

T-SCAN™ 10.0X USER MANUAL

Computerized Occlusal Analysis System





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Computerized Occlusal Analysis System

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WELCOME TO T-SCAN

Technical Support

Within the U.S. and Canada, support is available Monday - Friday 8:30am - 7:00pm EST.

Phone support: (617) 464-4279 or (800) 248-3669 x359

Email Support: support@tekscan.com

Fax Support: (617) 464-4266

Website: www.tekscan.com

Mail: Tekscan, Inc. 307 West First Street. South Boston, MA 02127-1309

If located outside the U.S. please contact your local distributor.

Tekscan, Inc. will provide technical assistance for any difficulties you may experience using your T-Scan system for 90 days from the system shipping date. After 90 days, Tekscan offers annual Technical Support and System Maintenance Plans or customer support at our standard rates per incident. An incident is defined as one single issue or problem.

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Tekscan, Inc. makes no representation or warranties with respect to this manual. Further, Tekscan, Inc. reserves the right to make changes in the specifications of the product described within this manual at any time without notice and without obligation to notify any person of such revision or changes.

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Introduction

This manual describes how to use Tekscan's T-Scan™ system. T-Scan is a reliable and easy-to-use tool that senses and aids in analyzing occlusal contact forces using paper-thin, disposable sensors. The T-Scan system comes with a full-featured Patient File Management system, which makes storing patient records and tracking occlusal scans simple, and makes the system an integral component of the clinical workstation for aiding in occlusal diagnosis and treatment.

The T-Scan Occlusal Analysis system can be incorporated into your office in the following ways:

- Hygiene
- Initial Patient Exam
- Identify Premature Contacts
- Achieve Bilateral Simultaneity
- Anytime you use Articulation Paper
- Increase Implant Longevity
- Establish Anterior Guidance
- Case Finishing
- Patient Education/Documentation

The T-Scan system is a valuable tool that aids in the diagnostic process of analyzing a patient's bite and showing what is and what is not functioning properly. When a bite is unstable it can cause pain, teeth and dental restorations to crack and break, gum disease, tooth loss, headaches, and TMJ Disorder.

The T-Scan software offers features that allow the user to:

- **Scan** the patient's occlusal contact data
- **View** the patient's tooth contacts and associate them with specific teeth
- **Analyze** the data, with force & time relationships of contacts displayed as color contour images
- **Manage** patient records and scan files through the use of an intuitive database

The T-Scan system is comprised of the Microsoft (MS) Windows-based T-Scan software, the associated hardware, and patented Tekscan sensors. The system's versatility allows you to copy occlusal contact data (as an image) and paste it into other Windows applications, or to create a PDF report that can be printed or sent out via email.

This manual provides a thorough description of the system's features and capabilities. Follow the Quick Start section as a guideline, and refer to specific sections for more detailed instructions on how to use each feature.

Warranty Information

Tekscan, Inc. Limited 1-Year Warranty

1. **WARRANTY.** Tekscan, Inc. warrants to the original purchaser of this product that should it prove defective by reason of improper workmanship and/or materials:

A. Tekscan Systems and Components:

For one year from the date of original purchase at retail, Tekscan will repair or replace, at our option, any defective part without charge for the part or labor if an inspection proves the claim. Parts used for replacement may be used or rebuilt, and are warranted for the remainder of the original warranty period.

B. Tekscan Sensors:

Tekscan will replace any Tekscan Sensor which fails due to manufacturing defect if an inspection proves the claim. Claims must be made within 30 days of purchase.

2. **TO OBTAIN WARRANTY SERVICE**, call Tekscan at 1-800-248-3669, (617) 464-4500 in MA, for further instructions. Should you be asked to deliver your product to Tekscan, Inc. in Boston, MA, shipping expenses are the purchaser's responsibility. Proof of purchase is required when requesting warranty service.
3. **THIS WARRANTY DOES NOT COVER** defects caused by modification, alteration, repair or service of the enclosed product by anyone other than Tekscan or an authorized Tekscan service center, physical abuse to, misuse of, the product or operation thereof in a manner contrary to the accompanying instructions, or shipment of the product to Tekscan or an authorized Tekscan service center for service. This warranty also excludes all costs arising from installation, cleaning or adjustments of user controls. Consult the operating manual for information regarding user controls.

4. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, IS HEREBY EXCLUDED AND DISCLAIMED. THE IMPLIED WARRANTIES FOR THE MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO A TERM OF ONE YEAR. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THAT THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THE WARRANTIES SET FORTH HEREIN ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED INCLUDING THE WARRANTY OF MERCHANTABILITY AND FITNESS. THE BUYER ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE TO HIM OR RELIED UPON BY HIM WITH RESPECT TO THE QUALITY AND FUNCTION OF THE GOODS SOLD HEREIN. NO PERSON, FIRM OR CORPORATION IS AUTHORIZED TO ASSUME FOR US ANY LIABILITY IN CONNECTION WITH THE SALE OF THESE GOODS.
5. **UNDER NO CIRCUMSTANCES** shall Tekscan, Inc. be liable to purchaser or any other person for any special or consequential damages, whether arising out of breach of warranty, breach of contract, or otherwise. Some states do not allow the exclusion or limitation of incidental or consequential damages, so that the above limitation or exclusion may not apply to you.

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Training

Tekscan is pleased to offer many ways for you to learn how to get the most benefit from your system. Training is offered with all new purchases. The following training alternatives are available:

- *Web-Based Operation Training*

Web-based training. This is scheduled with a qualified Tekscan trainer, and requires having your system on a computer connected to the Internet, and a telephone connection. Web based training is provided free of charge to all new U.S. customer's. International customers should contact their distributor for training.

- *Training Video Library*

The T-Scan Training library is a self-paced learning medium that focuses on operational use, features of the software, and evaluation of the features. The training library can be accessed here: <https://www.tekscan.com/support/product-training/t-scan>

- *Help File*

A fully interactive help file is included with all new systems. Help files can be accessed via the software menu (either **Help > Content** or **Help > Search**). The help file can also be opened separately as a standalone file via the Windows Start Menu (**Start > All Programs > Tekscan > Help**).

- *Webinar*

Tekscan offers free web-based courses, seminars, and training sessions. You participate with other users from the comfort of your home or office. Check our website, <https://www.tekscan.com/webinars>, for times and availability.

- *Training at Tekscan*

In-house training is available at our Boston home office, by appointment.

- *User Meetings*

Tekscan hosts User Meetings at various locations to be convenient to people in various parts of the world. User Meetings offer an opportunity to interact with other professionals using Tekscan technology. User Meetings may have an associated cost.

- *Onsite Operation Training*

Onsite training can be provided for a fee which is to be determined.

For a schedule of webinars and training dates, please visit our website at <https://www.tekscan.com/events>.

Note: Training is not required to operate a Tekscan system. For most users, however, training greatly improves one's ability to acquire and interpret data.

HARDWARE & INSTALLATION

T-Scan Minimum System Requirements

Windows Based

- Windows 7, 8, or 10
- Memory: 8 GB RAM
- 20 GB Disk Space
- Dedicated video card

Virtual Windows Based (running on Mac OS)

- Mac with minimum 8 GB RAM, recommended 16 GB RAM
- VMware® Fusion® or Parallels® software
- Windows 7 or Windows 10 software
- 75 GB Disk Space

T-Scan Component List



T-Scan Novus Handpiece (DH-1) System

- (1) Novus Handpiece (DH-1)
- (1) Novus Handpiece Holder and 3M Command adhesive strip (Novus System only).
- (20) Small Sensors (#2502) 
- (20) Large Sensors (#2002) 
- (2) Small Sensor Supports
- (2) Large Sensor Supports
- (1) Software CD with included PDF User Manual and Electronic Help File

Optional:

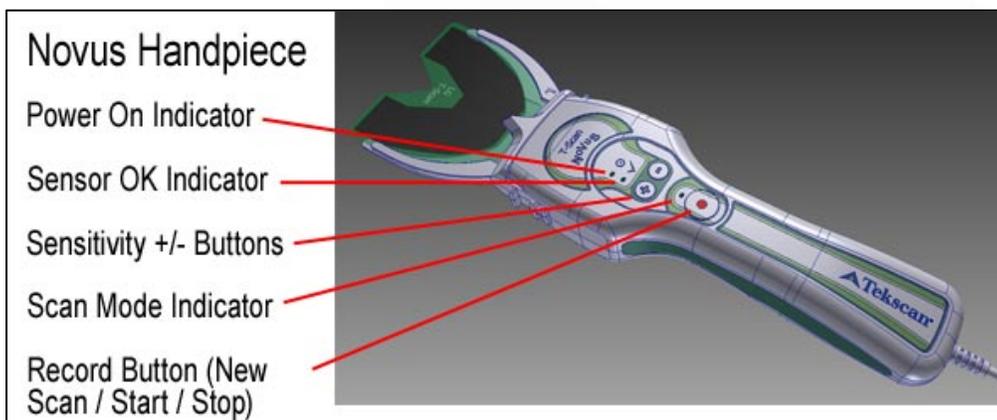
USB Cable length can be extended to 30 or 45 ft. with the following optional components:

- (1) 4-Port USB 2.0 Powered Slim Hub for PC
- (1) or (2) additional 15 ft. USB Cable(s)

Touch-free Sensor Supports can also be ordered.

The Novus Handpiece (DH-1)

The Novus Handpiece (DH-1) gathers the data from the sensor and processes it so that it can be sent to the computer. The buttons on the sensor Handpiece may also be used to start or stop a scan.



The Novus Handpiece (DH-1)

The Novus Handpiece (DH-1) label with compliancy, model number, warnings and parameters.



- **Power On LED Indicator:** Indicates that the Handpiece is powered on.
- **Sensor OK LED Indicator:** Indicates that the Handpiece is initialized, the sensor is correctly inserted into the Handpiece, and a new scan can be opened.
- **Sensitivity +/- Buttons:** These buttons can be used to open and control the sensitivity wizard, as well as control movie playback. See [Novus Handpiece Functionality](#).
- **Scan Mode LED Indicator:** Indicates the sensor is scanning force data and transferring that data to your computer.
- **Record Button:** Multi-function button. Press to open a new scan. Then, press to start / stop recording a scan.

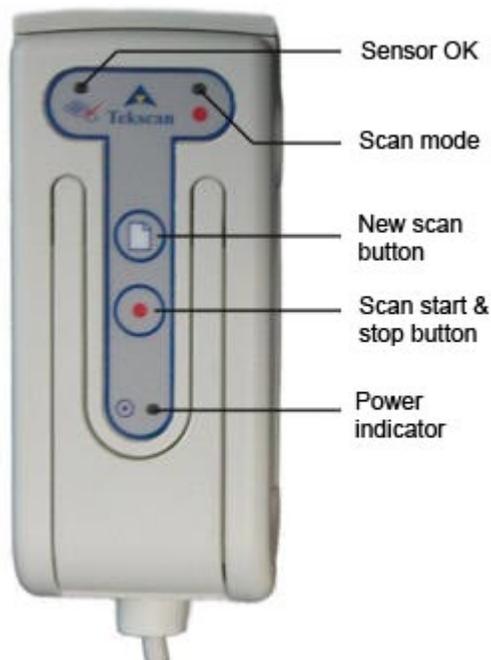
Novus Handpiece (DH-1) Specifications

COMMUNICATION/DATA ACQUISITION:	
COMMUNICATION PROTOCOL TO HOST COMPUTER	USB 1.1 OR 2.0 COMPATIBLE, 12 Mbps
SCAN SPEED	UP TO 175 Hz (UP TO 500 Hz with Turbo Mode)

DIGITAL PRESSURE RESOLUTION	8 BIT
ELECTRICAL:	
POWER SOURCE	HOST COMPUTER'S USB BUS
POWER CONSUMPTION	200mA MAX AT 5V
USB CABLE:	
LENGTH in (mm)	120 (3048)
HANDPIECE ENCLOSURE:	
SIZE L x W x H in (mm)	7.20 x 2.25 x 1.20 (182.9 x 57.2 x 30.5)
WEIGHT lbs (kgs)	0.50 (0.23) (INCLUDING CABLE)
AMBIENT OPERATING CONDITIONS:	
TEMPERATURE: °F (°C)	41 TO 95 (5 TO 35)
HUMIDITY: %	20 TO 80 (NON-CONDENSING)
PRESSURE: psi (kPa)	14.7 TO 10.1 (101.3 TO 69.7) (SEA LEVEL TO 10,000 ft)
STORAGE AND TRANSPORT CONDITIONS:	
TEMPERATURE: °F (°C)	-4 TO 140 (-20 TO 60) (SHORT-TERM < 72 HRS)
	41 TO 104 (5 TO 40) (LONG-TERM 72 HRS +)
HUMIDITY: %	5 TO 95 (NON-CONDENSING)
PRESSURE: psi (kPa)	14.7 TO 1.7 (101.3 TO 11.1) (SEA LEVEL TO 50,000 ft)

The Evolution™ Handle (EH-2)

The Evolution Handle (EH-2) gathers the data from the sensor and processes it so that it can be sent to the computer. The buttons on the sensor handle may also be used to start or stop a scan.



