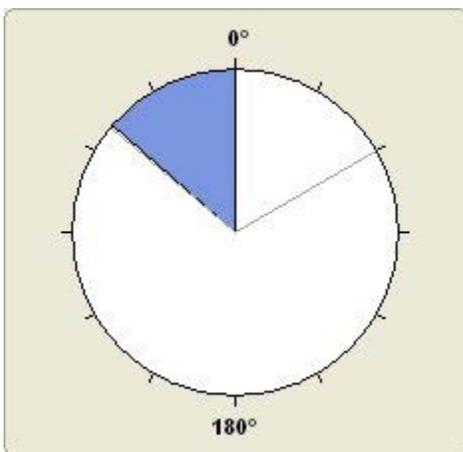
The angle graphic shows the true ROM in real time, with markers for the normal value.

True range of motion plus the Primary and Secondary values are displayed in real time.

Single Inclinometer Measurements

Cervical rotation, the validity straight leg raise, and ankylosis measurements are special circumstances where a single inclinometer is used for spine measurements.

Note: Be sure to use the Primary inclinometer when performing single inclinometry protocols.

Cervical Rotation and Validity Straight Leg Raise

These tests only use a single inclinometer. See the Tracker Multimedia Help System for testing protocols.

Spine Ankylosis

Spine ankylosis measurements are unique because the patient is unable to reach the neutral position. For ankylosis protocols, see the Tracker Multimedia Help System

ⓘ Notice: With ankylosis measurements, the Secondary inclinometer is not used.
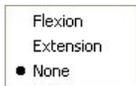
1. Click on the Ankylosis button to display the position of ankylosis list before attempting to measure the degree of ankylosis.
2. Click on the position of ankylosis in the list. If you inadvertently click the Ankylosis button, click on none.
3. Measure ankylosis according to the protocols in the Tracker Multimedia Help System.

ⓘ Notice: Ankylosis only requires one measurement. In the data boxes, the ankylosis measurement will include brackets <>.

		1	2	3	4	5	6
A	Flexion	<18>					
B	Extension						

Extremity Range of Motion

Extremity Range of Motion

Tracker Version 5 Software provides two methods for evaluating extremity range of motion using inclinometers.

Static: This method uses a single inclinometer and is similar to measuring range of motion with a goniometer. This is the method recommended by JTECH for its ease and efficiency.

Dynamic: This method uses protocols similar to measuring spine range of motion where the patient starts the test in the neutral position. The inclinometers should be attached to the patient with Velcro straps (provided).

❶ Notice: Click on the joint for testing and select the motions from the "Available Tests" list.

Ankylosis and Lag

For extremity range of motion measurements, the AMA defines ankylosis as "complete absence of motion of a joint" (*Guides*, 5th edition; 450). In addition to ankylosed joints, Tracker Version 5 Software allows you to measure and document joints that have motion, but are unable to reach neutral. In Tracker software, this condition is referred to as a "lag."

❶ Make sure the Mode default is set to "Static" in the Extremity Test Settings.

How to document ankylosis or lag measurements is discussed in the sections under static and dynamic range of motion.

Static Range of Motion

Static range of motion measurements are made using only the Primary inclinometer.

❶ Notice: For specific test protocols see the Tracker Multimedia Help System.

Alignment Rail

For most measurements the alignment rail should be attached to the inclinometer. Simply place the alignment rail on the bottom of the inclinometer and the inclinometer magnets will hold it in place. The rail makes aligning the inclinometer with anatomical landmarks easier and more accurate.

Primary inclinometer with alignment rail attached

Active and Passive Testing

Tracker Version 5 Software allows you to evaluate extremity motion both actively and passively. The default setting is for active range of motion, so you have to select passive.

1. Passive range of motion is measured by clicking on the Passive radio button
2. To measure both active and passive motions, complete the testing of the first type of motion (selected by radio button), then click the other radio button and test the second type of motion.

❶ Notice: When Auto Test Advance is turned on, the software allows only active or passive testing. To test both motions, turn the Auto Test Advance off.

Collecting ROM Data

Use the following instructions to collect data for standard range of motion tests.

1. Position patient as instructed in the Multimedia Help protocol.
2. Align or orient the Primary sensor as instructed in the Multimedia Help protocol and press "Enter." (See example A for testing wrist flexion.)
3. Move inclinometer to measurement position and press "Enter." (See example B for testing wrist flexion.)

Example A	Example B

Lag Button
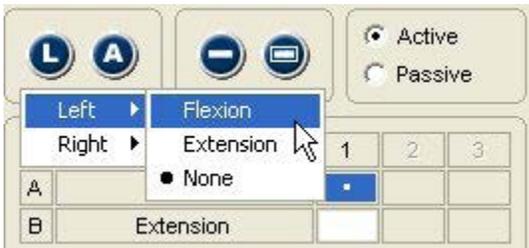
The "Lag" button is used when a joint is unable to reach neutral, but still has some available range of motion. For example, the Lag button would be used for a patient with -15 degrees of wrist extension and 80 degrees of wrist flexion. The -15 degrees indicates that the closest the patient can get to neutral position (with the wrist straight) is 15° of flexion.

1. Select the Lag button before entering the first "alignment" value.
2. With the Lag button selected, choose the side and motion from the resulting menus.
3. Perform range of motion tests according to Multimedia Help protocols.
4. Test results will display the selected motion results as a negative number.

Ankylosis
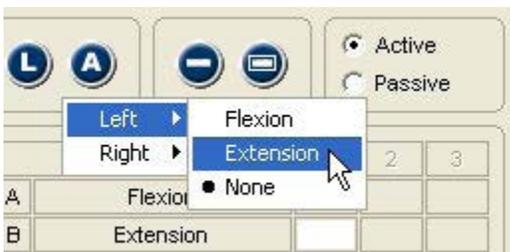
The Ankylosis button is used when an extremity joint is immobile. When a joint is marked as ankylosed, the opposite motion is not evaluated.

1. Select the Ankylosis button before starting the test.
2. Follow the Multimedia Help protocols, but only measure the position of ankylosis.
3. Range of motion results marked as ankylosed are displayed in brackets <>.
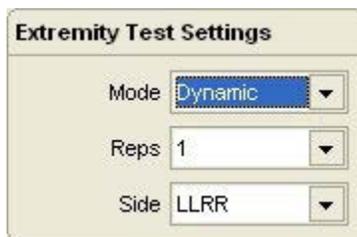
8.10

Dynamic Range of Motion

Dynamic range of motion measurements can only be used when the patient is able to reach neutral. When Dynamic mode is selected for extremity testing the Lag and Ankylosis buttons are disabled at the test screen since neither condition allows the patient to reach the neutral position.

ℹ Notice: Dynamic protocols may use one or both inclinometers, depending on the neutral position and stabilization of the extremity joint being evaluated. See the Tracker Multimedia Help System for individual test protocols.

Active and Passive Testing

Dynamic range of motion allows you to evaluate both active and passive motion. The default setting is for active range of motion, so you have to select passive.

1. Passive range of motion is measured by clicking on the "Passive" radio button
2. To measure both active and passive motions, complete testing of the first type of motion (selected by radio button), then click the radio button and test second type of motion.

ℹ Notice: When Auto Test Advance is turned on, the software does not allow both active and passive joint testing. You can test either active or passive.

Collecting Dynamic ROM Data

Use the following instructions to collect data for standard range of motion tests.

1. Position patient as instructed in Multimedia Help protocol.
2. Attach and/or position inclinometers as instructed in Multimedia Help protocol and press "Enter" to establish the neutral or zero position.
3. Have patient move, or move the patient's extremity for passive motion, to the end range and press "Enter."

Inclinometer attached at wrist with Velcro strap for dynamic range of motion testing.

Custom Tests
Managing Custom Tests

Tracker Version 5 software allows you to create and use custom inclinometry protocols for spine and extremity testing. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the inclinometry Test Selection form.

1. When the Custom Test Manager form is displayed click on the Inclinometry button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Inclinometry Tests
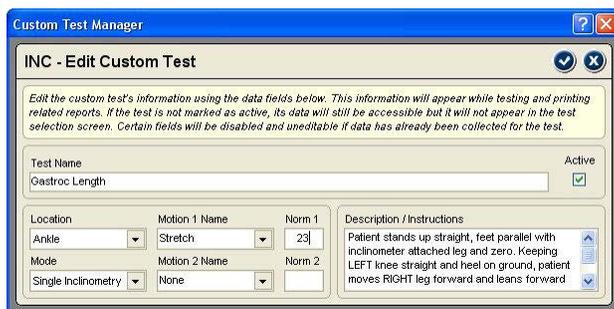
Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A custom test data form is displayed for entering parameters for the custom test.

Test Name - Enter a unique name for the test that will be displayed in test selection form and on reports.

Active - Click this check box to make the custom test active so it is displayed in the test selection form. Uncheck this box to keep the test available in your database, without displaying it in the test selection form.

Location - Select from the drop-down list to place the test within an anatomical region.

Mode - You can select either single inclinometry or dual inclinometry from the drop-down list.

Motion 1 Name - You can select from the drop-down list or enter a unique term, such as stretch or length for functional tests. Both Motion 1 and Motion 2 must be completed to save the test.

Motion 2 Name - Select the antagonist motion to motion 1 from the drop-down list or enter a unique term. This item must be completed to save the test.

Norm 1 and Norm 2 - If a normal range of motion value is established, click on the box and type it in. If a norm value is entered, the software will automatically calculate percent of norm in the test form and for reports.

Description/Instructions - Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

> Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

Chapter 9

Muscle Testing

Muscle Testing

This Instrumented section is used to evaluate motor deficits and loss of muscle strength. Loss of strength can be associated with neurological dysfunction at the nerve root or peripheral nerve levels and with injury or disease to the muscle.
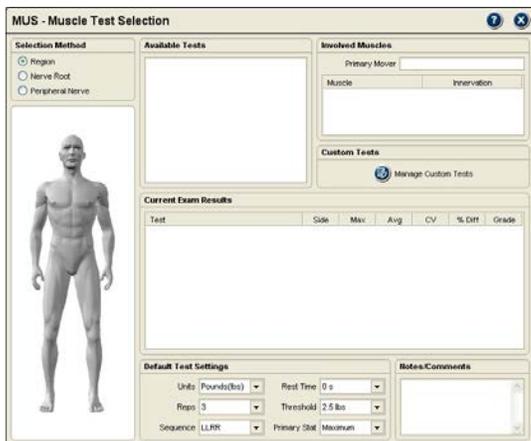
Traditionally, a subjective number grade is assigned to muscle tests, and it is still used in the AMA *Guides* for rating motor and strength deficit impairments. While Tracker Software allows you to grade tests, the wide range of muscle strength included within a grade 4 (partial to full resistance) limits its usefulness to identifying only significant motor weakness. Tracker dynamometer muscle testing, on the other hand, provides an objective way to discriminate even subtle losses in strength and effectively track changes in strength over time.

The torque curves generated by Tracker Software provide a wealth of information about the muscle test. The "ramping" or rate of rise of the patient's force helps identify how quickly the muscle generates force (proprioceptive response). Force curves can also be used in evaluating the patient's ability to sustain a contraction and in determining the patient's level of effort.

Selecting Muscle Tests
Tracker Version 5 Software provides three methods for selecting muscles tests depending on the reason for testing. Regardless of how tests are selected the actual test, elbow flexion for example, is the same.
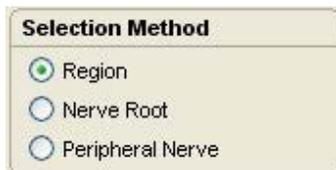
Region

Region allows you to select tests based on anatomical location and joint motion. It is the most commonly used method for selecting tests.

1. Select the Muscle Testing button at the Perform Exam screen.
2. Make sure the Region radio button is activated under Selection Method.
3. Click on the joint for testing on the muscle testing model. For scapular, cervical and trunk muscle tests, move the cursor over the middle of the model and click on the highlight.
4. After clicking on the joint, select the test or tests you want to perform from the Available Tests list. Click on the header to select all the tests or on the box to select individual tests.
5. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.

Click on joint for testing, then select the motion for testing from the Available Tests list.

Nerve Root

This option allows you to select tests based on a specific spinal nerve root. Two key uses of this method are evaluating strength loss from an electrodiagnostically identified nerve root lesion (for impairment rating) and for evaluating a nerve root distribution to aide in diagnosis or to establish the need for more advanced testing procedures.

Because of the redundant nature of the human nervous system, some muscle tests are available for more than one nerve root. For more specific identification of nerve root level and motor function, see the AMA *Guides*, 5th edition.

Select the nerve root level using the spine graphic, then muscle tests from the Available Tests list.

1. Select the Muscle Testing button at the Perform Exam screen.
2. Make sure the Nerve Root radio button is activated under Selection Method.
3. From the "spine" graphic, click on the nerve root level for testing. The nerve root level is displayed as you move the cursor over the spine graphic.
4. After clicking on the root level, select the test or tests you want to perform from the Available Tests list. Click on the header to select all the tests or on the box to select individual tests.
5. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.

Peripheral Nerve

This option allows you to see and select tests associated with specific peripheral nerves. Like the nerve root selection method, it facilitates test selection when a peripheral nerve lesion is identified through other diagnostic procedures and for diagnosing loss of motor function due to peripheral nerve dysfunction.

Select the peripheral nerve from the list, then muscle tests from the Available Tests list.

1. Select the Muscle Testing button at the Perform Exam screen.
2. Make sure the Peripheral Nerve radio button is activated under Selection Method.
3. From the Peripheral Nerve list, click on the peripheral nerve for testing.
4. After clicking on the peripheral nerve, select the test or tests you want to perform from the Available Tests list by clicking on the box next to the test.
5. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.

Additional Test Selection Information

When a test is highlighted in the Available Tests box, information about the involved muscles and innervation are displayed in the "Involved Muscles" area. The key muscle responsible for the motion is displayed in the Primary Muscle field. Some tests, however, do not have a primary mover. Additional muscles involved in the motion are displayed in the field below.

Muscle Testing Defaults

At the bottom of the Muscle Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Shows force values in terms of pounds, kilograms force or newtons.

Reps: Sets the number of repetitions per muscle test from 1-4. At least two repetitions are required for coefficient of variation (CV) calculation.

Sequence: Allows you to control the sequencing of side-to-side comparison tests. The LLRR setting performs the test's left side repetitions then moves to the right, while LRLR alternates between left and right until repetitions are complete.

Rest Time: Sets the software to automatically count down a rest period between repetitions.

Threshold: Sets the baseline that must be crossed for the software to begin collecting data for the repetition. This allows for placement of the muscle tester without inadvertently beginning a test.

Primary Stat: Determines whether the maximum force from the repetitions or the average of the repetitions is used for statistical calculations, such as bilateral difference and CV.

Zero Calibration

Tracker Version 5 software prompts for zero calibration every 24 hours. Zero calibration helps insure the accuracy of data collected by accounting for temperature changes and "electronic" drift that affect electronic measuring instruments.

1. When the zero calibration screen appears, turn the muscle testing dynamometer upside down so there is no weight on the testing pad.
2. Click the "Zero" button.

⚠ If your muscle testing dynamometer does not zero calibrate or if zero calibration values fluctuate more than 5% from previous calibrations, contact JTECH Customer Service. Testing with an uncalibrated device may result in inaccurate muscle testing data.

Muscle Testing Screen Features
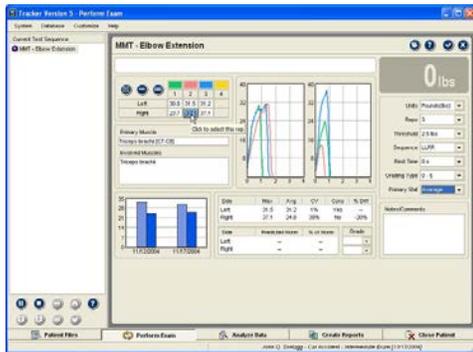
The Muscle Testing Screen provides a wide range of features that allows you to control data collection, statistical calculation and present data as it is collected.

Test Screen Buttons
At the top left of the screen are three buttons that allow you to exclude a repetition from statistical calculations, delete a single repetition, or delete data for all repetitions. On the upper right are buttons for opening the Multimedia Help System, opening the Context Help and for exiting the screen.

Exclude Button

Highlight the repetitions to exclude and click the Exclude button.
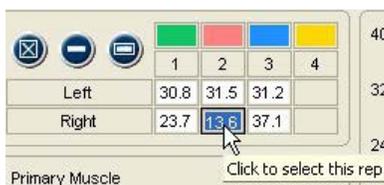
The Exclude button allows you to exclude repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up rep to prepare the patient or if the dynamometer slips, etc. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams. To include and exclude rep, highlight the repetition and click the Exclude button.

Delete Buttons

You can use the Delete button to remove a repetition for any reason, such as the threshold is inadvertently crossed and started a test without you or the patient being ready. The Delete All button is used to remove all the repetitions for a test. (Delete button for single repetitions on left, Delete All button on the right.)

1.   To delete a single rep, highlight the completed repetition and click the Delete button.
2.   To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Additional Buttons

 Multimedia Help: Click this button to access the Multimedia Help System for patient positioning and instrument placement.

 Context Help: Click this button to see help information related to the Muscle Testing screen.

 Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

 Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

Battery Status

The battery status indicators are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

If the data transfer between the instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the symbol at the right appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

To delete a repetition, highlight the repetition and click on the delete button. .

Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The cursor is placed in the first data box according to the settings (A or B, Left or Right) you have chosen for defaults when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

The cursor starts in the first data box according to the default settings, in this case the right side.

9.6

Torque Curve Graphs

Force curves are not displayed when MDE is used.

The graphing of torque curves is one of the features that separates Tracker from other muscle testing systems. As you perform a muscle test, the torque curves are automatically plotted in real time. Bilateral tests show left and right graphs, unilateral tests, such as cervical flexion, have one graph.

In addition to helping you visualize the test results, torque curves provide a wealth of additional information. For example, torque curves help you identify consistency of the patient's effort by looking at the overlapping of the graphs and looking for "cogwheeling" or "ratcheting," which are significant fluctuations in the curve. You can also visualize the patient's proprioceptive response by how quickly the curve ramps up.

Muscle Test Grading

Tracker Version 5 Software allows you to quickly assign grades to muscle tests, which are required when performing impairment rating examinations. Grades can also be assigned when the patient is too weak to provide resistance for a dynamometer muscle test. There are also some muscle tests that cannot be effectively performed with a dynamometer, requiring those tests to be graded.

To grade a muscle test, click on the drop-down arrow for the side and select the grade from the list. Five is normal, 0 is no contraction.

For more on muscle test grading see the AMA *Guides*, 5th edition.

Test Statistics

Side	Max	Avg	CV	Cons	% Diff
Left	31.5	31.2	1%	Yes	—
Right	37.1	24.8	39%	No	-20%

This area provides an overview of test results with calculation of coefficient of variation (CV) and bilateral difference. Effort is considered consistent if the CV is 14% or less, with a "Yes" displayed in the Cons column. Difference is based on the Primary Stat, either max or average, and is the amount of side-to-side difference.

Retest Comparison
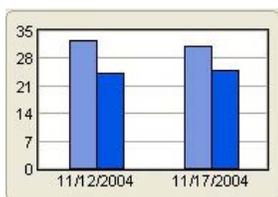
This graph shows the current test results, using the Primary Stat, compared to previous tests performed with the patient. If multiple previous tests were performed, a scroll bar is activated for the graph. This unique feature of Tracker allows you to see patient progress instantly.

Test Screen Defaults

The defaults for individual tests can be reset at the Muscle Testing screen. Defaults changed at the Muscle Testing screen only apply to the test that is open for the current patient. Changing defaults at the Muscle Testing screen does not affect the global defaults set at the Muscle Test Selection screen.

Grading Type allows you to select grading scales finer than 0-5. However, only 0-5 is used for impairment rating.

⚠ Changing defaults at the Muscle Testing screen after test data has been recorded may result in the loss of data. Before data is lost, a warning screen will appear.

Performing Muscle Tests

ⓘ Notice: Click on the Multimedia Help button to see test protocols with patient positioning and instrument placement.

1. Position the patient for the test. Have patient move joint through full range of motion. If the patient is too weak to complete a full range of motion, determine if a dynamometer test can be performed. If patient is unable to provide resistance, assign a grade 3 or less.
2. If patient can provide resistance, carefully position the muscle test dynamometer and begin the test.
3. Complete all repetitions. If patient is unable to complete all the repetitions, due to fatigue or pain, enter the reason in the Notes section.

Clinical Note: According to Evans in Instant Access to Orthopedic Physical Assessment:
1. Painful and strong is equated with minor muscle or tendon lesions.
2. Painful and weak is equated with major muscle or tendon lesions.
3. Painless and weak equates with neurological injury or complete rupture of the muscular attachment.
4. Painless and strong is normal.

Muscle Tester Weight Calibration

JTECH recommends yearly full calibration of your muscle testing dynamometer to insure accuracy. Calibration should be performed sooner if the dynamometer is dropped or if inaccurate readings are suspected.

ⓘ Notice: For information on factory recalibration, contact JTECH Customer Service.
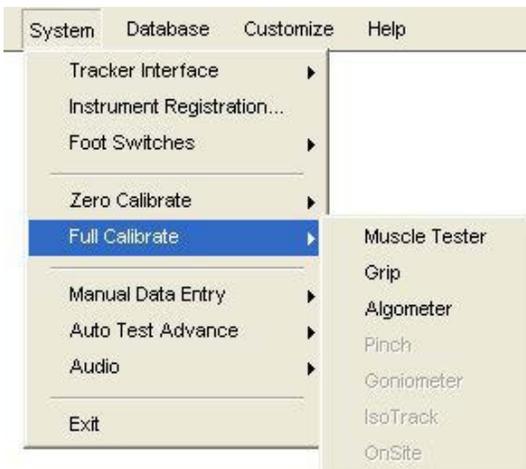
1. From the System menu, select Full Calibrate and Muscle Tester. The last full calibration and factory calibration (if loaded) values are displayed for reference.
2. Place the dynamometer upside-down in the calibration stand with no weight on the testing pad and click the "Zero" button.
3. Enter the amount of weight you are using to calibrate the muscle tester in the Weight field and set the units. JTECH recommends 50 lb. of weight for calibration.
4. Place the weight on the muscle testing pad and click the "Calibrate" button.

ⓘ Notice: If calibration values with the same weight differ more than 5% from previous calibrations or if your muscle tester does not calibrate correctly, contact JTECH Customer Service.

9.8

Custom Tests

Managing Custom Tests

Tracker Version 5 software allows you to create and use custom muscle testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, delete, edit and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name: Enter a unique name for the test that will be displayed in test selection form and on reports.

Region: Select from the drop-down list to place the test within an anatomical region.

Active: Click this check box to make the custom test active so it is displayed in the test selection form. Uncheck this box to keep the test available in your database without displaying it in the Muscle Test Selection form.

Bilateral: Check this box if the test is bilateral (side-to-side comparison) such as shoulder flexion.

Grade Only: Check this box if the test cannot be performed with a dynamometer and you only want to assign a grade.

Primary Muscle: Select from the drop-down to display the primary muscle and innervation in software forms and data reports.

Secondary Muscle 1-3: Use these drop-downs to select up to three secondary muscles involved in the motion. Description/Instructions - Use this text field to type in basic testing instructions using up to 250 characters.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form
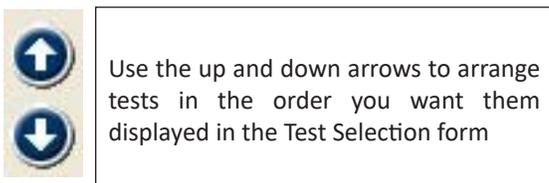
Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

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Chapter 10

Grip Testing

Grip strength evaluation has many uses in the clinical setting. Its primary use is to determine if grip strength deficits exist as a result of injury or disease. Grip strength is also used in IMEs and FCEs to evaluate the patient's level and consistency of effort using a variety of techniques, such as the five-position bell curve, rapid exchange grip and multiple grip test comparisons. Tracker also provides the ability to evaluate the patient's ability to sustain a grip contraction over time with our Sustained grip protocol featuring force over time graphs.

Tracker Grip Gauge

The Tracker grip gauge is an adjustable five-rung, hydraulic gauge equivalent to a Jamar gauge. It can be used for all standard grip tests and for comparison of grip strength to published normative values.

Grip Test Selection Screen

The Grip Test Selection screen allows you to select tests from five standard protocols, view test results and set test control defaults.

Available Tests

Tracker Version 5 Software features the following Grip Testing protocols.

Max Grip: This protocol allows you to efficiently test grip strength at one rung position. The rung position is set using the Grip Test Selection default or the Grip Testing screen default.

Sustained Grip: This protocol graphs force over time for grip tests at a single rung position.

Five Position Grip: This protocol is used to evaluate grip strength at all five rung positions.

Rapid Exchange Grip (REG): This protocol is used to validate reliability of effort for the Five Position Grip or Max Grip tests.

Multi-Max Grip: This protocol allows you to perform up to three grip tests at different times during an evaluation with comparison of the results.

Default Test Settings

At the bottom of the Grip Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Set this to record data in pounds, kilograms force or newtons. Factory default is pounds.

Reps: Set this for the number of repetitions for each test.

Two repetitions are required for coefficient of variation (CV) calculation. Factory default is three.

Sequence: Sets the software to perform tests for one side then the other or to alternate from side to side. LLRR test left then right, LRLR alternates left to right. Factory default is LLRR.

Primary Stat: Determines whether the maximum or average strength is used for statistical calculations, such as percent of difference. Factory default is Average.

Norm Type: Chooses the normative values used for comparison, such as Mathiowetz or values from the AMA *Guides*. Factory default is Mathiowetz.

10.2

Sustained Grip Defaults
These default settings are used only for the Sustained Grip protocol.

Test Time: Controls the length of time for data recording. It can be set from four seconds to 10 seconds. The factory default is four seconds.

Ready Time: Allows you to exclude ready time data from statistical calculations, such as the "ramp-up" of force at the beginning of the test. Factory default is .5 seconds.

REG Defaults
These default settings are used only for the REG test protocols.

Rep Rate: This setting allows you to set an audio sound prompt to help you control the rate of exchange during the REG test.

Validity: This setting allows you to select 100% or 105% for the validity comparison with the Five Position or Max grip tests. (Hildreth 1989, Westbrook 2002). If the value from the REG test exceeds the cutoff value, the test is determined to be invalid.

Selecting Grip Tests

From the available test list, click on the header bar or the box beside the test.

ⓘ Notice: An REG test cannot be performed unless a Five Position or Max Grip test have been performed. If both the Max Grip and Five Position tests have been performed, the software defaults to the Five Position test for REG comparison.

As tests are selected, they are placed in the Exam Queue. You can then perform tests individually or make them part of a larger exam sequence.

Zero Calibration

Tracker Version 5 Software prompts for a zero calibration of the grip gauge every 24 hours.

1. When the zero calibration screen appears, make sure there is no pressure on the grip gauge.
2. Click the "Zero" button.

⚠ If the grip gauge does not calibrate correctly, or values vary more than 5% from previous calibrations, contact JTECH Customer Service.

Grip Testing Screens
Test Screen Buttons
These buttons operate in the same manner for all grip testing screens, except that the REG screen does not have a delete button.

Exclude Button

This button excludes repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up rep to prepare the patient or if the patient's hand slips, etc. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams.

To exclude a repetition, highlight the repetition to exclude and click the Exclude button.

Delete Buttons

The Delete button removes the data for a repetition, such as if a test was inadvertently started without you or the patient being ready. The Delete All button is used to remove all the repetitions for a test.

1.	To delete a single rep, highlight the completed repetition and click the Delete button.
2.	To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Additional Buttons

Multimedia Help: Click this button to access the Multimedia Help System for patient positioning and instrument placement.

Context Help: Click this button to see help information related to the Grip Testing screen.

Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

Battery Status
The battery status indicators are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

 If the data transfer between the instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

 If communications are lost between an instrument and the software for more than one second, the symbol at the right appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

 To delete a repetition, highlight the repetition and click on the delete repetition button.

Manual Data Entry

 If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

 The cursor is placed in the first data box according to the settings (A or B, Left or Right) you have chosen for defaults when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

Max and Multi-Max Testing Screen Features

 The Max Grip and Multi-Max Grip test are efficient tests of maximum grip strength ability at a single rung position. Standard features of the Max and Multi-Max Grip Testing screens are left to right across the top, then bottom left to right:

Top Row
Description (Multi-Max only): This allows you to add a name or description for Multi-Max tests, such as "Beginning of Exam" for test 1, "Middle of Exam" for test 2 and "End of Exam" for test 3.

Grip Test Data: The maximum force achieved for each repetition is displayed. To exclude or delete a repetition, click on the repletion value and click the Exclude or Delete button.

Rung Position: This is the default set at the Grip Test Selection screen. To change from the default, click on the drop-down arrow and select a new grip gauge rung setting.

Force Graphs: These graphs are displayed in real-time as force is applied to the dynamometer.

Force Readout: Displays the numerical value of force as it is applied to the dynamometer.

Defaults: This area displays and allows you to change the defaults set at the Grip Test Selection screen. Defaults set at the testing screen only apply for the current test type performed with the currently selected patient.

Side	Max	Avg	CV	% Diff
Left	31.1	29.4	5%	
Right	29.9	26.4	13%	-4%

Side	Norm	% of Norm
Left	95.9	32%
Right	101.2	30%

Comparison Graph: Compares results of the current test with previously performed grip tests.

Statistics: *Max* is the highest force value for the side.

Avg is the average force from completed repetitions.

CV (coefficient of variation) is a consistency measure, with 14% or less considered consistent.

% Diff is the side to side difference.

Norm is the age- and gender-based normative values based on the default setting (AMA or Mathiowetz).

% of Norm is the percentage of normal based on the Primary Stat selected.

ⓘ Notice: Any comments or observations about the test are entered here.

Sustained Grip Testing Screen Features
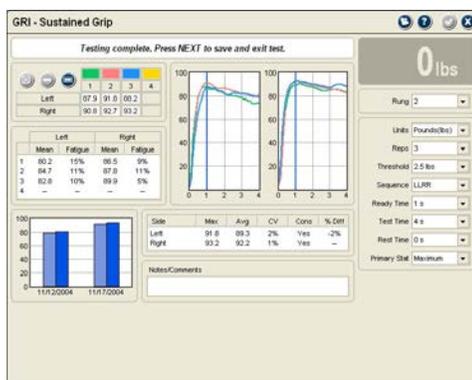
Sustained grip is measured at a single rung position and provides force curves showing grip strength over time. Each grip strength repetition is maintained for a specific period of time (default is four seconds), which allows you to look at the patient's ability to sustain a grip contraction and to review reliability of effort.

Features of the Sustained Grip Testing screen are (top row left to right and bottom row left to right):

Top Row

Grip Test Data: The maximum force achieved for each repetition is displayed. To exclude or delete a repetition, click on the repetition value and click the Exclude or Delete button.

	Left		Right	
	Mean	Fatigue	Mean	Fatigue
1	80.2	15%	86.5	9%
2	84.7	11%	87.8	11%
3	82.8	10%	89.9	5%
4	—	—	—	—

Repetition Statistics: Specific to each repetition, Mean is the average across the top of the force curve (excluding ready time data). Fatigue is the percent of difference between the maximum and the sustained force at the end of the timed repetition. The software provides an audible cue when the repetition's time is completed. Failure to sustain force for the duration of the repetition results in 100% fatigue.

Force Curve Graphs: These graphs of force over time are displayed in real-time as force is applied to the grip dynamometer.

Force Readout: Displays the numerical value of force as it is applied to the dynamometer.

Rung Position: This is the default set at the Grip Test Selection screen. To change from the default, click on the drop-down arrow and select a new rung setting.

Defaults: This area displays and allows you to change the defaults set at the Grip Test Selection screen. Defaults set at the testing screen only apply for Sustained Grip tests performed with the currently selected patient.

Bottom Row

The blue line shows the "Ready Time" cutoff. Data to the left of the line is not used for statistical calculations, such as Mean force. If the patient is unable to reach maximum grip strength during Ready Time, you can extend the time period.

Comparison Graph: Compares results of the current test with previously performed Sustained Grip tests.

Statistics: *Max* is the highest force value for the side.

Avg is the average force from completed repetitions.

CV (coefficient of variation) is a consistency measure, with 14% or less considered consistent.

Cons: Yes if CV is 14% or less, No if CV is 15% or more.

% Diff is the side to side difference.

ℹ Notice: Any comments or observations about the test are entered here.

Five Position Grip Test
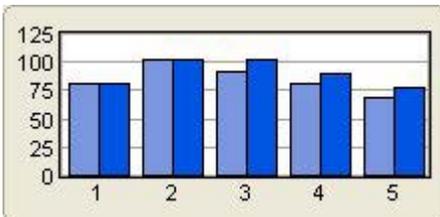
A bell-shaped curve in the Test Graph window is indicative of maximum voluntary effort.

The Five Position Grip Test is used to evaluate grip strength at all five rung positions. Results of the Five Position test are graphed to determine the presence of a bell-shaped curve (Stokes 1983), which is indicative of maximum voluntary effort.

ℹ Notice: The Five Position protocol starts at rung position 1 and automatically advances through to rung position 5.

To return to the test screen for any of the five rung positions, click on the rung position in the Statistics window.

Top Row

Rung Setting: This is automatically set as you progress through the test.

Grip Test Data: The maximum force achieved for each repetition is displayed. To exclude or delete a repetition, click on the repetition value and click the Exclude or Delete button.

Test Graph: This graph plots the Primary Stat value for each of the five rung positions, which should present a bell-shaped curve when all five rung positions are complete.

Force Graphs: These graphs are displayed in real-time as force is applied to the grip dynamometer.

Force Readout: Displays the numerical value of force as it is applied to the dynamometer.

Defaults: This area displays and allows you to change the defaults set at the Grip Test Selection screen. Defaults set at the testing screen only apply for Sustained Grip tests performed with the currently selected patient.

Bottom Row
Comparison Graph: Compares results of the current test with previously performed Max Grip tests.
Statistics: *Max* is the highest force value for the side.
Avg is the average force from completed repetitions.
CV (coefficient of variation) is a consistency measure, with 14% or less considered consistent.
% Diff is the side to side difference.

❶ Notice: Any comments or observations about the test are entered here.

Rapid Exchange Grip (REG)
The REG test was created as a validity test for the Five Position Grip Test, but it can also be used with the Max Grip Test. If the patient's REG exceeds the maximum seen in the Five Position Test, the patient may not be providing maximum voluntary effort. (❶ Notice: Tracker Software allows you to choose 105% cutoff based on research published by Westbrook 2002.) The REG is based on the theory that the patient does not have time to process the complex feedback of signals sent to the central nervous system necessary to consistently feign weakness.

Performing Grip Tests
❶ Notice: For specific test protocols and patient positioning see the Multimedia Help System.

1. Select and open a grip test.

❶ Notice: Either a Five Position or Max Grip test must be complete to open an REG test screen.

2. Make sure rung position is set and matches the software. If not, reset the grip gauge or software default.
3. Position the patient for the test (see Multimedia Help System).
4. Present the grip gauge (see Multimedia Help System).
5. Have patient squeeze the gauge:
    Max Grip and Multi-Max the patient squeezes as hard as possible and releases.

    Sustained Grip the patient squeezes as hard as possible until the software beeps to signal the end of the repetition.

    REG the examiner passes the grip gauge between the patient's hands and the patient squeezes as hard as possible. If the Rep Rate is turned on, the software provides an audible pacing cue for the exchange.
6. Complete the repetitions for the test, either one hand before the other or alternating hands according to the default setting.

❶ Notice: If patient is unable or unwilling to complete the test, you can place a comment to that effect in the Notes field.

Grip Gauge Weight Calibration

JTECH recommends yearly weight calibration of your grip dynamometer to insure accuracy. Calibration should be performed sooner if the grip dynamometer is dropped or if inaccurate readings are suspected.

ⓘ Notice: For information on factory calibration, contact JTECH Customer Service.

1. From the System drop-down, select Full Calibrate and Grip.
2. Place the dynamometer upside-down so it is suspended between tables (this will allow you to hang a weight on the adjustable handle in step 4) and click the Zero button.
3. Enter the amount of weight you are using to calibrate the grip gauge in the Weight field and set the units.
4. Hang the yellow calibration cable supplied with the grip gauge over the handle and attach the weight. Allow the weight to hang free and click the "Calibrate" button.

⚠ If your grip gauge does not calibrate correctly or if calibration values using the same amount of weight vary more than 5% from previous calibrations, contact JTECH Customer Service.

Custom Tests

Managing Custom Tests

Tracker Version 5 software allows you to create and use custom grip testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name - Enter a unique name for the test that will be displayed in test selection form and on reports.
Description/Instructions - Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

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Chapter 11

Algometry Testing

Algometry Testing

Algometry testing uses pressure to evaluate pressure pain response. According to Fischer, one of algometry's pioneer researchers, algometry can be used to quantify tenderness in myofascial and other musculoskeletal pain, to quantify tender points diagnostic of fibromyalgia syndrome, to quantify activity or arthritis and other inflammatory conditions, medicolegal applications, and evaluation of treatment results. One key to proper testing with algometry is the one kilogram per second standard rate of pressure application. Tracker Version 5 software includes a pacer to aid you with the proper pressure application.

Tracker Algometer Gauge

The Tracker algometer is a precision instrument designed specifically for algometry pressure measurements. Tracker Version 5 Software records data from the algometer in 0.10 pound increments. To match published research, use of the 1 cm² tip is recommended.

Algometry Test Selection Screen
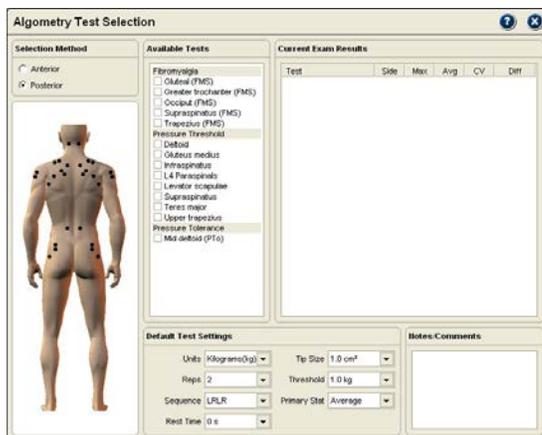
The Algometry Test Selection screen allows you to select tests from three standard protocols, view test results and set test control defaults.

Tests are selected for the Anterior and Posterior sides

Available Tests

Tracker Version 5 Software features the following algometry testing protocols.

Fibromyalgia: This protocol allows you to use the 18 standard test sites recommended by the American College of Rheumatology (1990), to compare results with the 4 kilogram (8.8 lb.) cutoff for positive tests and automatically calculates the number of positive tests based on results.

Pressure Threshold: This protocol includes the standard test sites developed by Fischer for algometry pressure threshold tests, compares side to side (Fischer found 2 kg difference to be clinically significant), and automatically compares results to Fischer's norms and cutoff values.

Pressure Tolerance: This protocol includes the shin and deltoid test points for evaluating pressure tolerance over bone and muscle. In addition to identifying muscle and bone pathologies, these tests can be helpful in determining the subject's pain perception to help predict rehabilitation results and abnormal pain behaviors.

Default Test Settings

At the bottom of the Algometry Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Set this to record data in pounds, kilograms or newtons. The factory default is kilograms since published research is in kg/cm².

Reps: Set this to the number of repetitions for each test. Two repetitions are required for coefficient of variation (CV) calculation. The factory default is two.

Sequence: Sets the software to perform tests for one side then the other or to alternate from side to side. LLRR tests left then right, LRLR alternates left to right. The factory default is LRLR to allow time between tests.

Rest Time: Allows you to set an automatic timer between repetitions. The factory default is 0 s.

Primary Stat: Determines whether the maximum or average strength is used for statistical calculations, such as percent of difference. The factory default is Average.

Selecting Algometry Tests

1.   Click on the Algometry icon to open the Algometry Test Selection screen.
2.   Under selection method, click on the Anterior or Posterior radio button.
3.   Select algometry tests using either of two methods:

i. From the available test list, click on the header bar to select all related tests or click on the box beside the test for an individual test.
ii. Using the Algometer model display, click on the points to be tested.

As tests are selected, they are placed in the Exam Queue. You can then perform tests individually or make them part of a larger exam sequence.

Zero Calibration

Tracker Version 5 Software prompts for a zero calibration of the algometer gauge every 24 hours.

1.   When the zero calibration screen appears, make sure there is no pressure on the algometer.
2.   Click the "Zero" button.

⚠ If the algometer does not calibrate correctly or if calibration values vary more than 5% from previous calibrations, contact JTECH Customer Service.

Algometry Testing Screens
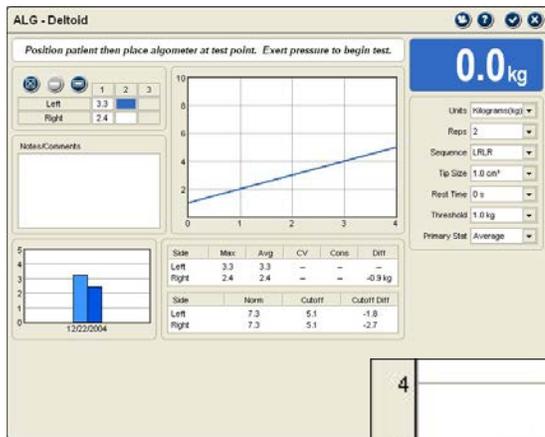
The Tracker Version 5 Algometry test screen features an exclusive, innovative pacing device to improve your testing accuracy and consistency. The real-time pressure graph in the center of the Algometry testing screen includes a diagonal line that helps you apply pressure at the proper rate. According to published research (Fischer, 1998), pressure should be applied at a consistent rate of 1 kg/sec. Applying pressure during a test so the pressure graph follows the diagonal line assures a consistent rate of 1 kg/sec.

The pressure graph moves slower and the line is easier to follow if the Unit default is set to measure in kilograms.
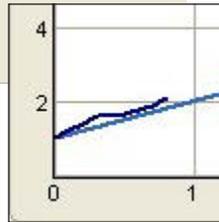
Test Screen Buttons

These buttons operate in the same manner for all algometry testing screens.

Exclude Button

This button excludes repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up repetition to prepare the patient or if the algometer slips, etc. Maintaining records of all repetitions, even practice repetitions, can be important in medicolegal exams.

To exclude a repetition, highlight the repetition to exclude and click the Exclude button

Delete Buttons

The Delete button removes the data for a repetition, such as if a test was inadvertently started without you or the patient being ready. The Delete All button is used to remove all repetitions for a test.

1. To delete a single repetition, highlight the completed repetition and click the Delete button.
2. To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

11.4

Additional Buttons

Multimedia Help: Click this button to access the Multimedia Help System for patient positioning and instrument placement.

Context Help: Click this button to see help information related to the Algometry Testing screens.

Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning will appear.

Battery Status

The battery status indicators are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

Ø   If the data transfer between the instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the symbol at the right appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

To delete a repetition, highlight the repetition and click on the delete repetition button.

Manual Data Entry

Manual Data Entry

The cursor starts in the first data box according to the default settings, in this case the right side.

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The cursor is placed in the first data box according to the settings (A or B, Left or Right) you have chosen for defaults when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

Algometry Testing Screen Features
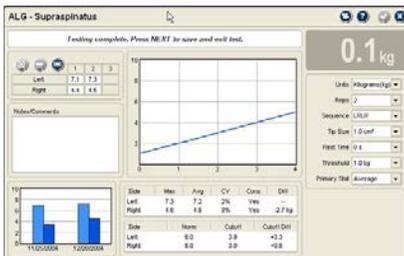
Pressure threshold and pressure tolerance tests display a normative value and a cutoff point based on the normative data.

Side	Max	Avg	CV	Cons	Diff
Left	7.3	7.2	2%	Yes	–
Right	4.6	4.5	3%	Yes	-2.7 kg

Side	Norm	Cutoff	Cutoff Diff
Left	6.0	3.9	+3.3
Right	6.0	3.9	+0.6

Standard features of the Algometry Testing screen are presented left to right across the top, then bottom left to right:

Top Row

Algometry Test Data: The maximum pressure achieved for each repetition is displayed. To exclude or delete a repetition, click on the repetition value and click the Exclude or Delete button.

Pressure Graphs: These graphs are displayed in real-time as pressure is applied to the algometer. Applying pressure so the graph follows the diagonal line assures that you follow the recommended pressure application rate of 1 kg/sec.

Pressure Readout: Displays the numerical value of pressure as it is applied to the algometer.

Defaults: This area displays and allows you to change the defaults set at the Algometry Test Selection screen. Defaults set at the testing screen only apply for the current test performed with the currently selected patient.

Bottom Row

Side	Max	Avg	CV	Cons	Diff
Left	2.9	2.5	14%	Yes	-3.0 kg
Right	5.7	5.5	3%	Yes	–

Side	Cutoff	Cutoff Diff
Left	4.0	-1.5
Right	4.0	+1.5

The cutoff for fibromyalgia tests is always 4 kg (8.8 lb.) as recommended by the American College of Rheumatology.

TIP
If norms and cutoff values are not displayed, check to make sure the patient's gender is entered in the Patient File.

Comparison Graph: Compares results of the current test with previously performed algometry tests.

Statistics: *Max* is the highest pressure value for the side.

Avg is the average pressure from completed repetitions.

CV (coefficient of variation) is a consistency measure, with 14% or less considered consistent. Two repetitions must be performed to calculate CV.

Cons indicates "Yes" if CV is 14% or less and "No" if CV is greater than 14%.

Diff is the side to side difference. In pressure algometry a side-to-side difference greater than 2 kg (4.4 lb.) is considered clinically significant.

Norm is the gender-based normative values based on the research published by Fischer. It is only displayed for pressure threshold and pressure tolerance tests. The gender must have been entered in the patient file for norms to be displayed.

Cutoff for pressure threshold and pressure tolerance tests is the lowest end of the normal range. According to Fischer, algometry tests falling below the cutoff are clinically significant for tenderness. For fibromyalgia tests the cutoff is 4 kg (8.8 lb.) as recommended by the American College of Rheumatology (1990).

Cutoff Diff displays how much the test results (using the Primary Stat) are above or below the cutoff.

ⓘ Notice: Any comments or observations about the test are entered here.

11.6

Algometer Full Calibration

JTECH recommends yearly weight calibration of your algometer dynamometer to ensure accuracy. Calibration should be performed sooner if the algometer is dropped or if inaccurate readings are suspected.

ℹ️ Notice: For information on factory calibration, contact JTECH Customer Service.

1. From the System drop-down, select Full Calibrate and Algometer.
2. Make sure there is no weight or force on the algometer tip and click the Zero button.
3. Enter the amount of weight you are using to calibrate the algometer in the Weight field and set the units.
4. Insert the flat pad tip into the algometer. With the tip up, place the algometer on the edge of a table so the IT hangs down. Carefully place the weight on the pad, making sure the algometer does not tip or slip off the table. Click the "Calibrate" button.

⚠️ Warning: If your algometer does not calibrate correctly or if calibration values using the same amount of weight vary more than 5% from previous calibrations, contact JTECH Customer Service.

Custom Tests

Managing Custom Tests

Tracker Version 5 software allows you to create and use custom grip testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name: Enter a unique name for the test that will be displayed in test selection form and on reports.
Description/Instructions: Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

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Chapter 12

Goniometry

Goniometry
The Goniometry Instrumented section is used to evaluate range of motion of the extremities, including fingers and toes. Standard range of motion protocols provided with Tracker Software are published in the AMA *Guides to the Evaluation of Permanent Impairment*, Fifth Edition, *Measurement of Joint Motion: A Guide to Goniometry* (Norkin and White), and *Clinical Assessment Recommendations: 2nd Edition* (ASHT).

Using the Tracker Goniometer
Foot Switch
The Enter foot switch may be used for entering the end range of motion when performing Tracker Goniometer measurements. This feature allows you to use both hands to control the goniometer when performing range of motion measurements. When the Enter foot switch is pressed, Tracker Version 5 Software provides an audible "ding" to indicate the value was received and recorded.

Extensions
For most extremity range of motion measurements the goniometer should be used with the plastic "extension" arms attached. With large extremity measurements, the extensions help provide better alignment to landmarks to make your goniometry measurements more accurate and repeatable. The extension should be removed for finger and toe measurements.

To attach the extensions
1. On the small goniometer arm, align the extension's metal pins with the holes in the goniometer arm. Press straight down on the pins until the extension makes contact with the goniometer arm.
2. On the large goniometer arm, align the holes at the square end of the extension over the metal pins on the large goniometer arm. Press straight down on the extension over the holes until the extension makes contact with the goniometer arm.

To remove extensions
1. Grasp the extension near the metal pins and gently wiggle the extension as you pull it away from the goniometer arm.

ⓘ Notice: Do not bend or twist the extensions when attempting to disengage them from the goniometer as they are plastic and may break.

Calibration

Goniometer Calibration
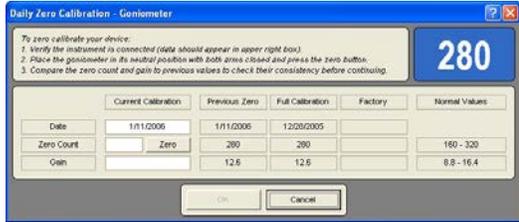
Factory Calibration

Echo wireless goniometers come with factory calibration. Refer to Chapter 2 of this manual for more information about installing factory calibration.

Daily Calibration
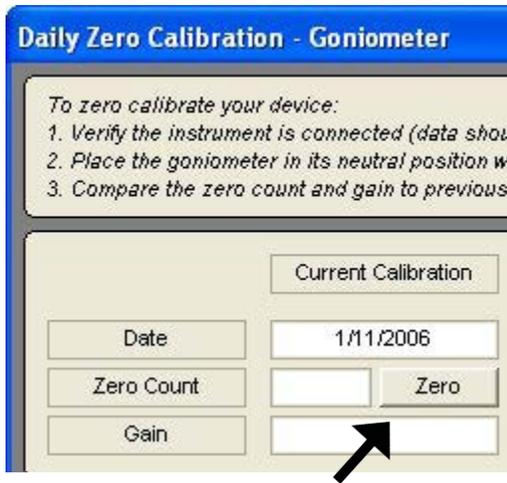
Click the Zero button with the goniometer arms closed to perform a daily zero calibration.

Tracker Version 5 Software requests a zero calibration the first time the goniometer is used within a 24 hour period to ensure the accuracy of the instrument. The calibration is quick and easy to perform.

1. When daily calibration is required, the Zero Calibration screen appears the first time a test is performed with the goniometer.
2. When the Zero Calibration screen appears, hold the goniometer by the long arm perpendicular to the floor with the pivot toward the ceiling and the arms closed. Make sure the IT is active with a Echo wireless goniometer.
3. Click the Zero button in the calibration screen.
4. Compare the gain value and zero count to the previous calibration. If either changes by more than five percent, verify that the goniometer arms are closed and reclick the Zero button. If you are unable to correctly zero calibrate the goniometer, contact JTECH Customer Service.

Full Calibration

A full calibration can be performed on your goniometer at any time. However, full calibrations of the goniometer are not required unless it has been dropped.
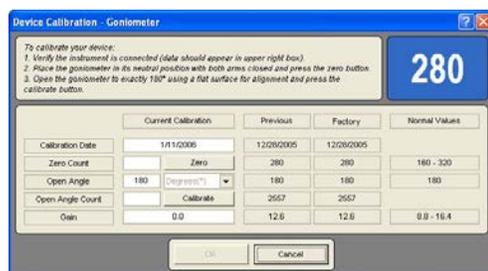
1. Select System from the top drop down menu then Full Calibrate and Goniometer from the lists. With a Echo wireless goniometer, make sure the IT is activated.
2. Remove the extension from the instrument if they are attached. Hold the goniometer by the long arm perpendicular to the floor with the pivot toward the ceiling and the arms closed. Click the Zero button.
3. Open the goniometer arms, place the instrument on a flat surface and click the Calibrate button.
4. Compare the gain value and zero count to the factory calibration. If either changes by more than five percent, recalibrate the goniometer and verify the arms are in the correct position for each step. If you are unable to correctly calibrate the goniometer, contact JTECH Customer Service.
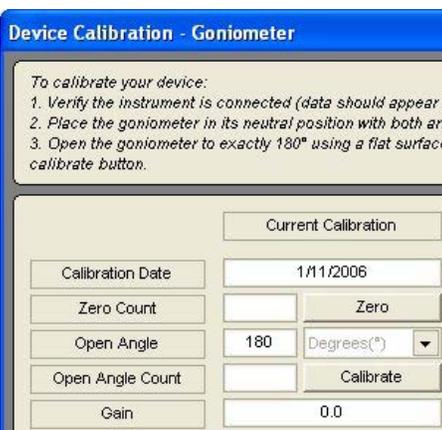
Software Screens
Selecting Goniometry ROM Tests

1. Click on an anatomical region on the Test Selection Model, such as the shoulder or the hand.
2. Tests for the selected anatomical region are displayed in the Available Tests window. Click on the item header to place all associated tests in the Perform Exam Queue or on the boxes to select individual tests.

ⓘ Notice: You can perform individual range of motion tests as you place them in the Exam Queue or you can add other exam items to build a test sequence. You can then perform the entire test sequence with the patient.

3. Items can be "deselected" by clicking the header to remove all associated items, clicking the check box for individual items, or by using the queue's delete buttons.

Move the cursor over an anatomical region to highlight and click to select.
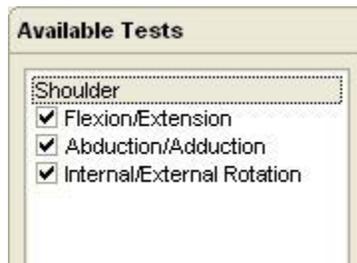
Checks indicate tests are selected from the Available Tests list.
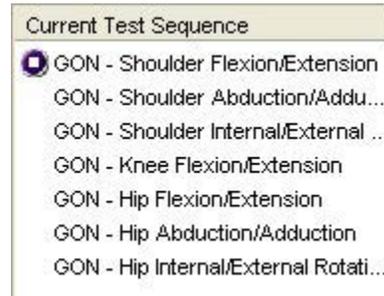
Tests as they appear in the queue.

Buttons at the bottom of the Exam Queue used to remove test. The bottom button clears the queue.

Default Settings

The default settings at the bottom of the Goniometer ROM Selection screen are used to control various aspects of the testing process. There are six default settings.

Default Settings

Reps: For most extremity measurements a single repetition is adequate. However, the *Guides* 5th edition recommends using three repetitions when measuring joint motion for impairment rating.
Side: Allows you to perform bilateral measurements or to only measure range of motion for one side.
Motion: This controls the sequence of agonist/antagonist tests, such as Shoulder Flexion/Extension. This allows you to select alternating test repetitions or to complete all reps for one motion before starting the next.
Primary Stat: This allows you to use either the maximum value from the repetitions, required for impairment rating, or the average for statistical calculations and comparisons.
Validity: This option allows you to apply CV consistency criteria for evaluating test results when more than one repetition is performed or to apply no validity criteria. CV uses coefficient of variation for consistency evaluation with 14% or less considered consistent.
Norms: This options allows for selection of the AMA norms based on the *Guides to the Evaluation of Permanent Impairment*, 5th Edition.

Current Exam Results

When tests are completed, Current Exam Results displays an overview of the collected data. Data is divided into three categories for Hand, Upper Extremity and Lower Extremity. Click on the button to view data collected in the category. If no data was collected in the current exam, the window remains blank.

Notes/Comments

This area of the Test Selection screen allows you to enter general notes or comments about the goniometry exam. Each testing screen also includes a Notes field for entering test-specific comments.

1. To enter a note or comment, place the cursor in the Notes field and click the mouse.
2. Type in the note or comment as you would with a word processor program. Notes are automatically saved when you exit the Goniometer Test Selection screen.

General Testing Screen Information

The testing screens used with the Tracker goniometer have features that function in the same manner, with some differences in the testing screens for finger range of motion, such as the absence of the Lag button. This section of the manual provides an overview of the software goniometer testing screen functions.

Testing Screen Button Functions

This button at the top of the screen opens the Tracker Multimedia Help System that presents video and references about subject positioning and instrument placement for all standard ROM tests.

This button provides context help related to the screen.

This button is used to close the screen and automatically save any changes to the data. It is only active when data within the screen has changed.

This button exits the screen without saving changes to the data.

The Lag button is used to identify loss of motion back to the anatomical neutral position for extremity joints. For example, if an elbow has 140 degrees of flexion, but remains in 15 degrees of flexion at full extension, the joint has an extension lag. Using the Lag button you can place a minus sign (-) in front of extension value to identify the lag. Either before or after testing, click the Lag button then select the side and the lagged motion from the lists to identify lagged motions.

This button is used to identify a joint as ankylosed or immobile. When marking a motion as ankylosed, all motions for the joint should be immobile. If there is some motion in the joint, the Lag button should be used. Joint motions identified as ankylosed are displayed with <> around the ROM value. Either before or after testing, click the Ankylosis button then select the side and the motion from the lists to identify ankylosis.

This button is used to remove a single repetition.

This button is used to remove all repetitions for the test.

Active and Passive Selection

Tracker Version 5 Software allows you to evaluate both active ROM and passive ROM. The default when entering a goniometry testing screen is active ROM. To change between active and passive measurements, click on the Active or Passive radio buttons.

Battery Status

The battery status indicators for Echo wireless instruments are located at the top right of the testing screen. The battery status indicators are only active for the Echo wireless goniometer and foot switch when the test screen is displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

If the data transfer from an instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the area for total range of motion. This prevents incorrect data from being displayed. If a data interruption occurs at the end of a repetition, you will not be able to use the Enter button until the system catches up.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the Lost Communications symbol appears in place of the battery status symbol. The instrument transceivers maintain and resend data to account for temporary interruptions and loss of communications. Data for the repetitions is complete and accurate if communications are restored in less than five seconds. Communications lost for more than five seconds cause the software to prompt you to delete the repetition data and retest.

To delete a repetition, highlight the repetition and click on the delete repetition button.

Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The cursor is placed in the first data box according to the settings (A or B, Left or Right) you have chosen for defaults when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

12.6

Repetition Data

Left		1	2	3
A	Flexion	89	89	
B	Extension	51	51	
Right		**1**	**2**	**3**
A	Flexion	▪		
B	Extension			

As each repetition is complete the recorded ROM value is displayed at the testing screen. There are places for up to three repetitions per motion for left and right. Beside the motion is the letter A or B. These are used to identify the motion sequence when setting the motion default. As repetitions are complete the software automatically moves to the next repetition until all the repetitions are complete according to the motion and side defaults selected.

ROM Graph
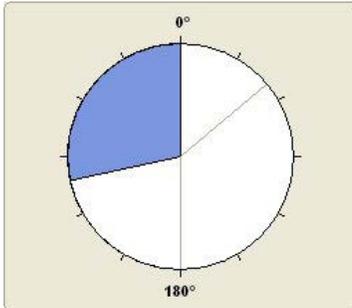
Opening and closing of the goniometer during testing is displayed in a real-time graphic at the testing screen. The starting point for the goniometer motion depends on the goniometer neutral offset for the test. For example, the neutral offset for shoulder flexion is 0 degrees with the goniometer arms closed. As the subject flexes the shoulder the goniometer arms are opened up until full flexion is reached. Elbow flexion, on the other hand, has a 180 degree neutral offset, which means the starting position is with the goniometer arms opened in a straight line. As the subject flexes the elbow the goniometer arms close until full flexion is reached. Refer to the multimedia helps for more information on goniometer positioning for each test.

Real-time Numerical Data

As the goniometer is opened and closed, the degrees of motion from the neutral starting position of the goniometer are displayed in real-time at the upper right-hand corner of the testing screen.

Offset

The Offset setting determines the starting neutral position of the goniometer for measuring ROM. The software automatically selects the offset based on the standard test being performed. Offsets are defined as follows: 0 is with the goniometer arms closed, 90 is with the arms set to 90 degrees and 180 is with the goniometer arms open in a straight line. The Offset buttons allow you to use alternate testing protocols and patient positions. To change the offset, click on the Offset button that corresponds to the neutral starting position for the motion. See the multimedia helps for shoulder internal/external rotation for an example of how different neutral offsets are used for alternate positions of the same test.

Testing Screen Defaults

The screen defaults allow you to change the default settings for testing with the current patient. These default settings do not change the global defaults set at the Goniometer Test Selection screen. Once the testing screen defaults are changed the changes will persist for subsequent tests for that patient. For an explanation of the default settings see page 3 of this chapter.

Comparison Histograph
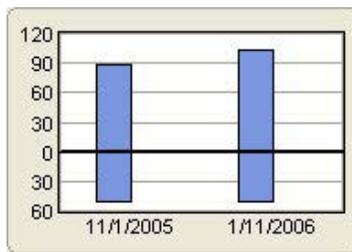
Comparing progress or change over time is one of the most important reasons for performing range of motion tests. Tracker Version 5 Software includes a histograph that provides an immediate visual comparison to previous tests. Motions designated as A are displayed above the 0 line of the graph and B motions are displayed below. Left and right tests are displayed side-by-side in different colors. A scroll bar is activated by the software if more serial tests have been performed than can be displayed at one time in the graph.

Test Data

Results of the test are displayed in the Test Data area of the testing screen. Displayed data includes: The motion and side, normal value for each motion, Primary Stat (either average of the reps or the maximum value depending on the default selected), CV (coefficient of variation) if more than one rep was completed and CV default was selected, Validity based on a CV less than 15%, and % Norm (the percent of normal based on the Primary Stat).

Notes/Comments

This area allows you to enter a note or comment concerning the test that is printed with reports. Notes can include items such as "patient reported pain during test." To write a note, place the cursor in the Notes field and type as you would in any word processing program.

Hand ROM Screens

Hand ROM Screens

There are some important variations in the testing screens for evaluating hand range of motion of the fingers and thumb in Tracker Version 5 Software. There are also some screens and testing procedures that are unique to the hand goniometry section of the software. This section addresses those differences and the special screens you will find.

Finger and Thumb Flexion/Extension Screens
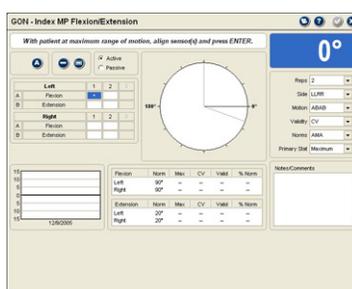
The absence of a Lag button and Offset buttons are the two important differences between the screens measuring finger and thumb flexion/extension and general goniometry screens.

The Offset buttons are not required for finger and thumb flexion/extension measurements because of the limited ways the goniometer can be used. The Lag button is not required because the software automatically handles the lack of extension (often referred to in finger ROM as hyperextension) by placing a - (minus) sign next to motions that do not cross the centerline appropriately between flexion and extension.

Goniometer Placement

Goniometer orientation for measuring finger MP flexion.

Because the finger flexion/extension test screens do not include a Lag button, goniometer placement is extremely important. The goniometer must always be placed on the dorsal surface of or just lateral to the joint. The "stop" on the goniometer must always face away from the joint being measured so the goniometer lies flat on the joint surface and so the software correctly identifies flexion and extension motions. For more information on goniometer placement, view the multimedia help files in the software.

12.8

In measuring finger and thumb flexion/extension motions, the software uses the 180 degree or straight open goniometer as the neutral midpoint. With normal joint motion, flexion motions go toward the closed position and away from the "stop." Normal extension motions, on the other hand, move from the 180 degree straight position toward the full open position at the stop.

Therefore, when the software is expecting an extension measurement, but the goniometer is between the closed position and the open straight position, it records the motion as lagged and places a - (minus) sign in front of the value. Likewise, when a flexion measurement is entered, but the goniometer is between the stop and the 180 degree straight position (still in extension), the software places a - (minus) sign in front of the test value.

 The Ankylosis button is available in finger and thumb flexion/extension screens, but the Lag button is not. See page 12.5 for description of how the button functions.

Fingers Complete Testing Screen
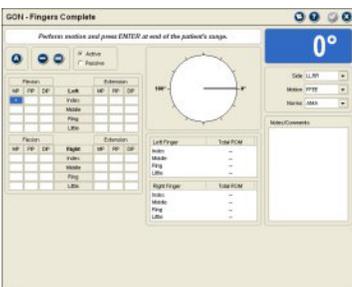
The Fingers Complete screen provides a quick, easy way to conduct finger flexion/extension studies of either or both hands. The screen allows you to test flexion then extension or extension then flexion moving from the index finger to little finger MP joints to PIP joints to DIP joints. The software accepts one ROM measurement per joint.

Ankylosis
An ankylosed joint should be identified using the steps below before the test series is performed. Ankylosis can be identified after the series is performed, but that requires the ankylosed position to be retested.

Flexion			Left	Extension		
MP	PIP	DIP		MP	PIP	DIP
<44>	63	72	Index		-5	-4
60	70	78	Middle	8	-1	-1
86	85	81	Ring	11	0	0
91	88	87	Little	14	0	0

Fingers Complete data showing index finger mp joint ankylosis and pip and dip joint extension lags.

Before the Series
1. Click on the box to highlight the ankylosed motion. The box changes to blue.
2. Click the Ankylosis button. When the warning prompt appears, click OK. Mark only the position of ankylosis, either flexion or extension. Repeat for additional ankylosed joints.

ℹ Notice: When a motion is marked as ankylosed before performing the test series, the antagonist position for the joint will be skipped during the test sequence since the joint has been identified as immobile.

3. Place the cursor in the first testing box and begin testing. The first test in the series may be flexion or extension, and it may be the left or right side, depending on the defaults selected. See the defaults information below.

After Testing
1. Complete testing series.
2. Click on the position of ankylosis, either flexion or extension, then click the ankylosis button.
3. At the prompt click OK. The software will erase the data for the joint, both agonist and antagonist motions.
4. Retest the ankylosed joint. The software places <> brackets around the ROM value indicating that the joint is immobile. The antagonist motion is grayed out.

Defaults

The Fingers Complete screen default settings are slightly different from the standard flexion/extension testing screens. The default settings are only available for Side, Motion, and Norms.

Side Defaults: LLRR tests all left hand finger joints then the right side, RRLL test all right hand then left hand joints, LL tests only the left hand, RR tests only the right hand.

Motion Defaults: FFEE tests all flexion then extension motions and EEFF tests all extension then flexion motions.

Norms: This setting is provided for future revisions that will allow alternate normative value tables to be used by the software.

Test Data

The Fingers Complete test screen displays a calculation for each finger's total active and total passive ranges of motion. These values are the sum of the finger's flexion and extension measurements (Norkin and White). Extension lags are subtracted from the total. If one of the finger's joints are marked as ankylosed or not measured, the calculation is not performed.

Distance Measurements
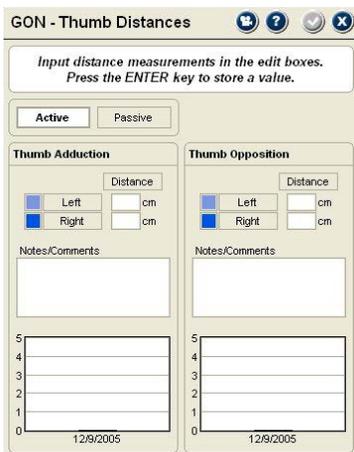
Tracker Version 5 Software includes documentation capabilities for finger and thumb ROM distance measurement performed with a centimeter ruler. The measurement screens include composite fingers (finger tip to distal palmar crease), finger abduction (mid pulp to mid pulp abduction), and thumb distances (thumb adduction and opposition).

Entering Measurements
1.   When a distance measurement screen is opened, you can select active and/or passive for the type of measurement. Active is the default.
2.   Place the cursor in the Distance box for the measurement. All distance measurements are entered in centimeters.

ⓘ Notice: You can use the Tab key to advance through the fields on the screen.

The form also includes a Notes/Comments field for entering additional information about the test.

At the bottom of the screen is a histograph that shows comparisons to previous tests performed with the patient.

Custom Tests
Managing Custom Tests

Tracker Version 5 software allows you to create and use custom grip testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name: Enter a unique name for the test that will be displayed in test selection form and on reports.

Active: Click this check box to make the custom test active so it is displayed in the test selection form. Uncheck this box to keep the test available in your database without displaying it in the Muscle Test Selection form.

Region: Select from the drop-down list to place the test within an anatomical region.

Motion 1: Select from the drop-down list or type in the primary joint motion being evaluated.

Norm 1: If a normative value is established for motion 1, enter it here for display and comparison in reports.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

Offset Angle: This refers to the angle of the goniometer when the motion 1 joint is in neutral, with 0° being closed and 180° being opened in a straight line. Use the drop-down menu to select 0°, 90° or 180°.

Motion 2: Enter the antagonist movement to motion 1 in this area using the drop-down list or typing in a description. This section must be completed to save the custom test. If no antagonist motion is to be evaluated, enter text such as "none" for the description.

Norm 2: Enter the normative value for motion 2 in this text box.

Description/Instructions - Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

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Chapter 13

Pinch Testing

Pinch Testing

Pinch strength evaluation has many uses in the clinical setting. Its primary use is to determine if pinch strength deficits exist as a result of injury or disease. In addition to hand and upper extremity strength evaluation pinch strength can also used in IMEs and FCEs to evaluate the patient's level and consistency of effort.

Tracker Pinch Gauge

The Tracker pinch gauge features a standard design that is easy for the patient to pinch in thumb-to-finger tip tests and key or lateral pinch tests. The JTECH pinch gauge can be used for all standard pinch tests and for comparison of pinch strength to published normative values.

Pinch Test Selection Screen

The Pinch Test Selection screen allows you to select tests from five standard protocols, view test results and set test control defaults.

Available Tests

Tracker Version 5 Software features the following Pinch Testing protocols.