The Evolution Handle (EH-2).



The Evolution Handle (EH-2)



The Evolution (EH-2) label.

- **Sensor OK Green LED Indicator:** Green indicates that the sensor is correctly inserted into the handle and a new scan can be opened.
- **Scan Mode Green LED Indicator:** Green indicates that the sensor is scanning force data and transferring that data to your computer.
- **New Scan Button:** This will open a new scan window in the software, so that you can begin scanning force data.
- **Scan Start & Stop Button:** Use this button to start a scan or stop a scan that is in progress.
- **Power Green & Yellow LED Indicator:** When yellow, this light indicates that the handle is receiving power, but is not yet initialized. When Green, this light indicates that the handle is receiving power and has been initialized by the computer (i.e.: the device shows up under the Windows device manager).

Evolution Handle (EH-2) Specifications

COMMUNICATION/DATA ACQUISITION:	
COMMUNICATION PROTOCOL TO HOST COMPUTER	USB 1.1 or 2.0 Compatible, 12 Mbps
SCAN SPEED	Up to 100 Hz (Up to 500 Hz with Turbo Mode).
DIGITAL PRESSURE RESOLUTION	8 BIT
ELECTRICAL:	
POWER SOURCE	Host Computer's USB BUS
POWER CONSUMPTION	200mA MAX at 5V
USB CABLE:	
LENGTH in (mm)	180 (4572)
WEIGHT lbs (kgs)	0.40 (0.18)
HANDLE ENCLOSURE:	
SIZE LxWxH in (mm)	5.38 x 2.25 x 1.30 (137 x 57 x 33)
OPEN LEVER HEIGHT in (mm)	4.30 (109.2)
WEIGHT lbs (kgs)	0.77 (0.35)
AMBIENT OPERATING CONDITIONS:	
TEMPERATURE: °F (°C)	14 to 131 (-10 to 55) Prolonged use at high Temperatures should be avoided
HUMIDITY: %	0 to 90 (non condensing)
PRESSURE: psi (kPa)	1.7 to 14.7 (11.6 to 101.3) (sea level to 50,000 ft.)
STORAGE AND TRANSPORT CONDITIONS:	
TEMPERATURE: °F (°C)	-4 to 131 (-20 to 55) Short-Term 41 to 104 (5 to 40) Long-Term
HUMIDITY: %	0 to 90 (non condensing)
PRESSURE: psi (kPa)	1.7 to 14.7 (11.6 to 101.3) (sea level to 50,000 ft.)

Sensors & Sensor Supports

The T-Scan sensor is an ultra-thin (.004", 0.1 mm), flexible printed circuit that detects your patient's occlusal forces. These sensors are made up of 1370 active pressure sensing locations for the large sensor (#2002 for the Novus Handpiece, and #2001 for the Evolution Handle), and 1122 pressure sensing locations for the small sensor (#2502 for the Novus Handpiece, and #2501 for the Evolution Handle). These sensing locations are referred to as 'sensing elements', or 'sensels'. The 'sensels' are arranged in sensor rows and columns. Each sensel can be seen as an individual square on the computer screen by deselecting **View > 2D Contours**.

Note: Do not cut The T-Scan sensor. This exposes the patient to the sensor's interior, allowing saliva, other liquids, and foreign material into the sensor.

Note: Sensor Supports are not interchangeable. Small Sensor Supports and Large Sensor Supports must be used with small and large Sensors, respectively. Likewise, the Novus and Evolution Sensors and Supports are not interchangeable.

Novus Sensors & Sensor Supports

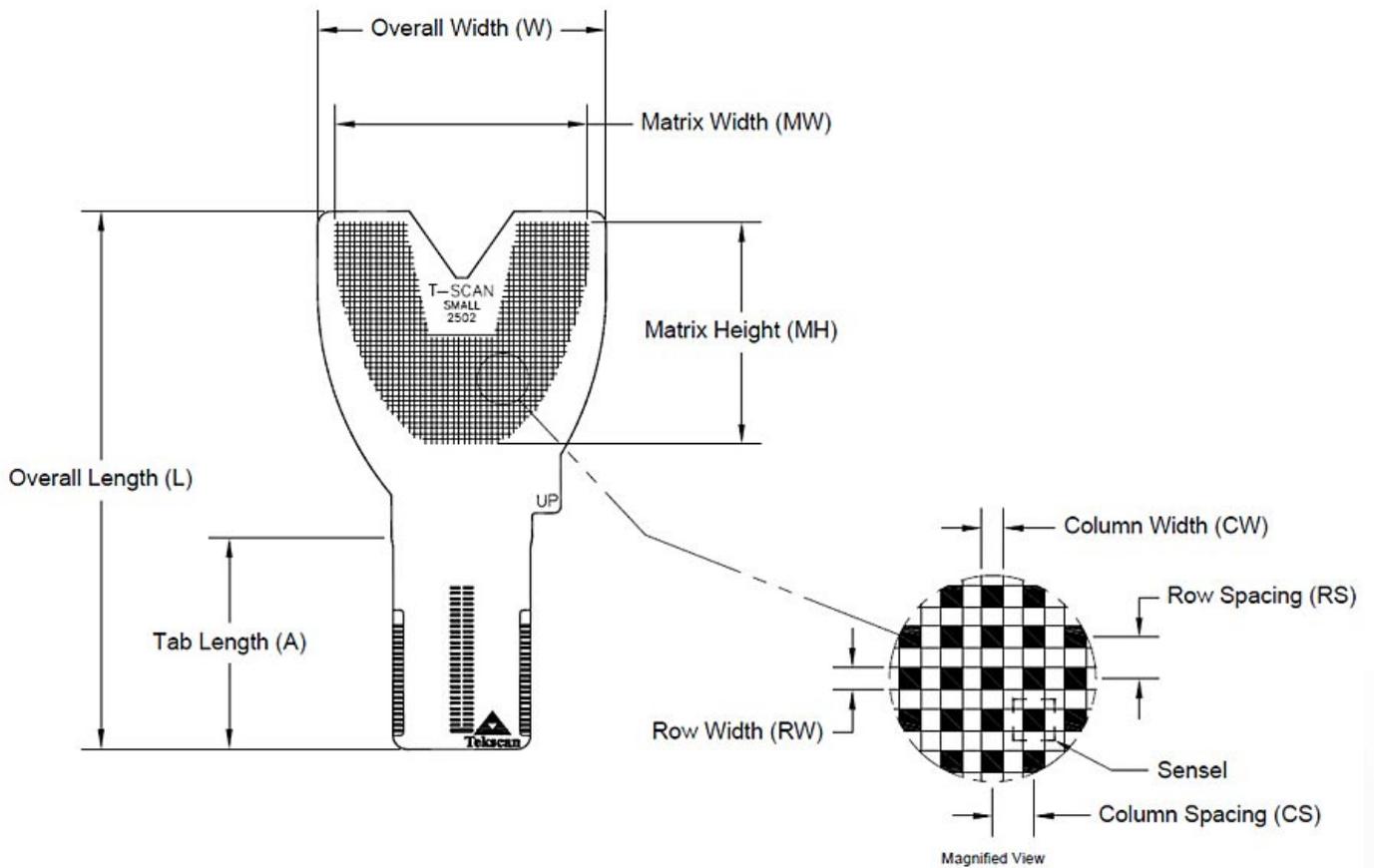


Small



Large

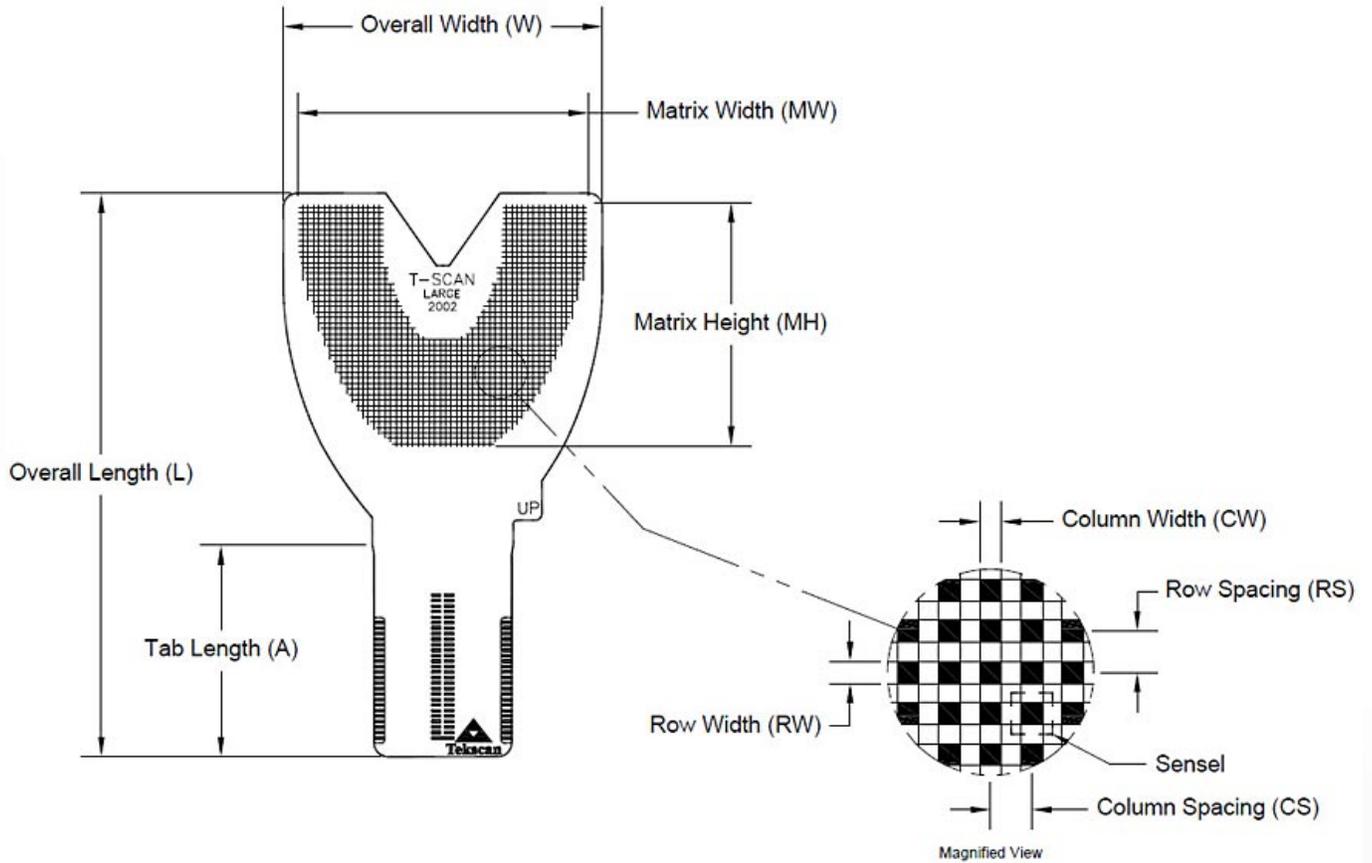
Sensor Specifications



Sensor 2502 Shown

Small Novus Sensor (#2502)