Key (Lateral): This is a standard protocol where the patient holds the pinch gauge like a key and squeezes.

Palmar (Chuck): With this protocol the patient holds the gauge between the thumb and the index and middle fingers.

Tip Pinch: This is the primary opposition protocol between the thumb and index finger.

Thumb to Middle Opposition: This opposition protocol is between the thumb and middle finger.

Thumb to Ring Opposition: This opposition protocol is between the thumb and ring finger.

Thumb to Little Opposition: This opposition protocol is between the thumb and little finger.

Default Test Settings

At the bottom of the Pinch Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Set this to record data in pounds, kilograms force or newtons. Factory default is pounds.

Reps: Set this for the number of repetitions for each test. Two repetitions are required for coefficient of variation (CV) calculation. Factory default is three.

Sequence: Sets the software to perform tests for one side then the other or to alternate from side to side. LLRR tests left then right, LRLR alternates left to right. Factory default is LLRR.

Rest Time: Allows you to set a predetermined amount of time for the patient to rest between repetitions. Software automatically counts down rest time after each repetition in a pinch test. Factory default is 0.

Threshold: This sets the amount of force that must be applied to the gauge before the software begins collecting repetition data. This reduces false starts while the patient is getting positioned.

Primary Stat: Determines whether the maximum or average strength is used for statistical calculations, such as percent of difference. Factory default is Average.

Norm Type: Chooses the normative values used for comparison, such as Mathiowetz or values from the AMA *Guides*. Factory default is Mathiowetz.

Selecting Pinch Tests
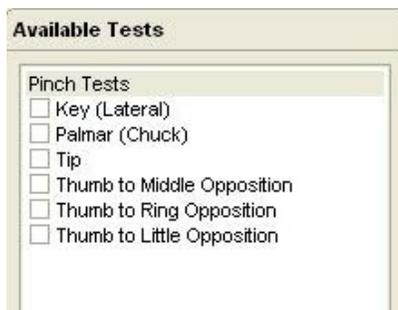
From the available test list, click on the header bar to select all available pinch tests or the box beside a test to select individual tests..

As tests are selected, they are placed into the Exam Queue. You can then perform tests individually or make them part of a larger exam sequence.

1. To open an individual test in the Exam Queue, double click on the test name in the queue.
2. To run an exam sequence of tests in the queue, click on the play button at the bottom of the Exam Queue.

Pinch Gauge Zero Calibration

Tracker Version 5 Software prompts for a zero calibration of the pinch gauge every 24 hours. This helps insure the accuracy of the data you collect by accounting for temperature changes or electronic drift.

1. When the zero calibration screen appears, make sure there is no pressure on the pinch gauge.
2. Click the "Zero" button.

⚠ Warning: If the pinch gauge does not calibrate correctly, or values vary more than 5% from previous calibrations, contact JTECH Customer Service.

Pinch Testing Screens
Test Screen Buttons
These buttons operate in the same manner for all pinch testing screens.

Exclude Button

This button excludes repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up rep to prepare the patient or if the patient's hand slips, etc. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams.

Delete Buttons

The Delete button removes the data for a repetition, such as if a test was inadvertently started without you or the patient being ready. The Delete All button is used to remove all the repetitions for a test.

1. To delete a single rep, highlight the completed repetition and click the Delete button.
2. To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Additional Buttons

Multimedia Help: Click this button to access the Multimedia Help System for patient positioning and instrument placement.

Context Help: Click this button to see help information related to the Pinch Testing screen.

Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

Wireless Instrument Battery Status

The battery status indicators for Echo Wireless Instruments are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

If the data transfer between the instrument is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the symbol at the right appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

To delete a repetition, highlight the repetition and click on the delete repetition button.

Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The cursor is placed in the first data box when the screen opens according to the settings (A or B, Left or Right) you have chosen for defaults. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

The cursor starts in the first data box according to the default settings, in this case the right side.

Pinch Testing Screen Features

Features of the Pinch Testing screens are described from left to right across the top, then bottom left to right:

Top Row
Pinch Test Data: The maximum force achieved for each repetition is displayed. To exclude or delete a repetition, click on the repletion value and click the Exclude or Delete button.
Notes: Any comments or observations about the test can be entered here.
Force Graphs: These graphs are displayed in real-time as force is applied to the pinch gauge.
Force Readout: Displays the numerical value of force as it is applied to the pinch gauge.

Defaults: This area allows you to change the defaults set at the Pinch Test Selection screen. Defaults set at the test screen only apply for the current test performed with the current patient.

Bottom Row
Comparison Graph: Compares results of the current test with previously performed pinch tests.
Statistics: *Max* is the highest force value for the side.
　　　Avg is the average force from completed repetitions.
　　　CV (coefficient of variation) is a consistency measure, with 14% or less considered consistent.
　　　Cons is a quick indication if the repetitions meet the CV criteria of 14% or less. Yes indicates that the included repetitions have a CV of 14% or less. No indicate a CV of 15% or greater.
　　　% Diff is the side to side difference.
　　　Norm is the age- and gender-based normative values based on the default setting (AMA or Mathiowetz).
　　　% of Norm is the percentage of normal based on the Primary Stat selected.

Side	Max	Avg	CV	Cons	% Diff
Left	27.5	27.4	0%	Yes	—
Right	26.5	25.9	2%	Yes	-4%

Side	Predicted Norm	% of Norm
Left	15.7	175%
Right	16.5	160%

Performing Pinch Tests

ⓘ Notice: For specific test protocols and patient positioning see the Multimedia Help System.

1. Select and open a pinch test.
2. Position the patient for the test (see Multimedia Help System).
3. Present the pinch gauge (see Multimedia Help System).
4. Have patient squeeze the gauge as hard as possible.
5. Complete the repetitions for the test, either one hand before the other or alternating hands, according to the default setting.

If patient is unable or unwilling to complete the test, you can place a comment to that effect in the Notes field.

Pinch Gauge Weight Calibration
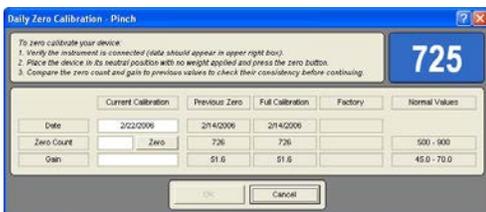
JTECH recommends yearly weight calibration of your pinch dynamometer to insure accuracy. Calibration should be performed sooner if the pinch dynamometer is dropped or if inaccurate readings are suspected.

ⓘ Notice: For information on factory calibration, contact JTECH Customer Service.

1. From the System drop-down, select Full Calibrate and Pinch.
2. Place the pinch gauge on a flat surface with no weight applied and click the Zero button.
3. Enter the amount of weight you are using to calibrate the pinch gauge in the Weight field and set the units.
4. Place the weight on the pinch gauge over the slot on the teal pinch gauge flange and click the "Calibrate" button.

⚠ Warning: If your pinch gauge does not calibrate correctly or if calibration values using the same amount of weight vary more than 5% from previous calibrations, contact JTECH Customer Service.

Custom Tests
Managing Custom Tests

Tracker Version 5 software allows you to create and use custom grip testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1.   When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.

2.   Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name - Enter a unique name for the test that will be displayed in test selection form and on reports.
Description/Instructions - Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests
The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

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Chapter 14

Static Strength Testing

Static Strength Testing

Static strength testing is a quick, reliable and relatively safe method of evaluating strength in work-oriented postures. It can be used for post-offer testing to determine if a prospective employee has the strength capacity to perform the job's requirements. Static strength testing is also a valuable adjunct to functional capacity evaluations (FCEs) for helping to determine consistency of effort and providing reasonable expectations for demonstrated dynamic lifting abilities.

Static Strength Testing Precautions

The following are general guidelines to minimize risk of injury to the patient. Note that these guidelines are not comprehensive and cannot cover all conditions. Final responsibility for the risk of injury to the patient lies with the examiner.

1. Force increase generated by the examinee should be gradual, especially for testing of the spine, and in the presence of a musculoskeletal injury, instability, or recent surgery. A warm-up repetition consisting of 50% maximum effort is recommended prior to each test. A warm up rep allows you to evaluate the examinee's ability and to look for signs of discomfort or distress before attempting a maximum safe effort.
2. The examinee should be CLOSELY observed during testing for any evidence of pain or discomfort. The test should be stopped immediately if they experience an increase in pain, shortness of breath or dizziness.
3. Contraindications to testing include: uncontrolled hypertension, severe respiratory problems, herniated disk, osteoporosis, structural weakness of the abdominal or thoracic wall, unsplinted fractures, unhealed torn or sutured tendons, or any other condition that would be exacerbated by the performance of isometric contraction or Valsalva maneuver.
4. In the event the examinee is illiterate or does not understand English, be sure they are made aware of all the inherent risks of testing and understand their freedom to stop the test at any time.

Static Strength Testing Accuracy

Several general rules must be followed to insure repeatability and accuracy when using isometric strength testing.

1. Have the examinee build force gradually until the maximum effort is achieved and held. In general, maximum force should occur in about two seconds. Standard protocols require at least three seconds of data collection after the maximum force is achieved for valid statistical determinations.
2. Use standardized instructions to insure consistency.
3. Make sure examinee does not jerk the gauge at the beginning of the test, but steadily increases force to maximum effort.
4. Be aware of the examinee's posture and joint angles.
5. Provide a brief rest of 30 seconds between repetitions if a limited number of repetitions are performed and up to two minutes if a large number (15 or more) of repetitions are performed.
6. Test the least strenuous positions first: Arm Lift, High Near Lift, High Far Lift, Leg Lift, Torso Lift, Floor Lift.
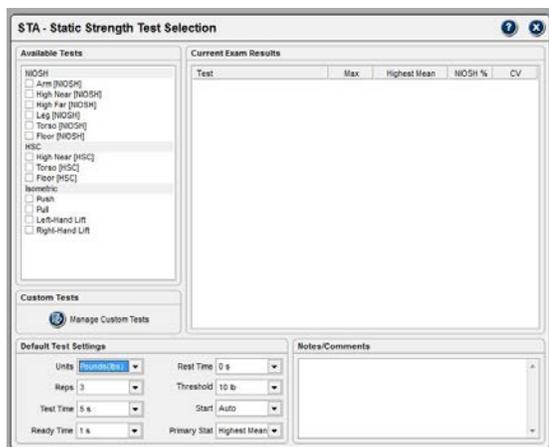
Examinee Instructions

Studies have shown that static strength testing results vary according to the instructions given to the examinee. Therefore, greater consistency will result if the instructions are standardized as follows:

Tell the examinee: "We are going to measure your strength. These tests are isometric strength tests, which means that you will be exerting force, but not moving anything. We will measure your average maximum force with this apparatus. For each test, please follow these instructions:

1. The test will be demonstrated for you. If you do not understand, please ask questions.
2. For each test, you will have up to three attempts. The first is practice, try it at 50% effort. This attempt is a warm-up and will help you determine if you know what is expected.
3. Next you will be given one or two more attempts on each test. Try to do your best on each attempt.
4. When a test is given, I will say, 'Ready ... set ... go.' For the period of the test, you should apply consistent, maximum effort. If at any time during the test you experience pain or discomfort, you should stop the test immediately. The computer will beep when the test is finished.
5. Let me demonstrate the test for you.
6. Are there any questions?
7. Let's begin the first test. 'Ready ... set ... go.'"

Adapted from *Preemployment Isometric Strength Testing Methods*, Dr. Andrew Jackson FACSM, June 1990, p 37.

Static Strength Test Selection Screen

The Static Strength Test Selection screen allows you to select tests from three categories: NIOSH, HSC, and Isometric.

❶ Notice: When using the JTECH Mobile Lift System platform, the medial malleoli are positioned on the red line and the gauge attachment is adjusted using the slider mechanism.

NIOSH Tests

NIOSH static strength tests were developed by Keyserling and published in the NIOSH (National Institute of Occupational Safety and Health) *Work Practices Guides for Manual Lifting*. NIOSH tests are based on standard industrial heights and include a normative comparison.

Positioning for NIOSH lifts includes two variables:

V : Is the vertical distance from the top of the platform or deck to the static lifting gauge handles.
H: Is the horizontal distance from the center of the medial malleoli (ankle bone) to the attachment point for the gauge. The gauge should be held vertically from the attachment point.
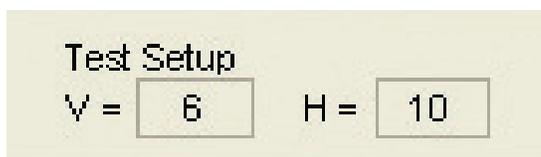
The NIOSH test screen for the Arm Lift allows you to document the vertical and horizontal positions. The other NIOSH tests use predetermined vertical and horizontal positions.

The following NIOSH tests are available in Tracker Version 5 Software (see the multimedia help within the software for more information on specific tests):

Arm Lift: Height of handles is determined by positioning the examinee with elbows flexed 90°, shoulders neutral, feet shoulder width apart, and medial malleoli over platform mark. The horizontal and vertical positions are adjusted so the gauge handles fit in the examinee's palms. Document the V and H positions in the software. The examinee lifts upward without swaying backward, rising up on toes, or elevating shoulders. This test primarily stresses the elbow.

High Near Lift: The vertical height of the gauge handles is 60", and the horizontal position of the slider attachment is 10". The examinee holds the gauge handles with forearms supinated and lifts directly upward without rising up on the toes. This test primarily stresses the shoulder.

High Far Lift: The gauge handle vertical height is 60" and the horizontal adjustment is 20". The examinee holds the gauge handles with forearms supinated and lifts directly upward without rising up on toes. This test primarily stresses the shoulder.

Leg Lift: The gauge handle vertical height is 15" and horizontal adjustment is 0". The feet are far enough apart so the gauge handles fit between the medial borders of the knees. The trunk should be held as vertical as is comfortable. The lift is made using a leg lift technique, emphasizing the quadriceps. This test primarily stresses the knee.

Torso Lift: The gauge handle vertical height is 15" and the horizontal adjustment is 15". The examinee flexes at the waist with minimal knee flexion and pulls upward in the direction of the arms. If data from the Torso Lift test is needed and the examinee is performing well on other tests, perform a single repetition to reduce risk.

❶ Notice: The Torso Lift test is stressful on the low back and, therefore, potentially poses the most risk for examinees with low back pain. Exercise extreme caution with this test and do not use if there is any reason for concern.

Floor Lift: The gauge handle vertical height is 6" and the horizontal adjustment is 10". The examinee flexes the trunk and the knees to reach the lift gauge handles. The examinee lifts upward utilizing the hip, back and leg extensors.

HSC Tests

Available Tests

NIOSH
- [ ] Arm [NIOSH]
- [ ] High Near [NIOSH]
- [ ] High Far [NIOSH]
- [ ] Leg [NIOSH]
- [ ] Torso [NIOSH]
- [ ] Floor [NIOSH]

HSC
- [ ] High Near [HSC]
- [ ] Torso [HSC]
- [ ] Floor [HSC]

Isometric
- [ ] Push
- [ ] Pull
- [ ] Left-Hand Lift
- [ ] Right-Hand Lift

Horizontal Strength Change (HSC) tests are used to validate effort on the NIOSH lift test. Effort validation is particularly important when static lifting is part of an FCE.

According to published research (Berryhill, et al), a 33% strength change can be expected when the lift gauge attachment position is moved 10 inches closer or 10 inches farther away. HSC testing (also called "inappropriate horizontal strength testing") modifies two NIOSH tests (Torso Lift and High Near Lift) by moving the gauge farther away and one (Floor Lift) by moving the gauge closer.

A horizontal strength change is considered inappropriate on the farther tests if the strength reduction is less than 33% of the corresponding NIOSH tests. The closer test is considered inappropriate if the strength increase is greater than 33%. According to the research conclusion, "A score of 2 or more IHSC seems to indicate submaximal effort on the part of the subject being tested." Only one repetition is performed for each HSC test.

For more information on HSC tests, see: Berryhill B, Osborne P, et al. Horizontal Strength Changes: An Ergonomic Measure for Determining Validity of Effort in Impairment Evaluations, a Preliminary Report. *Journal of Disability*, 1993, 3 (1-4),143-148.

HSC High Near Lift: The vertical height is 60" and horizontal position 20".

HSC Torso Lift: The vertical height is 15" and the horizontal position is 25".

HSC Floor Lift: The vertical height is 6" and the horizontal position is 0".

Isometric Tests

The isometric test category allows you to perform static strength evaluations for push and pull strength and to evaluate the lift strength of one arm. Tests in the isometric category are similar to NIOSH lift tests, but do not have normative comparisons. For more information on specific tests, see the Multimedia Help System.

Default Test Settings

At the bottom of the Static Strength Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Set this to record data in pounds, kilograms force or newtons. Factory default is pounds.

Reps: Set this for the number of repetitions for each test. Two repetitions are required for coefficient of variation (CV) calculation. Factory default is three.

Test Time: Controls the length of time for data recording. It can be set from four seconds to 10 seconds. The factory default is five seconds.

Ready Time: Allows you to exclude ready time data from statistical calculations, such as the "ramp-up" of force at the beginning of the test. Factory default is two seconds.

Rest Time: Allows you to set a predetermined amount of time for the examinee to rest between repetitions. The software automatically counts down rest time after each repetition. Factory default is 0.

Threshold: This sets the amount of force that must be applied to the gauge before the software begins collecting repetition data. This reduces false starts while the patient is getting positioned.

Start: This allows you to use manual start, which requires you to press the "Start" button in the test screen before repetition data can be collected, or automatic start that begins collecting repetition data when the threshold is crossed.

Primary Stat: Determines whether the maximum force or highest mean force is used for CV calculations. Factory default is Highest Mean.

Selecting Static Strength Tests

From the available test list, click on the header bar to select all available tests within the category or click on the box beside a test to select the individual test.

As tests are selected, they are placed into the Test Sequence Queue. You can then perform tests individually or make them part of a larger exam sequence.

1. To open an individual test in the Test Sequence Queue, double click on the test name in the queue.
2. To run a sequence of tests in the queue, click on the "Play" button at the bottom of the Test Sequence Queue.

Strength Gauge Zero Calibration

Tracker Version 5 Software prompts for a zero calibration of the static strength gauge every 24 hours. This helps insure the accuracy of the data you collect by accounting for temperature changes or electronic drift.

1. When the zero calibration screen appears, make sure there is no pressure on the gauge.
2. Click the "Zero" button.

⚠ Warning: If the gauge does not calibrate correctly, or values vary more than 5% from previous calibrations, contact JTECH Customer Service.

Static Strength Testing Screens

Test Screen Buttons

These buttons operate in the same manner for all static strength testing screens.

Exclude Button

This button excludes repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up rep to prepare the examinee or if the examinee's hand slips, etc. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams.

Delete Buttons

The Delete button removes the data for a repetition, such as if a test was inadvertently started without you or the patient being ready. The Delete All button is used to remove all the repetitions for a test.

1. To delete a single rep, highlight the completed repetition and click the Delete button.
2. To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Additional Buttons

Multimedia Help: Click this button to access the Multimedia Help System for patient positioning and instrument placement.

Context Help: Click this button to see help information related to the Static Strength Testing screen.

Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

Wireless Instrument Battery Status

The battery status indicators for Echo Wireless Instruments are located at the top right of the testing screen. Only battery status indicators for instruments utilized with the test are displayed.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

To see which instrument the battery status indicator is for, place the cursor on the status indicator.

Data Interruptions

If the data transfer between the instrument and software is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

If communications are lost between an instrument and the software for more than one second, the symbol at the right appears in place of the battery status symbol. The instrument transceivers have a buffer that maintains and resends data packets to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

To delete a repetition, highlight the repetition and click on the Delete Repetition button.

Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using Tracker instruments. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The cursor is placed in the first data box when the screen is opened. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

NIOSH Testing Screen Features
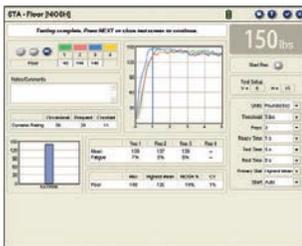
Features of the NIOSH Static Strength Testing screens are described from left to right across the top, then bottom left to right:

Top Row

Rep Data: The maximum force achieved for each repetition is displayed. To exclude or delete a repetition, click on the repetition value and click the Exclude or Delete button.

Notes/Comments: Any comments or observations about the test can be entered here.

Dynamic Rating: These values use the Highest Mean to indicate the theoretical load a patient may be able to lift dynamically on an occasional basis (Blankenship, 1990). Frequent and constant values are derived from the occasional lift value using ratios from the Dictionary of Occupational Titles, 1991. Actual dynamic lifting ability should be verified using dynamic lifting tests.

Force Graphs: These graphs are displayed in real-time as force is applied to the strength gauge. The dark blue vertical line indicates the end of ready time.

Force Readout: Displays the numerical value of force as it is applied to the gauge.

Start Rep: This button is used if the start default is set to manual. Click the button and have the examinee begin the test. The software will begin recording data as soon as the threshold is crossed. The button is disabled if the automatic start setting is selected.
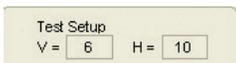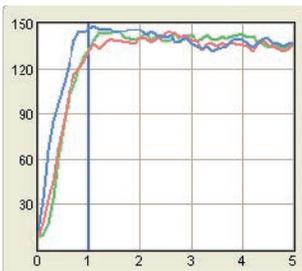
Test Setup: This area indicates the vertical positioning of the gauge handles (V) from the platform deck and horizontal positioning of the attachment (H) from the examinee's medial malleoli. The Arm Lift requires entry of the V and H values as they are examinee specific. For the Arm Lift, click on a box and enter a value.

Settings: This area allows you to change the settings at the Static Strength Test Selection screen. Settings changed at the test screen only apply for the specific test performed with the current patient. Changing settings here does not change the system defaults.

Bottom Row

Comparison Graph: Compares results of the current test with previously performed tests.

Statistics: *Mean* is the average of the force exerted from the end of ready time to the end of the test.

> *Fatigue* is the percent of difference between the highest force value during test time and force at the end of the repetition.
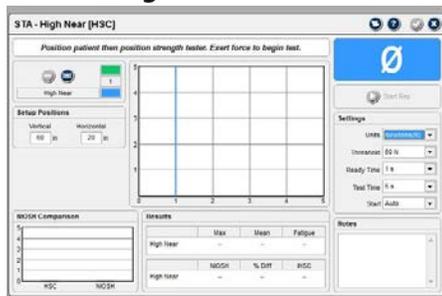>
> *Max* is the highest force from all the repetitions from the test.
>
> *Highest Mean* is the highest mean value from all the repetitions in the test.
>
> *NIOSH %* is based on the highest mean and indicates how the examinee compares to NIOSH normative data with 50% representing average strength.
>
> *CV* is the coefficient of variation, a consistency measure, which is the standard deviation divided by the mean. Two repetitions are required for calculation. A CV less than 15% is considered consistent.

HSC Testing Screen Variations

The Horizontal Strength Change (HSC) testing screens function in the same manner as the NIOSH testing screen with several variations:

Number of Repetitions: The HSC screen only allows one repetition to be entered in accordance with the published research.

No Dynamic Rating: The HSC test is a validity test for NIOSH lifting effort and no published values are available for dynamic lifting predictions.

Graph Comparison: Instead of comparing the current HSC test to previous HSC tests, the graph compares the current test with its companion NIOSH test.

Statistics: The maximum force, mean force and fatigue are displayed. Additional statistics are:

> *NIOSH:* This is the highest mean value from the companion NIOSH lift test.
>
> *% Diff:* This is the percent of difference between the HSC test and its companion NIOSH test.
>
> *IHSC:* This area displays if the demonstrated horizontal strength change is appropriate or inappropriate. "Yes" indicates the strength change is inappropriate.

Isometric Testing Screen Variations

Like the HSC testing screens, the isometric testing screens resemble the NIOSH lifting screens with several variations:

Test Setup: Only the vertical height of the gauge handles is documented.

No Dynamic Rating: Adequate research was not found to determine dynamic predictions for the isometric tests.

Statistics: No normative values for calculating reliable population percentiles are available.

Static Strength Gauge Full Calibration

JTECH recommends yearly weight calibration of your gauge to insure accuracy. Calibration should be performed sooner if the gauge is dropped or if inaccurate readings are suspected.

ℹ Notice: For information on factory calibration, contact JTECH Customer Service.

1. From the System drop-down, select Full Calibrate and Static Gauge.
2. Make sure there is no weight or force on the gauge and click the Zero button.
3. Enter the amount of weight you are using to calibrate the gauge in the Weight field and set the units.
4. Suspend the gauge by the handles and hang the weight from the gauge. With the weight suspended, click the "Calibrate" button.

⚠ Warning: If your gauge does not calibrate correctly or if calibration values using the same amount of weight vary more than 5% from previous calibrations, contact JTECH Customer Service.
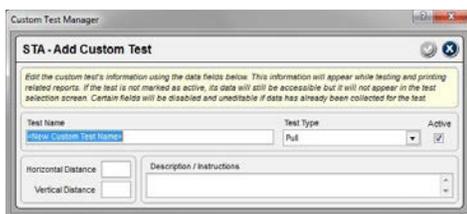
Custom Tests

Managing Custom Tests
Tracker Version 5 software allows you to create and use custom static strength testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, edit, delete and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Test Name: Enter a unique name for the test that will be displayed in test selection form and on reports.

Test Type: Use this drop-down to designate whether the subject pushes or pulls on the static strength gauge.
Horizontal Distance: Enter a value in this text box if a horizontal distance for foot placement from the gauge attachment point is specified.
Vertical Distance: Enter a value in this text box if a height measurement from the base or floor to the gauge handle is specified.
Description/Instructions: Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

Chapter 15

Isometric

Isometric Strength Testing

This Isometric Instrumented section is used in conjunction with the IsoTrack testing platform to evaluate strength in a variety of ways: Isometric muscle testing for motor deficits and loss of muscle strength, static strength testing for lifting capacity, and isometric functional position strength testing. Isometric functional position tests are typically categorized under static strength and are created by the user as custom tests.

Selecting the Type of Test

When the Isometric Testing button is selected from the instrumented categories, the ISO Test Selection form is displayed. The form automatically defaults to the last type of test performed, either muscle test or static strength.

1. To select muscle tests, the Muscle Test button at the top of the test selection form must be selected. The header at the top of the selection form reads "ISO - Muscle Test Selection" when the Muscle Test button is selected.
2. To select static strength tests and custom functional position tests, the Static Strength button must be selected. The header at the top of the form reads "ISO - Static Strength Test Selection" when the Static Strength button is selected.
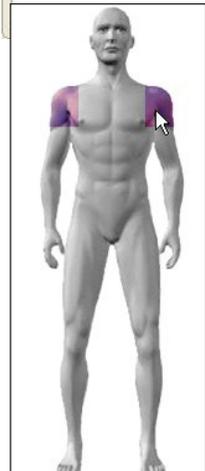
Isometric Muscle Testing

When Isometric Muscle Testing is selected, Tracker Version 5 Software provides three test selection methods depending on the purpose for testing. Region is used to select muscle tests based on joint motion, such as elbow flexion. Nerve Root and Peripheral Nerve methods allow you to pick tests based on muscle innervation levels. Regardless of how a test is selected, the actual test, elbow flexion for example, is the same.

Region

Region organizes tests according to anatomical location and joint motion. It is the most commonly used method for selecting tests.

1. Select the Muscle Testing button at the Isometric Test Selection screen.
2. Make sure the Region radio button is activated under Selection Method.
3. On the muscle testing model, click on the joint for testing. For scapular, cervical and trunk muscle tests, move the cursor over the middle of the model and click on the highlight.
4. After clicking on the joint, select the test or tests you want to perform from the Available Tests list. Click on the header to select all the tests for the joint or click on a box to select an individual test.
5. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.

Click on joint for testing, then select the motion for testing from the Available Tests list

Nerve Root

This option allows you to select tests based on a specific spinal nerve root. Two key uses of this method are evaluating strength loss from an electrodiagnostically identified nerve root lesion (such as for impairment rating) and for evaluating strength loss in a nerve root distribution to aide in diagnosis, track progress or establish the need for more advanced testing procedures.

Because of the redundant nature of the human nervous system, some muscle tests are available for more than one nerve root. For more specific identification of nerve root level and motor function, see the AMA *Guides to the Evaluation of Permanent Impairment*, 5th edition.

Select the nerve root level using the spine graphic, then choose muscle tests from the Available Tests list.

1. Select the Muscle Testing button at the Isometric Test Selection screen.
2. Make sure the Nerve Root radio button is activated under Selection Method.
3. From the "spine" graphic, click on the nerve root level for testing. The nerve root level is displayed as you move the cursor over the spine graphic.
4. After clicking on the root level, select the test or tests you want to perform from the Available Tests list. Click on the header to select all the tests for the nerve root or on a box to select an individual test.
5. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.
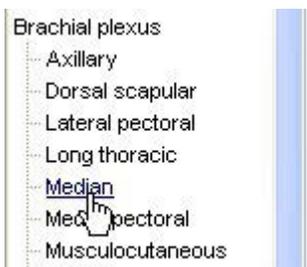

Peripheral Nerve

This option allows you to see and select tests associated with specific peripheral nerves. This method facilitates test selection when a peripheral nerve lesion has been identified through other diagnostic procedures and for diagnosing loss of motor function due to peripheral nerve dysfunction.

1. Select the Peripheral Nerve radio button under Selection Method.
2. Click on the peripheral nerve for testing.
3. Select the test or tests you want to perform from the Available Tests list.
4. As tests are selected, they are entered in the Exam Sequence Queue. You can select additional muscle tests to create an exam sequence or perform muscle tests individually as you select them.

Additional Test Selection Information

When a test is highlighted in the Available Tests list, information about the involved muscles and innervation are displayed in the "Involved Muscles" area of the Test Selection form. The key muscle responsible for the motion is displayed in the Primary Muscle field. Some tests, however, do not have a primary mover. Additional muscles involved in the motion are displayed in the field below.

Custom Isometric Tests

The Manage Custom Tests button in the Isometric Test Selection form is used to create custom tests. Clicking the button brings up the Custom Test Manager form. See the chapter on Custom Tests in this manual for more information on creating custom tests.

Isometric Muscle Testing Defaults

At the bottom of the Isometric Muscle Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference. The defaults displayed when muscle testing is selected are only for isometric muscle testing.

Units: Shows force values in terms of pounds, kilograms force or newtons.

Reps: Sets the number of repetitions per muscle test from 1-4. At least two repetitions are required for coefficient of variation (CV) calculation.

Sequence: Allows you to control the sequencing of side-to-side comparison tests. The LLRR setting performs the test's left side repetitions then moves to the right, while LRLR alternates between left and right until repetitions are complete.

Rest Time: Sets the software to automatically count down a rest period between repetitions.

Threshold: Sets the baseline that must be crossed for the software to begin collecting data for the repetition. This allows for positioning the subject of the muscle test without inadvertently beginning a test.

Primary Stat: Determines whether the maximum force from the repetitions or the average of the repetitions is used for statistical calculations, such as bilateral difference and CV.

Test Time: This default controls the duration of the isometric muscle tests and can be set at 4, 5, 6, 8 or 10 seconds.

Ready Time: Determines the "ramping" time allowed at the beginning of the test for the subject to reach full force and is used to exclude the submaximal force from the mean force calculation for the repetition. Ready Time can be set at 1, 2, or 3 seconds.

Zero Calibration

Tracker Version 5 software prompts for zero calibration every 24 hours. Zero calibration helps insure the accuracy of data collected by accounting for temperature changes and "electronic" drift that affect electronic measuring instruments.

1. When the zero calibration screen appears, remove attachment from the IsoTrack.

2. Click the "Zero" button.

⚠ Warning: If your IsoTrack does not zero calibrate or if zero calibration values fluctuate more than 5% from previous calibrations, contact JTECH Customer Service. Testing with an uncalibrated device may result in inaccurate muscle testing data.

15.4

Isometric Muscle Testing Screen Features

The Isometric Muscle Testing Screen allows you to automatically collect data from IsoTrack muscle tests and to control data collection and statistical calculation options.

Test Screen Buttons
At the top left of the screen are three buttons that allow you to exclude a repetition from statistical calculations, delete a single repetition, or delete data for all repetitions. On the upper right are buttons for opening the Multimedia Help system, opening the Context Help and for exiting the screen.

Exclude Button

Highlight the repetitions to exclude and click the Exclude button.
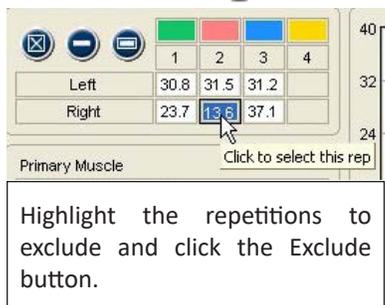
The Exclude button allows you to exclude repetitions from statistical calculations without deleting the data. You may wish to exclude a repetition if it was performed as a warm-up rep to prepare the patient or if some other event occurs that skews the rep's data. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams. To exclude rep, highlight the repetition and click the Exclude button. You can reverse the action by highlighting an excluded repetition and clicking the Exclude button.

Delete Button
You can use the Delete button to remove a repetition for any reason. The Delete All button is used to remove all the repetitions for a test.

 1. To delete a single rep, highlight the completed repetition and click the Delete button.

 2. To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Setup Button
This button near the top of the page opens the Isometric Test Setup form with detailed information on how to adjust the IsoTrack for the test being performed. See the Isometric Muscle Testing Setup section of this chapter for more information.

Additional Buttons

 Multimedia Help: Click this button to access the Multimedia Help system for patient positioning and instrument placement.

 Context Help: Click this button to see help information related to the Muscle Testing screen.

 Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

 Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

Battery Status

The battery status indicator for the IsoTrack wireless transceiver is located at the top right of the testing screen.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)
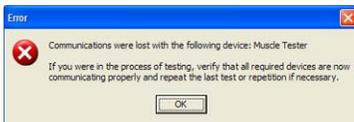
Data Interruptions

If the data transfer between the IsoTrack and the software is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

If communications are lost between the IsoTrack and the software for more than one second, a Lost Communication symbol appears in place of the battery status symbol. The IsoTrack transceiver has a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds, the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.


Manual Data Entry

If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using the IsoTrack. When an MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

The software places the cursor in the first data box according to the default settings (A or B, Left or Right) you have chosen when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

The cursor starts in the first data box according to the default settings, in this case the right side

Torque Curve Graphs
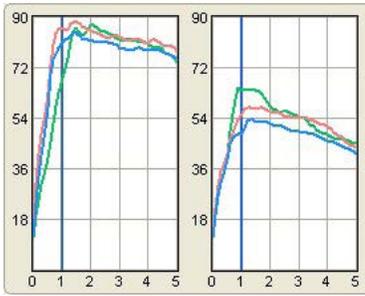
The graphing of torque curves is one of the features that separates Tracker from other muscle testing systems. As you perform an isometric muscle test, the torque curves are automatically plotted in real time. Bilateral tests show left and right graphs, unilateral tests, such as cervical flexion, have a single graph.