Type	General Dimensions			Sensing Region Dimensions							Summary		
	Overall Length <i>L</i>	Overall Width <i>W</i>	Tab Length <i>A</i>	Matrix Width <i>MW</i>	Matrix Height <i>MH</i>	Columns <i>CW</i>	Rows <i>CS</i>	Qty.	<i>RW</i>	<i>RS</i>	Qty.	Total No. of Sensels	Sensel Spatial Resolution
US	(in)	(in)	(in)	(in)	(in)	(in)	(in)		(in)	(in)		(sensel per sq-in)	
2502	4.90	2.62	1.93	2.30	2.00	0.040	0.050	46	0.040	0.050	40	1122	400.0
Metric	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)	(mm)		(sensel per sq-cm)	
2502	124.3	66.5	48.9	58.4	50.8	1.02	1.27	46	1.02	1.27	40	1122	62.0

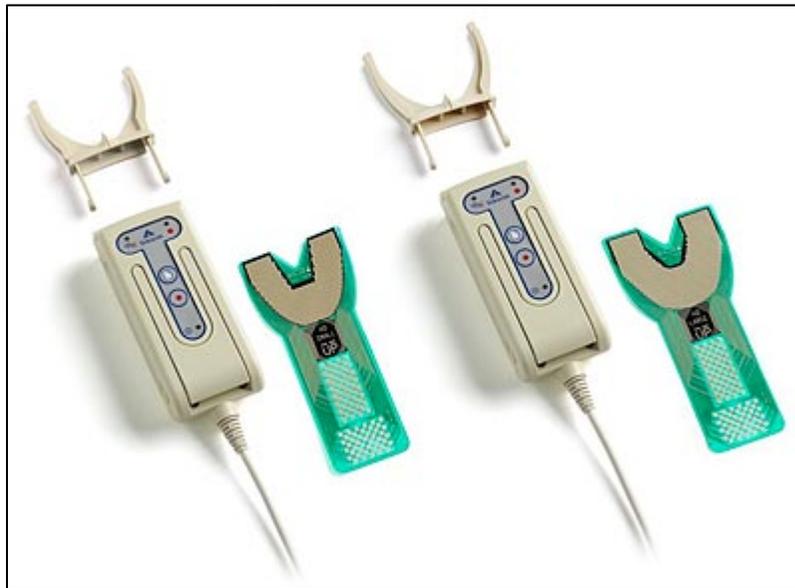


Sensor 2002 Shown

Large Novus Sensor (#2002)

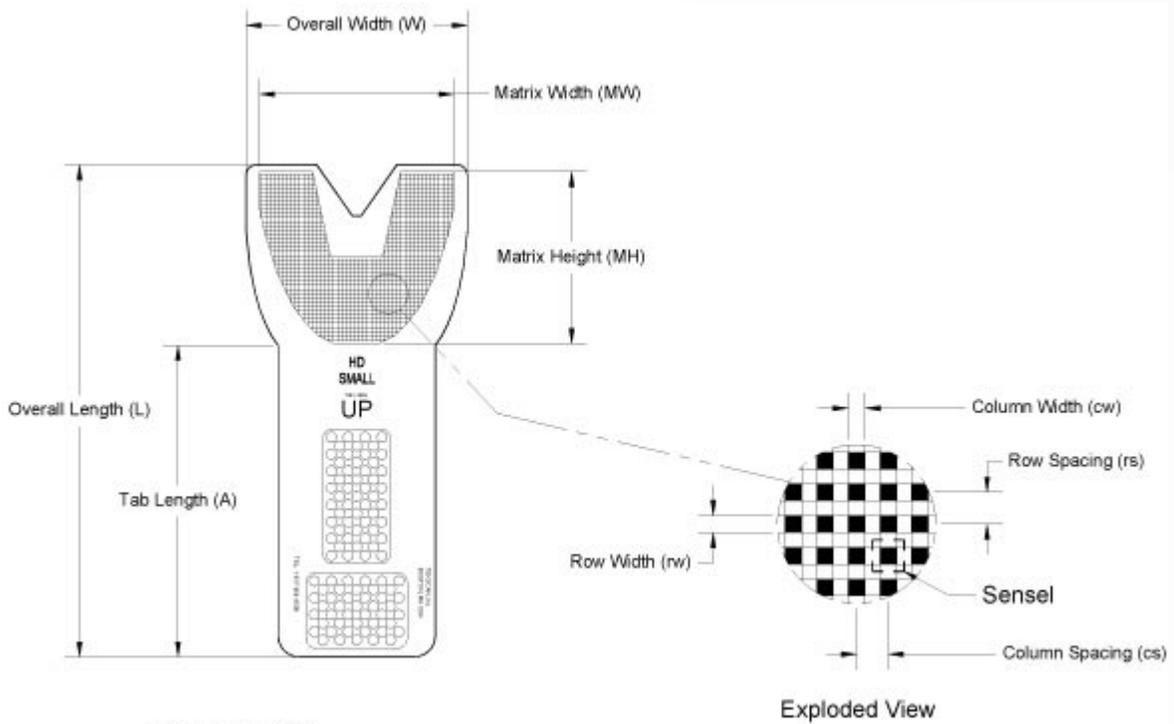
Type	General Dimensions			Sensing Region Dimensions							Summary		
	Overall Length <i>L</i>	Overall Width <i>W</i>	Tab Length <i>A</i>	Matrix Width <i>MW</i>	Matrix Height <i>MH</i>	Columns <i>CW</i>	CS	Qty.	<i>RW</i>	Rows <i>RS</i>	Qty.	Total No. of Sensels	Sensel Spatial Resolution
US	(in)	(in)	(in)	(in)	(in)	(in)	(in)		(in)	(in)			(sensel per sq-in)
2002	5.13	2.90	1.93	2.60	2.20	0.040	0.050	52	0.040	0.050	44	1370	400.0
Metric	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)	(mm)			(sensel per sq-cm)
2002	130.2	73.7	48.9	66.0	55.9	1.02	1.27	52	1.02	1.27	44	1370	62.0

Evolution Sensors & Sensor Supports



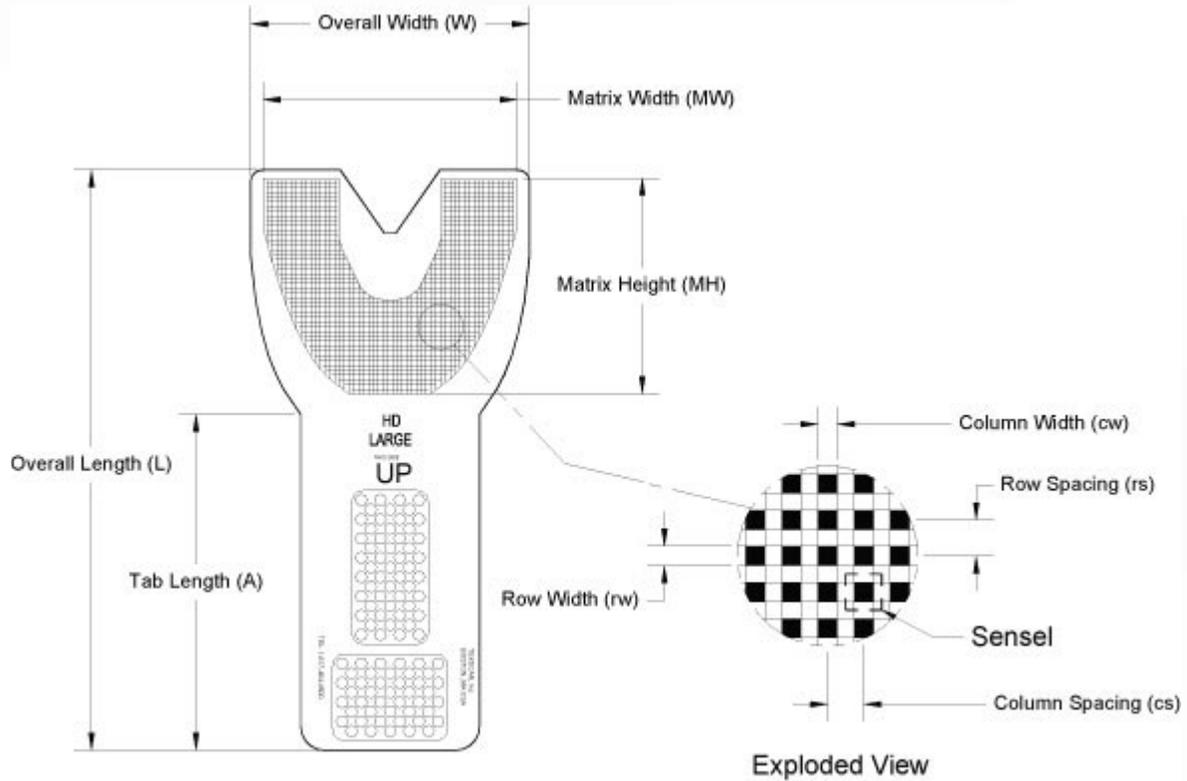
Small

Large



Small Evolution Sensor (#2501)

Type	General Dimensions			Sensing Region Dimensions								Summary	
	Overall Length	Overall Width	Tab Length	Matrix Width	Matrix Height	Rows			Rows			Total No. of Senses	Sensel Spatial Resolution
	<i>L</i>	<i>W</i>	<i>A</i>	<i>MW</i>	<i>MH</i>	<i>CW</i>	<i>CS</i>	<i>Qty.</i>	<i>RW</i>	<i>RS</i>	<i>Qty.</i>		
US 2501	(in) 5.8	(in) 2.6	(in) 3.7	(in) 2.30	(in) 2.04	(in) 0.040	(in) 0.050	46	(in) 0.040	(in) 0.050	40	1122	(sensel per sq-in) 400.0
Metric 2501	(mm) 148	(mm) 67	(mm) 94	(mm) 58	(mm) 52	(mm) 1.02	(mm) 1.27	46	(mm) 1.02	(mm) 1.27	40	1122	(sensel per sq-cm) 62.0



Large Evolution Sensor (#2001)

Type	General Dimensions			Sensing Region Dimensions								Summary	
	Overall Length	Overall Width	Tab Length	Matrix Width	Matrix Height	Rows			Rows			Total No. of Senses	Sensel Spatial Resolution
	<i>L</i>	<i>W</i>	<i>A</i>	<i>MW</i>	<i>MH</i>	<i>CW</i>	<i>CS</i>	<i>Qty.</i>	<i>RW</i>	<i>RS</i>	<i>Qty.</i>		
US 2001	(in) 6.0	(in) 2.9	(in) 3.5	(in) 2.64	(in) 2.24	(in) 0.040	(in) 0.050	52	(in) 0.040	(in) 0.050	44	1370	(sensel per sq-in) 400.0
Metric 2001	(mm) 153	(mm) 74	(mm) 89	(mm) 67	(mm) 57	(mm) 1.02	(mm) 1.27	52	(mm) 1.02	(mm) 1.27	44	1370	(sensel per sq-cm) 62.0

T-Scan Components Maintenance and Care

Novus Handpiece and Evolution Handle

Cleaning: Remove gross contamination from all surfaces of the Handpiece with an EPA-registered hospital cleaning and disinfecting wipe such as CaviWipes (Metrex Research) or equivalent. Use as many wipes as necessary until visibly clean. Discard wipe(s) in accordance with Federal, State, and local regulations for infectious materials disposal.

Disinfection: After proper cleaning is performed, apply an additional EPA-registered hospital cleaning and disinfecting wipe to all surfaces of the Novus Handpiece. Follow wipe manufacturer's instructions for appropriate contact duration. Discard wipe.

Note: Novus Handpiece cleaning and disinfection instructions were validated using CaviWipes manufactured by Metrex Research, using manufacturer's recommended visibly wet contact time of 30 seconds for cleaning and 3 minutes for disinfecting, both at room temperature.

Storage: The Novus Handpiece should be stored with the underside latch in the open (downward) position when not in use.

Sensors and Sensor Supports

Cleaning: Remove gross contamination from all surfaces of the Sensors and Sensor Supports, including all hard-to-reach areas, with an EPA-registered hospital cleaning and disinfecting wipe such as CaviWipes (Metrex Research) or equivalent. Use as many wipes as necessary until visibly clean. Discard wipe(s) in accordance with Federal, State, and local regulations for infectious materials disposal.