In addition to helping you visualize the test results, torque curves provide a wealth of important information. For example, torque curves help you identify consistency of the patient's effort by displaying overlapping graphs and showing "cogwheeling" or "ratcheting," which are significant fluctuations in the curve. You can also visualize the patient's proprioceptive response by how quickly the curve ramps up to peak force and the muscle's ability to sustain a contraction by the curve's plateau.

Results

This area provides statistical calculations based on the repetitions performed. Bilateral tests show left and right side data.

Mean: This is the average of the force exerted against the IsoTrack from the end of Ready Time to the end of the test.

Fatigue: This is the difference between the peak force and force at the end of the Test Time. If force drops below the threshold before the test ends, fatigue will be 100%.

Max: The highest of all repetitions for the side.

Average: The average of all the highest force achieved for each repetition for the side.

CV: Coefficient of variation provides a means of evaluating consistency of force exerted.

Cons: Effort is considered consistent if the CV is 14% or less, with a "Yes" displayed in the column.

Diff: Shows the side-to-side difference for bilateral tests based on the Primary Stat default selected.

Muscle Test Grading

Tracker Version 5 Software allows you to quickly assign grades to muscle tests, which are required when performing impairment rating examinations. Grades can also be assigned when the patient is too weak to provide resistance for a dynamometer muscle test. There are also some muscle tests that cannot be effectively performed with a dynamometer, requiring those tests to be graded.
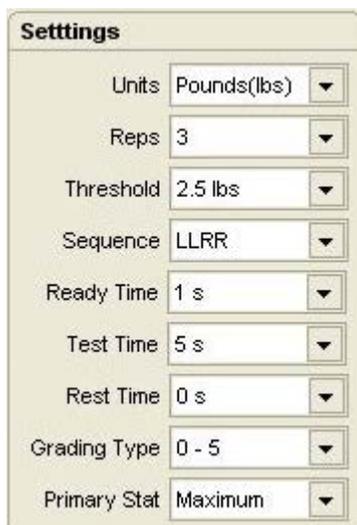
For more on muscle test grading see the AMA *Guides*, 5th edition.

History
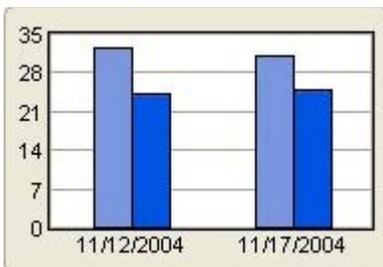
This graph shows the current test results, using the Primary Stat, compared to previous tests performed with the patient. If multiple previous tests were performed, a scroll bar is activated for the graph. This unique feature of Tracker allows you to see patient progress instantly.

Settings

The defaults can be reset for individual isometric muscle tests at the Isometric Muscle Testing screen. Defaults changed at the Isometric Muscle Testing screen only apply to the test that is open for the current patient. Changing defaults at the Isometric Muscle Testing screen does not affect the global defaults set at the Test Selection screen.

⚠ Warning: Changing defaults at the Muscle Testing screen after test data has been recorded may result in the loss of data. Before data is lost, a warning screen will appear.

Isometric Muscle Testing Setup Form
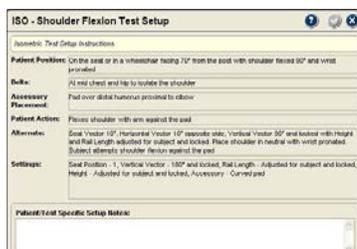
The note field allows you to describe specific adjustments made for the subject, such as rail length, to make retesting more repeatable.

When the Setup button is pressed in an Isometric Muscle Testing screen, the Setup form for the test is displayed. Setup forms provide information about patient positioning, accessories used and adjustment parameters for the IsoTrack Multi-Vector Alignment system.

Patient Position: Describes how to position the subject for the test being performed.
Belts: Describes stabilization belts and attachments used to achieve the most reliable test results.
Accessory Placement: Describes positioning of accessories, such as testing pad, on or near the subject for the test being performed.
Settings: Describes the seat and load cell adjustments for the IsoTrack Multi-Vector Alignment system.

> *Seat Position:* Seat location in or out from the pole read from labels on seat adjustment bar.
> *Vertical Vector:* Rotational adjustment of the load cell in the vertical plane from 0° (straight up) to 180° (straight down) read from label on the side of the load cell.
> *Rail Length:* Load cell distance out from the pole, typically is patient specific in isometric muscle testing, read from the ruler on the IsoTrack adjustment arm.
> *Height:* Load cell distance up from the platform read from ruler on pole.
> *Accessory:* Pad or handle used to perform the test.

Left/Unilateral: Describes specific settings for left-side bilateral tests or for unilateral tests like neck flexion.
> *Seat Vector:* Rotation of the seat read from label under the seat. The setting includes rotational degrees and left or right directions.
> *Horizontal Vector:* Rotation of the IsoTrack adjustment arm around the pole read from label on adjustment arm around pole. The setting includes rotational degrees and left or right directions.

Right: Specific setting for the right side of bilateral tests. No information is displayed in this area for unilateral tests.
Alternate: Describes setup options for performing test using an alternate position. Alternate positions are not available for all tests.

15.8

Performing Isometric Muscle Tests

ℹ Notice: Click on the Multimedia Help button to see test protocols with patient positioning. Use the Setup button to see physical setup parameters for the IsoTrack.

1. Have subject move joint through full range of motion. If the subject is too weak to complete a full range of motion, determine if an isometric test can be performed. If subject is unable to provide resistance, assign a grade of 3 or less.
2. If subject can provide resistance, position the subject for the test and adjust the IsoTrack to match the required setup parameters.
3. Have subject exert force according to the test protocol and maintain isometric contraction for the required duration of the repetition.
4. Complete all repetitions. If patient is unable to complete all the repetitions or the full duration for a repetition due to fatigue or pain, enter the reason in the Notes section.

Clinical Note: According to Evans in Instant Access to Orthopedic Physical Assessment:
1. Painful and strong is equated with minor muscle or tendon lesions.
2. Painful and weak is equated with major muscle or tendon lesions.
3. Painless and weak equates with neurological injury or complete rupture of the muscular attachment.
4. Painless and strong is normal.

Static Strength
Static Strength Testing

According to research, static strength testing is a quick, reliable and relatively safe method of evaluating strength in work-oriented postures. In post-offer of employment testing, static strength testing can be used to verify that the employee does have the strength capacity to meet the job requirements. Static strength testing is also a valuable adjunct to functional capacity evaluations (FCEs) for helping to determine consistency of effort and providing reasonable expectations for demonstrated dynamic lifting abilities.

Another application of Tracker Version 5 Isometric Testing software and the IsoTrack Multi-Vector Alignment system is isometric functional position testing. These test are designed by the user to replicate functional positions that require application of force. For example, an overhead pulling position replicating a chopping motion might be administered as part of a post-offer for firemen.

Static Strength Testing Precautions
The following are general guidelines to minimize risk of injury to the subject. Note that these guidelines are not comprehensive and cannot cover all conditions. Final responsibility for the risk of injury to the test subject lies with the examiner.
1. Force increase generated by the examinee should be gradual, especially for testing of the spine, and in the presence of a musculoskeletal injury, instability, or recent surgery. A warm-up repetition consisting of 50% maximum effort is recommended prior to each test. A warm up rep allows you to evaluate the examinee's ability and to look for signs of discomfort or distress before attempting a maximum effort.
2. The examinee should be CLOSELY observed during testing for any evidence of pain or discomfort. The test should be stopped immediately if the examinee experiences an increase in pain, shortness of breath or dizziness.
3. Contraindications to testing include: uncontrolled hypertension, severe respiratory problems, herniated disk, osteoporosis, structural weakness of the abdominal or thoracic wall, unsplinted fractures, unhealed torn or sutured tendons, or any other condition that would be exacerbated by the performance of isometric contraction or Valsalva maneuver.
4. In the event the examinee is illiterate or does not understand English, be sure the examinee is made aware of all the inherent risks of testing and understands the freedom to stop the test at any time.

Static Strength Testing Accuracy
Several general rules must be followed to insure repeatability and accuracy when using isometric strength testing.

1. Have the examinee build force gradually until the maximum effort is achieved and held. In general, maximum force should occur in about two seconds. Standard protocols require at least three seconds of data collection after the maximum force is achieved for valid statistical determinations.
2. Use standardized instructions to insure consistency.
3. Make sure examinee does not jerk the gauge at the beginning of the test, but steadily increases force to maximum effort.
4. Be aware of the examinee's posture and joint angles.
5. Provide a brief rest of at least 30 seconds between repetitions if a limited number of tests and repetitions is performed and up to two minutes if a large number of tests and repetitions (15 or more total repetitions) is performed.
6. Test the least strenuous positions first: Arm Lift, High Near Lift, High Far Lift, Leg Lift, Torso Lift, Floor Lift.

15.10

Examinee Instructions

Studies have shown that static strength testing results vary according to the instructions given to the examinee. Therefore, greater consistency will result if the instructions are standardized as follows:

Tell the examinee: "We are going to measure your strength. These tests are isometric strength tests, which means that you will be exerting force, but not moving anything. We will measure your average maximum force with this apparatus. For each test, please follow these instructions:

1. The test will be demonstrated for you. If you do not understand, please ask questions.
2. For each test, you will have up to three attempts. The first is practice, try it at 50% effort. This attempt is a warm-up and will help you determine if you know what is expected.
3. Next you will be given one or two more attempts on each test. Try to do your best on each attempt.
4. When a test is given, I will say, 'Ready … set … go.' For the period of the test, you should apply consistent, maximum effort. If at any time during the test you experience pain or discomfort, you should stop the test immediately. The computer will beep when the test is finished.
5. Let me demonstrate the test for you.
6. Are there any questions?
7. Let's begin the first test. 'Ready … set … go.'"

Adapted from *Preemployment Isometric Strength Testing Methods*, Dr. Andrew Jackson FACSM, June 1990, p 37.

Static Strength Test Selection Form

When the Static Strength button is selected, the ISO Static Strength Test Selection form is displayed. This form allows you to select tests from three standard categories - NIOSH, HSC, and Isometric - and from custom tests you create.

Selecting Static Strength Tests
From the available test list, click on the header bar to select all available tests within the category or click on the box beside a test to select the individual test.

As tests are selected, they are placed into the Test Sequence Queue. You can then perform tests individually or make them part of a larger exam sequence.

NIOSH Tests

NIOSH static strength tests were developed by Keyserling and published in the NIOSH (National Institute of Occupational Safety and Health) *Work Practices Guides for Manual Lifting*. NIOSH tests are based on standard industrial heights and include a normative comparison.

Positioning for NIOSH lifts includes two variables:

Vertical is the distance from the top of the platform to the static lifting handle. Vertical distance with the IsoTrack is the Height setting and is read from the ruler on the pole. The vertical height setting is predetermined for all NIOSH tests except the Arm Lift, which is subject specific. See the test's Setup form for specific height adjustments.

The Vertical Vector load cell adjustment should be left unlocked for all lift tests. This allows the load cell to pivot slightly if necessary on off center pulls by the subject.

Horizontal is the distance from the center of the medial malleoli (ankle bone) to the attachment point for the lifting handle. Horizontal distance with the IsoTrack is the Rail Length and is read from the ruler on the IsoTrack adjustment arm. Horizontal rail length is 18.5" for all NIOSH static strength tests. The medial malleoli are aligned over the inch markers on the IsoTrack base to achieve the required horizontal position. See the test's Setup form for alignment information.

❶ Notice: The diagonal line through the 0" marker on the IsoTrack base is used for the NIOSH Floor Lift.

Clinical Note: The Torso Lift test is stressful on the low back and, therefore, potentially poses the most risk for examinees with low back pain. Exercise extreme caution with this test and do not use if there is any reason for concern.

HSC Tests
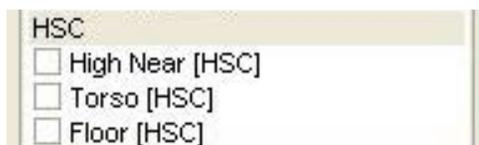
Horizontal Strength Change (HSC) tests are used to validate effort on the NIOSH lift tests. Effort validation is particularly important when static lifting is part of an FCE.

According to published research (Berryhill, et al), a 33% strength change can be expected when the lift attachment position is moved 10 inches closer or 10 inches farther away. HSC testing (also called "inappropriate horizontal strength testing") modifies two NIOSH tests (Torso Lift and High Near Lift) by moving the attachment farther away and one (Floor Lift) by moving it closer.

A horizontal strength change is considered inappropriate on the farther tests if the strength reduction is less than 33% of the corresponding NIOSH tests. The closer test is considered inappropriate if the strength increase is greater than 33%. According to the research conclusion, "A score of 2 or more IHSC seems to indicate submaximal effort on the part of the subject being tested."

For more information on HSC tests, see: Berryhill B, Osborne P, et al. Horizontal Strength Changes: An Ergonomic Measure for Determining Validity of Effort in Impairment Evaluations, a Preliminary Report. Journal of Disability, 1993, 3 (1-4),143-148.

Like the NIOSH tests, the HSC horizontal rail length is preset to 18.5" and foot placement is adjusted using the inch markers on the IsoTrack base to achieve the horizontal position.
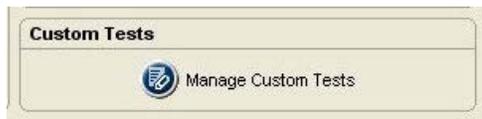
Isometric Tests

The isometric category allows you to perform standard static tests for push and pull strength and to evaluate the lift strength of one arm. Tests in the isometric category are similar to NIOSH lift tests, but do not have normative comparisons. For more information on specific tests, see the Multimedia Help System.

Custom Tests

This category is only displayed if you have created at least one Isometric Static Strength test. Custom tests can be created by clicking the Manage Custom Test button at the bottom of the form or using the Customize drop-down menu at the top of the screen. For more information on creating custom tests, see the Custom Test section of this manual.

Default Test Settings

At the bottom of the Static Strength Test Selection screen are the Default Test Settings. These are global default settings that you can adjust to your testing preference.

Units: Set this to record data in pounds, kilograms force or newtons. Factory default is pounds.

Reps: Set this for the number of repetitions for each test. Two repetitions are required for coefficient of variation (CV) calculation. Factory default is three.

Test Time: Controls the length of time for data recording. It can be set from four seconds to 10 seconds. The factory default is five seconds.

Ready Time: Allows you to exclude ready time data from statistical calculations, such as the "ramp-up" of force at the beginning of the test. Factory default is two seconds.

Rest Time: Allows you to set a predetermined amount of time for the examinee to rest between repetitions. The software automatically counts down rest time after each repetition. Factory default is 0.

Threshold: This sets the amount of force that must be applied to the gauge before the software begins collecting repetition data. This reduces false starts while the patient is getting positioned.

Start: This allows you to use manual start, which requires you to press the "Start" button in the test screen before repetition data can be collected, or automatic start that begins collecting repetition data when the threshold is crossed.

Primary Stat: Determines whether the maximum force or highest mean force is used for CV calculations. Factory default is Highest Mean.

IsoTrack Zero Calibration
The software periodically prompts for a zero calibration of the IsoTrack load cell to account for temperature changes or electronic drift. To zero calibrate, remove any attachment from the load cell and click the Zero button. If the load cell does not calibrate correctly, or values vary more than 5% from previous calibrations, contact JTECH Customer Service.
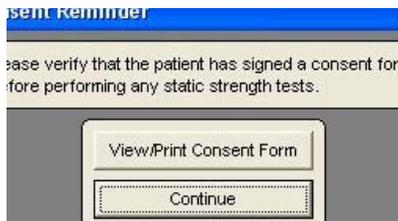
Static Strength Testing Screens
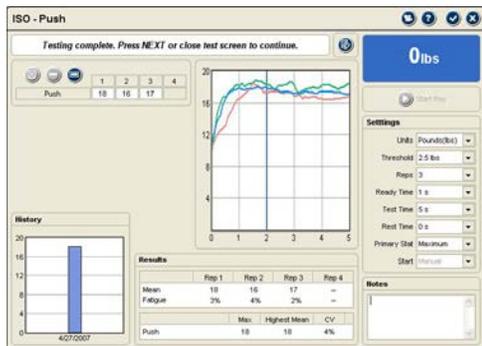
ISO Static Strength Testing screens feature some basic elements that are all the same, such as function buttons and force curve graphs, and specific elements for the type of test. The following describes standard elements within the screens. Test-specific screen elements are described at the end of this section.

Consent Form Warning

The first time static strength testing is performed with a subject, the software displays a consent form warning. You can select "Print Consent Form" to print a copy of the JTECH consent form provided with the software for the subject to sign or click continue to begin testing without printing a consent form. JTECH recommends reviewing risks and having the subject sign a consent form, either the one provided or your own, prior to testing.

Test Screen Buttons

These buttons operate in the same manner for all static strength testing screens.

Exclude Button

This button excludes repetitions from statistical calculations without deleting the data. Repetitions may be excluded if you performed a warm-up rep to prepare the examinee or if the examinee's hand slips, etc. Maintaining records of all repetitions, even practice reps, can be important in medicolegal exams.

Delete Buttons

The Delete button removes the data for a repetition, such as if a test was inadvertently started without you or the patient being ready. The Delete All button is used to remove all the repetitions for a test.

 1.   To delete a single rep, highlight the completed repetition and click the Delete button.

 2.   To delete all repetitions, click the Delete All button and click "Yes" at the warning screen.

Setup Button

This button accesses the Test Setup form, which provides examinee positioning and IsoTrack setup parameters for the test.

Additional Buttons

 Multimedia Help: Click this button to access the Multimedia Help system for patient positioning and instrument placement.

 Context Help: Click this button to see help information related to the Static Strength Testing screen.

 Save and Close: Click this button to exit the screen and save the data. This option is only available when information on the screen has changed.

 Close without Saving: Click this button to exit the screen without saving. If information on the screen has changed, a warning screen will appear.

15.14

Battery Status

The battery status indicator for the IsoTrack wireless transceiver is located at the top right of the testing screen.

 Green - full charge

 Yellow - less than one hour left (complete the exam and charge the instrument)

 Red - less than 20 minutes left (complete the test and charge the instrument)

Data Interruptions

 If the data transfer between the IsoTrack and the software is interrupted, delayed or out of synchronization, a Ø symbol is displayed in the force value area of the testing screen. This prevents incorrect data from being displayed.

Loss of Communications

 If communications are lost between the IsoTrack and the software for more than one second, a Lost Communication symbol appears in place of the battery status symbol. The IsoTrack transceiver has a buffer that maintains and resends data information to account for temporary data interruptions and loss of communications. If communications are restored in less than five seconds, data for the repetition will be complete and accurate. If communications are lost for more than five seconds, the software will provide a warning screen and prompt you to delete the data for the repetition and retest the repetition.

Manual Data Entry

 If you have purchased the optional Manual Data Entry (MDE) module, you select and open test screens for entering data just as you do when using the IsoTrack. When a MDE test screen is opened, the words Manual Data Entry are displayed in the upper right-hand box.

 The software places the cursor in the first data box according to the default settings (A or B, Left or Right) you have chosen when the screen opens. Type in the test data and click the Tab button to move to the next data box. When you have completed all the entries you wish to make, click the Save and Close button.

Other Testing Screen Features
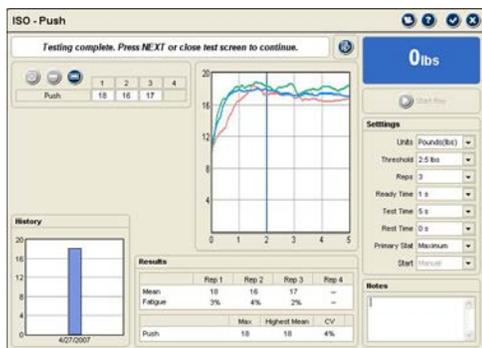
Rep Data: The maximum force achieved for each repetition is displayed. HSC tests only allow one repetition to conform with published protocols.

Force Graphs: These graphs are displayed in real-time as force is applied to the IsoTrack load cell The dark blue vertical line indicates the end of ready time.

Force Readout: Displays the numerical value of force as it is applied.

Start Rep: This button is used if the start default is set to manual. Click the button and have the examinee begin the test. The software will begin recording data as soon as the threshold is crossed. The button is disabled if the automatic start setting is selected.

Settings: This area allows you to change the default settings for the current test with the current subject. Changing settings here does not change the system defaults.

Notes/Comments: Any comments or observations about the test can be entered here.

History: Compares results of the current test with previously performed tests, except for HSC tests. HSC tests graph a comparison with the corresponding NIOSH lift test.

Results: This provides statistical calculation based on the type of test performed. See the specific test type below for more information.

Notes: This field is used for entering notes about the test, such as pain reports by the subject.

NIOSH Testing Screen Features

Two important features in the NIOSH screen are the Dynamic Rating and Results data presented.

Dynamic Rating: These values use the Highest Mean to indicate the theoretical load a patient may be able to lift dynamically on an occasional basis (Blankenship, 1990). Frequent and constant values are derived from the occasional lift value using ratios from the Dictionary of Occupational Titles, 1991. These are only theoretical values and actual dynamic lifting ability should be verified using dynamic lifting tests.

Results

Mean is the average of the force exerted from the end of ready time to the end of the test.

Fatigue is the percent of difference between the highest force value during test time and force at the end of the repetition.

Max is the highest force from all the repetitions from the test.

Highest Mean is the highest mean value from all the repetitions in the test.

NIOSH % is based on the highest mean and indicates how the examinee compares to NIOSH normative data with 50% representing average strength.

CV is the coefficient of variation, a consistency measure, which is the standard deviation divided by the mean. Two repetitions are required for calculation. A CV less than 15% is considered consistent.

HSC Testing Screen Variations

The Horizontal Strength Change (HSC) testing screens function in the same manner as the NIOSH testing screen with several variations:

Number of Repetitions: The HSC screen only allows one repetition to be entered in accordance with the published research.
No Dynamic Rating: The HSC test is a validity test for NIOSH lifting effort with no published values for dynamic rating.
History: The graph compares the current test with its companion NIOSH test.

Results: The maximum force, mean force and fatigue are displayed. Additional statistics are:

NIOSH: This is the highest mean value from the companion NIOSH lift test.

% Diff: This is the percent of difference between the HSC test and its companion NIOSH test.

IHSC: This area displays if the demonstrated horizontal strength change is appropriate or inappropriate. "Yes" indicates the strength change is inappropriate.

Isometric Testing Screen Variations

Like the HSC testing screens, the isometric testing screens resemble the NIOSH lifting screens with several variations:

No Dynamic Rating: Adequate research or resources are not available to determine dynamic predictions for the isometric tests.
Results: The maximum force, mean force, fatigue and CV are displayed.

Weight Calibration

IsoTrack Weight Calibration

JTECH recommends yearly full calibration of your IsoTrack load cell to insure accuracy. Calibration should be performed sooner if inaccurate readings are suspected.

ℹ Notice: For information on factory recalibration, contact JTECH Customer Service at 800 985-8324, ext. 4 or customerservice@jtechmedical.com.

1. From the System menu, select Full Calibrate and IsoTrack. The last full calibration and factory calibration values (if loaded) are displayed for reference.
2. Remove any accessory from the IsoTrack load cell and click the "Zero" button.
3. Enter the amount of weight you are using to calibrate the IsoTrack load cell, including the weight of any attachment used, in the Weight field and set the units. JTECH recommends 75 lb. of weight for calibration.
4. Hang the weight from the IsoTrack load cell and click the "Calibrate" button.

ℹ Notice: If calibration values with the same weight differ more than 5% from previous calibrations or if your IsoTrack load cell does not calibrate correctly, contact JTECH Customer Service.

Custom Tests

Managing Custom Tests

Tracker Version 5 software allows you to create and use custom muscle testing protocols. This section describes the procedures for managing custom tests.

You can open the Custom Test Manager using the Customize drop-down menu at the top of the software screen or by clicking the Edit - Manage Custom Tests button in the Test Selection form.

1. When the Custom Test Manager form is displayed click on the Muscle Testing button on the left side.
2. Use the buttons on the right side of the Custom Test Manager form to add, delete, edit and arrange custom tests.

Adding and Editing Custom Tests

Use the Add button to create a new custom test. To edit an existing test, highlight the test name in the custom test list and click the Edit button. A Custom Test Data form is displayed for entering parameters for the custom test.

Use the up and down arrows to arrange tests in the order you want them displayed in the Test Selection form.

Test Name: Enter a unique name for the test that will be displayed in test selection form and on reports.
Test Type: This drop-down is used to select whether the custom test is categorized under muscle testing or static strength (lifting, pushing, pulling). Some of the setup option change depending on the test type.
Active: Click this check box to make the custom test active so it is displayed in the test selection form. Uncheck this box to keep the test available in your database without displaying it in the Muscle Test Selection form.

Muscle Testing Setup Options

Region: Select from the drop-down list to place the test within an anatomical region.
Bilateral Test: Check this box if the test is bilateral (side-to-side comparison) such as shoulder flexion.
Grade Only: Check this box if the test cannot be performed with a dynamometer and you only want to assign a grade.
Primary Muscle: Select from the drop-down to display the primary muscle and innervation in software forms and data reports.
Secondary Muscle 1-3: Use these drop-downs to select up to three secondary muscles involved in the motion.

Static Strength Setup Options

Push/Pull - Select from the drop-down list to designate whether the subject pushes or pulls on the load cell during the test.
IsoTrack Setup Section: This section contains text boxes used to describe the setup of the IsoTrack testing station for the test. This information is used to help insure repeatability and consistency of tests and is not printed on reports.
Description/Instructions: Use this text field to type in basic testing instructions using up to 250 characters.

Deleting Custom Tests

The software does not allow you to remove a custom test that has been used with a patient. If a custom test has been used with a patient, mark it "Inactive" using the Edit button. If the test has not been used, highlight the name in the list and click the Delete button.

Chapter 16

Hand

This module is designed to facilitate efficient documentation of hand and upper extremity evaluations.

When the Hand module is enabled, the "Hand" button at the main Perform Exam screen is enabled. Clicking the Hand button opens the module.

Hand
Select this to document hand evaluation components such as hand function, skin and nail condition, wounds, burns, and edema.
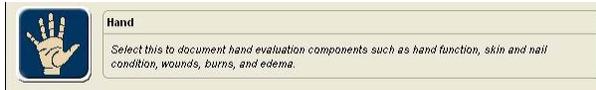
Using the Hand Module
The Tracker Version 5 Hand module provides an easy and versatile way to document conditions relating to the hand and to generate reports.

The "category" buttons are used to navigate in the Hand module. Clicking on a button opens a documentation form. The Edema button also provides access to forms for documenting circumferential measurements, volumetric measurements and lymphedema measurements.

1. Click on the Hand button in the Perform Exam screen.
2. Select a "category" button for the type of evaluation. You can use the category buttons to easily move forms.

HND - Hand Evaluation
Select a hand evaluation category to open the corresponding test form.

Category

| Observations | Function | Skin | Nails | Edema |
| Wound | Scar | Burn Scar | Splint | |
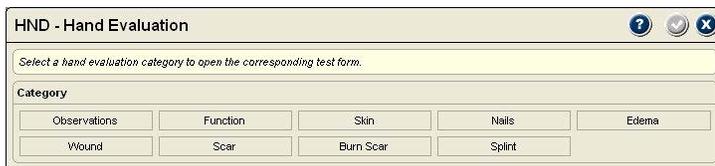
ℹ Notice: When the hand module is opened, the "category" navigation buttons are always displayed to allow you easy movement from one form to the next.

Quick-Click Documentation
Tracker Version 5's Quick-Click feature uses check boxes and drop down lists that allow you to document with point-and-click and fill-in the-blank simplicity. Many of the selection lists are editable to match your needs and terminology.

Editing List Items

Most of the list boxes and many drop down boxes allow you to add items, delete items and edit items based on your requirements. If list items can be edited, an Edit button appears in the upper right-hand portion of the screen.

1. Click on the Edit button.
2. When the Edit List Items screen appears, select the "List Type" using the drop down box.
3. To add a list item, click the Add button and enter the item title or description.

To delete a list item, highlight the item in the list and click the Delete button.

To edit a list item, highlight the item in the list, click on the Item Title box, and edit the item.

4. Click the OK button to save and exit or the Cancel button to exit without saving.

Observations

The Observations form is automatically displayed when you open the Hand and UE module. You can use the form to document your observations or click on another category button.

The Observations form is divided into left and right sides. It features our Quick-Click selection boxes with four categories: Deformities, Atrophy, Hair and Other.

1. To select items for documentation, click on the associated check box.
2. To deselect an item, click on the check box and the check mark is removed.
3. To mark all the categories for the side as normal, click the Mark All As Normal check box at the top of the form. You can also mark all the categories as normal, then change only the ones where abnormalities are observed.
4. Enter notes or comments by clicking on the Notes text field and typing.
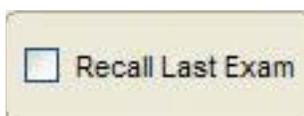
Recall Last Exam   This time-saving feature allows you to mark all the categories for a side as normal. You can then edit just those categories that present with conditions.

All the list boxes in Observations are editable. Follow the instructions at the beginning of this chapter in Edit List Items or use the software help system by clicking the Help button.

Function

The Function form opens when the Function category button is clicked. The function form provides six categories for documentation: ADL, Work Status, Safety, Fine Motor, Gross Motor and Prehension Patterns.

Only the Prehension Patterns list is editable and allows you to select more than one item. The other categories are "scored" by moving the slider or clicking on a number. The interpretation of the selected number appears in the box to the right of the slider. This scoring allows you to create bar graph reports indicating progress for the patient and third parties.

1. Select the Left or Right button to identify the side for documentation.
2. Move the slider or click on a number to score the category. If the slider is at the NR (Not Rated) position, no data is collected for reports.
3. Prehension Pattern is selected by clicking on the check box beside an item or items in the list. To deselect an item, click on the check box to remove the check mark. See the beginning of this chapter or the software help system for information on editing the Prehension Pattern items list.
4. Enter notes or comments by clicking on the Notes text field and typing.

Skin

The Skin form is used to document skin presentations such as color, texture, temperature, sweat and wrinkle response.

The Skin form has buttons on the top to identify if documentation is for the left or right side. It automatically opens on the left side. The form features our Quick-Click selection boxes with categories for Color, Texture, Temperature, Sweat, Ninhydrin Sweat Test and the Wrinkle Test. You can document for volar and dorsal surfaces of the hand for all categories except Sweat and Wrinkle Test. Only items in the Color and Texture list boxes are editable using the edit feature. (See Edit List Boxes at the beginning of this chapter or click on the Help button in the software).

The form also provides the ability to document the actual measured skin temperatures in degrees Fahrenheit or Celsius.

1. To select items for documentation, click on the associated check box.
2. To deselect an item, click on the check box to remove the check mark.
3. If you measured the skin temperature, click on the Temperature text box and type in the temperature. You can change the temperature units by clicking on the drop-down arrow and highlighting your selection.
4. Enter notes or comments by clicking on the Notes text field and typing.

Nails

The Nails form provides Quick-Click documentation of Blanching, Color, Appearance, and Conditions. It includes buttons for documenting left or right side and automatically opens on the left side. Quick-Click selection boxes for Color, Appearance and Conditions are editable using the Edit List Boxes feature. (See the beginning of this chapter or the software Help system). Blanching is documented using the check boxes to indicate "Yes" or "No."

The form features a Mark All As Normal check box to streamline documentation.

To speed up documentation, click "Mark All As Normal" then edit areas where conditions exist.

1. To select items for documentation, click on the associated check box.
2. To change a selection, click on the check box to remove the check mark.
3. Clicking "Mark All As Normal" checks Blanching as "Yes" and checks "Normal" or "None" in all check box lists for all fingers of the side. Unclicking the "Mark All As Normal" check box removes all the check marks.
4. Enter notes or comments by clicking on the Notes text field and typing.

Edema

The Edema selection contains five forms for documenting Presentation, Hand Circumferential Measurements, Arm Circumferential Measurements, Volumetric, and Lymphedema.

The form always opens to Presentation. Other Edema forms are opened by clicking on the subcategory buttons, such as Hand Circumferential.

16.4

Presentation

This form allows you to document left and right edema presentations without clicking a button. It also features "Recall Last Exam" check boxes for each side to streamline documentation. Edema Presentation includes categories for Location, Description and Severity. All the check box lists are editable. To speed up re-exams, you can use the "Recall Last Exam" check box then edit the categories only where the condition has changed.

1. To select items for documentation, click on the associated check box. See the beginning of this chapter or the software Help system for information on editing the list items.
2. To deselect an item, click on the check box to remove the check mark.
3. Clicking the Recall Last Exam check box places check in all the same places as the last exam. This allows you to see the patient's condition at the last exam and to make documentation more efficient. For example, if the patient's condition is unchanged, your documentation is complete. If there are changes in the condition, click those items to remove the check and click on the items that describe the current condition.
4. Enter notes or comments by clicking on the Notes text field and typing.

Hand Circumferential

This form is used to document circumferential edema measurements of the hands and fingers. It provides a variety of locations to meet your needs.

Involved Side
Clicking on a check box to identify the involved side controls the difference calculation. If either the Left or Right boxes are checked, the uninvolved side is subtracted from the involved side and the difference is displayed. If Both is checked, the smaller value is subtracted from the larger to produce the difference. If no check box is selected, the difference is not calculated.

Recall Uninvolved

The Recall Uninvolved check box streamlines documentation of re-exams and provides more stable values for comparison. The check box is only active if the uninvolved side was documented in the previous exam. Clicking the check box recalls the data into the current form.

Units

This option allows you to set the units of measure in millimeters, centimeters or inches. Millimeters does not allow you to enter values less than whole numbers, centimeters accepts values to one decimal place and inches accepts values to two decimal places.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. Click on left or right location text box and type in the measurement.
2. You can use the Tab key to advance through the text boxes in the form.
3. You cannot enter values into the Diff (difference) boxes.
4. To enter notes, click on the Notes box and type.

Definitions
MCP: Metacarpal phalangeal joint
PPx: Proximal phalanx
IP: Interphalangeal joint of thumb
PIP: Proximal interphalangeal joint of fingers
MPx: Middle phalanx
DIP: Distal interphalangeal joint of the finger

Arm Circumferential

This form includes two standard locations for elbow and wrist and up to four additional customizable locations. The optional location selections can be edited using the Edit List Box feature of the software (see the beginning of this chapter or the software Help system for more information).

Involved Side
Clicking on a check box to identify the involved side controls the difference calculation. If the Left or Right boxes are checked, the uninvolved side is subtracted from the involved side and the difference is displayed. If Both is checked, the smaller value is subtracted from the larger to produce the difference. If no check box is selected, the difference is not calculated.

Recall Uninvolved

The Recall Uninvolved check box streamlines documentation of re-exams and provides more stable values for comparison. The check box is only active if the uninvolved side was documented in the previous exam. Clicking the check box recalls the data into the current form.