Sensor Support Disinfection: After proper cleaning is performed, place the sensor support in a standard sterilization pouch suitable for steam sterilization. Place in Gravity Steam Sterilizer validated according to ANSI AAMI (EN) ISO 17665, making sure you do not exceed sterilizer's maximum load when sterilizing multiple devices in one autoclave cycle. Run sterilization cycle of 132°C for 15 minutes, with a 30 minute drying cycle following the sterilization phase.

Sensor Disinfection: After proper cleaning is performed, place the sensor into disinfection solution at the manufacturer's specified dilution for the manufacturer's specified application time, ensuring that the sensor is fully immersed and not contacting any other products in disinfection bath. An EPA-registered hospital disinfectant containing o-phthalaldehyde is recommended, such as Cidex OPA (Johnson & Johnson). Remove sensor from the solution and rinse disinfected sensor in a large volume (e.g. 1 gallon) of tap water for at least 1 minute. Replace water and repeat immersion for 1 minute two more times, replacing rinse water each time. Note: three (3) separate large volume water immersion rinses are required. Dry with a clean, soft cloth.

Note: The same sensor can be used on the same patient across multiple sessions. The same sensor should not be used on different patients.

Note: Novus Sensors / Sensor Supports cleaning and disinfection instructions were validated using CaviWipes manufactured by Metrex Research, using manufacturer's recommended visibly wet contact time of 30 seconds for cleaning and 3 minutes for disinfecting, both at room temperature.

Note: Novus Sensor disinfecting instructions were validated using Cidex OPA manufactured by Johnson & Johnson, immersed for 12 minutes at room temperature.

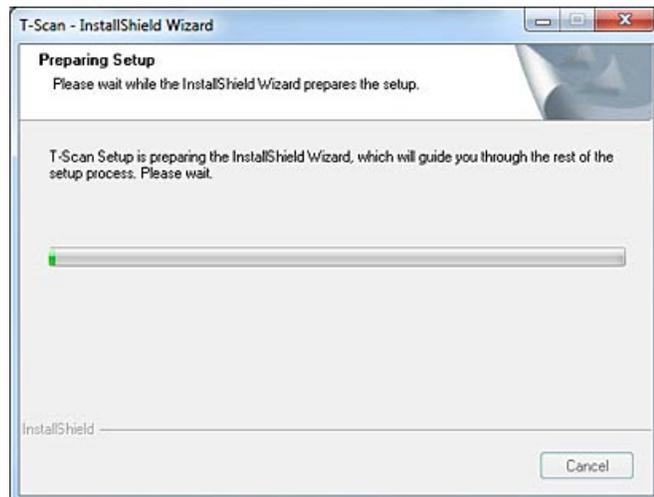
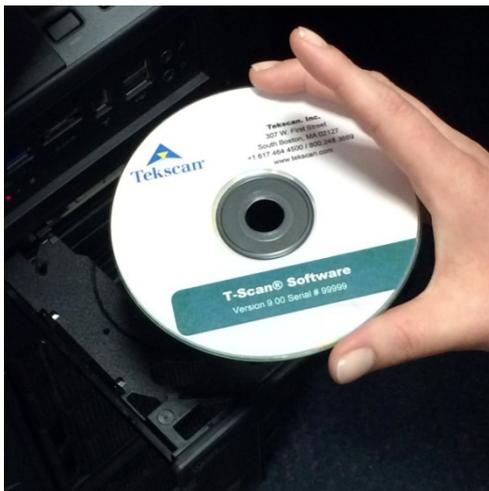
Note: Novus Sensor Support disinfecting instructions were validated with the Steris AMSCO Lab 250 Steam Sterilizer at 132°C for 7.5 minutes, with a 30 minute drying cycle.

Note: Beacoup by Ecolab Healthcare, Wescodyne by Steris Corp, and 1 Stroke Environ by Steris Corp are not recommended for cleaning or disinfecting the Novus Handpiece, Sensors, and Sensor Supports. In tests, when used in concentrated quantities, they can discolor or possibly crack the housing material for the Handpiece and Sensor Supports.

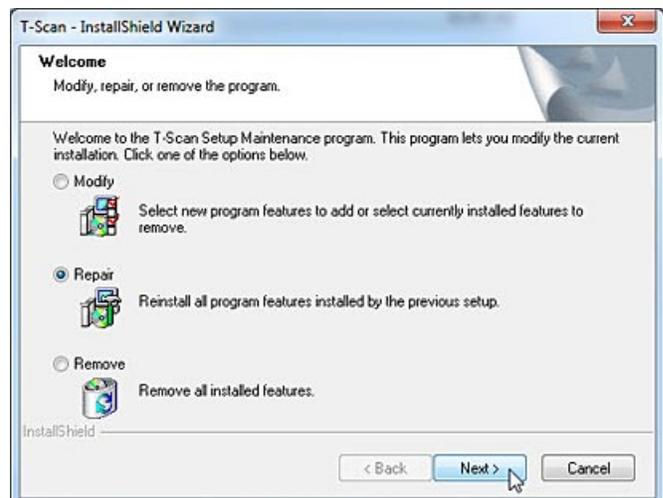
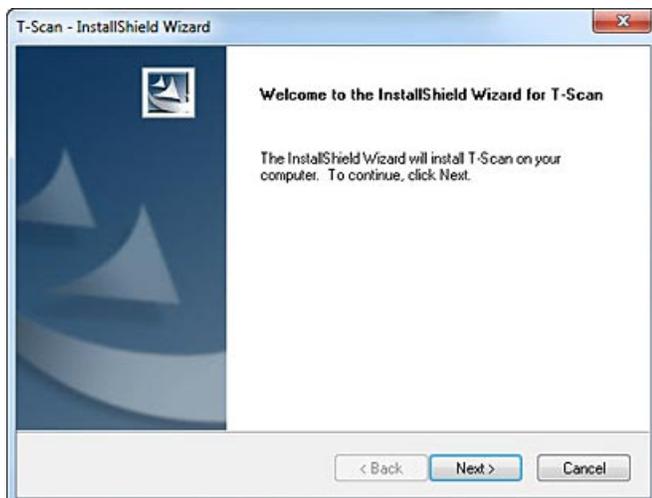
Installing the T-Scan Software

Before software installation, close all other applications. You do not need to uninstall older versions of T-Scan software first.

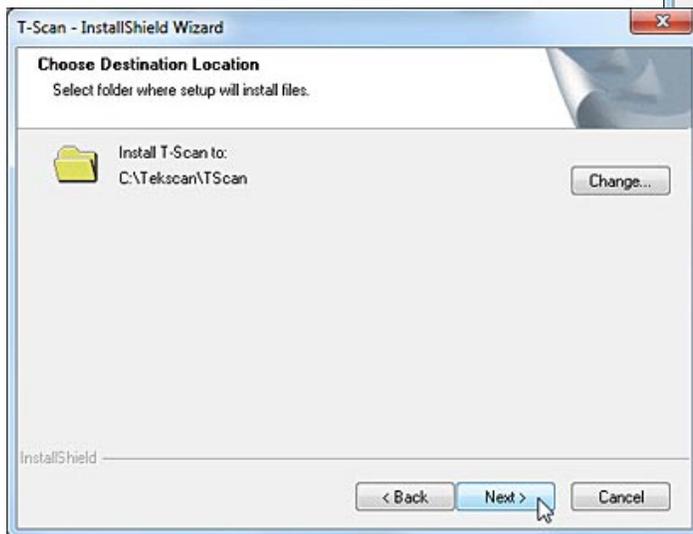
1. Place the installation CD in your CD-ROM drive. Follow the on-screen instructions.



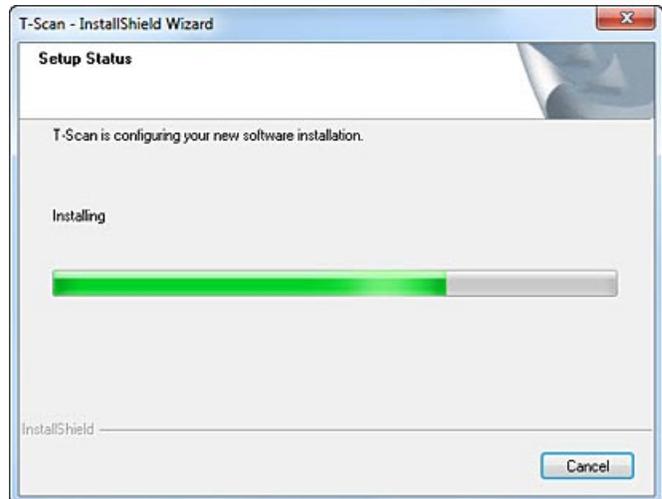
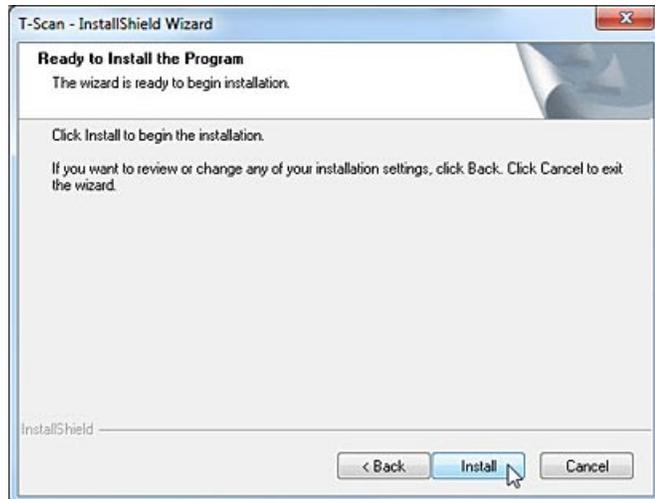
2. If this is a new installation, click **Next** (below left). If this is an upgrade, select “Repair” and click **Next** (below right).



3. Accept the license agreement, and click **Next**.
4. Select a location where the T-Scan software will be installed on your computer. It is recommended that you use the default location. Click **Next**.

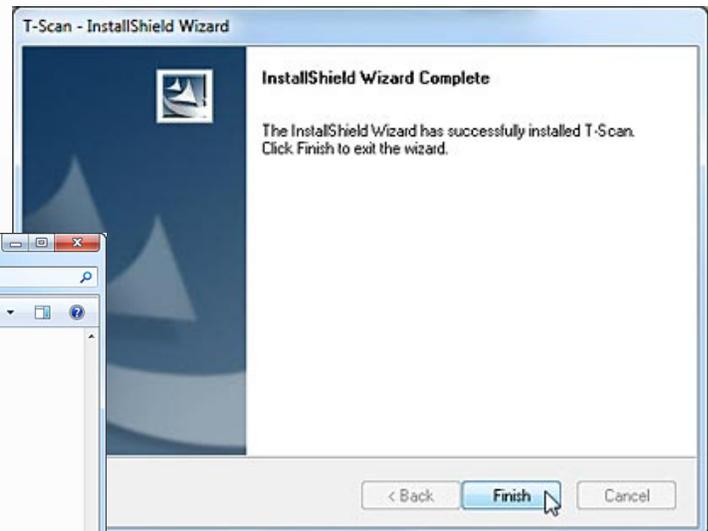
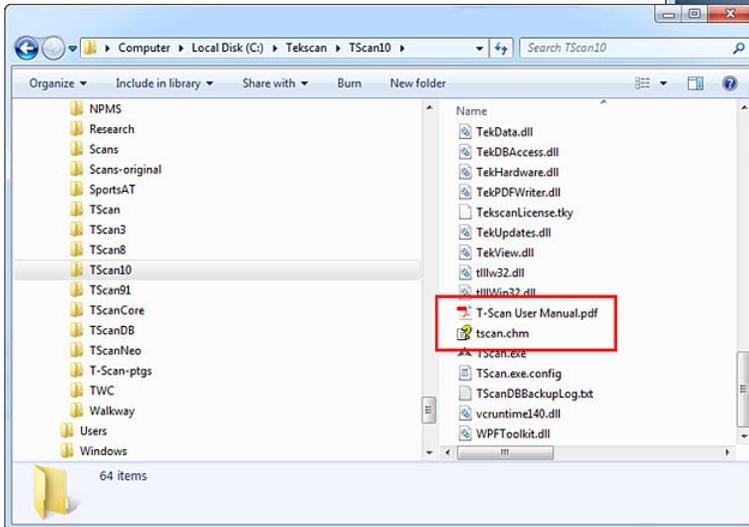


5. Click **Install**.



6. Click **Finish**.

Note: Electronic copies of the T-Scan User Manual (**T-Scan User Manual.pdf**) and Help File (**tscan.chm**) can be found under **C:\Tekscan\TScan10**.



Installing the T-Scan Software on a Network

An additional licensing fee is associated with running the software on multiple computers linked to a network with a shared database. Please [contact Tekscan](#) for more information.

Installing the T-Scan Hardware

Connect the Novus Handpiece or Evolution Handle to your computer's USB port. Your computer will automatically detect the new hardware and configure it for your system.



Installing the Novus Handpiece Holder

1. Clean the wall surface with isopropyl rubbing alcohol, and then let it dry.
2. Remove the red liner from the 3M Command strip, and press the adhesive to the back of the Handpiece Holder.



- Remove the black liner. Press the Handpiece Holder to the wall for 10-20 seconds. Wait an hour before inserting the Handpiece and Cable.



- To remove the strip, hold the Handpiece Holder, and pull straight down on the protruding tab. It will stretch about 12 inches before releasing from the wall.

Main Software Views

The Main Window consists of the **Title Bar**, **Main Menu**, **Toolbar**, **Active Scan Pane**, **2D and 3D ForceView**, **Timing Pane**, **Graph**, and **Navigation Bar**.

The screenshot shows the T-Scan 10.0x software interface. The components are labeled as follows:

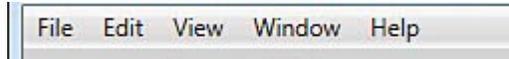
- Title Bar:** The top window title bar showing 'T-Scan 9' and standard window controls.
- Main Menu:** The menu bar with 'File', 'Edit', 'View', 'Window', and 'Help' options.
- Toolbar:** A row of icons for file operations, scan type selection, and other functions.
- Active Scan Pane:** A vertical pane on the left showing a list of 'ACTIVE SCANS' with patient information and scan dates.
- ForceView:** The central area containing a '2D ForceView' (a dental arch diagram with force vectors and percentages) and a '3D ForceView' (a 3D model of the dental arch).
- Timing Pane:** A panel on the right showing 'Force Outliers', 'Tooth Selection', and a 'Timing Table'.
- Graph:** A line graph at the bottom showing '% Max. Wall Force' over 'Time (sec)'. It includes a legend for 'Force' and 'Time'.
- Navigation Bar:** The bottom-most bar with playback controls (play, stop, etc.) and a progress slider.

Line	Time	Force %	σ's
A1	0.40s	3.1%	0.35s
B1	0.75s	91.5%	
C1	0.95s	90.3%	0.40s
D1	1.35s	0.0%	

- **Title Bar:** Displays T-Scan version (left) and **Minimize / Maximize / Close** buttons (right).



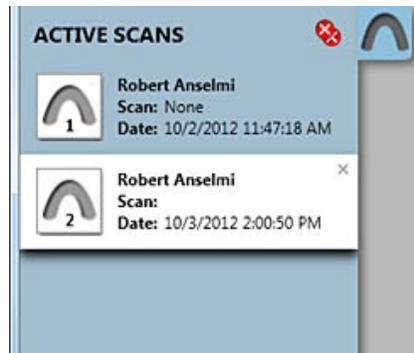
- **Main Menu:** Pull-down menus to navigate the software. See [Main Menu](#) and [Keyboard Shortcuts](#).



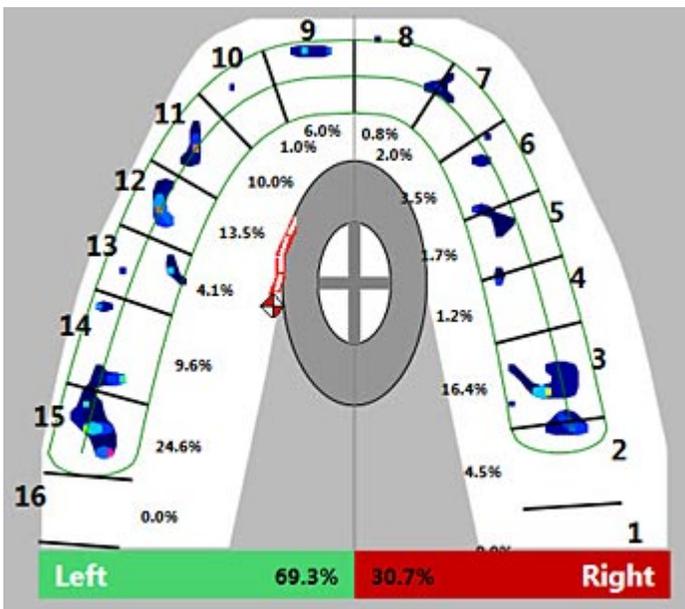
- **Toolbar:** Navigate to most common software tasks. See [Toolbar](#).



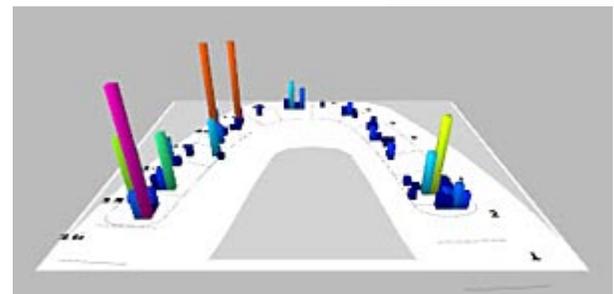
- **Active Scan Pane:** Thumbnail view of all open scans. See [Active Scan Pane](#).



- **ForceView:** View 2D and 3D ForceViews. Displays patient's bite mark pressure over time. See [ForceView](#).



2D ForceView



3D ForceView

- **Timing Pane:** View bite and individual tooth timing measurements, and Force Outliers. See [Timing Pane](#).

TIMING

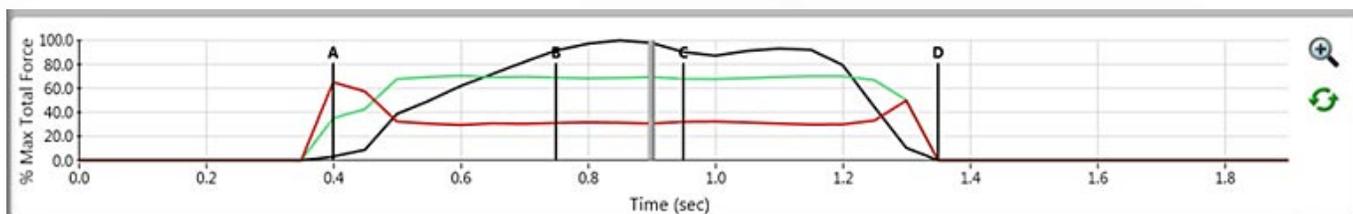
Force Outliers

Tooth Selection

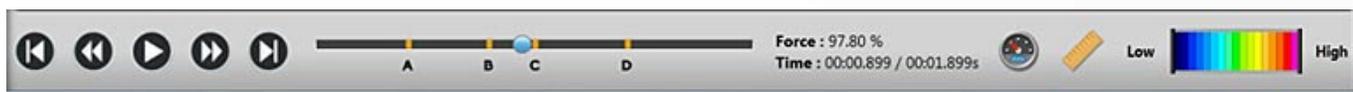
Timing Table

Closure 1			
Line	Time	Force %	σ's
A1	0.40s	3.1%	0.35s
B1	0.75s	91.5%	
C1	0.95s	90.3%	0.40s
D1	1.35s	0.0%	

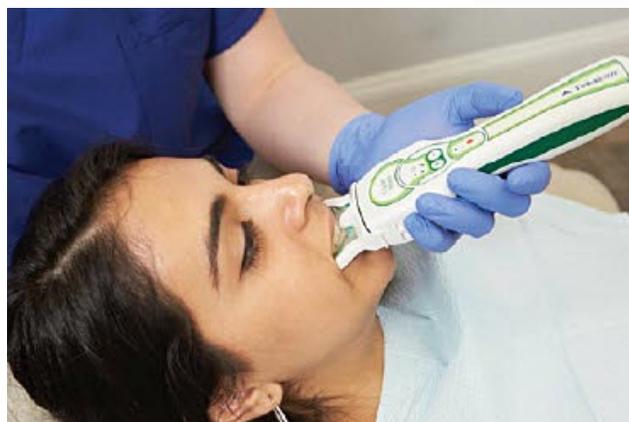
- **Graph:** Displays force versus time for the patient's overall bite, individual teeth, or Force Outliers. Each graph line is color coded for visual reference to Arch Model or individual teeth. See [Graph](#).



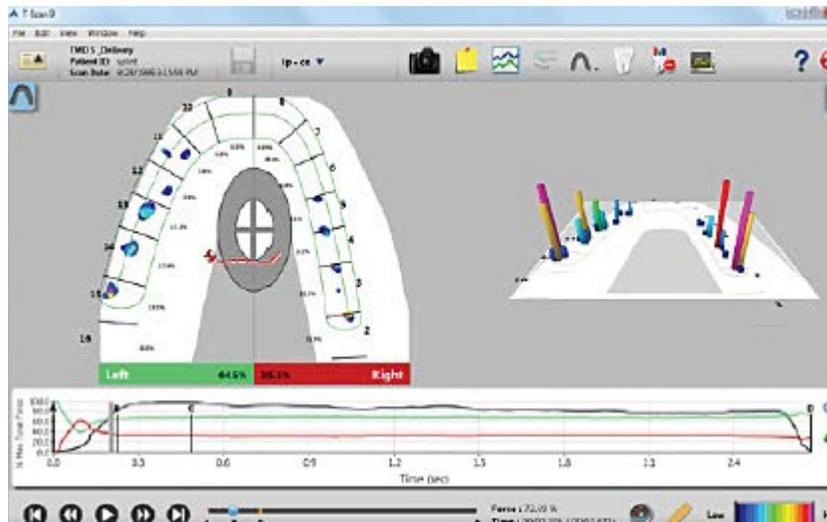
- **Navigation Bar:** Provides key scan and review operations. See [Navigation Bar](#).



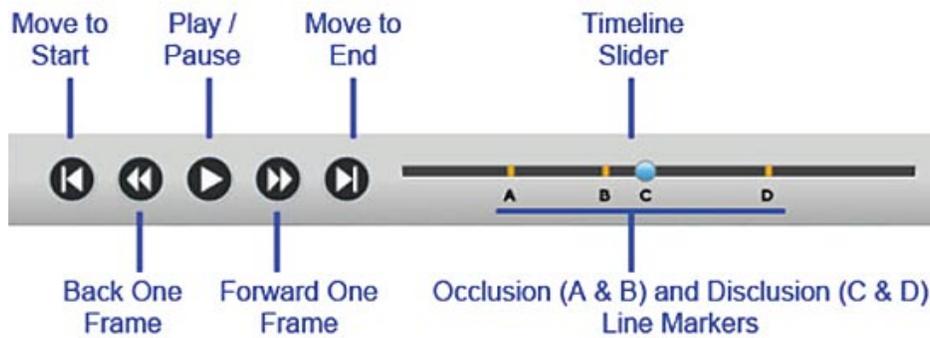
T-SCAN WORKFLOW



Set Up



Take Scan



Review Scan

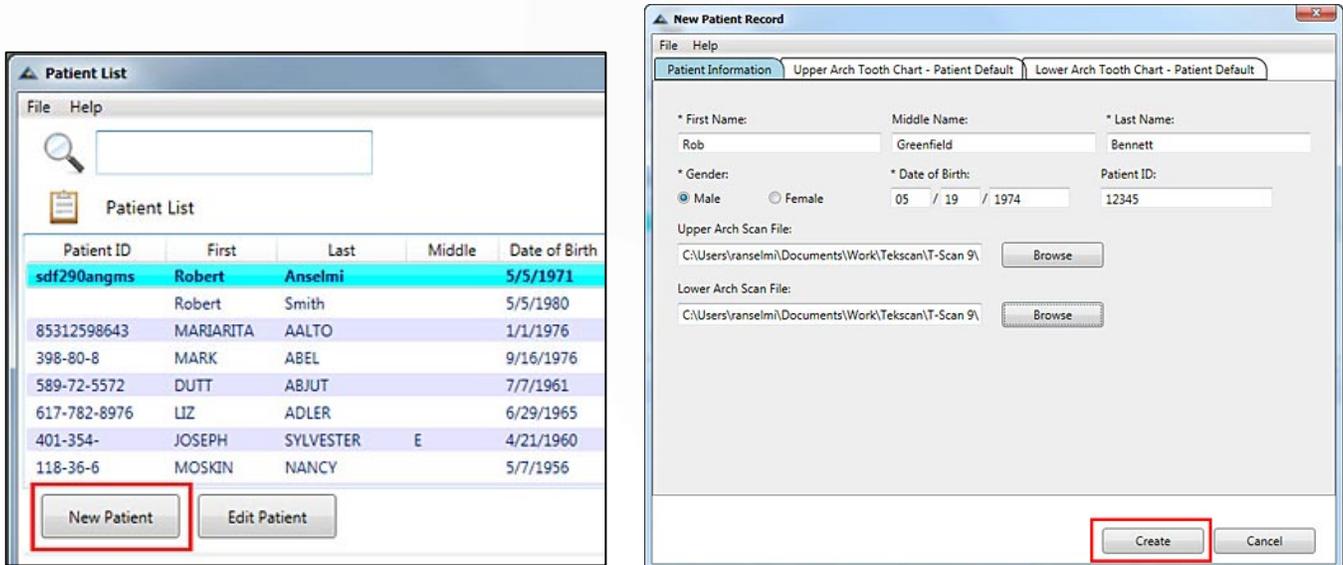
Opening T-Scan software & Setting up the Patient