Units

This option allows you to set the units of measure in millimeters, centimeters or inches. Millimeters does not allow you to enter values less than whole numbers, centimeters accepts values to one decimal place and inches accepts values to two decimal places.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. To enter data for the wrist or elbow, click on the text box for the measured side and enter the data.
2. To enter data for custom locations, click on the drop-down arrow and select the location. Click on the left or right text box and enter the measurement data.
3. You can use the Tab key to advance through the text boxes for entering measurement data.
4. To enter notes, click on the Note field and type.

Volumetric

This form provides documentation of volumetric measurement for the arms, hands and an additional custom location.

Involved Side

Clicking on a check box to identify the involved side controls the difference calculation. If the Left or Right boxes are checked, the uninvolved side is subtracted from the involved side and the difference is displayed. If Both is checked, the smaller value is subtracted from the larger to produce the difference. If no check box is selected, the difference is not calculated.

Recall Uninvolved

The Recall Uninvolved check box streamlines documentation of re-exams and provides more stable values for comparison. The check box is only active if the uninvolved side was documented in the previous exam. Clicking the check box recalls the data into the current form.

Units

This option allows you to set the units of measure in milliliters or ounces. Milliliters does not allow you to enter values less than whole numbers, ounces accepts values to one decimal place.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. For Arm or Hand, click on left or right location text box and type in the measurement.
2. For a custom location measurement, click on the drop-down arrow and highlight your selection in the list. To add selections to the list, see Editing List Items at the beginning of this chapter or the software Help system.
3. You can use the Tab key to advance through the text boxes in the form.
4. You cannot enter values into the Difference boxes.
5. To enter notes, click on the Notes box and type.

Lymphedema

This form is used to document lymphedema measurements of the upper extremities and hand.

Involved Side
Clicking on a check box to identify the involved side controls the difference calculation. If the Left or Right boxes are checked, the uninvolved side is subtracted from the involved side and the difference is displayed. If Both is checked, the smaller value is subtracted from the larger to produce the difference. If no check box is selected, the difference is not calculated.

Recall Uninvolved

The Recall Uninvolved check box streamlines documentation of re-exams and provides more stable values for comparison. The check box is only active if the uninvolved side was documented in the previous exam. Clicking the check box recalls the data into the current form.

Units

This option allows you to set the units of measure in millimeters, centimeters or inches. Millimeters does not allow you to enter values less than whole numbers, centimeters accepts values to one decimal place and inches accepts values to two decimal places.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. You can record lymphedema measurements taken above the elbow, above the wrist and locations about the hand. To document a measurement above the wrist or elbow, click on the location box to identify the measurement location. You can add additional measurement locations to the list by clicking on the Edit button.
2. Click on the associated text box and enter a value.
3. You can use the Tab key to advance through the text boxes in the form.
4. You cannot enter values into the Difference boxes.
5. To enter notes, click on the Notes box and type.

16.8

Wound

The Wound form allows you to document up to five wounds on each side. The form provides documentation options for using Quick-Click to create detailed descriptions or to use the RYB classification system described by Cuzzell.

Number Buttons

The number buttons are used to open forms for up to five wounds per side. The location should uniquely identify each wound so that re-exams are consistently documented for the same wound number.

Recall Last Exam

This feature streamlines the re-exam process and helps insure that you document correctly for each wound if more than one was evaluated. Location information, selected check boxes, and size data are all entered into the form as they were recorded for the last exam. You can then keep the information as is or edit it to complete the current exam. Unchecking the button removes all the imported previous exam data from the current form.

Units

This option allows you to set the units of measure in millimeters, centimeters or inches. Millimeters does not allow you to enter values less than whole numbers, centimeters accepts values to one decimal place and inches accepts values to two decimal places.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. For location, place the cursor in the text box and type.
2. To complete the categories, click on items in the check box lists. You can select as many items in each category as necessary to describe the wound and interventions. To add selections to the lists, see Editing List Boxes at the beginning of this chapter or the software Help system.
3. To enter data for size measurements, you can type information into the boxes or use the up or down arrows. To adjust decimal values, place the cursor to the right of the decimal point and use the up/down arrows. The area calculation is the wound length times the width.
4. To enter notes, click on the Notes box and type.

Scar

The Scar form provides documentation capabilities for up to five scars on each side. The form allows you to use Quick-Click documentation to create detailed descriptions and to enter size measurements.

Number Buttons

The number buttons are used to open forms for up to five scars per side. The location should uniquely identify each scar so that re-exams are consistently documented for the same scar number.

Recall Last Exam

This feature streamlines the re-exam process and helps insure that you document correctly for each scar if more than one was evaluated. Location information, selected check boxes, and size data are all entered into the form as they were recorded for the last exam. You can then keep the information as is or edit it to complete the current exam. Unchecking the button removes all the imported previous exam data from the current form.

Units

This option allows you to set the units of measure in millimeters, centimeters or inches. Millimeters does not allow you to enter values less than whole numbers, centimeters accepts values to one decimal place and inches accepts values to two decimal places.

1. To change the Units, click on the drop-down arrow and highlight your selection in the list.

Entering Data

1. For location, place the cursor in the text box and type.
2. To complete the categories, click on items in the check box lists. You can select as many items in each category as necessary to describe the scar. To add selections to the lists, see Editing List Boxes at the beginning of this chapter or the software Help system.
3. To enter data for size measurements, you can type information into the boxes or use the up or down arrows. To adjust decimal values, place the cursor to the right of the decimal point and use the up/down arrows. The area calculation is the length times the width.
4. To enter notes, click on the Notes box and type.

Burn Scar

The Burn Scar form allows you to document up to five burn scars on each side. The form allows you to use Quick-Click documentation to create detailed descriptions and to enter size measurements.

Number Buttons

The number buttons are used to open forms for documenting each burn scar. The location should uniquely identify each burn scar so that re-exams are consistently documented for the same burn scar number.

Recall Last Exam

This feature streamlines the re-exam process and helps insure that you document correctly for each burn scar if more than one was evaluated. Location information, selected check boxes, and size data are all entered into the form as they were recorded for the last exam. You can then keep the information as is or edit it to complete the current exam. Unchecking the button removes all the imported previous exam data from the current form.

Mark All As Normal

This check box feature makes documentation more efficient as you near the end of care. Checking the box marks all the normal check boxes in each category. You can accept all as normal or edit categories that are not back to normal.

Percent Body Area

This is a simple text box you can use for entering the percentage of body area covered by the burn scar.

Score

This box displays the sum of the checked category list items for Pigmentation, Height, Pliability and Vascularity.

Entering Data

1. For location, place the cursor in the text box and type.
2. To complete the categories, click on items in the check box lists. In the Burn Scar form you can only select one item per category. Items cannot be added to the lists in this form.
3. To enter notes, click on the Notes box and type.

Splint

Splinting is an important element in hand therapy and the Splint form provides efficient Quick-Click documentation.

The Left and Right buttons are used to identify the splinted side. The form automatically opens on the left side.

1. To select items for documentation, click on the associated check box.
2. To change a selection, click on the check box to remove the check mark.
3. To edit items in the selection lists, click on the Edit button. See Edit List Items at the beginning of this chapter or the software Help system for more information.
4. Enter notes or comments by clicking on the Notes text field and typing.

Chapter 17

Functional Module

Functional Module
This module is designed to facilitate efficient documentation of functional capacity evaluation components, such as work postures (positional tolerances), work activities, manual material handling (lifting), dexterity and cardiovascular fitness.

When the Functional module is enabled, the "Functional" button at the main Perform Exam screen is enabled. Clicking the Functional button opens the module.

Functional

Select this for documenting functional testing such as material handling, work postures, work activities, dexterity and cardiovascular condition.
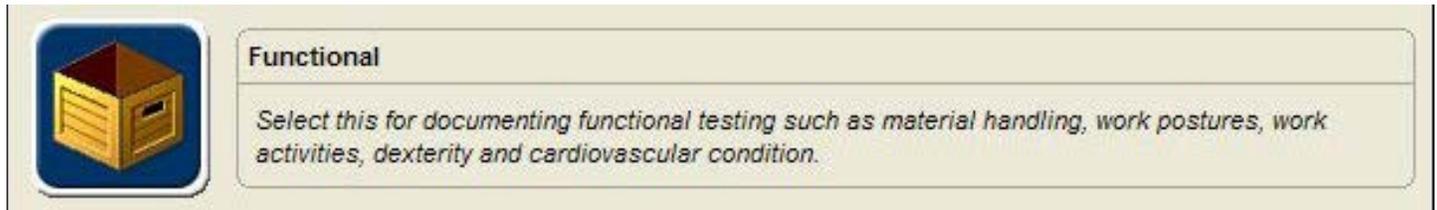
Using the Functional Module
The Tracker Version 5 Functional module provides an easy and versatile way to document functional testing results and to generate reports.

The "category" buttons, displayed above the Current Test Sequence queue, are used to open Tracker 5 Test Selection forms for the category. When tests are selected from a category, they are displayed in the Current Test Sequence queue. For more information on using the Current Test Sequence queue see Chapter 4 of this manual.

1.   Click on the Functional button in the Perform Exam screen.
2.   Select a "category" button to select tests from the category.
3.   Track heart rate response during the evaluation using the Tracker wireless heart rate monitor.
4.   Time up to five postures in the background during distraction activities and tests.

Buttons in the top row, left to right, are Work Activities, Manual Material Handling and Work Postures. Second row buttons, left to right, are Dexterity and Cardiovascular.

Wireless Heart Rate Tracking

Tracker Version 5 features an optional real-time wireless heart rate tracking system. The system allows you to monitor heart rate responses to tests and activities throughout the evaluation. It also provides a warning cue when the maximum allowable heart rate (based on the percentage of maximum heart rate you select) is exceeded.

Heart Rate (bpm) displays the current heart rate in large numbers for easy viewing.

HRmax is derived from the birth date you entered in the patient file. It is calculated using the formula: 220 - age = HRmax. If no value is displayed, go to the Patient File section of the software and enter a birth date for the subject.

Warning % is the threshold percentage of the HRmax selected for the subject. If this percentage of the HRmax is exceeded during the evaluation a warning sounds. The software defaults to 85%. To change the percentage:

1. Click on the Warning % box.
2. Highlight the new percentage to select it from the drop-down list.

HRwarning is the heart rate value that results by multiplying the HRmax by the Warning %. If the HR warning heart rate is exceeded during the evaluation, a warning alarm sounds.

When using the wireless heart rate monitor, make sure the strap is correctly positioned on the subject and the transmitter is turned on. Click on the Heart Rate display to establish communications with the wireless heart rate monitor.

ℹ Notice: If the heart rate warning sounds, take immediate precautions to ensure the safety of the subject.

Data Interruptions and Loss of Communications

If the data transfer between the wireless heart rate monitor and software is interrupted, delayed or out of synchronization, a Ø symbol is displayed instead of the heart rate. This prevents incorrect heart rate data from being displayed.

If communications is lost for more than five seconds, you will need to resolve the cause, such as the subject moving out of transmission range. Then, click on the Ø symbol in the heart rate display.

You can hide the Heart Rate Monitor and Posture Tracking window by clicking the up arrow below Posture Tracking. To reopen the items, click on the down arrow.
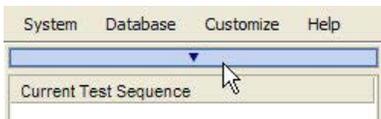
Heart Rate Transceiver Battery Status

The battery status indicator for the IsoTrack wireless transceiver is located at the top right of the testing screen.

Green - full charge

Yellow - less than one hour left (complete the exam and charge the instrument)

Red - less than 20 minutes left (complete the test and charge the instrument)

Posture Tracking
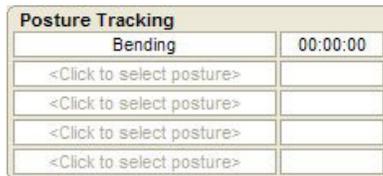
This innovative feature allows you to time positional tolerances in the background while the subject performs other activities. This allows you to use distraction to help evaluate the subject's reliability of effort and symptom reports. Tracker also allows you to perform direct testing of postures. For more information on direct testing, see the Postures section later in this chapter.

Tracker Software allows you to run up to six posture timers at once. You can also change the postures you wish to time throughout the evaluation. Use the Clear Selection option from the Posture Tracking drop-down list to clear the Posture Tracking box.

Selecting Postures
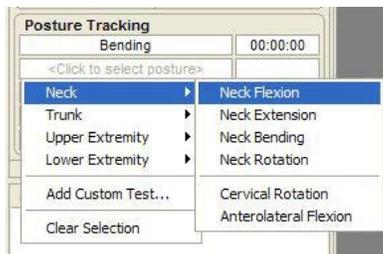
1. Click on the posture timing box to display a list of anatomical posture categories.
2. Highlight an anatomical category from the list.
3. From the resulting list, highlight a posture to select it. Postures above the dividing line are standard Tracker selections. Postures below the dividing line are custom postures.
4. Select up to five postures, one in each box, for evaluation. You can change any or all of the postures any time during the evaluation.

ⓘ Notice: Selecting a posture does not start the timer. You must manually start the timer. The timers only run when you are in the Perform Exam section of the software.

Starting, Pausing and Stopping Posture Timers

The Posture Tracking time boxes display the cumulative time logged for the posture. For example, if you timed sitting for five minutes while the subject completed forms, 15 minutes during the intake interview and three minutes during dexterity testing, the timer box displays 00:23:00.

1. With a posture displayed in the posture box, click on the time box to start the timer.
2. To pause or stop a timer when it is running, click on the time box. You can start and stop a timer as often as necessary during an evaluation.

Creating Custom Postures
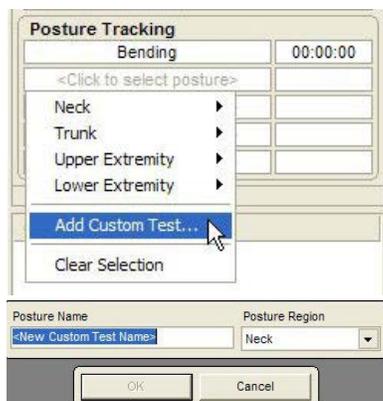
Tracker Software provides a method for quickly adding custom postures for evaluation into the software. To add postures on the fly during an evaluation, use Posture Tracking boxes.

1. Click on a Posture Tracking box.
2. From the drop-down list, click on Add Custom Test.
3. When the custom form appears, enter the posture name in the Posture Name field.
4. Click on the Posture Region drop-down and select the appropriate region for the posture. This feature allows better organization and faster selection of postures.
5. Click OK to exit and save the posture. Custom postures are automatically selected when they are created.

Use the Posture Selection form and Posture Testing forms to identify job requirements. See Work Postures in this chapter for more information.

Functional Testing Overview

The Tracker Functional Testing module was designed to operate in a consistent manner with operations on all the forms. You will find some differences in the forms that are dictated by the varying types of tests. This section describes the consistent elements you will find throughout the Functional Testing module.

Test Selection Forms

Other than background timing of postures, all tests are selected using the category buttons and the test selection forms. When a test is selected, it is placed in the Current Test Sequence queue where it can be run immediately or included in a test sequence or protocol. For more information on operation of the Current Test Sequence queue, see Chapter 4 of this manual.

Functional test selection forms all have three primary elements:
1. Available tests
2. Custom test management
3. Current exam results

Available Tests

Available Test list boxes display both standard tests included with the Tracker Functional module and custom tests you create. Available Tests may be broken down into categories, such as occasional lifting and frequent lifting in material handling, and subcategories to facilitate test organization or to indicate differences in the testing forms.

1. Click on the check box next to the test you want to administer.
2. To select all tests within a subcategory, click on the subcategory header bar.
3. To remove tests from the Current Test queue, uncheck the check box for the test. To remove all the tests in a subcategory, click the header bar to uncheck all the subcategory tests.

Custom Test Management

The Custom Test button in test selection forms allows you to manage custom tests in the software. Clicking the button takes you to the Manage Custom Tests form. There you can add custom tests, delete unused custom tests, edit custom test information and make tests active or inactive. For more information on using the Custom Test Manager, see Chapter 2 of this manual.

Current Exam Results

This area of the test selection forms provides a quick look at results for tests that were completed within the functional testing category. For more detail on specific tests, you should go to the testing screen or review information in data reports.

Functional Testing Forms

All the forms in Tracker for documenting functional tests follow a consistent design concept. The forms provide a great deal of flexibility so you can use them like a worksheet for capturing detailed information or as a cursory overview with selective documentation. The choice is yours, depending on your style and needs.

Setup

This area varies slightly depending on the type of test being performed. The Job Req. checkbox is the consistent element in all Functional Testing forms. This box is used to designate if the test is required by the job. Checking the box allows you to automatically create a Job Requirement Comparison in the Analyze Data section and to generate comparison reports for employers and referrals.

Other elements in the Setup area can include a weight goal for lifting tests, distance for carry tests, frequency for activities, etc. Data is entered using text boxes and drop-down menus.

Pre Test

This area is used to document the heart rate and pain level of the subject before starting the test.

1. If you purchased the JTECH wireless heart rate monitor, simply click on the Heart Rate button to capture the heart rate. If the heart rate monitor is not installed, click on the box and enter the heart rate.

2. Enter the pretest pain level by clicking on the box and selecting from the drop-down. You can also "Tab" to the box and type in a value. For 0.5 increments, press the number button twice.

Test Data

Data is entered for tests using data lists and data entry boxes.

1. Some forms, such as manual material handling, use the + button to open a data row for entering data.

2. Other test forms, such as non material activities, feature established lists. With these forms, click on a list item to open the data entry boxes for the item.

3. The "Stopwatch" feature is available for many tests. It can function as a simple timer, such as cardiovascular forms, or to actually score the test as with some dexterity tests. To start the Stopwatch, click the "Play" arrow button and the "Stop/Pause" button to pause or stop the timer.

Using the edit feature allows you to complete the test before determining the subject's ability level. You can then highlight the corresponding list item to click the ability check box.

4. Check boxes are included in the data rows as necessary to allow you to identify ability levels. Occasional lifting forms, for example, include check boxes for identifying the occasional weight, the maximum weight and the infrequent weight. Most activities, on the other hand, have an "Ability" check box to mark the highest ability level completed.

5. Heart rate and pain level boxes are available for each data row. If the wireless heart rate monitor is installed, you can capture the heart rate by clicking the heart rate button.

6. You can edit the data row at any time by highlighting the list item.

Post Test

This area is used to document the reason for stopping the test and "cool-down" heart rate and pain level.

1. Click on the Reason for Stopping drop-down and select an item from the list. You can also click on the list and type in a reason, however, it will only be saved for the current test with the current patient.
2. After the cool-down period, usually 1-3 minutes depending on the test, capture the heart rate and record the pain level.

 The Edit button in the testing forms is used to edit the Reason for Stopping drop-down list. Click on the button to access the Edit Items form.

Determinations
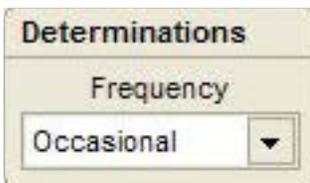
This area allows you to determine the subject's ability based on test performance. The determination may include drop-downs for frequency and physical demand level (PDL) depending on the type of test. Simply click the drop-down and select from the list.

Totals or Calculations
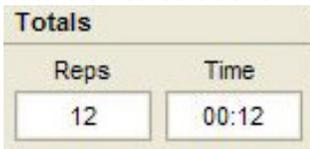
Some forms include totals for items such as time, repetitions, etc. Others may include calculations, such as total work in frequent lifting forms, depending on the type of test.

Observations

 This is a special, innovative item available for all functional testing forms. It streamlines the process of documenting your observations during the test and reduces the amount of notes or comments required. Clicking the Observations button activates the Observations form for the test being conducted. See the Observations Forms section below for more information.

Notes/Comments
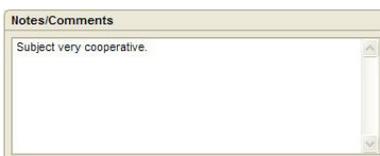
All functional testing forms include a Notes/Comments field. Click on the field and type in any notes or comments you wish to make about the test or the subject's performance.

Other Buttons

The buttons in the upper right part of the functional testing forms perform the following functions:

 Multimedia Help: Click this button to play video help describing the test.

 Onboard Help: Click this button to display a help file describing the function of elements within the form.

 Save and Close: Click this button to save the data and close the test form. This button is only active if you have changed data within the form.

 Close without Saving: Click this button to close the form without saving data.

Observations Forms

Observations forms are accessible from all functional testing forms. These forms include standard documentation elements, such as Pain and High Effort Behavior, and test specific elements like Lifting Strategy for manual material handling tests. Observations forms are associated with a functional testing form and can only be accessed from that testing form.

1. Click the Observations button to access the Observations form.

ⓘ Notice: All of the items in Observations forms "check box" lists are editable. Click on the Edit button to bring up the Edit List Items form.

Pain Behaviors

Pain behaviors are categories by body region for faster, easier selection.

1. Click on the button for the body region where the pain behavior was displayed, such as Facial for wincing.
2. Click on the check box associated with the pain behavior.

ⓘ Notice: You can select pain behaviors from any or all of the categories. However, the software only allows you to select a total of 15 pain behaviors for a test.

High Effort Behaviors

High effort behaviors are documented because they can provide indications of the subject's effort and participation level in a functional evaluation. JTECH provides a list of high effort behaviors that you can edit and increase. If you add more items than can be displayed in the box, the software places a scroll bar on the right side of the list.

1. Click on the check box associated with a demonstrated high effort behavior.

Signs

This area is used to document other types of signs that are useful in determining effort and participation. The questions in the list vary slightly depending on the type of test. "Yes" is the expected answer to the questions. "Undetermined" allows you to indicate that you looked for the sign, but were unable to distinguish if it was present or not.

1. Click the check box that represents your answer to indicate the presence of a sign.
2. You must answer at least one question for Signs to be included in reports.

Range of Motion and Movements

Range of Motion

☑ Normal
☑ Minimal loss
☐ Moderate loss
☐ Severe loss

Movements

☑ Consistent
☑ Consistent with distraction
☑ Inconsistent
☐ Inconsistent with distraction

These two options are only available for work activities, posture, dexterity and cardiovascular tests. They allow you to quickly document if range of motion is compromised and the consistency of movement patterns demonstrated. List items are editable for both boxes.

1. Click the check box indicating the range of motion and movement pattern consistency.

Lifting Strategies

Lifting Strategies

☐ Leg lift
☐ Torso lift
☐ Leg-torso lift
☐ Straight leg lift
☐ Reaching

This option is only available for manual material handling tests. It allows you to document the lifting method used by the subject during the test. This can help you when making recommendations, such as a lifting education program prior to returning to work. The list items are editable.

1. Click the check box indicating the lifting strategy employed.

Work Activities

Work Activities Forms

Work Activities documents functions like reaching or bending that are not sustained for prolonged periods. An activity sustained for a prolonged period should be evaluated as a posture.

For selection activities are divided into Repetitive and Timed/Distance categories. Repetitive includes activities like reaching or bending, timed includes kneeling, and distance includes climbing.

Custom Tests

You can create custom work activity tests based on repetitive, timed or distance. Active custom tests are displayed under the custom header in the available test lists.

1. To create a custom test, click on the edit button.
2. Complete the custom test setup. For more information on creating custom tests, see Chapter 4 of this manual.

Units

US Standard or Metric unit selections apply to weight, distance, and height measurements. US Standard uses pounds for weight, feet for distance and inches for height. Metric uses kilograms for weight, meters for distance and centimeters for height.

Current Exam Results

Basic information about completed work activity tests is displayed at the bottom of the test selection form under Current Exam Results. The display includes the frequency goal, demonstrated ability and reason for stopping.

Repetitive Work Activities Forms

Work Activities forms function as worksheets for detailed documentation or for basic information depending on your needs or the needs of your referral source.

Data Entry

Repetitive activities forms use list items to enter test data. The Stopwatch can time activity performance, but is not required.

1. Click the list item representing the number of repetitions you want to document. The software defaults to 1-3 because that starting point allows you to verify the subject's ability to participate in the activity.
2. To identify the subject's demonstrated ability level, highlight the list item and click the ability check box.

Determinations are based on the subject completing the required repetitions without pain increase or difficulty.

No ability (Never): Completes only 0-3 repetitions.
Occasional: Completes 1-3 and 10X repetitions.
Frequent: Completes 1-3, 10X and 10X- Fast repetitions.
Constant: Completes 1-3, 10X, 10X - Fast and 200 repetitions. Constant can also be evaluated as a posture.

When the test is complete, assign a determination based on your interpretation of the subject's ability.

Timed Work Activities Forms

Timed activities forms use the Stopwatch to time performance of the required items within the activity test.

1. Highlight the list item to enter activity data.
2. Click the "Play" button for the Stopwatch when the subject begins the activity.
3. Click the "Pause/Stop" button for the Stopwatch when the subject stops or when the required time is reached. The software provides a "beep" when the suggested time for performing the item is reached.
4. Identify the highest ability for completed test activities to determine the subject's demonstrated ability level.

Kneeling Form

Kneeling is a timed form that includes items for kneeling on the left leg, the right leg, both legs and sitting on heels. Completion of all four items for 15 seconds each is usually used to determine the occasional kneeling ability. Frequent and constant kneeling ability is usually evaluated as a posture.

Balancing Form

Balancing is a timed form that includes items for left leg eyes open, right leg eyes open, left leg eyes closed, right leg eyes closed, balance beam forward and balance beam backward. There are also additional check boxes for Setup, Determinations and Strategy.

Setup and Determinations include slippery, moving, narrow and elevated surfaces. Slippery, moving and narrow may be based on the subject's ability to balance with eyes closed. Ability on elevated surfaces is evaluated using a balance beam.

Strategy is used to document how the subject maintains balance. It is evaluated at the beginning of the test during the "eyes open" items. Ankle strategy, where the ankle is used to correct and maintain balance, is the correct method. If a hip strategy is used, JTECH recommends ending the balance test and selecting a determination of never for balancing.

Possible determinations based on ability are:

Never (no ability): Cannot complete 30 seconds on each leg with eyes open or uses a hip strategy

Occasional: Completes 30 seconds on each leg with eyes open using an ankle strategy

Frequent: Completes 30 seconds each leg with eyes open and 15 seconds on each leg with eyes closed. Completion of eyes closed may also qualify subject for slippery, moving and narrow surfaces.

Constant: Completes eyes open, eyes closed and balance beam forward and back test items. Completion of the balance beam may qualify subject for elevated surfaces.

Stair Climbing

Stair climbing is a distance test and includes 1 Flight, 2 Flights, 5 Flights and 5X - Five Flights.

The Stair Climbing form includes a section that allows you to enter the number of steps in a flight and to pace the activity using steps/minute and a built-in metronome. The number of steps per flight can vary, but 20 can be used as an average.

Steps/minute controls the pace of the metronome. The metronome beeps at four times the steps/minute. It is designed for using a step bench and a stepping pattern where the first foot up, second foot up, first foot down, second foot down equals one step. The pace should be set at a rate that does not cause the subject to exceed the maximum heart rate.

Climbing also includes documentation for Rating of Perceived Exertion (RPE) using the Borg scale since a cardiovascular response is expected.

ℹ Notice: When evaluating frequent or constant ability, you can test directly to the item level, such as 5 flights for frequent, or break the test into segments using 1 flight, 2 flights and 5 flights. Segmenting the test allows you to document heart rate and pain level response at multiple points during the test.

Never (no ability): Cannot complete 1 flight.
Occasional: Completes 1 flight.
Frequent: Completes 5 flights.
Constant: Completes 5X - 5 flights.

Crawling

Crawling can be evaluated as a timed test or a distance test depending on the requirements. For timed testing, use the Stopwatch to time crawling. If a known distance is required, you can enter the distance as a requirement and evaluate against it.

Never (no ability): Cannot crawl for 30 seconds or required distance.
Occasional: Completes 30 seconds or required occasional distance.
Frequent: Complete 30 seconds plus 30 minutes or required frequent distance.
Constant: Evaluate as a posture.

17.12

Material Handling

Material Handling Forms

Material Handling documents lifting, carrying, pushing and pulling. Standard tests are provided in the software as well as the ability to create custom lifts and simulated lifts.

The selection form provides three testing categories: Occasional, Frequent, and Simulation. Occasional and Frequent indicate how often the lift is performed, Simulation is indicates positioning and material lifted. It can also be used for evaluating constant ability.

Custom Tests

You can create custom tests for all three categories. Occasional custom tests can also be divided by type: lift, carry, push or pull. Active custom tests are displayed under the custom headers.

1. To create a custom test, click on the Custom Test button.
2. Complete the custom test setup. For more information on creating custom tests, see Chapter 4 of this manual.

Settings

Extrapolations have the software extrapolate material handling abilities for different frequencies based on a test's results. For example, you can have the software extrapolate the subject's possible frequent and constant abilities based an occasional lift. While extrapolations can be useful in helping to determine a subject's effort level, JTECH strongly recommendations that a subject's ability should be based on actual testing to the required frequency rather than extrapolations.

DOT: From the Dictionary of Occupational Titles, this is the most conservative extrapolation. From the occasional ability the extrapolated values are frequent = 50%, constant = 20%.
Blankenship: This extrapolation falls in the middle. From occasional ability the extrapolated values are frequent = 66%, constant = 33%.
Snook: This extrapolation, which is derived from published research, is the most liberal. From the occasional ability the extrapolated values are frequent = 80%, constant = 55%.

Units

US Standard or Metric unit selections apply to weight, distance, and height measurements. US Standard uses pounds for weight, feet for distance and inches for height. Metric uses kilograms for weight, meters for distance and centimeters for height.

Current Exam Results

Basic information about completed material handling tests is displayed at the bottom of the test selection form under Current Exam Results. The display includes the weight goal, frequency, maximum load, heart rate, pain level and reason for stopping.

Occasional Test Forms

Occasional refers to the amount of time during a work day the subject spends performing the lift. It has different definitions depending on location and legal requirements. The Dictionary of Occupational Titles (DOT) defines occasional as being performed up to 33% of the day while California Work Comp defines occasional as up to 3 hours per day. The Tracker Functional Testing Module can be used with either definition.

Entering Test Data

Since the actual number of lifts and weights are not known for occasional material handling tests, the test forms use a + button to add data into the item list. This method allows you to use the form like a worksheet and document every lift attempt or to only document the occasional and maximum abilities.

1. Click the + button to open the data entry for a sequence.
2. Enter the information in the data boxes.
3. To edit data in a row or to check ability when the test is complete (occasional, maximum and infrequent check boxes), highlight the item in the list and edit the data.

Rating of Perceived Exertion (RPE)

RPE can provide an indication of the correlation between the subject's perceived exertion and the physiological response to the material handling test. RPE uses the Borg scale from 6-20, where 6 means no exertion and 20 means maximal exertion.

1. When a maximum lift ability is identified, make sure that lift sequence is highlighted in the item list.
2. Immediately after the lift is completed, capture or take the subject's heart rate and enter it into the Heart Rate data field.
3. Have the subject rate exertion from 6-20 using the Borg scale. Click the RPE drop-down and select the numeric rating.
4. The RPE comparison is displayed at the bottom of the form. The numeric rating is multiplied by 10 and compared to the subject's maximum heart rate at the end of the maximum lift. If the heart rate and RPE are within 15 points (+ or -) the match is yes. Otherwise the match is no.

Extrapolation

If you want the software to extrapolate the frequent and constant abilities from the identified occasional ability, click the check box. The extrapolation formula used is determined by the Settings selection in the Material Handling Test Selection form.

17.14

NIOSH Comparison
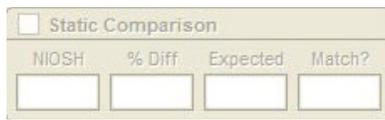
This option is only available for standard occasional lifts that have a corresponding NIOSH static lift. You must have NIOSH static lifting data in the software for the option to be active. If the option is active, click on the check box to make the comparison.

NIOSH: This is the highest value from the corresponding NIOSH static strength test.

% Dif: This is the percentage of difference between the NIOSH lift and the identified occasional ability for the current lift.

Expected: This is the expected difference between the NIOSH lift and the occasional ability based on work published by Keith Blankenship.

Match: This indicates if the comparison falls within the expected range.

Determinations
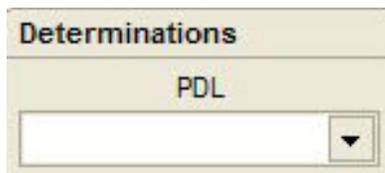
PDL (Physical Demand Level) is a classification system for material handling defined in the Dictionary of Occupational Titles (DOT). The system combines the amount of force exerted with the frequency of the exertion to create categories. The categories for occasional lifting are:

Sedentary: exerting negligible to 10 lbs of force.
Light: exerting 10-20 lbs of force.
Medium: exerting 21-50 lbs of force.
Heavy: exerting 51-100 lbs of force.
Very Heavy: exerting in excess of 100 lbs of force.

ℹ Notice: If the subject is unable to lift to the highest weight in a PDL category, JTECH recommends selecting the next lowest category. That prevents your PDL classification from implying the subject may be able to lift more weight than demonstrated in the evaluation.

Frequent Test Forms
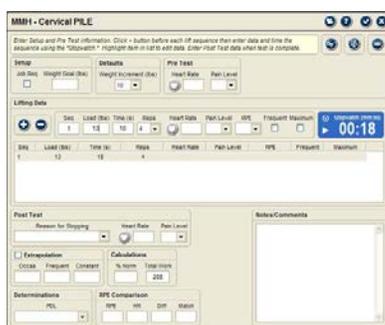
The DOT defines frequent lifting as constituting 34-66% of the work day while California Work Comp defines it as 3-6 hours. You can use Tracker Frequent Testing forms with either definition.

Tracker Frequent Material Handling forms are based on the Progressive Isoinertial Lifting Evaluation (PILE) developed by Mayer, et al. The protocol requires the subject to complete four lifts in 20 seconds for each stage of the test. The weight is then increased and the next stage performed. An increase in heart rate above the maximum allowable, a pain increase, inability to lift the weight or meeting the job requirement are all stopping criteria for the test.

Defaults
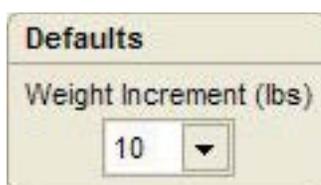
Since the weight in the published PILE protocol increments sequentially at rates of five pounds for women and 10 pounds for men, Tracker software automatically selects the increment based on the subject's gender. In some cases you may want to change the weight amount, since the PILE requires women to perform more lifts to reach the same weight goal as men. To change the increment, click on the drop-down and select from the list. If you do not want the software to automatically increment the loads for data entry, select the blank space from the drop-down.

Entering Test Data

Since the actual number of lifts and final weight are not known for frequent material handling tests, the test forms use a + button to add data into the item list. This method allows you to use the form like a worksheet and document every lift attempt or to only document the frequent and maximum abilities.

Since the PILE protocol requires the subject to complete a set of 4 lifts in 20 seconds, the frequent material handling forms include the "Stopwatch" feature. It provides audible cues at five second intervals and a different ending sound at 20 seconds.