1. Open T-Scan. Double-click the T-Scan program icon (Start > Programs > Tekscan > T-Scan).

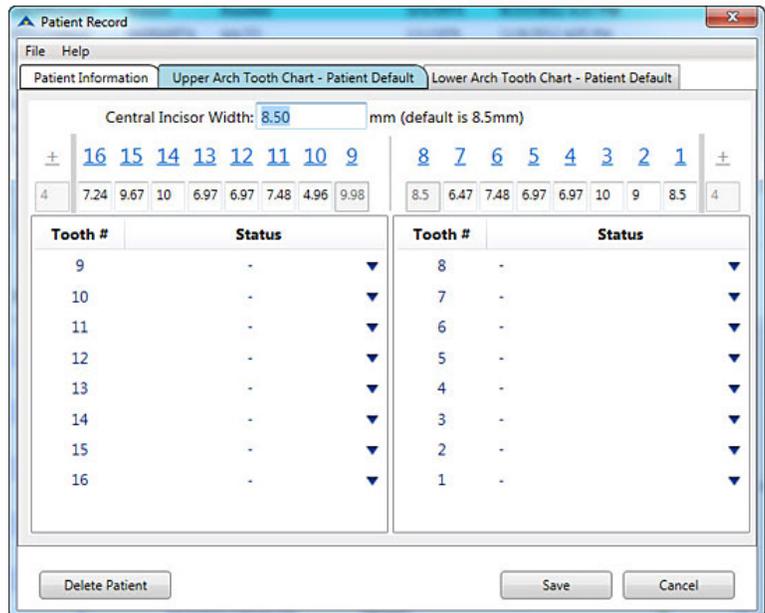


2. **Create a Patient.** Click **New Patient**. Fill out the "Patient Information" (asterisks - * - are mandatory fields) and Tooth Charts (optional). Load Intra-oral scan (.stl) files if appropriate.

Click **Create**. The **Date of Birth** field format is governed by the MS Windows "Region and Language" **Short date** format settings. Refer to Tekscan's [online FAQ](#).



3. **Customize Arches (Optional).** Click the "Upper" and/or "Lower Arch" tabs to set the Patient's Central Incisor Width, Tooth Widths, and Tooth Statuses. This can be done now or after the Patient's scan is taken. See [Patient Record Window](#).



Performing A Scan

1. **Insert a Sensor Support and Sensor.** Ensure a new sensor is used, and all components are sanitized, according to the [T-Scan Components Maintenance and Care](#) section. You can use the same sensor on the same patient across multiple sessions, but the same sensor should not be used on different patients.

If you are using a T-Scan Novus Handpiece:

- a. Select a sensor support (either large or small). Insert it into the Handpiece, with the sensor support's central incisor pointer facing in the "up" position.



b. Open the latch on the underside of the Handpiece (down position).



Open Latch



Closed Latch

c. Slide the sensor tab (with "This Side UP" facing upwards) under the central pointer on the support, and into the Handpiece, until it stop (shown right). Do not force the sensor into the Handpiece! Push the latch upward to close it. The sensor locks in place.

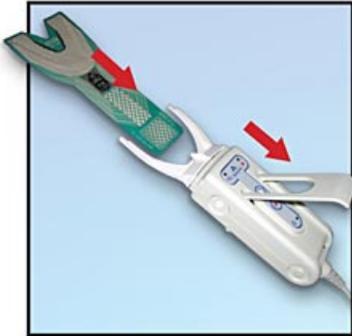
Caution! When inserted, do not hold the device from the sensor only. It can become damaged or misaligned.

Note: Always store the Handpiece with the latch in the down (open) position.

If you are using a T-Scan Evolution Handle:



- a. Select a sensor support (either large or small). Insert it into the Handle, with the sensor support's central incisor pointer facing in the "up" position.

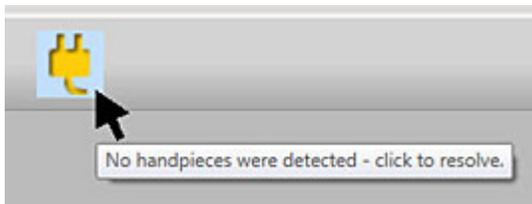


- b. Open the latch on the topside of the Handle (vertical position). Slide the sensor (with "This Side UP" facing upwards) under the central pointer on the support, into the handle, until it stops. *Do not force the sensor into the handle!* Close the latch so it is flush with the Handle.



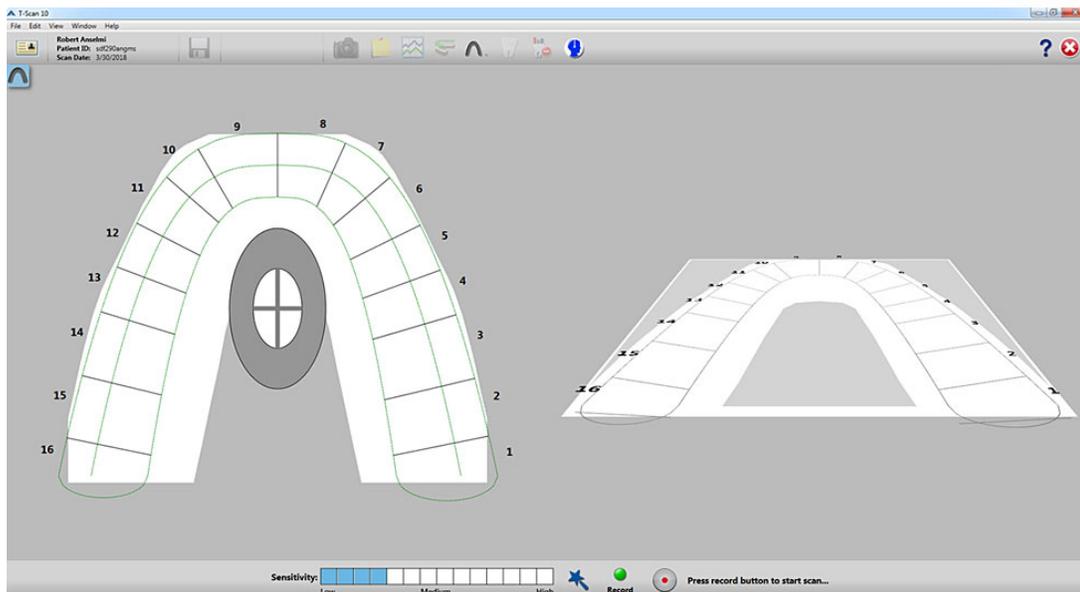
Caution! When inserted, do not hold the device from the sensor only. It can become damaged or misaligned.

Note: If your Handle is not properly connected to the computer, you will see a yellow plug icon on the Toolbar and on the [Patient List](#) window. Clicking the icon opens the message prompting you to reconnect the handle. Then press **Connect to Handle**.



If the software is still unable to identify the hardware, or the Handle does not properly connect, [contact Tekscan](#).

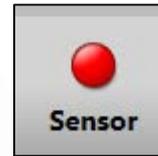
2. **Open a Real-time Window.** Click **New Scan** in the Patient Record window (or press record button on Novus Handpiece / New scan button on Evolution Handle). The 2D and 3D ForceView shows the patient's bite in real-time, as it is occurring.



If the Sensor Indicator is green, the sensor is ready to scan. If red, the Sensor is misaligned. Do the following, in sequence. If the Sensor indicator turns green at any point, do not perform any remaining steps.



Sensor correctly aligned



Sensor misaligned

- a. Remove and reinsert the Sensor, following the [Performing a Scan](#) instructions.
 - b. Ensure two Sensors are not stuck together. If so, peel apart the Sensors, and reinsert one Sensor, following the [Performing a Scan](#) instructions.
 - c. Ensure the Sensor insertion tab terminal connectors are clean and free of debris. Follow the [T-Scan care instructions](#). Reinsert the Sensor, following the [Performing a Scan](#) instructions.
 - d. The cable may be unplugged or not properly plugged in. Remove the handle's cable from the computer. Check the cable connector and wire for defects. Carefully reconnect the handle cable.
 - e. If none of the above steps correct the situation, or a component is defective, [contact Tekscan](#).
3. **Position Sensor.** Place the sensor in the patient's mouth, with the sensor support's position guide between the central incisors. Keep the handle as parallel to the occlusal plane as possible.



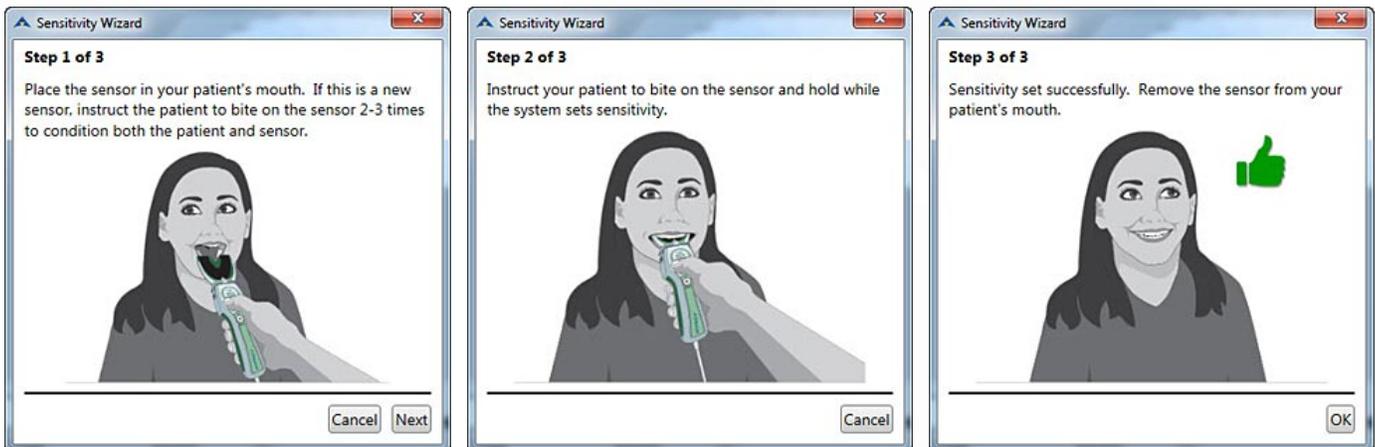
4. **Set Sensitivity.** Each patient has a more or less forceful bite. The Sensitivity setting aligns the sensor's output with the biting force of the patient, leading to a more useful scan with less saturated sensels. Select a lower setting if too many saturated sensels are obtained in your scans. Select a higher setting if the force is too low for a scan.
- a. **Manual adjustment:** Have the patient close firmly on the Sensor and adjust the Sensitivity selection by clicking one of the 14 available Sensitivity blocks from Lowest (left) to Highest (right) until 1-3 pink contacts are visible in the 3D ForceView at maximum intercuspation.

b. **Automatic Adjustment:** The Wizard lets the software adjust the Sensitivity for you.

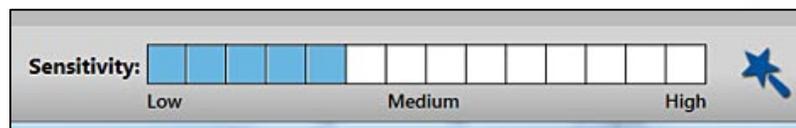
- i. Click **Run the sensitivity wizard**. Alternately, staying chairside, you can use the + buttons on the Handpiece to start the sensitivity wizard, and then use the + button to progress through the wizard or – button to cancel. See [Novus Handpiece Functionality](#).



- ii. Follow on-screen instructions.



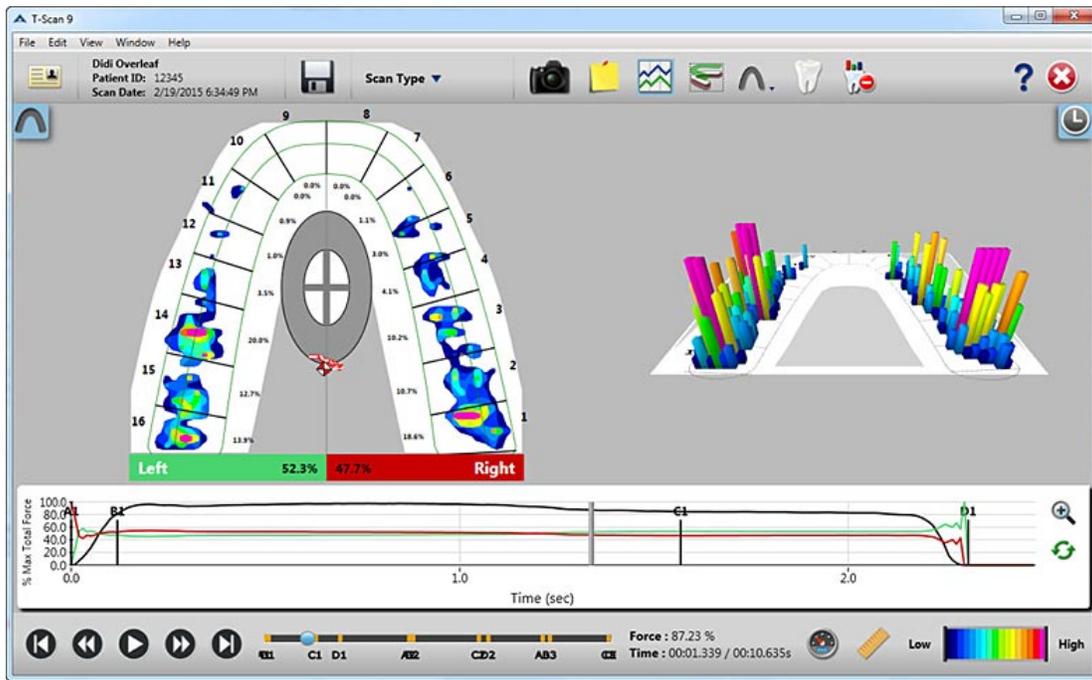
- iii. If unsuccessful, repeat the Wizard or set sensitivity manually.
- iv. When complete, sensitivity can be viewed in the Navigation bar. You can accept the setting or additionally adjust sensitivity manually.



5. **Record Scan.** Press the Record button on the Handpiece / Handle, or **Record** on the Navigation Bar. Have the patient bite down firmly on the sensor and watch the system record a scan. After the patient has concluded their bite, press the **Record** button again to stop the scan.



6. **Review Scan.** The scan is displayed showing the data at the point of initial contact. The 2D ForceView is divided into two equal colored boxes (green on the left and red on the right) around the mid-sagittal plane, showing bite force distribution across the arch. The 3D ForceView shows the same information, but in columns, where you can easily identify force changes. The Navigation Bar changes to provide playback options. See [Reviewing a Scan](#).



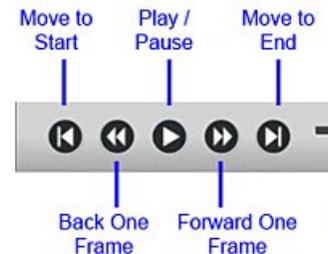
7. **Save Scan.** Click **Save** on the Toolbar. Scans are saved numerically by date within the Patient Record. “Notes” and “scan Types” can be used to categorize scans for the same patient, making it easier to find scans later.

Reviewing a Scan

Your scan consists of a number of frames of occlusal and disclusal force data that is "captured" during the scan period, giving you visibility into occlusal contact sequencing. You can also [create a Report](#) from a scan.

Playing back the recording

1. [Perform a scan](#) or open an existing patient scan.
2. Use playback buttons ([Navigation bar](#)) to review the scan. [Keyboard Shortcuts](#) can also be used to navigate your scan. In addition, the Handpiece buttons can be used to navigate your scan. See [Novus Handpiece Functionality](#).



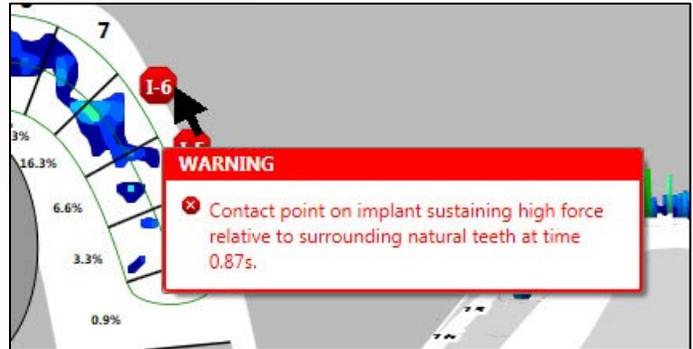
By playing the scan forward / backward, you can see how the patient comes into / out of occlusion, which teeth contacts are more forceful, which teeth are interfering with proper masticatory function, among other things. Observe the forces rise and fall across the arch in the 2D and 3D ForceViews over time.

Turn on the graph to see the force progression over the duration of the scan at once. Open the Timing Pane to view closure timing, force outliers, or individual tooth timing.

Observe the Center of Force Trajectory to determine the stability of a closure, identify interferences, and better understand shift of occlusion balance over scan duration.

Hover over Implant Warnings in the 2D ForceView to see when implants are loading early or sustaining too much force. There are 3 different warnings, depending on which of the following criterion is met:

- The contact point on an implant is loading too quickly (early loading). With this criteria, the rate of loading is looked at, and a warning is generated if it is greater than the rate of change for any natural tooth, or if the rate of change is equal to any natural tooth and the Implant is a Force Outlier.
- The contact point on an implant is sustaining a high level of force, which is two color levels higher than its natural surrounding teeth.
- The contact point on an implant is sustaining a high level of force, which is two color levels higher than its bilateral matching tooth.

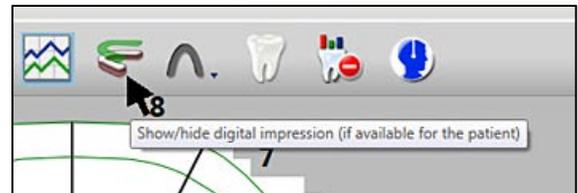


Implant warning example. This helps guide you to potential issues during patient evaluation.

Implants that have multiple conditions met will show the earliest warning first. The "early loading" warning is displayed before any other.

Viewing a Digital Impression Overlay (DIO)

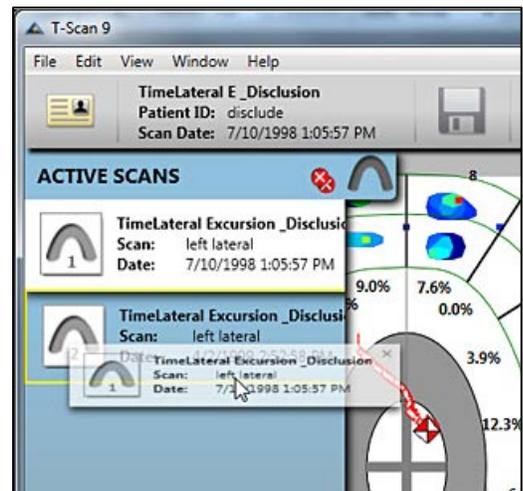
If you have an intraoral scanner, and wish to view the T-Scan force data over the digital impression, you can do so by loading the DIO files (.stl) into the Patient Record and going into DIO mode. See [Creating a Digital Impression Overlay](#).

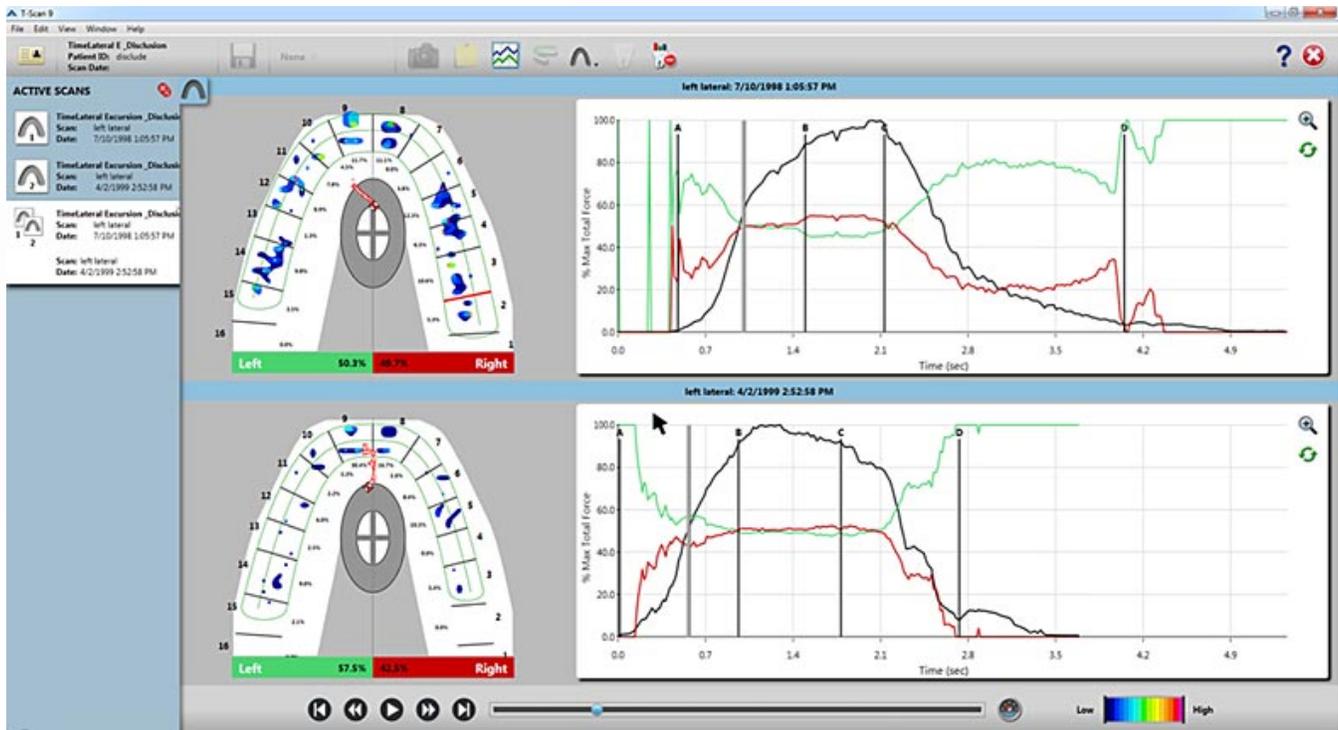


Comparison View

Comparison view puts two scans side by side simultaneously (useful for pre/post treatment, for example). Ensure you have two scans from the same Patient open (Active scans pane). Drag one scan thumbnail over the other, and let go of the mouse. Both scans are combined into a new scan window.