1. Click the + button to open data entry for a sequence.
2. For the first lift, enter the starting weight (container plus weights) in the "Load" box. The weight automatically increases by the default amount for each subsequent lift.
3. Time the lift sequence using the Stopwatch. If the subject is unable to complete four lifts in the allotted time, a stopping criterion has been reached.
4. Click the + button to open the next sequence for data entry. Repeat until a stopping criterion is reached.
5. To edit data in a row or to check ability when the test is complete (frequent or maximum check boxes), highlight the item in the list and edit the data.

Rating of Perceived Exertion (RPE)

RPE can provide an indication of the correlation between the subject's perceived exertion and the physiological response to the material handling test. RPE uses the Borg scale from 6-20, where 6 means no exertion and 20 means maximal exertion.

1. When a maximum lift ability is identified, make sure that lift sequence is highlighted in the item list.
2. Immediately after the lift is completed, capture or take the subject's heart rate and enter it into the Heart Rate data field.
3. Have the subject rate exertion from 6-20 using the Borg scale. Click the RPE drop-down and select the numeric rating.
4. The RPE comparison is displayed at the bottom of the form. The numeric rating is multiplied by 10 and compared to the subject's maximum heart rate at the end of the maximum lift. If the heart rate and RPE are within 15 points (+ or -) the match is yes. Otherwise the match is no.

Extrapolation

If you want the software to extrapolate the occasional and constant weights from the identified frequent ability, click the check box. The extrapolation formula used is determined by the Settings selection in the Material Handling Test Selection form.

Calculations

Tracker 5 Software provides two additional calculations from results of the PILE test:

% Norm: This percentage, based on Mayer's published research, indicates the subject's population percentile according to gender and identified frequent lifting ability.

Total Work: This calculation is possible since the PILE protocol uses a set distance (from one shelf to the other and back) for the lift. It is the result of the weights lifted, the number of lifts and the excursion of the lifts.

Determinations

PDL categories for frequent lifting are:
Sedentary: exerting negligible force.
Light: exerting negligible to 10 lbs of force.
Medium: exerting 10 to 20 lbs of force.
Heavy: exerting 20-50 lbs of force.
Very Heavy: exerting in excess of 50 lbs of force.

ⓘ Notice: If the subject is unable to lift to the highest weight in a PDL category, JTECH recommends selecting the next lowest category. That way prevents your PDL classification from implying the subject may be able to lift more weight than demonstrated in the evaluation.

Simulation Test Forms

Material Handling Simulation Test forms are created using the custom test manager. For more information on creating custom tests, see Chapter 4 of this manual.

To create more "real-world" material handling tests, simulation tests allow you to specify starting and ending heights, objects lifted, and coupling or handle information. Simulation tests also allow you to test to the constant frequency.

Custom Test Settings
The information you entered while defining the custom simulation test are displayed in this area.

Setup

With simulation tests, you must assign a frequency goal or requirement for the test. In occasional and frequent material handling tests, the frequency goal is determined by the type of test. The acceptable ability and PDL determinations are both affected by the frequency selected.

Entering Test Data

Since the actual number of lifts and weights are not known, the test forms use a + button to add data into the item list. This method allows you to use the form like a worksheet and document every lift attempted or to only document the acceptable, maximum and infrequent abilities.

1. Click the + button to open the data entry for a sequence.
2. Enter the information in the data boxes.
3. To edit data in a row or to check ability, highlight the item in the list and edit the data.

ⓘ Notice: The Accept (acceptable) weight is based on the frequency goal selected. If a constant frequency goal is selected, the Accept box should be checked for the item representing the constant ability.

Determinations

The PDL category list is determined by the Setup frequency selected. If constant is selected as the frequency goal, the PDL selection list is for constant abilities. If occasional is selected, the selection list is for occasional abilities.

Work Postures

Work Postures Forms
Tracker Software allows you to evaluate and document the ability to sustain postures in two ways: indirectly through distraction and directly through Work Posture Test forms.

Work Posture Test forms also provide additional capabilities to improve your evaluation and documentation. Here are some of the additional uses for the Work Posture forms:

1. Identify job requirements. Work Posture Test forms include a Setup drop-down that allows you to identify the frequency and time duration required for the posture.
2. Enter non-evaluation times. In some cases you may want to include times for postures that are outside the direct functional evaluation, such as driving time and time completing forms outside the testing area.
3. Determinations. Select the subject's frequency and duration abilities to include in reports.
4. Enter observations. You can indicate pain behaviors and other indications of effort to help in your recommendations following the evaluation.

Posture Test Selection Form

For direct testing and to include posture documentation elements, the a posture testing form must be selected using the Posture Test Selection form. To access the form click on the Work Postures button.

Available tests are divided by anatomical regions to make organization and selection easier: Neck, Trunk, Upper Extremity and Lower Extremity. Standard tests included with the software are displayed under the first header bar of each category. Custom tests created either through the Custom Test Manager or the Add Custom Tests through the background timing feature are displayed under the Custom header bars.

1. Click on the check box for a posture to add it to the Current Test Sequence queue.
2. Click on a header bar to select all tests in the category.
3. To open the testing form, go to the Current Test Sequence queue and double click on the test or highlight it and click the Play button.

Posture Testing Form

The Posture Testing form follows the same conventions as the other forms within the Functional Testing module. It gives you the ability to identify job requirements, enter test data, time demonstration of the posture and make determinations.

Setup
Setup allows you to identify if the posture is a job requirement, how long the posture must be sustained and the frequency required.

1. The Job Req. checkbox is used to identify if the posture is required on the job. Checking this box allows you to create a Job Requirements Comparison report.
2. If a time requirement is known, click on the Time box and enter the goal in minutes.
3. If a frequency requirement is known, click on the Frequency drop-down and select from the list.

17.18

Pre Test

These elements should only be used when direct testing of a posture is performed. When indirect distraction testing is used, heart rate and pain level responses due to the posture or the distraction activity can be difficult to separate.

1. Click on the Heart Rate button to capture heart rate from the Tracker wireless heart rate monitor or click on the box and enter the pre test heart rate.
2. Click on the Pain Level drop-down and select from the list or type in the pain level. When typing, quickly pressing the number key twice adds a .5 increment to the pain rating.

Entering Test Data
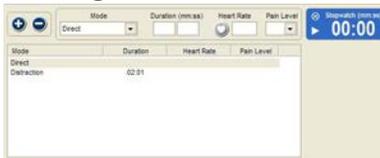
Direct testing and data collected outside the evaluation are entered by clicking the + button to open the data entry row. If the posture has been timed in the background using the Posture Timer, data is displayed in the item list. Items timed in the background are designated as "Indirect."

1. Click the + button to create a row in the list items and open the data entry boxes.
2. Select the Mode using the drop-down. Direct tests are those where the subject is observed simply sustaining the posture. Indirect is used for postures timed in the background during distraction and outside of the formal evaluation, such as sitting while driving to the evaluation.
3. Duration can be entered into the boxes, minutes on the left and seconds on the right. For direct tests, Duration can also be entered using the Stopwatch. Click on the Stopwatch "Play" button to time the posture.
4. For direct testing, capture the heart rate from the JTECH wireless heart rate monitor using the Heart Rate button or click on the Heart Rate box and enter the value.
5. For direct testing, click on the Pain Level drop-down and select from the list or type in the pain level. When typing, quickly pressing the number key twice adds a .5 increment to the pain rating.

Post Test
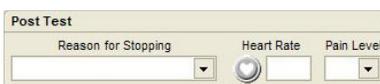
Post Test data allows you to indicate why the test or demonstration of the posture was stopped. Reasons for stopping include meeting the job requirement or an increase in pain. Click on the test and select from the drop-down to document the reason for stopping. You can edit the reason for stopping using the Edit button located in the upper right-hand corner of the Posture Testing form.

For direct testing you can also enter the post test heart rate and pain level. When direct testing is complete, allow the subject to move out of the posture and relax for 1-3 minutes. Then capture or enter the heart rate and enter the pain level.

Determinations

This area of the software allows you to indicate the frequency and duration capabilities derived from the evaluation.

1. Click on the Frequency drop-down and select from the list.
2. Click on the duration box and enter the number of minutes the posture can be sustained during an 8 hour day.

Calculations

This area displays the total time the posture was demonstrated and the longest duration. These numbers can help you in making determinations and recommendations about the subject's ability to sustain the posture in a work environment.

Notes/Comments

You can enter notes or comments about the posture by clicking on the field and typing.

Observations

You can enter observations about performance of the posture by clicking on the Observations button. Observations can pertain to direct and indirect testing.

Dexterity

Dexterity Testing Forms
Tracker software includes the ability to document standard dexterity tests like the Purdue Pegboad and Bennett Hand Tool Dexterity. It also provides the ability to create and document custom tests to meet your needs.

Dexterity Test Selection Form

To access dexterity tests, click on the Dexterity icon. The Dexterity Test Selection form is displayed. The form displays a list of available tests from which you can select. The list shows standardized test forms provided by JTECH and custom tests you create.

1. Click on a check box to place the test in the Current Test Sequence queue.
2. To place all the tests within a category into the queue, click on the header box.
3. Once a test is in the queue, you can open the test form.

Dexterity Testing Forms
Standard and custom dexterity testing forms have elements that are consistent throughout. The following elements are found in every dexterity testing form.

Buttons

At the upper right-hand section of the form are two rows of buttons.

Top row left to right are:
Video Help: Click this button to view the video help for the test.
Onboard Help: Click this button to access the onboard help system that describes features of the test form.
Save and Close: Click this button when documentation is complete to save the data when you exit the form. This button is only active when data in the form has been changed.
Close without Saving: Click this button to exit the form without saving any data.

Bottom row, left to right:
Observations: Click this button to access the Observations form.
Edit: Click this button to edit the Reason for Stopping drop-down list.
**Clear Form:** Click this button to clear the testing form.

Setup

You can indicate here if the test is being performed to evaluate a job requirement. You can also set a job required frequency goal using the drop-down menu.

Pre Test

Enter the pre test heart rate and pain level in this section. Click the Heart Rate button to automatically capture heart rate from the wireless heart rate monitor. You can manually enter heart rate by clicking on the box and typing.

Post Test

This area is used to document the reason for stopping, such as completed all trials. It is also used to document the post test heart rate and pain level after the subject has cooled down.

Determinations

This section is used to identify the frequency ability suggested by the subject's performance. Click on the drop-down to select the frequency.

Notes/Comments

Click in the box and beginning typing to enter any notes or comments you have about the subject's test performance.

Purdue Pegboard Testing Form

The Purdue Pegboard test is used to evaluate fine object manipulation. It is scored in three parts: The number of pegs moved in the hand subtests, the sum of the hand subtests and the assembly test. Any or all of the hand or assembly subtests can be administered. One to three trials can also be performed for each subtest.

Entering Test Data
Scores for each trial are based on the amount of pegs moved in the specified time.

1. Click on the + button to open a data row and the data entry boxes.
2. Select a subtest from the Trial drop-down. The form defaults to left hand, trial 1. Each time you hit the + button the software defaults to the next trial in the list. You can accept the default or select a different subtest from the drop-down.
3. Use the Stopwatch to time the trial. The Stopwatch counts down from the set time to zero.
4. Enter the number of pegs completed.
5. Capture the heart rate and enter the pain level.
6. Repeat for additional trials.

Calculations

This area shows the percent of normal based on published research involving industrial job applicants. Norm values use one or three trials or the highest score from two trials. The 50th percentile is average.

The sum subtest is the sum of the three hand tests: left, right and both. If three trials are complete for all hand subtests, the sum of each is used to calculate the total sum. The highest score for each subtest is used if any subtest has less than three trials. Each subtest must have at least one trial for the sum to be displayed.

17.22

Minnesota Dexterity Test Form

The Minnesota Dexterity Test is used to evaluate gross hand function. It involves lifting, turning and placing of small disks. The score is based on the amount of time the user takes to complete each subtest. Up to four trials can be performed for each subtest.

1. Click on the + button to open a data row and the data entry boxes.
2. Select a subtest from the Trial drop-down. The form defaults to Turning, trial 1. Each time you hit the + button the software advances to the next trial in the list. When all trials are complete for a subtest, the software advances to the first trial of the next subtest. You can accept the default or select a different subtest from the drop-down.
3. Click the Stopwatch "Play" button when the subject begins the trial.
4. When the subject completes the trial, click the "Pause/Stop" button. The amount of time on the Stopwatch is automatically displayed in the Time box as the score for the trial.

ℹ️ Notice: You can manually enter the time score in the Time box if you choose not to use the Tracker Stopwatch.

5. Capture the heart rate and enter the pain level.
6. Repeat for additional trials.

Calculations

Norm percentile comes from published research. Two trials must be completed for a subtest for the software to calculate a norm percentile. The score is the total time to complete all the trials of the subtest. The 50th percentile represents the average.

Hand Tool Dexterity

This is a test of eye/hand coordination and tool usage. Norms are based on published research on applicants for assembly and manufacturing positions.

The hand tool dexterity test involves only one trial. The score is the amount of time the subject takes to complete the test.

1. Click the Stopwatch "Play" button when the subject begins the test.
2. When the subject completes the test, click the "Pause/Stop" button. The amount of time on the Stopwatch is automatically displayed in the Time box as the score for the test.

ℹ Notice: You can manually enter the time score in the Time box if you choose not to use the Tracker Stopwatch.

3. Capture the heart rate and enter the pain level.

Custom Dexterity Forms

Custom dexterity forms are managed using the Custom Test Manager. In setting up the test you have the option to use the sum or average if more than one trial is performed with the test.

Custom Test Description/Instructions
This area displays the information you entered in the Custom Test Setup form. It cannot be edited at the Dexterity Custom Test form.

Entering Test Data
Custom Dexterity Test forms allow you to enter multiple trials for the test. However, when a test involves subtests, like the Purdue, each subtest should be set up with its own testing form.

If the dexterity test's score is based on the time required to complete a trial, you can use the Stopwatch to time the trial. You must then manually enter the time from the Stopwatch into the Score box.

1. Click on the + button to open a data row and the data entry boxes.
2. Time the trial with the Stopwatch.
3. Enter the score into the Score Box.
4. Capture the heart rate and enter the pain level.
5. Repeat for additional trials.

Cardiovascular

Cardiovascular Testing Forms

Tracker Software uses maximum aerobic power tests to calculate sustained METs. This type of testing uses two known work loads, either from bench stepping or treadmill activity, combined with age and weight to calculate VO2 Max. Since research has demonstrated that a linear relationship exists between workload and heart rate response, establishing VO2 Max at two workloads allows us to calculate the predicted sustained MET level.

This form of testing is less hazardous to the subject because attaining the maximum allowable heart rate is not required. If more accurate cardiovascular data is required, testing should be performed in a qualified medical facility with emergency response personnel and resuscitation equipment on hand.

Cardiovascular Test Selection Form

The form allows you to select the Bench Step test or the Modified Bruce Treadmill test. Both test forms function in a similar manner. To select both tests, click on the header bar in the Available Test box.

Units
This options determines if bench step heights are displayed in inches or centimeters.

Current Exam Results
The area shows results for completed cardiovascular tests.

Cardiovascular Testing Forms

The main difference between the testing forms is in selecting work loads. The Bench Step test uses step heights and rates, while the Modified Bruce uses stages based on treadmill inclination and speed.

Buttons

At the upper right-hand section of the form are two rows of buttons.

Top row left to right are:
Video Help: Click this button to view the video help for the test.
Onboard Help: Click this button to access the onboard help system that describes features of the test form.
Save and Close: Click this button to save data and exit the form. This button is only active when data has been changed.
Close without Saving: Click this button to exit the form without saving any data.

Bottom row left to right:
Observations: Click this button to access the Observations form.
Edit: Click this button to edit the Reason for Stopping drop-down list.
Clear Form: Click this button to clear the testing form.
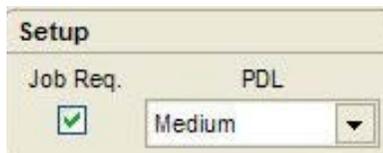
Setup

This section is used to indicate if cardiovascular conditioning is a job requirement. In cases where medium to very heavy material handling is involved, cardiovascular condition should be evaluated because poor cardiovascular conditioning can lead to fatigue and injury on the job. If the PDL level is known, it should be entered by clicking on the drop-down and selecting from the list.

The following list shows the PDL and corresponding MET requirements:

<1.5 = Never
1.5 - 2.1 = Sedentary
2.2 - 3.5 = Light
3.6 - 6.3 = Medium
6.4 - 7.5 = Heavy
>7.5 = Very Heavy

Pre Test
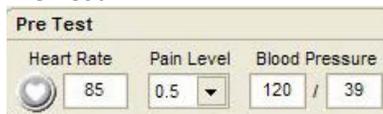
This area is used to document the subject's resting heart rate, pain level and blood pressure before starting the cardiovascular test.

1. Capture the pre test heart rate from the JTECH wireless heart rate monitor by clicking the Heart Rate button. You can also manually enter the heart rate by clicking on the box and typing the heart rate.
2. Click on the Pain Level drop-down and select a value. You can also click on the box and type in the number between 1 and 10. When typing, quickly pressing the number key twice adds a 0.5 increment to the pain rating.
3. Click on the left Blood Pressure box and enter the systolic blood pressure. Click on the right Blood Pressure box and enter the diastolic blood pressure.

Entering Test Data
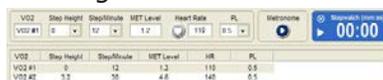
Both tests require that two known workloads be entered. The first workload must be less than the second or the heart rate response cannot be measured.

Bench Step Form

1. Click on the VO2 #1 list item to open the data row and data entry boxes.
2. Select a Step Height and Step/Minute from the drop-down lists. When both are selected, the MET Level is automatically displayed.
3. Click the Metronome "Play" button. When the test begins the subject steps to the pace of the metronome.
4. When the subject begins stepping, click the Stopwatch "Play" button and time the stepping for three minutes.
5. When three minutes are up, have the subject stop stepping and capture the heart rate. The heart rate must be entered to perform the MET calculations at the end of the test.
6. Enter the Pain Level.
7. Click on the VO2 #2 list item to open the second data row.
8. Select a second step height and Step/Minute combination that produces a higher MET Level than the first stage.
9. Repeat steps 3-6 for the second stage.

17.26

Modified Bruce Treadmill Form

1. Click on the VO2 #1 list item to open the data row and data entry boxes.
2. Select a Stage from the drop-down list and the Speed, % Grade and MET Level are displayed.
3. Set the treadmill to the Speed and % Grade for the stage.
4. When the subject begins walking on the treadmill, click the Stopwatch "Play" button and time the stage for three minutes.
5. When three minutes are up, have the subject stop and capture the heart rate. The heart rate must be entered to perform the MET calculations at the end of the test.
6. Enter the Pain Level.
7. Click on the VO2 #2 list item to open the second data row.
8. Select a second Stage that is higher than the first.
9. Repeat steps 3-6 for the second stage.

Post Test

Enter Post Test data after subject has had three minutes to cool down.

1. Select the reason for stopping from the drop-down list.
2. Capture or enter the post test heart rate. Post test heart rate is important following a cardiovascular test because it provides information about how the heart responds once the stress is removed.
3. Enter the Pain Level.
4. Enter Blood Pressure.

Calculations

In addition to the VO2 Max data entered in as a result of the cardiovascular test, the software needs age and weight to complete the calculations.

Age: This value is derived from the subject's birthdate. It is entered in the Patient File section of the software.
Weight: This value is entered in the Vital Signs section of the software. Vital Signs is located in the Physical/ Neurological section of Perform Exam.

Sustained METs provides the information necessary to determine the PDL the subject can work at for an eight-hour day.

Determinations

This drop-down allows you to indicate the Physical Demand Level the subject can work at for an eight-hour day. Be sure to take into account issues like Post Test heart rate and blood pressure when making a PDL determination. Refer to the list below for PDL and MET correlation.

<1.5 = Never
1.5 - 2.1 = Sedentary
2.2 - 3.5 = Light
3.6 - 6.3 = Medium
6.4 - 7.5 = Heavy
>7.5 = Very Heavy

Notes/Comments
Click on the field and enter notes or comments about the test.

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Chapter 18

QuickScreen™
QuickScreen

This optional module allows you to perform quick neuromusculoskeletal evaluations for upper and lower extremity strength loss, spine range of motion, grip strength and pain level. Quick Screening data can be saved to a patient file and incorporated into a more detailed Tracker Version 5 examination or used for tracking progress over time.

1. Click the Quick Screening button in the main Tracker Version 5 Software screen to open the Quick Patient Screening form.
2. For a new patient, click the New Patient button. If you want to review or print an existing patient quick screen, click the Open Patient Screening button.
3. If you are opening a new patient file, you must enter at least a patient name into the Patient Information form. Birthdate, gender and handedness are optional, but they are necessary for the software to perform a normative comparison for grip strength. The birthdate must be entered in a dd/mm/yyyy format.
4. Once you have entered a patient name and other optional information you want for the patient file, click the Save checkmark button to open the Quick Patient Screening form.

Quick Patient Screening Form

The form includes options for selecting the test category, tests available within the categories, the subject's current pain level, setting and notes.

Test Category: This section provides three buttons for selecting tests for upper extremity strength (Upper Strength), lower extremity strength (Lower Strength), and spine range of motion (Spine Motion.

Upper Strength: Strength tests within the category are Max Grip, Shoulder Abduction, Shoulder Flexion, and Shoulder Extension.

Lower Strength: Hip Flexion, Hip Extension, Hip Internal Rotation, Hip External Rotation.

Spine Motion: This category includes inclinometry range of motion tests for Cervical Flexion/Extension, Cervical Lateral Flexion, Lumbar Flexion/Extension, and Lumbar Lateral Flexion.

Current Pain Level: This is a slider bar that includes an NR selection for Not Recorded and a 0-10 pain rating scale.

Settings: This option allows you to set the force measurement units used in Pounds (lb) force, Kilograms (kg) force or Newtons. Reps controls the number of repetitions performed for each test and can be set at 1 or 2.

Notes: You can enter notes about the screening in this area by clicking on the field and typing.

18.2

Collecting Test Data

1. With the Quick Patient Screening form displayed, click on a Test Category button, such as Upper Strength.
2. Click the Test Header button, such as Max Grip, for the quick screen test you want to perform.
3. For wireless instruments, make sure the strength device or the inclinometers are turned on.
4. Perform the test. Strength tests display the repetition test results and a left to right maximum strength comparison to identify strength deficits. Spine motion tests display repetition results and a max motion to AMA norm comparison to identify ROM deficits.
5. When testing is complete you can click the Save and Exit button to exit the quick screen without printing or click the Print Screening Results button to print the quick screen data. Tracker Version 5 Software automatically saves the quick screen patient file when it is printed.

To clear the test form and retest, click the Delete button. Click on the Video button to play the video help file to show patient positioning and instrument placement for the test.

Force and inclinometer measurements are displayed in real time. The dots on the left side of the display indicate instrument connection and battery strength. Green indicates full battery strength.

ℹ Notice: Quick screening patient results can be printed using the narrative writer and data worksheet report options. These options include force curve graphs for muscle tests. See the Reports section of this manual for more information on narrative and worksheet reports.

Post-Test Displays

When a test is completed the software displays a graph to demonstrate results and deficits. It also highlights areas with deficits on the mannequin figure.
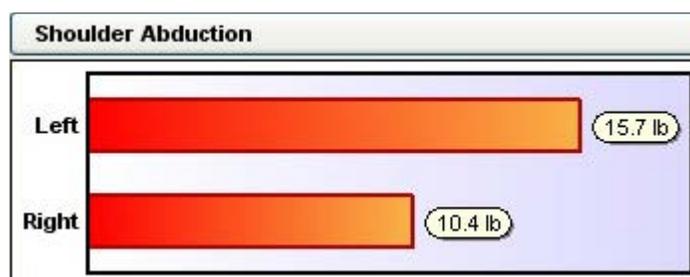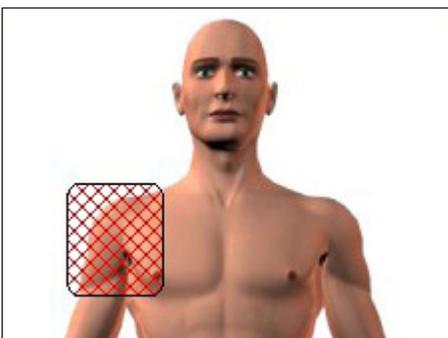
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Chapter 19

Analyze Data

This section is used to review test results and to compare serial test results, such as comparing cervical flexion results from the initial examination to the current test.

Analyze Data is selected using the bottom menu.
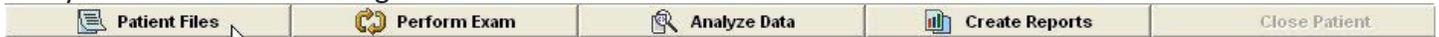
Analyze Data Selections

Summary Button

This button provides two functions depending on the modules enabled. For instrument modules and the manual entry module, summary provides a quick review of test results. This allows you view all data collected plus statistical calculations in one place without returning to the testing screen. If the Functional Testing module is enabled, summary provides a quick job requirements summary and allows you to review and rate the reliability of the subject's demonstrated abilities. There is also a section for entering restrictions and recommendations.

1.   Click on the Summary button to see the tree list of items. If an item has a + mark, click on the item to see additional items listed underneath.
2.   Click on the item to see the available summary form.

Instrumented Test Summary Data
Each instrumented test summary provides information specific to the type of test performed. For most tests the summary provides:

- Maximum and average of completed reps.
- Statistical calculations (CV, bilateral difference).
- Graphs comparing current test to previous tests.
- Repetition data including force curves for strength tests.
- Special calculations such as test-to-test comparison for the Multi-Max Grip test.
- Extremity muscle testing innervations for viewing and sorting muscle test results by nerve root, peripheral nerve, and joint motion to help you determine cause and extent of motor deficits.

Functional Capacity Selections

Unlike most instrument selections, the Functional Capacity selections are interactive. That means they allow you to make selections and enter data.

Job Requirements
This form displays the testing categories from the Perform Exam Functional section. Items identified in the testing form as a job requirement and assigned a requirement goal are displayed. This form allows you to quickly see identified job requirements and how the subject's demonstrated abilities compare.

19.2

Reliability of Effort

This form allows you to view indicators of effort collected during the functional testing and to rate the demonstrated effort. Use the scroll bar on the right side of the form to see all the elements.

Reliability of Effort Box

Select from the check boxes to rate your perception of the subject's effort reliability. You can edit the list using the Edit button in the upper right-hand corner of the form. If you are unsure of how to rate the subject's effort, the Evaluation of Effort section and data review sections of this form can help.

Notes/Comments

This text field allows you to enter any information you want about your conclusions concerning the subject's effort level. Click on the box and type in the information.

Evaluation of Effort

These check boxes are designed to help you determine the reliability of the subject's effort. Yes answers indicate reliable and no answers indicate unreliable performance. N/A indicates that the topic was not assessed.

1. If all answers to the questions in the list are predominately yes or no, use the "Mark All" buttons to check all items either yes or no. You can then change individual items to the appropriate answers.
2. If the answers are mixed, click on the individual check boxes to answer the questions.
3. The boxes to the side of the questions show the number of yes compared to all questions answered. The closer the numbers, the higher the reliability.

Subjective Indications of Effort

This area shows the High Effort Behaviors and Other Signs you identified in the Observations forms. This section is not interactive or editable.

Objective Indications of Effort

This area displays objective measurements of effort, such as coefficient of variation from instrumented strength tests, rapid exchange grip strength, multi-max grip strength and static lifting horizontal strength changes. Data is only displayed for completed tests. This section is not interactive or editable.

Reliability of Symptom Reports

Like Reliability of Effort, this form allows you to review and rate the reliability of the subject's symptom reports. This is an important aspect of the evaluation prior to making recommendations for additional care or return to work.

Reliability of Symptoms Box
Click on a check box to rate the reliability of the subject's symptom reports. You can edit the list using the Edit button in the upper right-hand corner of the form. If you are unsure of the reliability level, you can use the Evaluation section and Subjective Pain Indicators sections to aid in your determination.

Evaluation of Symptom Reports Reliability
This interactive section provides a series of questions that are designed to help you determine the reliability of the subject's symptom reports throughout the evaluation process.

1. If all answers to the questions in the list are predominately yes or no, use the "Mark All" buttons to check all items either yes or no. You can then change individual items to the appropriate answers.
2. If the answers are mixed, click on the individual check boxes to answer the questions. N/A indicates that the topic was not assessed.
3. The boxes to the side of the questions show the number of yes compared to all questions answered. The closer the numbers, the higher the reliability.

Subjective Pain Indicators
This area provides listings of observed pain behaviors documented in the Observations forms and pain changes from the testing forms. These items help you see if the pain behaviors and pain changes were consistent throughout the evaluation. This section is not interactive or editable.

Perceived Function

This section is used to help you determine if the subject's perceived ability or function matches the demonstrated ability. Subject's that perceive their ability to be greater than actual ability may be more prone to reinjury on the job.

Reliability of Function Reports
Select from the check boxes to rate your perception of the subject's function reports. You can edit the list using the Edit button in the upper right-hand corner of the form. If you are unsure of how to rate the subject's function reports, the Evaluation section and data review sections of this form can help.

19.4

Evaluation of Function Report Reliability

This interactive section provides a series of questions designed to help you determine the reliability of the subject's function reports throughout the evaluation process.

1. If all answers to the questions in the list are predominately yes or no, use the "Mark All" buttons to check all items either yes or no. You can then change individual items to the appropriate answers.
2. If the answers are mixed, click on the individual check boxes to answer the questions. N/A indicates that the topic was not assessed.
3. The boxes to the side of the questions show the number of yes compared to all questions answered. The closer the numbers, the higher the reliability.

Rating of Perceived Exertion

This area provides an indication of how the subject rated exertion compared to physiological responses during strenuous parts of the evaluation, such as material handling, cardiovascular tests and climbing. The total number of RPE responses collected during the evaluation is compared to appropriate and inappropriate matches. If the subject's RPE (multiplied by 10) was within 15 points of the measured heart rate the response is considered appropriate.

Restrictions and Recommendations Selections

This section of Analyze Data is used to create lists of restrictions and recommendations following the evaluation.

Restrictions

This interactive form allows you to import data from completed functional tests and to add other restrictions as necessary.

1. To import functional testing data into a section of the form, click on the Import button located in the upper right-hand corner of each section.
2. To add other restrictions, click the + button located in the upper left-hand corner of each section to open a data row.
3. To enter data or edit a restriction, highlight the restriction in the list. Click on a box, such as Activity or Details, and type in the information.
4. To delete an item from the list, highlight the item and click the - button.

Recommendations

This interactive form allows you to quickly create recommendation lists and to enter detailed instructions.

19.5

Recommendation List

The left hand portion of the form is used to display and select recommendations from categorized lists. The categories for recommendation lists are:

General: This area is used for overall recommendations that do not fall within the other categories.

Accom: This area is for accommodation recommendations, such as assistive devices or work hours.

Rehab: This area is used to list rehabilitation recommendations, such as work hardening and physical therapy.

Medical: Recommendations in this area can include orthopedic consults or records reviews.

Psych: This area is used for psychological recommendations, such as meeting with a psychologist.

The recommendation lists are editable, but items are limited to 60 characters in length. Click on the Edit button in the upper right-hand corner of the form to edit list items.

To use the recommendations lists:

1. Click the category button on the left side of the list for the type of recommendation.
2. Click on a check box to select an item from the list. You can select as many items from each category as necessary.

Detailed Recommendations

The Recommendation box on the right side of the form is a test field that allows you to enter as much information a necessary. This area gives you the opportunity to provide detailed instructions when a simple listing of recommendations is not sufficient. Simply click on the box and type in the information.

History Button

The History button is used to compare test results for specific dates and ranges. It can help determine if the patient is making progress, has reached a plateau or is at maximum medical improvement.

1. Click on the History button and select an item using the tree structure. All tests for that item are displayed, such as upper extremity muscle tests.

Recent and Overall Improvement

Recent improvement shows the percent of change from the previous test to the current test. Overall Improvement shows the percent of change from the initial test. If the patient's test results are less than the previous test, the percent of change shows as a negative number.

19.6

Improvement for Specific Periods
One of Tracker Version 5 Software's unique features is the ability to look at the percent of change between specific tests.

1. At the Test History Screen, click on the "From" drop-down arrow to display a list of available test dates. Highlight the "from" test to establish the beginning date for the change comparison.
2. Click on the "To" drop-down arrow and select a date from the list to establish the ending date for the change comparison.

Acute Whiplash Button

The Acute Whiplash button allows you to grade and document whiplash injury using criteria developed by Dr. Arthur C. Croft. The form also references the *Croft Treatment Guidelines* based on the whiplash grade.

ⓘ Notice: The treatment guidelines are merely guidelines and do not present prescriptions for treatment schedules. The patient's condition is always the ultimate guide to the need for care and your clinical decision making. Guidelines can alert you to the possibly missed or occult injuries, to cases where treatment appears to be outside the guidelines, or to the possibility that the approach to care needs to be reevaluated.

1. C lick the Acute Whiplash button to open the form.
2. Click on all the check box items that apply.
3. Click the View Data button to display results from Cervical ROM and Algometry tests to assist you in decision making.
4. As you complete the form the grade and resulting treatment guidelines are displayed at the bottom of the form.
5. When you are finished, click the Save button to save and exit.

You can clear the form using the Delete Button

The Edit button allows you to edit the item list of Complicating Factors.

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Chapter 20

Impairments

The Impairments section is used to assign and calculate impairments based on the American Medical Association's *Guides to the Evaluation of Permanent Impairment*.

When the Tracker Version 5 Impairment module is enabled, an "Impairment" button is displayed on the bottom menu bar. Clicking the Impairment button opens the Impairment module.

🖼 Patient Files	📋 Perform Exam	📊 Analyze Data	🖩 Impairments	🖨 Create Reports	✖ Close Patient

ⓘ Notice: The American Medical Association (AMA) has licensed JTECH to use and/or include all editions of the *Guides to the Evaluation of Permanent Impairment* (*Guides*) in this product. As of 2001, all earlier editions of the *Guides* were replaced by the Fifth Edition and the AMA recommends that only the most current edition be used for the medical evaluation of permanent impairment.

Using the Impairment Module
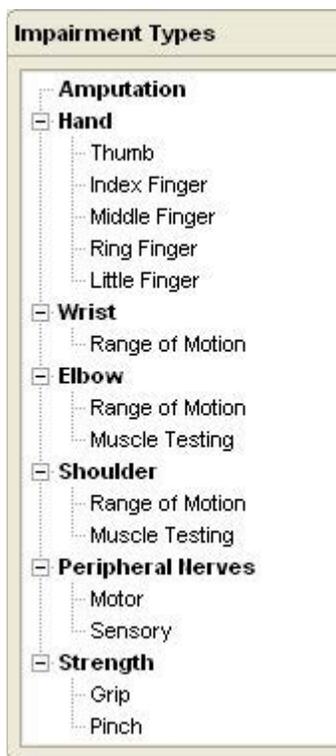
The Tracker Version 5 Impairment module provides an easy and versatile way to rate and generate impairment reports. The impairment module enables you to rate impairments using a few easy steps:

1. Click on the Impairments button on the bottom menu bar.
2. Select the "Category" (anatomical area) for impairment rating. You can easily move back and forth between categories if multiple impairments need to be rated.
3. Select an Impairment Type from the list that appears when a category is clicked, such as Peripheral Nerves - Motor or Shoulder - Range of Motion under Left Upper Ext. You can easily move between Impairment Types for rating multiple impairments. (See sections in this chapter for operation of specific Impairment Type forms.)
4. Click on Impairment Calculator to review, adjust and save the final whole person impairment.
5. To generate impairment narrative and data reports, click on the Create Reports button on the bottom menu line.

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Activities of Daily Living (ADL)
ADL Category

Activities of Daily Living (ADLs) selected from Impairment Types.

This category was provided as a convenient method of indicating an impairment's effect on the individual's ability to perform common activities of daily living (ADLs). It was derived from Table 1-2, p. 4 of the *Guides*. Results entered in this form will not change any impairment values. However, the *Guides* do recommend that physicians take into account the injury's affect on ADLs when determining impairment.

Click on check boxes to identify interference with the eight categories of common ADLs. Notes or comments can be typed into the Comments field.

Completing the ADL Form

1. Select the ADL category button and Activities of Daily Living from the Impairment Types list.
2. Click on an interference check box to identify the amount of interference with a particular ADL category.

ⓘ Notice: Only one check box per ADL category can be selected.

3. To change an interference check box selection, click on another check box in the same row.
4. To remove a selection, re-click on the check box.
5. Click the Save and Close button to save the ADL data for reports.

ADL Legend
The following is a guide to interpreting the ADL interference levels.

None: Impairment does not interfere with ADLs
Slight: Some interference, but requires no assistance
Moderate: Interference that requires occasional assistance
Severe: Interference that requires assistance
Complete: Cannot perform the activities

Spine

Spine Category

Impairment category buttons with the spine category selected. Once the spine category is chosen, the Impairment Types are displayed.

Spine Impairment Types with the Cervical DRE method selected.

The Spine category features both the Diagnosis-Related Estimates (DRE) method and the Range of Motion (ROM) method of rating spine impairment. According to the *Guides* on page 379, "The DRE method is the principal methodology used to evaluate an individual who has had a distinct injury."

The *Guides* do, however, provide six distinct reasons for using the ROM method (See pages 379-381 of the *Guides*). :

1. When an impairment is not caused by an injury, if the cause of the condition is uncertain and the DRE method does not apply, or an individual cannot be easily categorized in a DRE class.
2. When there is multilevel involvement in the same spinal region.
3. Where there is alteration of motion segment integrity (eg. fusions) at multiple levels in the same spinal region, unless there is involvement of the corticospinal tract.
4. Where there is recurrent radiculopathy caused by a new (recurrent) disk herniation or a recurrent injury in the same spinal region.
5. Where there are multiple episodes of other pathology producing alteration of motion segment integrity and/or radiculopathy.
6. Where statutorily mandated.

Completing Spine DRE Method Forms

Select the Spine category and the DRE Impairment Type related to the spine region (Cervical, Thoracic or Lumbar) for impairment rating and the DRE form is displayed.

The DRE form provides six buttons across the top: Not Rated, Category I, Category II, Category III, Category IV, and Category V. Click on the button to see the criteria and rate impairment within a category. Only one DRE category can be used for a spine region.

Not Rated

Use the Comments box to identify the reason why no impairment was rated.

This option is used to document that an individual was evaluated, but an impairment was not rated. You may choose not to rate an impairment for reasons such as the individual was not at maximum medical improvement, the impairment was not permanent or stationary, or the individual was uncooperative during the examination.

1. Click on the Not Rated button and click on the check box.
2. To deselect Not Rated, either re-click the check box or exit the Not Rated screen without saving.
3. To save the Not Rated impairment, click the Save and Close button at the top of the screen.
4. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Category I

This category is used when the individual has no significant clinical findings on which to rate an impairment.

1. Click on the Category I button
2. Click on the check box.
3. To deselect Category I, either re-click the check box or exit the Category I screen without saving.
4. To save the Category I impairment, click on the Save and Close button at the top of the screen.
5. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

ⓘ Notice: If you select an impairment from a category, then choose another DRE category for the same spine region a warning prompt appears. Click Yes to use the new impairment or No to keep the original impairment.

Categories II through V

These are the DRE categories where an impairment value can be assigned. The *Guides* allow a range of three percent within a category, which is 5-8% for Category II.

The categories are divided into three "objective findings" sections that correspond to Tables 15-3, 15-4, or 15-5 depending on the spine region being rated. The sections allow documentation signs and symptoms used to determine a DRE category.

ⓘ Notice: Tracker Version 5 Impairment software allows you to select an impairment percentage without selecting signs or symptoms. If no signs or symptoms are selected, only the percentage of impairment will be available for reports.

1. Select the most appropriate factors from one section. For the "clinical history" section you can choose all the signs, or select specific signs that apply to the individual.

ⓘ Notice: For "Fractures" you may only select one option from the section. According to the *Guides*, if more than one fracture is present in a spine region, the ROM method should be used.

2. Select the impairment percentage using one of the four buttons on the right-hand side of the screen.

ⓘ Notice: The *Guides* indicate on page 381, #6 that the higher percentages should be assigned depending on the impairment's impact on the individual's ADLs and that the reason for the increase should be documented in the report.

3. To save the impairment, click on the Save and Close button.
4. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Spine-ROM Method
Completing Spine ROM Method Forms

"Although called the range-of-motion method, this evaluation method actually consists of three elements that need to be assessed: (1) the range of motion of the impaired region; (2) accompanying diagnoses (Table 15-7); and (3) any spinal nerve deficit," explain the *Guides* on page 398. Tracker Version 5 Impairment software divides the spinal nerve deficit into two impairment types, motor root and sensory root, for easier data management.

ℹ Notice: The thoracic spine ROM method selections do not include spinal nerve deficit components (motor root or sensory root). The T1 spinal nerve component for upper extremity sensory loss is included in the cervical spine section.

Spine Disorders

The Spine Disorders forms for all three spine regions work in essentially the same manner. The Spine Disorders forms represent Table 15-7, p. 404 of the *Guides*. The table and the Spine Disorders forms are broken into four sections: I. Fractures; II. Intervertebral disk or other soft-tissue lesion; III. Spondylolysis and spondylolisthesis, not operated on; and IV. Spinal stenosis, segmental instability, spondylolisthesis, fracture or dislocation, operated on.

> The four buttons at the top of the Spine Disorders forms correspond to the sections within Table 15-7 of the *Guides.*

According to instructions in the *Guides* for Table 15-7 (p. 402, #3), "If there are two or more diagnoses within a spinal region, use that which is most significant." Based on this instruction, Tracker Version 5 Impairment software only allows selection from one section of the table per spine region.

ℹ Notice: To see the impairment percentage for a diagnosis, place the cursor over the diagnosis.

I. Fractures

When the Fractures button is selected from a Spine Disorders form, a listing of the spinal levels is displayed. There are also columns for Compression, Posterior Element and Reduced Dislocation. You can select one item from each column for each spine level. From the Compression column you can only select one compression amount per spine level. The software automatically combines the selections according to the *Guides*. (For more information, see the *Guides* pages 402-404.)

1. Click on the check boxes that correspond to the levels and types of fractures. Re-clicking a check box removes the check mark.
2. To save the impairment, click the Save and Close button.
3. Click another impairment category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

> If you click a check box in one Spine Disorders section, then open another section and click a check box a warning appears. Clicking "Yes" discards the fist checked information, clicking "No" keeps the initial box checked.

II. Disk/Soft Tissue

The "intervertebral disk or other soft-tissue lesion" section of Table 15-7 allows the addition of multiple levels and, for surgical treatment, multiple surgeries to the impairment. Tracker Version 5 Impairment software provides an effective method for adding levels and surgeries to the impairment rating.

1. Click on the check box for the description that most accurately reflects the impairment.
2. If multiple levels are involved, the levels documentation area on the right-hand side of the form activates. Click the Multiple Levels check box and use the up or down arrows to adjust to the correct number of levels. The software, in accordance with the *Guides*, adds one percent per additional level.

The check boxes and up/down arrows features on the right-hand side are used to add multiple levels and multiple surgeries into the impairment

ⓘ Notice: When the Multiple Levels check box is clicked, the software automatically defaults to two levels. If more than two levels are involved, you must use the up arrow to increase the number.

3. If multiple surgeries can be added to the impairment, the Multiple Operations area activates on the right-hand side of the form. Click the Multiple Surgeries check box and adjust to the correct number. The software automatically defaults to two surgeries when the box is checked.
4. To save the impairment, click on the Save and Close button.
5. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

III. Spondylo - Unoperated

This section provides two options for impairment rating.

1. Click on the check box that most appropriately describes the diagnosis.
2. Click the Save and Close button to save the impairment.
3. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

IV. Decompression / Fusion

This form offers the opportunity to add multiple levels and surgeries into the impairment.

1. Click on the check box for the description that most accurately reflects the impairment.
2. If multiple levels are involved, the levels documentation area on the right-hand side of the form activates. Click the Multiple Levels check box and use the up/down arrows to adjust to the correct number of levels. The software, in accordance with the *Guides*, adds one percent per additional level.

❶ Notice: The software automatically defaults to two levels. Use the up arrow to increase the number.

3. If multiple surgeries can be added to the impairment, the Multiple Surgeries area lights up on the right-hand side of the form. Click the Multiple Operations check box and adjust to the correct number. The software automatically defaults to two surgeries when the box is checked.
4. To save the impairment, click on the Save and Close button.
5. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Completing Spine Range of Motion Forms

Active check boxes, like Cervical Flexion above, indicate where ROM data exists. Clicking an active check box imports data for that motion. Unchecking a check box removes the data for that motion. Clicking the Inclinometer button imports all available ROM data for the spine region.

If spine ranges of motion were recorded in the Perform Exam section of the software, they can be imported into the corresponding spine ROM forms in two ways: 1) Click on the Inclinometer button to import all available test results for the spine region, 2) Click on an "active" check box to import data for that motion only.

If spine ROM data is imported from the Perform Exam section, the ROM values cannot be changed. Imported ROM data can be cleared by unclicking a check box or clicking the clear all button at the bottom of the screen. If no data is imported from the Perform Exam section, data can be manually entered into a spine ROM form.

According to the *Guides*, Spine range of motion impairments can be combined with Spine Disorders and Spine Nerve Deficits within the same spine region. If more than one region is affected, each region is rated separately and the results are combined.

Spine ROM Form Features

Spine ROM forms all function in the same manner. In addition to the check boxes, each screen also has four primary columns.

1. The first column indicates motions of the spine region, such as flexion, extension, left lateral bending and right lateral bending for the lumbar region.

To see all the repetitions for an imported ROM test, click on the Show Reps button.

2. The ROM column has a box for each motion within the region. Imported data is automatically displayed in the box. If no data for the spine region was imported, you can click on a box and manually enter the range of motion value.

3. The 10% or 5° column refers to the validity criteria for spine range of motion measurements. To be valid, three consecutive measurements must fall within 10% or 5° of the mean (*Guides* p. 399). Check boxes are automatically completed when data is imported. For manually entered data, you must click the "Yes" check box to use the value for rating impairment.

4. The ankylosis column is used when the individual cannot reach neutral zero position for a motion. Data can be manually entered if no values were imported. If a motion is identified as ankylosed, the antagonist motion cannot be entered.

ⓘ Notice: Spine Ankylosis - The *Guides* state on page 402 that "... the position or angle of restriction closest to neutral is considered the position of ankylosis or end-restricted movement." The *Guides*, however, do not provide ankylosis impairments for lumbar flexion or extension. The *Guides* indicate that ankylosis of the lumbar spine in flexion or extension is rare, therefore they do not provide ankylosis impairment values.

5. The WPI column represents the whole person impairment for the corresponding spine motion. The added and combined (if ankylosis is present) value for the spine region is displayed in the bottom right hand corner.

Lumbar Spine ROM Form

The Lumbar Spine ROM form has several unique features. First, the form includes range of motion measurement boxes for sacral ROM (sacral hip flexion and extension). These measurements are from the Tracker Secondary inclinometer placed on the sacrum during lumbar flexion and extension measurements. The sacral hip flexion measurement is required to calculate a lumbar flexion impairment.

According to the *Guides* (p .406), "... the physician must take into account the sacral (hip) flexion angle when assessing impairment due to limited lumbar spine flexion because individuals with limited hip flexion have increased impairment with limited lumbar flexion."

Second, the *Guides* provides an accessory straight leg raise (SLR) validity test for lumbar spine flexion measurements. This accessory test is used when the lumbar flexion motion is less than 65° for women and less than 55° for men. The validity test compares the sacral hip flexion and extension angles to passive straight leg raising measurements. The difference between the sum of sacral flexion and extension and the tightest straight leg raise must be less than or equal to 15° for the lumbar flexion test to be valid. (See page 406 of the *Guides* for more information on the accessory validity test.)

Spine Motor Nerve Root Forms

Spine Motor Nerve Root forms are available for cervical and lumbar spine regions. The *Guides* only provide motor nerve impairments for the T1 level of the thoracic spine, so it is included in the cervical region.

Spine Motor Nerve Root Form Features
The following features are provided for both the Cervical and Lumbar Spine Motor Nerve Root forms:

This form contains buttons that allow you to rate cervical nerve motor deficits by nerve root, brachial plexus and brachial plexus trunks. The Lumbar Motor Nerve Root form does not include the plexus buttons. To rate the brachial plexus or a trunk, click on the associated button and use the same procedures for rating a motor nerve root.

ℹ Notice: For rating the middle trunk of the brachial plexus, use the C7 nerve root.

Tip
To prevent duplication of impairment, if the brachial plexus or a trunk is rated, the software will not allow you to rate an overlapping nerve root

1. Import button - If you graded muscle tests during the examination and documented the results in the Tracker Perform Exam section, you can import the results into this form. Click the Import button in the upper right-hand corner of the form.
   Assigned grades are displayed with the associated motions in the Involved Motions section of the form.

2. Nerve Roots (Left and Right) - These areas list the nerve roots for the spine segment being rated (cervical: C5-T1, brachial plexus upper trunk, brachial plexus lower trunk, and brachial plexus; lumbar: L3-S1) from Tables 15-17 and 15-18, p. 424 and 16-14, p. 490 of the *Guides*. If the injury caused bilateral weakness, both sides can be rated. Click on the nerve root level for the side to rate that nerve root motor deficit impairment.

3. Involved Motions - This area is divided into key motions and additional motions. Key motions are those muscle actions and joint movements most closely associated with a specific nerve root (see Table 15-2, p. 376). Additional motions are those where innervation of the motion's primary muscle is less closely associated with the selected nerve root. To rate a nerve root motor impairment, click on one of the Involved Motions.

4. Grade - The *Guides* require muscle tests to be graded for impairment rating. If the test was documented and graded in the Perform Exam section, the grade is automatically selected. If no grade was imported, click on a grade. (See Grading below.)

5. Motor Deficit Percent - The *Guides* require that a % Motor Deficit based on the grade be assigned to rate the impairment. Use the up/down arrows to adjust the % Motor Deficit. The software automatically limits the range based on the grade selected.

ℹ Notice: The side-to-side deficit from dynamometer muscle testing does not correspond to the % Motor Deficit adjustment. You must determine the extent of the deficit based on the muscle test performed. (See Grading Motor Deficits below.)

6. Nerve Root Impairment - These boxes at the bottom of the page display the left and right side extremity impairments based on the Nerve Root, Motion, Grade and % Motor Deficit.

7. Once all nerve root impairments for one or both extremities are rated, click the Save and Close button to save the impairments.

8. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Grading Motor Deficits

The following chart is taken from Table 15-16, p. 424.

Grade	Description of Muscle Function	% Motor Deficit
5	Active movement against gravity with full resistance	0
4	Active movement against gravity with some resistance	1-25
3	Active movement against gravity only, without resistance	26-50
2	Active movement with gravity eliminated	51-75
1	Slight contraction and no movement	76-99
0	No contraction	100

Spine Sensory Nerve Root Forms

This form contains buttons that allow you to rate cervical nerve sensory deficits by nerve root, brachial plexus and brachial plexus trunks. The Lumbar Sensory Root form does not include the plexus buttons. To rate the brachial plexus or a trunk, click on the associated button and use the same procedures for rating a sensory nerve root.

🛈 Notice: For rating the middle trunk of the brachial plexus, use the C7 nerve root.

Spine Sensory Nerve Root Forms are available for the cervical and lumbar spine regions. The *Guides* only provide sensory spinal nerve impairment values for the T1 level of the thoracic spine, so it is included in the cervical region.

Spine Sensory Nerve Root Form Features

The following features are provided for both the Cervical and Lumbar Spine Sensory Nerve Root forms:

1. Import button - If you graded sensory dermatome tests during the examination and documented the results in the Perform Exam section, you can import the results into this form. Click the Import button in the upper right-hand corner of the form. Assigned grades are displayed with the associated nerve roots.
2. Nerve Roots (Left and Right) - These areas display the nerve roots for the spine regions from Tables 15-17 and 15-18, p. 424 and 16-14, p. 490 of the *Guides*. Click on a Root Level to rate that nerve root sensory deficit impairment.
3. Grade - The *Guides* require sensory tests to be graded for impairment rating. The grade determines the range for the Sensory Deficit percentage, which is used to calculate the sensory impairment. Imported grades are displayed with the nerve root. If no grade was imported, click on a grade. (See Grading Sensory Deficits below.)
4. Sensory Deficit Percent - The *Guides* require that you assign a % Sensory Deficit based on the sensory testing grade. Use the up/down arrows to adjust the % Sensory Deficit. The software automatically limits the range based on the grade selected.
5. Repeat for additional sensory nerve root impairments.
6. Once all nerve root impairments are rated, click the Save and Close button to save the impairments.
7. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Grading Sensory Deficits
The following chart is taken from Table 15-15, p. 424.

Grade	Description of Sensory Deficits	% Sensory Deficit
5	No loss of sensibility, abnormal sensation, or pain	0
4	Distorted superficial tactile sensibility (diminished light touch), with or without minimal abnormal sensations or pain, that is forgotten during activity	1-25
3	Distorted superficial tactile sensibility (diminished light touch and two-point discrimination), with some abnormal sensations or slight pain, that interferes with some activities	26-60
2	Decreased superficial cutaneous pain and tactile sensibility (decreased protective sensibility), with abnormal sensations or moderate pain, that may prevent some activities	61-80
1	Deep cutaneous pain sensibility present; absent superficial pain and sensibility (absent protective sensibility), with abnormal sensations or severe pain, that prevents most activities	80-99
0	Absent sensibility, abnormal sensations, or severe pain that prevents all activity	100

Upper Extremities

Upper Extremity Categories

The upper extremities are divided into two categories: one for the left upper extremity and one for the right. According to the *Guides*, if both extremities are involved, you should rate each separately then combine the impairments.

Since the forms and operations are the same for the left upper extremity and the right upper extremity, this section applies to both.

1. Select either the left or the right upper extremity button to begin the impairment rating process.
2. From the Impairment Types list, select the impairment type and/or anatomical region for impairment rating. For multiple impairments, rate one area then select and rate the next area until all impairments for the selected upper extremity are rated.
3. If both upper extremities are involved, rate all the impairments for one extremity then rate the impairments for the other.
4. To complete the impairment rating, click on the Impairment Calculator button.

Amputation

The first upper extremity category is amputation and it applies from scapulothoracic (forequarter) amputation to transmetacarpophalangeal loss of all fingers at the MP joints (Table 16-4, p. 440). For amputation of the thumb ray and fingers see the Hand section of this chapter.

1. Click on Amputation in the tree structure and the upper extremity amputation form is displayed.

2. If you documented an upper extremity amputation in the Physical Exam section of the software, the Import button is active and you can click it to import the amputation data. If the import button is not active, click on a check box that corresponds to the amputation level. Only one check box can be selected.

3. For amputation from distal to the bicipital insertion to transmetacarpophalangeal loss of all digits, adjust the impairment percentage between 94-90% upper extremity impairment (Table 16-4, p. 440). According to the *Guides*, p. 442, the impairment should be rated using clinical judgment based on the "functional possibilities afforded by either prosthetic or surgical options (eg, Krukenberg procedure), or simply by the actual length of the residual stump."

4. Click on the Save and Close button.

ⓘ Notice: Scapulothoracic (forequarter) amputation impairment is rated at the whole person level (Table 16-4, p. 440)

Hand

Hand impairment forms are based on the digit for selection purposes. Click on the digit for which to rate the impairment from the tree structure and a selection bar is displayed for selecting impairment options for the digit.

Thumb ROM Form

The Thumb ROM form provides the ability to rate impairment for both motion loss and fixated joints (ankylosis) according to figures and tables in Section 16.4d Thumb Ray Motion Impairment of the *Guides*.

If you have documented thumb range of motion using the Perform Exam section of Tracker Version 5 Software, you can import all the values or just specific measurements of thumb motion.

All values are imported by clicking on the goniometer button.

Individual values are imported by clicking on an active check box.

ⓘ Notice: Unclicking a check box removes the imported data.

Active check boxes, such as for MP flexion and extension, indicate that range of motion measurements are available to import into the impairment screen.

Digit Impairment	2%
Hand Impairment	1%

According to the *Guides*, " If a contralateral 'normal' joint has less than average mobility, the impairment value(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment for the involved joint." (p. 453) Tracker Version 5 Impairment Software includes a feature for subtracting values for a less-than-average contralateral, uninvolved side.

Impairment Rating

1 (1)

The whole person impairment is displayed with the upper extremity impairment in parenthesis

1. If data for the joint motion was imported, click on the check box under Subtract Contralateral Baseline Impairment, and the software automatically performs the subtraction.
2. If data was not imported, click on the box and type in the impairment percentage to be subtracted.

Thumb motion impairments are added according to the *Guides* (p. 454). The software displays the impairment percentages for the digit, hand, upper extremity and whole person.

Finger ROM Forms

When all finger motions are complete the total active motion method can be used.

These forms function essentially the same as the Thumb ROM Impairment form with two key exceptions:

1. Finger ROM impairment forms provide an option for calculating finger ROM impairment based on the total active range-of-motion method described on page 465 of the *Guides*. To use this method, all ranges of motion of the MP, PIP and DIP joints must be completed. To use total active motion, click on the check box.
2. The joint's ROM impairments are added, then combined other joint ROM impairments to determine the digit impairment.

Digit Sensory Forms

Digital Sensory Loss

	Ulnar Digital Nerve
	Radial Digital Nerve

Digit Total Loss

All digit sensory forms function in the same manner. You can rate digit sensory loss impairment according to Tables 16-6 and 16-7 and digital neuromas according to Section 16.3c using the same form.

1. Two-point discrimination values in the Perform Exam section can be imported by clicking on the Import button. Import exam data for one side of the digit using the check boxes. The import options are only active if there is data available.
2. If no data is available to import, click on the Up/Down arrows or enter a digit length value in the Partial and Total boxes. Impairment values for imported data can also be adjusted using the up and down arrows.
3. When rating ring finger sensory impairment if the little finger has been amputated (p. 448), click on the check box marked "Adjust sensory impairment for amputated little finger."
4. Digit sensory impairments for the ulnar and radial sides are added.
5. Click on the Save and Close button.

Digital Neuromas

Impairment due to digital neuromas is rated using the lower section of the Digit Sensory Impairment form. According to the *Guides*, digit sensory loss and sensory loss due to digital neuroma cannot be rated in the same nerve (Section 16.3c, p. 449).

1. Select a grade for the involved nerve that represents the amount of sensory loss resulting from the neuroma according to Table 16-10a. (The table can be viewed in the help system by clicking on the Help button.) If both sides are involved, they must be rated separately.

2. Select the percent of sensory deficit according to Table 16-10a using the Sensory Deficit spinner box. You can either click on the box and type in a value or use the up/down arrows. The available range based on the selected grade is displayed under the Deficit Range.

3. The resulting digit impairment is displayed on the right.

4. If the neuroma involves both the radial and ulnar nerves, repeat the procedure to rate the complete impairment. The radial and ulnar digit sensory impairments are added together to determine the total digit sensory impairment.

5. To save the data for use in the "Impairment Calculator," you must click on the Save and Close button.

Digit Amputation

Each digit has an amputation impairment form. The thumb amputation form is slightly different than forms for the fingers. All finger amputation forms work in the same manner.

Thumb Amputation Form

The Import button is displayed in color when it is active and you have amputation data than can be imported.

The thumb amputation allows you to import amputation information you collected in the Perform Exam section of the software. If you have data available the import button is active and clicking it will import the amputation data.

Amputation impairments of the thumb vary by amputation level. According to the *Guides*, p. 442, "Amputations of the thumb at levels proximal to the metacarpophalangeal joint are considered to provide a greater severity of impairment than amputation at the MP joint level." Thumb metacarpal amputations are rated as upper extremity impairments according to Table 16-4, p. 440, while amputations from the MP joint distally are rated as digit impairments.

1. Either import amputation data or click on the check box corresponding to the amputation level.

2. For amputation through the proximal phalanx or distal phalanx adjust the percent of digit remaining (Figure 16-4, p. 443 of the *Guides*).

3. The form displays the digit, hand, upper extremity and whole person impairment values resulting from the amputation.

4. Click on the Save and Close button.

ⓘ Notice: According to Figure 16-3, p. 442, thumb amputation through the MP joint receives a 100% digit impairment and amputation through the IP joint receives a 50% digit impairment.

Finger Amputation Forms

The finger amputation form all work in identical manners. Unlike the thumb, however, the *Guides* do not provide additional impairment for amputation through the metacarpals.

1. Either import amputation data or click on the check box corresponding to the amputation level.
2. Amputation through the finger joints receive a fixed digit impairment percentage according to table 16-3, p. 442 of the Guides (MP=100%, PIP=80% and DIP=45%). For amputation through the proximal phalanx, middle phalanx or distal phalanx adjust the impairment percentage based on the amount of digit remaining (Figure 16-5, p. 443 of the Guides).
3. The form displays the digit, hand, upper extremity and whole person impairment values resulting from the amputation.
4. Click on the Save and Close button.

Wrist, Elbow and Shoulder

Items with a "+" can be expanded to display additional selections. To rate a joint ROM impairment, click on "Range of Motion" for that joint

ℹ Notice: The *Guides* (p. 450) define joint ankylosis as "the complete absence of motion of a joint." Therefore, the software will not allow you to combine an ankylosis measurement with a reduced motion for the same joint.
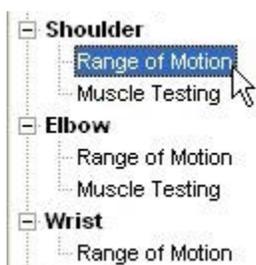
The forms for these three anatomic regions function essentially the same. The wrist region, however, does not have a muscle testing form because the Guides only provide "Impairments of the upper extremity due to strength deficit from musculoskeletal disorders based on manual muscle testing of the individual units of motion of the shoulder and elbow" (Table 16-35, p. 510).

Range of Motion Forms

Upper extremity range of motion forms provide the ability to rate impairments for both motion loss and fixated joints (ankylosis) according to the figures in Chapter 16 of the Guides.

According to the Guides (p. 453), "Impairment values for motion measurements falling between those shown in the pie chart may be adjusted or interpolated proportionally in the corresponding interval." Tracker Version 5 Impairment software automatically performs the interpolation for you.

1. Select an upper extremity category button and click on Range of Motion for the joint in the Impairment Types list.
2. If you documented the joint's range of motion in the Perform Exam section using inclinometry and/or goniometry, you can import the data from either instrument into the Range of Motion Impairment form one of two ways.

To import all the ROM data for the joint collected with one of the instruments, click on the instrument icon. To import data for a specific motion, click on an active check box for the instrument used to measure the range of motion.

This example shows that data has been collected for elbow flexion and extension with the goniometer and for wrist radial and ulnar deviation with the inclinometer.

ℹ Notice: If data is imported, you cannot edit the ROM values at this screen. You can uncheck the check box and manually enter a value. If no data was imported, you can enter ROM values by clicking in a ROM or Ankylosis box and typing a number.

3. If data was imported from the Perform Exam section, you can view the repetition data by clicking on the Show Reps button.

4. According to the *Guides* (p. 453), if the contralateral uninvolved side has less than average ROM, the resulting measurement can serve as a baseline and be subtracted from the impairment of the involved side. You can click on the check box if data for the motion was imported or click on the text box and enter an impairment percentage and the software automatically subtracts the baseline impairment.

5. The upper extremity impairment (UEI) percentage for each motion is displayed in the UEI column. The combined whole person and upper extremity (in parentheses) impairments are displayed in bottom right-hand corner of the form.

6. To save the data for use in the "Impairment Calculator," you must click on the Save and Close button.

Muscle Testing Forms

According to the *Guides* (p. 508), "In a rare case, if the examiner believes the individual's loss of strength represents an impairing factor that has not been considered adequately by other methods in the *Guides*, loss of strength may be rated separately." If the strength loss is due to nerve root or peripheral nerve injury, the impairment should be rated using those methods. The *Guides* also stress that strength loss can be combined with other impairments "only if based on unrelated etiologic or pathomechanical causes."

ℹ Notice: The *Guides* only provide muscle strength loss impairments for the shoulder and elbow

Because the *Guides* assign motion values on a 100% scale, strength impairments for each motion of the same joint are added together. (*Guides* p. 510)

1. Select the left or right upper extremity category button and click on "Muscle Testing" for the shoulder or elbow joint in the Impairment Types list.

2. If you documented the muscle test grade in the Perform Exam section, the software automatically imports the grade into the Grade column in the Muscle Testing Impairment form.

ℹ Notice: If data is imported, you cannot edit the assigned grade at this screen. You must return to the Perform Exam section.

3. Select the "motion unit" (elbow flexion for example) for impairment rating. If the grade was imported from the Perform Exam section, it is automatically selected in the Grade area. If no grade was imported, click on a grade button to assign a muscle testing grade.

ℹ Notice: The *Guides* indicate that injuries resulting in more than a grade 3 deficit are usually accompanied by other clinical findings that should take precedence. *Guides* Table 16-35 only provides strength deficit ranges associated with grades 3 and 4, as outlined in Table 16-11, p. 484.

4. Adjust the Strength Deficit percentage to determine the strength loss impairment.
5. You can repeat the process to rate additional strength loss impairments.
6. The upper extremity impairment (UEI) for each motion unit rated is displayed in the UEI column. The combined whole person and upper extremity (in parenthesis) impairments are displayed in the bottom right-hand corner.
7. Click the Save and Close button to save the impairment.

Peripheral Nerves

These Impairment Types selections are used to rate loss of motor function (muscle weakness) and sensory deficits related to specific peripheral nerves. The tables and rating information for the upper extremity peripheral nerve structures are found in the *Guides*, Section 16.5, pp. 480-497.

Peripheral Nerves - Motor Form
The upper extremity Peripheral Motor form provides areas for identifying the involved nerve structure(s), affected motion(s), grading and adjusting motor deficit percentages according to the *Guides*.

To rate a peripheral nerve related motor deficit:
1. Select the involved nerve structure from the list in the Peripheral Nerve box (Table 16-15, p. 492) by clicking on the nerve.
2. Once a peripheral nerve is selected, associated muscle motions are displayed in the Involved Motions box. The muscle test grades are displayed for tests graded in the Perform Exam section. Select the muscle motion that best represents the loss of strength for the impaired nerve structure.
3. If you graded the selected muscle test in the Perform Exam section, that grade is automatically selected in the form's Grade area. If the test was not graded, click on the grade that best represents the strength loss. (See grading information below.)
4. The motor deficit range is determined by the grade selected. Use the up/down arrows to adjust the Motor Deficit %, which is multiplied by the maximum nerve impairment to determine the upper extremity impairment for the peripheral nerve.
5. If additional peripheral nerves are involved, repeat the procedure for each nerve structure.
6. Click on the Save and Close button to save the impairment values.
7. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

ⓘ Notice: According to the *Guides* (p. 484), "The examiner must use clinical judgment to estimate the appropriate percentage of motor deficits and loss of power within the range of values shown for each severity grade."

Grading Peripheral Motor Deficits

After selecting the impaired peripheral nerve, select an associated muscle test, grade the muscle and adjust the motor deficit to calculate the nerve impairment.

The following grading chart comes from Table 16-11, p. 484 of the *Guides*.

Grade	Description of Muscle Function	% Motor Deficit
5	Complete active range of motion against gravity with full resistance	0
4	Complete active range of motion against gravity with some resistance	1-25
3	Complete active range of motion against gravity only, without resistance	26-50
2	Complete active range of motion with gravity eliminated	51-75
1	Evidence of slight contractility; no joint movement	76-99
0	No evidence of contractility	100

ℹ Notice: For tests performed with the Tracker muscle tester, the bilateral difference is not the same as the motor deficit used for calculating impairment.

Peripheral Nerves - Sensory Form

According to the *Guides* (p. 482), "The examiner must use clinical judgment to estimate the appropriate percentage of sensory deficits or pain within the range of values shown for each severity grade. The maximum value for each grade is not applied automatically.

After selecting the impaired peripheral nerve, grade the sensory loss and adjust the sensory deficit to calculate the nerve impairment.

The upper extremity Peripheral Nerves Sensory form provides areas for identifying the involved nerve structure(s),grading sensory loss and adjusting sensory deficit percentages according to the *Guides*.

To rate a peripheral nerve related sensory deficit:

1. Select the involved nerve structure from the list in the Peripheral Nerve box (Table 16-15, p. 492) by clicking on the nerve.
2. If you graded the selected peripheral nerve's sensibility in the Perform Exam section, that grade is automatically selected in the form's Grade area. If the sensibility was not graded, click on the grade that best represents the sensory loss or pain. (See grading information below.)
3. The sensory deficit range is determined by the grade selected. Use the up or down arrows to adjust the Sensory Deficit, which is multiplied by the maximum nerve impairment value to determine the upper extremity impairment for the involved nerve structure.
4. If additional peripheral nerves are involved, repeat the procedure for each nerve structure.
5. Click on the Save and Close button to save the impairment values.
6. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Strength Impairment

Important information about grip and pinch strength impairment rating:

The *Guides* Fifth Edition does not provide a clear understanding of how grip strength impairment should be calculated. In Example 16-70, p. 510, the joint impairment from Table 16-34, p. 509 is multiplied by the maximum joint value from Table 16-18, p. 499 to arrive at the impairment rating. Table 16-34, p. 509 seems to support the intention of multiplying by joint values as it is now titled "Upper Extremity Joint Impairment Due to Loss of Grip or Pinch Strength (emphasis added)," as opposed to the Fourth Edition title of "Upper Extremity Impairment for Loss of Strength." The supporting text on pages 508-509 of the Fifth Edition, however, does not specify that as the proper procedure, leaving the matter open to interpretation.

The Fifth Edition Chapter Chair for the Upper Extremities, Frank E. Jones, MD, explained to JTECH that the intent was to associate the impairment with the unit level and not automatically with the entire upper extremity as in the Fourth Edition. He also cautioned that grip and pinch strength impairments should be rarely used and only when loss of strength has not been adequately considered by other methods in the *Guides*.

Because the *Guides* do not provide adequate information about how grip strength impairment should be rated, JTECH's Tracker Version 5 Impairment Software was designed with a flexible interface. The Involved Joint/Region buttons allow you to rate the impairment based on the Upper Extremity, as in the Fourth Edition, or to assign a joint value from Table 16-18.

Grip Strength Form

The *Guides* provide three methods of estimating grip strength impairment: comparison to the uninvolved side, comparison to occupation-based norms (Table 16-31, p. 509), and comparison to age-based norms (Table 16-32, p. 509). The normal value selected is then used to calculate a strength loss index, which is compared to Table 16-34, p. 509 to determine the upper extremity joint impairment due to loss of grip strength. Tracker Version 5 Impairment software allows you to choose between the three normative comparison methods before applying a joint value from Table 16-18, p 499.

Grip tests should be performed with the grip gauge handle in position two or three for use with normative comparisons.

For occupation- and age-based normative comparisons, the three sections that appear below the buttons must be completed.

1. Select the left or right upper extremity category and Grip (under Strength) from the Impairment Types list.
2. Select the button for the type of normative comparison: opposite side, occupation or age.
   Opposite Side: If this button is selected, go to step 3.
   Occupation: If this button is selected, the appropriate gender, handedness and occupation radio buttons must be clicked. If you entered gender and handedness in the Patient File section, only the Occupation Type button must be selected.
   Age: If this button is selected, the appropriate gender, handedness and age categories must be selected. If the data was entered in the Patient File selection, the selections are automatically made.

For Involved Joint/Region, except Upper Ext, the joint-specific buttons must also be completed.

The check box must be selected to determine which grip test to use for the impairment rating.

3. Select the involved region/joint. For all selections, except Upper Ext, you must also select an involved joint by clicking on a joint-specific radio button. (For more information see Example 16-70, p 510 and Table 16-18, p. 499 of the *Guides*.)

ⓘ Notice: To rate the grip strength impairment directly from Table 16-34, p. 509, use the Upper Ext button.

4. Select the grip test to use for the impairment calculation by clicking on a check box. If grip test data collected in the Perform Exam section is displayed in the Current Side and Opposite Side columns, the impairment is automatically calculated when a box is checked. Data can be manually entered in empty boxes in the Current and Opposite Side columns. When data is manually entered the impairment is automatically calculated.

5. Click the Save and Close button to save the grip strength impairment.

6. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Pinch Strength Form

For Involved Joint/Region, except Upper Ext, the joint-specific buttons must also be completed.

The *Guides* provide two methods of estimating pinch strength impairment: comparison to the uninvolved side and comparison to occupation-based norms (Table 16-33, p. 509). The normal value selected is then used to calculate a strength loss index, which is compared to Table 16-34, p. 509 to determine the upper extremity joint impairment due to loss of pinch strength. Tracker Version 5 Impairment software allows you to choose between the two normative comparison methods before applying the joint value from table 16-18, p. 499.

1. Select the left or right upper extremity category and Pinch (under Strength) from the Impairment Types list.
2. Select the button for the type of normative comparison: opposite side or occupation.
   Opposite Side: If this button is selected, go to step 3.
   Occupation: If this button is selected, the appropriate gender, handedness and occupation radio buttons must be clicked. If you entered gender and handedness in the Patient File section, only the Occupation Type button must be selected.
3. Select the involved region/joint. For all selections, except Upper Ext, you must also select an involved joint by clicking on a joint-specific radio button. (For more information see Example 16-70, p 510 and Table 16-18, p. 499 of the Guides.)

ⓘ Notice: To rate the pinch strength impairment directly from Table 16-34, p. 509, use the Upper Ext button.

4.	If key (lateral) pinch test data was collected in the Perform

Exam section of the software, the test data is automatically imported into the Pinch Impairment form. Click the check box beside Key data to complete the pinch strength impairment calculation.

If no data was collected, click on the text field and enter the pinch test results. Make sure data is entered for both sides if Opposite Side was selected for normative comparison.

5.	Click the Save and Close button to save the grip strength impairment.
6.	Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Lower Extremities
Lower Extremity Categories

The lower extremities are divided into two categories: one for the left lower extremity and one for the right. According to the Guides, if both extremities are involved, you should rate each separately then combine the impairments.

Since the forms and operations are the same for the left and the right lower extremities, this section applies to both.

1.	Select either the left or the right lower extremity button to begin the impairment rating process.
2.	From the Impairment Types list, select the type and/or anatomical region for impairment rating. To rate more than one region or impairment type, rate one area then select and rate the next area until all impairments for the selected lower extremity are rated.
3.	If both lower extremities are involved, rate all the impairments for one extremity then rate the impairments for the other.
4.	To complete the impairment rating, click on the Impairment Calculator button.

When the Left or Right Lower Extremity button is selected, the available impairment types are displayed.

Amputation
The lower extremity amputation form is used for rating amputations from the pelvis through the toes. Amputation impairment percentages for lower extremity amputations are provided in Table 17-32, p. 545 of the Guides.

1.	Click on Amputation in the Impairment Types tree structure to display the lower extremity amputation form.
2.	Select either the Lower Extremity or Toes button depending on amputation level.
3.	If the amputation level was documented in the Perform Exam section of the software, click on the Import button to import the data into the lower extremity amputation form. Otherwise, click on a check box corresponding to the amputation level.

ⓘ Notice: According to Table 17-32 of the *Guides*, Hemipelvectomy amputations are only rated at the whole person level.

ℹ Notice: Only one level can be selected for lower extremity amputations and only one level per toe can be selected for toe amputations.

4. To provide more specific information about the amputation location, place the cursor in the Location Details field and type in up to 50 characters.
5. Click on the Save and Close button to save the impairment.
6. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Peripheral Nerves

These impairment type selections are used to rate loss of motor function (muscle weakness) and sensory deficits and pain related to the specific peripheral nerves. The tables and rating information for the lower extremity peripheral nerve structures are found in the Guides, Section 17.2l, pp. 550-553.

Peripheral Nerves - Motor Form

The lower extremity Peripheral Motor form provides areas for identifying the involved nerve structure(s), effected motions, grading and adjusting motor deficit percentages according to the Guides.

1. Select the involved nerve structure from the list in the Peripheral Nerve box (Table 17-37, p. 552) by clicking on the nerve.
2. Once a peripheral nerve is selected, associated muscle motions are displayed in the Involved Motions box. The muscle test grades are displayed for tests graded in the Perform Exam section. Select the muscle motion that best represents the loss of strength for the impaired nerve structure.
3. If you graded the selected muscle test in the Perform Exam section, that grade is automatically selected in the form's Grade area. If the test was not graded, click on the grade that best represents the strength loss. (See grading information on page 13.12 of this chapter.)

The bottom right hand Impairment Rating box displays the combined peripheral motor whole person and lower extremity (in parentheses) impairment percentages.

4. The motor deficit range is determined by the grade selected. Use the up or down arrows to adjust the Motor Deficit %, which is multiplied by the maximum nerve impairment value to determine the lower extremity impairment for the involved nerve structure.
5. If additional peripheral nerves are involved, repeat the procedure for each nerve structure.
6. Click on the Save and Close button to save the impairments.
7. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Peripheral Nerves - Sensory Form

The lower extremity Peripheral Sensory form provides areas for identifying the involved nerve structure(s),grading sensory loss, grading dysesthesia and adjusting sensory and dysesthesia deficit percentages according to the Guides.

1.   Select the Sensory or the Dysesthesia button.
2.   Select the involved nerve structure from the list in the Peripheral Nerve box (Table 17-37, p. 552) by clicking on the nerve.
3.   Click on the grade that best represents the sensory loss or dysesthesia. (See grading information on page 13.10 of this chapter.)
4.   The sensory deficit range is determined by the grade selected. Use the up or down arrows to adjust the Sensory Deficit, which is multiplied by the maximum nerve impairment value to determine the lower extremity impairment for the involved nerve structure.
5.   Repeat the procedure for each nerve structure for sensory loss and dysesthesia.
6.   Click on the Save and Close button to save the impairments.
7.   Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

> In the lower extremities, both sensory loss and/or dysesthesia can be rated for a peripheral nerve structure.

Hip, Knee, Ankle/Foot, Toe

The forms for these four anatomic regions function essentially the same. The Ankle/Foot Range of Motion form has several unique elements that are addressed in the Lower Extremity Range of Motion section of this chapter. The toe region does not include a range of motion form.

Range of Motion Forms
Lower extremity range of motion forms provide the ability to rate impairments for both motion loss and fixated joints (ankylosis) according to the Tables in Chapter 17 of the *Guides*.

For lower extremity range of motion impairments the Guides provide tables showing percentages for mild, moderate and severe impairments. Multiple range of motion impairments for a joint are added together when determining the motion impairment.

According to the *Guides*, "An immobile joint is an impairment even when the position of ankylosis is optimal." In the text (pp. 538-543), the Guides provide the impairment percentages for lower extremity joints ankylosed in the optimal position. Additional ankylosis percentages are provided in Tables 17-15 through 17-30 for variations from the optimal neutral position. Tracker Version 5 software includes the ability to rate an impairment for an ankylosed joint.

> If data was imported from the Perform Exam section, you can view the repetition data by clicking on the Show Reps button.

1. Select the Left or Right Lower Extremity category button and click on "Range of Motion" for the joint in the Impairment Types list.
2. If you documented the joint's range of motion in the Perform Exam section using the goniometer or the inclinometer, the data can be imported into the Range of Motion impairment form in several ways.

The active check boxes indicate whether data has been collected in the Perform Exam section of the software.

ⓘ Notice: When entering ankylosis values, the software will not allow you to exceed the values outlined in Section 17.2g of the *Guides*.

To import all data collected with an instrument, click on the instrument icon. If part of your data was collected with the inclinometer and part with the goniometer, you can still import all the data for each instrument.

To import data for a specific motion, click on the active check box associated with the instrument. Check boxes are only active if data is available from the Perform Exam section of the software.

If no data is imported, you can enter ROM values by clicking in a ROM or Ankylosis box and typing a number.

ⓘ Notice: If data is imported, you cannot edit the ROM values at this screen. You must return to the Perform Exam section to make any changes.

You can clear imported data by clicking on a check box or using the Delete All button at the bottom of the form.

3. If a value is entered under the Ankylosis column, the impairment for ankylosis in the optimal position is activated. Additional impairments for variations from the optimal position are displayed in the LEI column.
4. If no ankylosis value is entered, the impairments for abnormal motions entered or imported into the ROM boxes are displayed in the LEI column. The combined whole person and lower extremity (in parentheses) impairments are displayed in the bottom right-hand corner of the form.
5. Click the Save and Close button to save the impairments.
6. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Ankle/Foot ROM Form

The active Ankle/Foot ROM Impairment form includes options for rating loss of tibia-os calcis angle and pantalar ankylosis

The complex motion of the ankle and foot requires a slightly different form for impairment rating. According to the *Guides* (p. 10), "Exceptions, as detailed in the musculoskeletal chapter, include impairments of the joints of the thumb, which are added, as are the ankle and subtalar joints in the lower extremity: both situations include complex motions."

The Ankle/Foot form includes impairments for the ankle, foot (subtalar), pantalar ankylosis and loss of tibia-os calcis angle.

1. Use the Ankle and Foot buttons to select the unit motions for impairment rating.
2. Varus/valgus and internal/external malrotation values must be entered.
3. Loss of tibia-os calcis angle must be manually entered. The box is available under both the Ankle and Foot selections, but the value is only entered once.
4. If the Pantalar Ankylosis box is checked, only ankylosis values can be entered for the ankle or the foot. Variations in position from the optimal neutral position are added to the pantalar ankylosis impairment.
5. Measurements collected in the Perform Exam section can be imported using the instrument buttons and/or the check boxes.

Muscle Testing Forms

The *Guides* do not require a strength or motor deficit adjustment for lower extremity muscle weakness impairments, as is required for neurological motor impairments.

According to the *Guides* (p. 531), "Weakness caused by an identifiable motor deficit of a specific peripheral nerve should be assessed according to Section 17.2l, Peripheral Nerve Injuries." Muscle weakness ratings are based on Table 17-8, p. 532 according to grading criteria outlined in Table 17-7, p. 531 of the *Guides*.

1. Select the Left or Right Lower Extremity category button and click on Muscle Testing from the Impairment Types list for the involved joint.
2. If you documented the muscle test grade in the Perform Exam section, the software automatically imports the grade into the Grade column in the Muscle Testing Impairment form.

ℹ Notice: If data is imported, you cannot edit the assigned grade at this screen. You must return to the Perform Exam section.

3. Select the "motion unit" (knee flexion for example) for impairment rating. If the grade was imported from the Perform Exam section, it is automatically selected in the Grade area. If no grade was imported, click on a grade button to assign a muscle testing grade.
4. You can repeat the process to rate additional strength loss impairments.
5. The lower extremity impairment (LEI) for each motion unit rated is displayed in the LEI column. The combined whole person and upper extremity (in parentheses) impairments are displayed in the bottom right-hand corner.
6. Click the Save and Close button to save the impairments.
7. Click another category button to rate additional impairments or click on the Impairment Calculator button to complete the impairment rating.

Impairment Calculator
Using the Impairment Calculator

According to the *Guides* (p. 379), "Spine impairment rating is performed using one of two methods: the diagnosis-related estimates (DRE) or range of motion (ROM) method." Therefore, Tracker Version 5 Impairment software does not allow the combining of spine DRE method and spine ROM method impairments within the same spine region.

The Impairment Calculator is the final step in rating impairments using Tracker Version 5 Impairment software. This step allows you to review the impairment values you have assigned, determine compatibility of the rated impairments, remove impairments from the final calculation, see how using different criteria impact the final whole person impairment, and adjust the final impairment up or down.

To complete a final combined whole person impairment:

1. Click on a region button to display impairment options. If multiple regions are involved, complete one region then each additional region.
2. Select the Associated Impairment Ratings to use for the final combined whole person impairment by clicking on the check boxes beside the items. Items with a + can be opened to display additional sub-items. Clicking on an item with a + or - sign selects the item and all its sub items.

❶ Notice: Impairment percentages are displayed for all items you rated as Whole Person (Extremity) [Hand/Foot].

3. You can deselect an item by re-clicking on the check box. This feature allows you to see how different combinations affect the final combined whole person impairment.
4. The regional combined impairments and combined whole person impairment are displayed under Impairment Totals.
5. You can adjust the final combined whole person impairment, such as for adding up to 3% for pain (see *Guides* Chapter 18), using the Impairment Adjustment. Click on the up or down arrows to adjust the final combined whole person impairment, displayed in the bottom right-hand box. According to the *Guides*, impairment adjustments should be accompanied by an explanation. Click on the Reason for Adjustment box and type in an explanation.
6. When you have completed the impairment selection and adjustment process, click on the Save and Close button. You can now generate impairment narrative and data reports.

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Chapter 21

Create Reports

Create Reports

The Create Reports section is used to select elements to include in both narrative and worksheet reports.

Create Reports is selected using the bottom menu.

🖼 Patient Files	🖨 Perform Exam	📊 Analyze Data	🖼 Impairments	🖨 Create Reports	❌ Close Patient

The type of report you create is determined by selecting either the Narratives or Worksheets buttons. Both options allow you to select the items to be included in the report. Tracker Version 5 Software uses a standard queue feature for organizing elements for both narrative and worksheet reports.

Narratives	Worksheets

Narrative Reports

Narratives Button

Clicking the Narratives button allows you to select items, along with headers and statements, and import them into your word processor to create specific, unique reports. Providing the ability to easily edit the report, such as adding comments or expanding on the meaning of test results, is an important advantage of placing the information into your word processor.

ℹ Notice: Microsoft Word is recommended to maximize Tracker Version 5 Software's narrative report writing features.

Using the Queue with Narratives

When you select an item to include in your narrative, a description of the item is placed in the narrative queue. The queue feature allows you to organize and order items, save the list of items as a reusable template, load templates for convenient report creation, and import the list of items into your word processor to create the report.

ℹ Notice: The Narrative Queue does not have a preview screen. To see the report before printing, import the data into your word processor.

Creating a Narrative
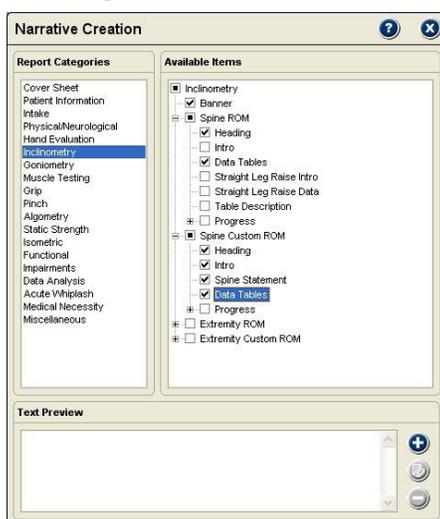
When you click the Narratives button, the Narrative Creation screen is displayed. This screen has three primary areas: Report Categories, Available Items and Text Preview.

Report Categories

Items in Report Categories represent the key documentation portions of the software, such as Patient Information, Intake, Physical Evaluation and Instrumented Testing. When a Report Categories item is selected, items within the category are displayed in the Available Items list.

21.2
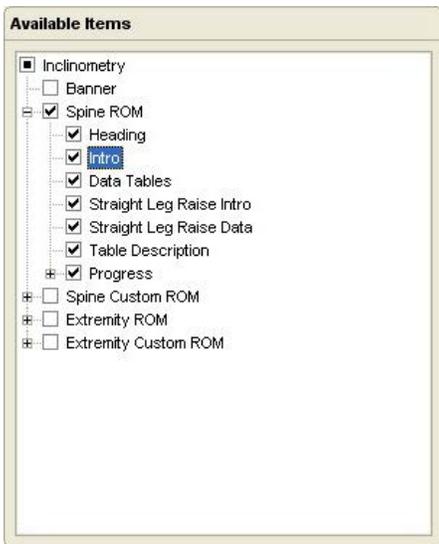
Available Items

The Available Items list contains a variety of items you can choose for your narrative report. The items include banners, headings, statements, data tables (test results) and other related items.

1. Click on an item in the Report Categories list to display items in the Available Items field.
2. Select all the items in the list by clicking on the check box beside the top or "parent" item.

ⓘ Notice: Items with a + beside them indicate item groups that can be opened to see available items within the group.

Select a group of items by clicking on the check box beside the group heading.

Select individual items by clicking on the item's check box.

3. Deselect an item, group or entire list by unchecking the corresponding check box.

Item Descriptions
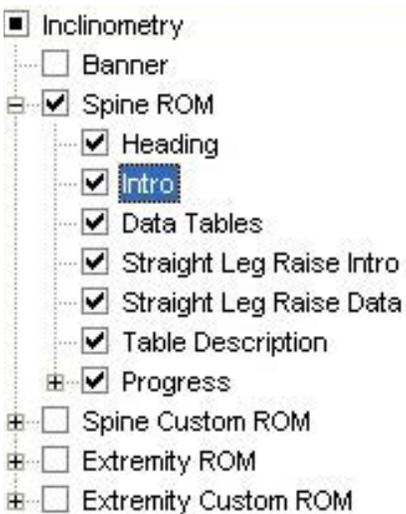
Banner indicates the item will produce a large, boxed header in your report. Banners are used to differentiate sections within the narrative.
Heading items produce a header in the narrative that is a step down from a banner. Headers separate subcategories within the narrative.
Intro indicates an editable statement use to define the narrative report section.
Data and Data Tables indicate test data that can be inserted in the narrative.
Graphs include graphic items such as force curves that you can include in the narrative report.
Recent Change shows the percent of change from the previous test to the current report test date.
Overall Change shows the percent of change from the first test to the current report test date.

As you select items from the Available Items list, they are placed in the Narrative Queue in the order they are selected. You can also rearrange the order of items once they are placed in the queue.

1. For a single item, highlight the item and use the Up or Down buttons or simply drag and drop it in the new position.
2. For multiple items, hold down the Shift or Ctrl key and drag the cursor over the items to highlight them. Use the Up and Down buttons or drag and drop the items in the new position.

Text Preview
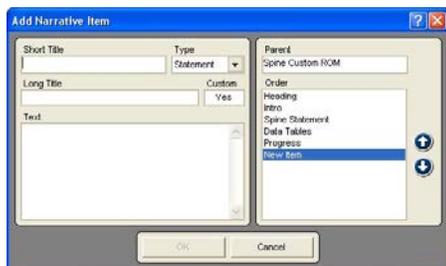
This section of the Narrative Creator provides you with a high degree of versatility for modifying narratives to your style. In addition to viewing banners, headings and text, it allows you to edit existing text elements and to create your own custom items for your narratives.

Creating New Items

1. Click on the group heading (item with a +/-) where the new item will be inserted. For example, to place a new item under Inclinometry, highlight Inclinometry or highlight Spinal ROM to place an item at that level.
2. Click on the Add button to the right of the Text Preview window to display the Add Narrative Item screen.
3. Enter a short title that will show up in the Available Items list.
4. Click on the Type drop down to indicate if the item is a banner, heading or statement.
5. Enter a long description that is displayed in the Narrative Queue.
6. In the Text field, type in the text as you want it to appear in your narrative report. The amount of text is unlimited. Use the Enter key to place hard returns and spaces in the statements.
7. Use the Up and Down buttons on the right-hand side of the window to arrange the item within the Order list.
8. Click OK to save and exit, click Cancel to exit without saving.

Editing Items

1. Highlight the Available Item you want to edit. Only items that have text displayed in the Text Preview field are editable.
2. Click the Edit button to the right of the Text Preview window.
3. When the Edit Narrative window opens all the information about the item is displayed.
4. Make any edits to the item and click OK to save or click Cancel to exit without saving.

Deleting Items

Custom items you create can be deleted from the Available Items lists. Standard items from JTECH, such as an Intro, cannot be deleted, but they can be edited.

1. Highlight the item to delete and the delete button beside the Text Preview window is activated. If the Delete button is not activated, the item cannot be deleted.
2. Click the Delete button and "Yes" at the warning screen.

Narrative Preferences
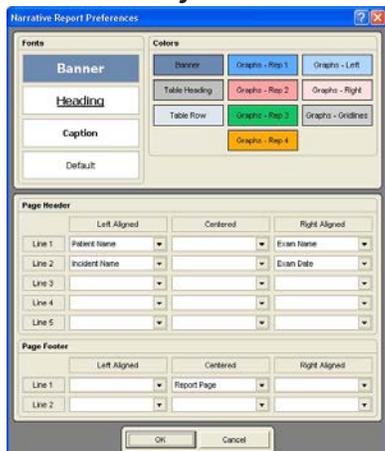
Tracker Version 5 Software allows you to control some of the formatting of the data as it is imported into your word processor. For narrative reports you can control fonts, font colors, graph colors, page header information and page footer information.

1. Click the Report Preferences button at the bottom of the queue.
2. Edit preferences
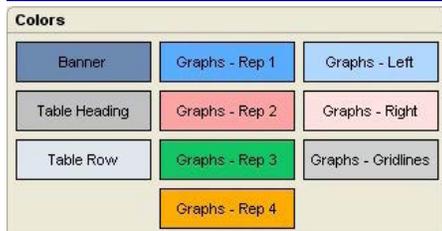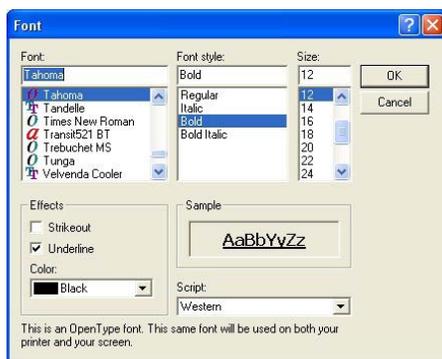
21.4

Fonts

This section controls the range of fonts used in narrative reports.

Banners separate the main sections of the report and are usually placed in large, bold type.

Headings further separate sections of the report below the banners.

Captions refer to leaders, such as **Patient Name:** or **ID Number:**, that show up to identify information in the narrative. Captions also refers to titles in data tables.

Default refers to the font used for standard text, such as intros and statements.

Fonts
1. Click on the category of font you want to change, such as Banner or Heading to display a standard Windows fort selection form.
2. Apply changes to the font, such as font, style, size, effects or color.
3. Click the OK button to save changes and exit or the Cancel button to exit without saving.
4. Click the OK button at the bottom of the Preferences form to save your changes and exit.

Colors

This sections controls boxes for banners, table headers and table rows. It also allows you to control the color of force curve and progress graphs.
1. Click on the item you want to change the color for and a standard Windows Color form is displayed.
2. Select the color and click OK to save and apply the color or click Cancel to exit without saving.
3. Click the OK button at the bottom of the Preferences form to save your changes and exit.

Page Header

This section allows you to control information that is placed at the top of the second and subsequent pages of the report. You can have up to five rows with up to three columns each. Information can range from patient name to clinic information.
1. Click the drop-down for the row and column location to insert data.
2. Highlight your selection from the drop-down list.
3. Click the OK button at the bottom of the Preference form to save your changes and exit.

Page Footer

This section allows you to place up to two rows with up to three columns each at the bottom of every page.
1. Click the drop-down for the row and column location to insert data.
2. Highlight your selection from the drop-down list.
3. Click the OK button at the bottom of the Preference form to save your changes and exit.

Examples of color Banner, Table Heading, Table Row, Force Curves, and Change Graph

Worksheet Reports
Worksheets Button
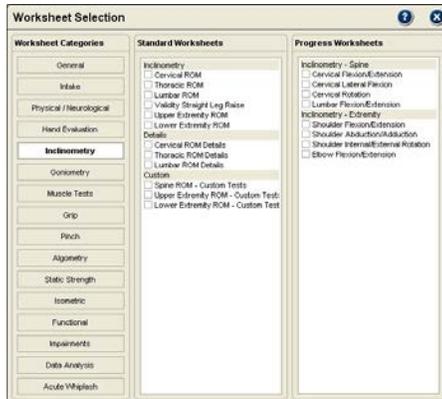
The Worksheets button is used to create standard data reports for the currently selected patient and exam. The software gives you the ability to order the elements included in the report to meet your needs.

ⓘ Notice: Worksheet reports are created for the currently selected exam. To create a report from a previous exam, open Patient Files and select the exam date from the "tree" structure.

The Worksheet Selection screen has three parts: Worksheet Categories, Standard Worksheets, and Progress Worksheets.
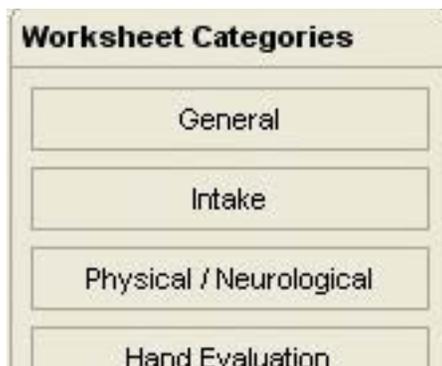
Worksheet Categories
Worksheet Categories are listed on the left and can be selected by clicking the buttons. When a category button is clicked, available standard worksheets are listed in the column and progress worksheets are listed in the right-hand column.

Standard Worksheets
Standard worksheet reports present the data collected in predefined chart formats. Standard worksheets include data from all repetitions, statistical calculations and graphic elements like force curves for muscle testing and sustained grip tests.
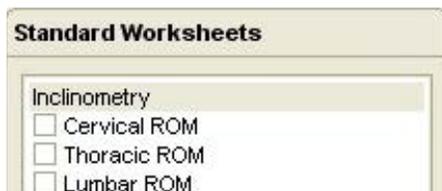
1.   Click on a Worksheets Category button.
2.   From the Standard Worksheets list, click on a header to select all the items below it or click the check box beside an item to select it. Selected items are placed in the Reports Queue.
3.   Repeat steps 1 and 2 for additional report elements. See Reports Queue section for information about viewing and printing standard worksheet reports.
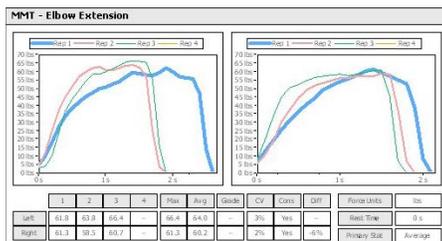
Progress Worksheets
Progress worksheets graph test results (based on the Primary Stat) to demonstrate changes over time. Progress reports are only available for completed tests.
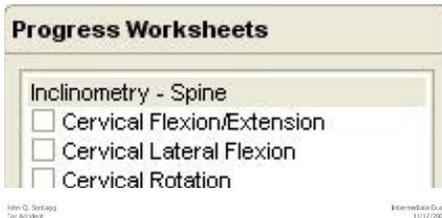
1.   Select a worksheet category.
2.   From the Progress Worksheets list, click on a header to select all the items below it or click the check box beside an item to select it. Selected items are placed in the Reports Queue.
3.   Repeat steps 1 and 2 for additional report elements. See Reports Queue section for information about viewing and printing worksheet reports.
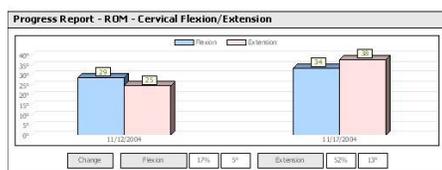
ⓘ Notice: Tests performed on previous exams, but not on the current exam, are available for Progress reports.

ⓘ Notice: You can mix standard report items with progress report items in the queue to create a custom report.

21.6

Reports Queue

Reports Queue

As you select items to create either a narrative or worksheet report, they are placed in the Report Queue. The queue allows to arrange the report elements, and to save the item list as a template for future reports. The queue is also used to recall report templates to create a report for the current exam.

ℹ Notice: Narrative and worksheet items cannot be combined in the same report, since narratives upload into your word processor and worksheets are send directly to the printer.

Reports Queue Buttons
Once items are placed in the queue, they are controlled using the queue buttons. The queue buttons are also used for recalling a template for creating a report.

Print: Sends the report to the system's default printer

Preview: Allows you to see worksheet reports before printing. This button is not available for narrative reports.

Delete: Removes the highlighted item from the queue.

Move Up: Moves the highlighted item up in the queue order.

Context Help: Displays help information for the queue.

Load Report Template: Opens a form for selecting and applying saved report templates.

Save Report Template: Opens a form for naming and saving report as a reusable template.

Delete All: Clears all items from the queue.

Move Down: Moves the highlighted item down in the queue order.

Report Preferences: Opens a form for controlling report appearances, such as fonts and colors.

Using the Queue for Narratives
The software applies formatting to the list of items as they are placed in the queue for a narrative. This feature was developed to visually break up the list so items are easier to see when creating a narrative. Banners are displayed in bold italics with the word banner. Headings are bolded and both data and statements are indented to make the queued items easier to read.

Printing Narratives

1. When you have all the items in the queue arrange for your narrative report, click the Print button.
2. The software displays a standard Windows Save File window. You can save the narrative in the default location, which is in the Reports folding located in the Tracker 5 Program folder. You can also use the Windows Save In to identify another location for the report file.
3. Type in a name for the file in the File Name field.
4. Click the Save button to save the narrative. Tracker will automatically open the narrative in your word processing program. If it does not, contact JTECH customer service.

Using the Queue for Worksheets
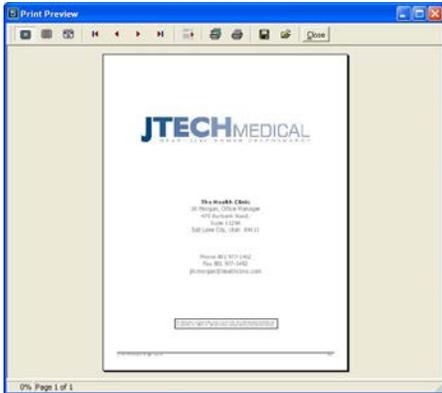
When worksheet items are place in the Reports Queue, the software does not apply formatting. You can still arrange items in the order you want using the queue buttons.

Previewing Worksheets
The Preview button allows you to see worksheet reports before you print them. The preview shows all items in the queue in the order they appear in the report.

1. With worksheet items in the queue, click the Preview button.
2. Use the Preview Screen's buttons to change the preview size, advance through pages, print the report, etc.
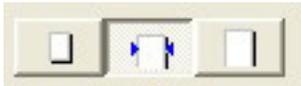
The first three buttons adjust the preview size on the screen from full page, 100% and full width.
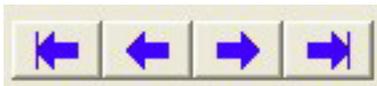
The next four buttons move forward and backward through the pages of the report.

The next two buttons allow you to go to a specific page in the report and to search for text in the report.

The next two buttons are for the printer. The left button allows you to select and setup the printer. The right button automatically sends the report to the printer.

The right-hand set of buttons allows you to recalled a saved report and to save the report to a file. Reports saved this way can only be recalled and printed through the Tracker Report Preview.

The last button closes the preview.

Printing Worksheets

1. Print worksheet reports without previewing by clicking the queue's print button.
2. Complete the standard Windows Print form and click OK.

Save and Load Report Templates
The queue functions in the same manner whether you are creating a narrative or a worksheet report template. Report templates are also recalled the same way.
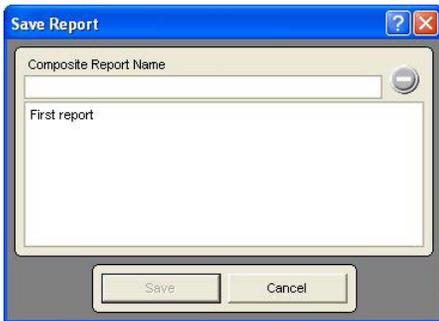
To save a report template

1. Select all the items and arrange them in the Report Queue.
2. Click on the Save Report Template button.
3. Enter a name for the template in the Name field.
4. Click the Save button.
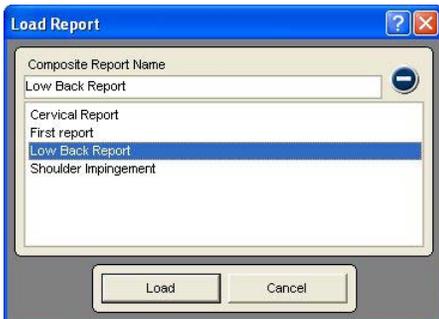
To load a report template

1. Click on the Load Template button.
2. Highlight a template name in the list.
3. Click the Load button.

ⓘ Notice: You can load more than one report template into the queue, but duplicate items will not be added.

To delete a report template

1. Click either the Save or Load buttons.
2. Highlight the template in the list.
3. Click the Delete button.
4. Click "Yes" at the warning.

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Index

Index (cont.)

Index (cont.)

Index (cont.)