Note: Scans from one patient cannot be compared to scans of another.





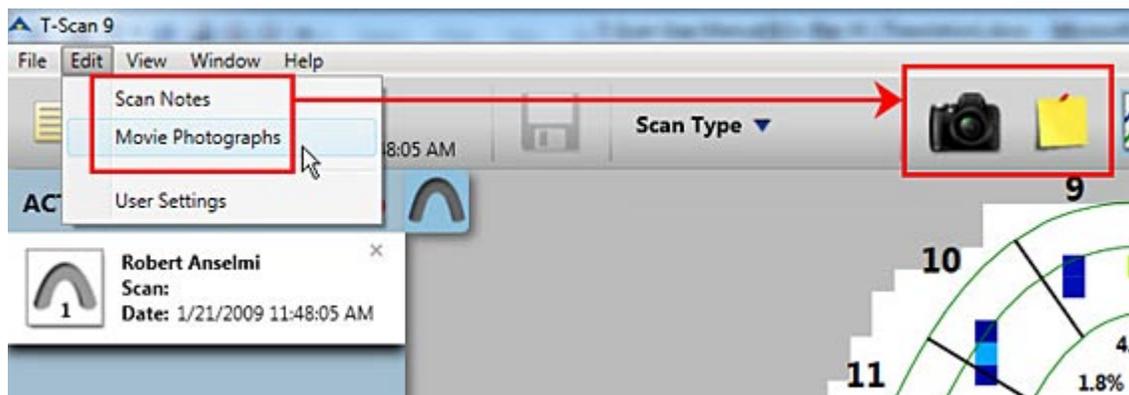
In this mode, the graphs for both scans are proportional. The longest length scan is used as the reference, and the Time (sec) X-axis of the shortest scan is increased to line up with this longer scan. This means that the timing (X-axis) is correlated between both graphs.

In this mode, the graph Timeline will synchronize all scans together, starting from an initial point. Using [Keyboard Shortcuts](#) "A," "B," "C," and "D" moves both scans' Timelines to that point. Pressing **Play** moves both scans forward in tandem.

SOFTWARE REFERENCE

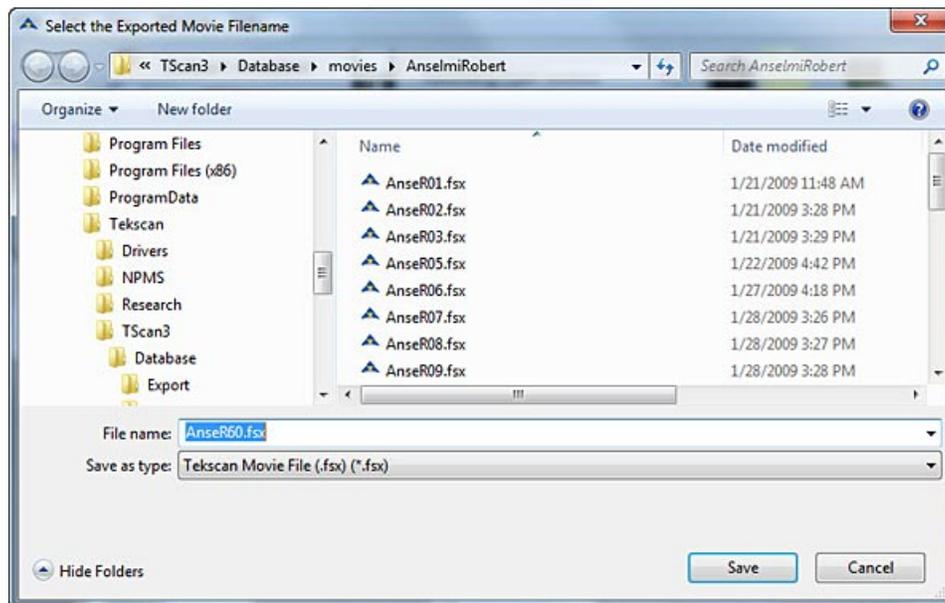
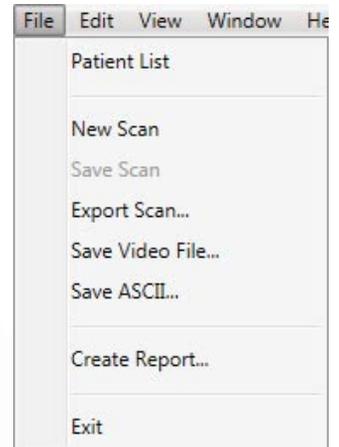
Main Menu

The **Main Menu** provides most command operations within the T-Scan system. The most frequently used items in the Main Menu also have icons on the Toolbar.

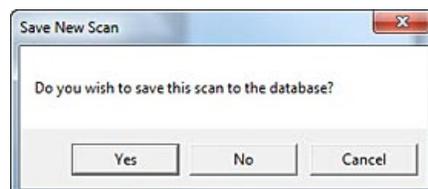


File Menu

- **Patient List:** Opens the "Patient List" dialog, to create a new patient, edit an existing patient, create a new scan for a patient, and open or delete a patient's scan. See [Patient List Window](#).
- **New Scan:** Opens a new scan for the current patient.
- **Save Scan:** Saves the current scan to your patient record.
- **Export Scan:** Opens the "Save" dialog, where a scan (.fsx) file can be exported to a location on your computer.

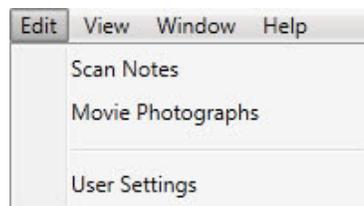


- **Save Video File:** Saves the scan as a compressed video (.mp4) file. See [Converting a Scan to a Video](#).
- **Save ASCII (Optional):** Save the scan as an ASCII (text) file, for post-processing in spreadsheet software, such as Microsoft Excel or MiniTab, primarily for research purposes. See [ASCII Output Module](#).
- **Create Report:** Exports the scan, including comments and graphs, to an Adobe Acrobat (.pdf) file. See [Creating a Report](#).
- **Exit:** Closes the T-Scan application. Any unsaved open scans will prompt the "Save New scan" dialog.



Edit Menu

- **Scan Notes:** Opens the "Notes" dialog, where scan comments can be entered. See [Including Notes with a Scan](#).
- **Movie Photographs:** Opens the "scan Images" dialog, where images can be associated to the scan. See [Attaching an Image to a Scan](#).
- **User Settings:** Opens the "User Settings" dialog, where global software parameters are adjusted. The **Close** button saves changes on all tabs and closes the dialog. Note: All images below show default settings. "User Settings" tabs are:



- **Privacy:** These settings adjust privacy settings for the program and displayed Patient information.

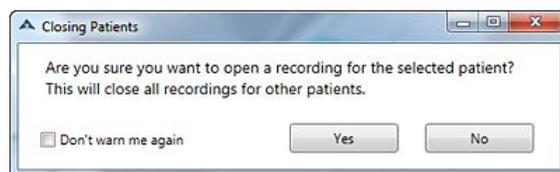
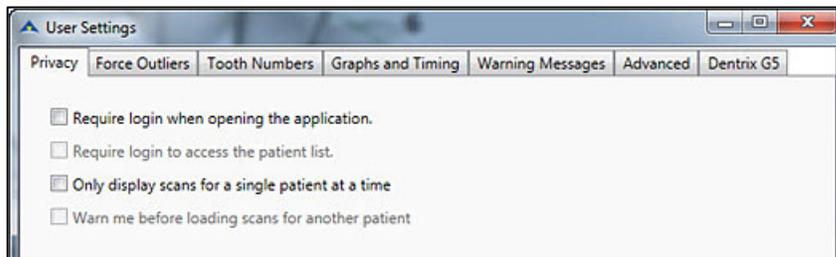
Require login when opening the application:

Opens a login prompt each time the T-Scan software is opened. This allows you to set up login security for the T-Scan. Once logged in, you can create additional Users who will have their own user login credentials (assuming you are logging in as a domain administrator or a user with administrative rights on the computer in question). See [Privacy & User Settings](#).

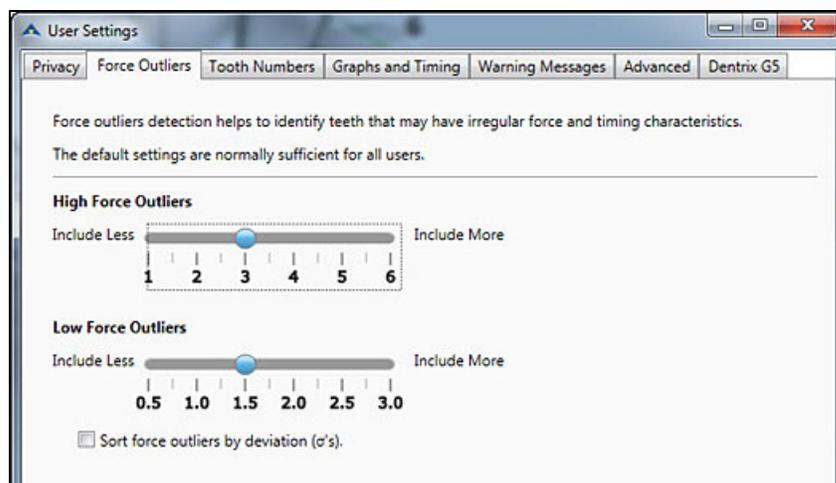
Require login to access the patient list: Same as above, but opens a login prompt each time the patient list is opened. See [Privacy & User Settings](#).

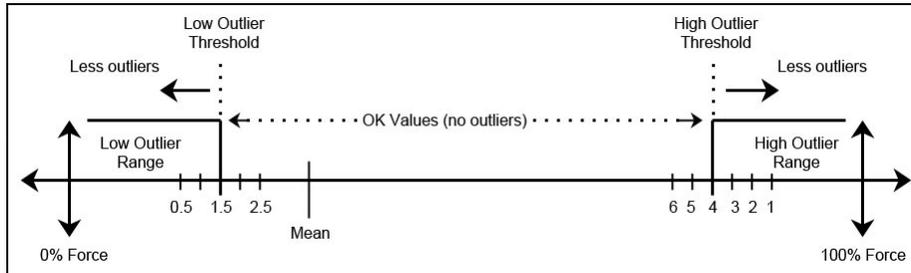
Only display scans for a single patient at a time: Check to open any number of scans, but only for one patient. If scans of another patient are opened, the original patient's scans are closed.

Warn me before loading scans for another patient: Checking generates a warning when attempting to open a new patient's scans while another patients' scans are open.



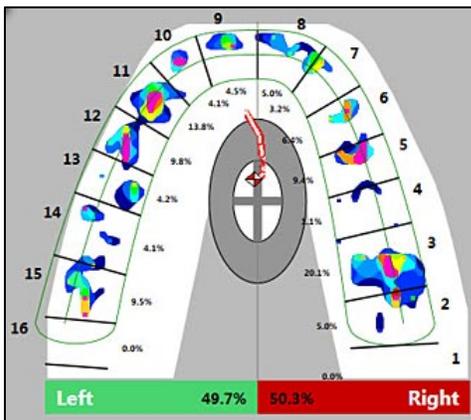
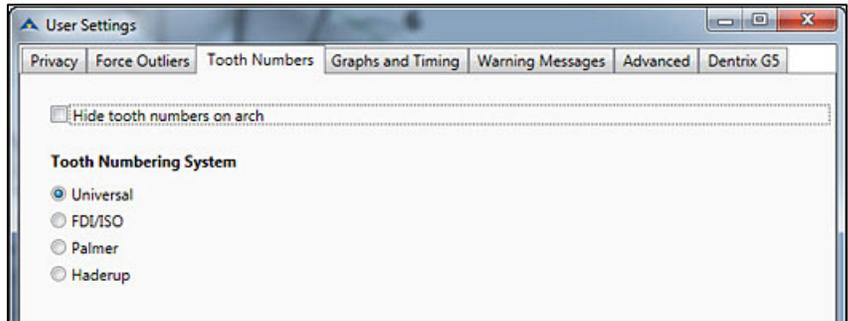
- **Force Outliers:** These settings adjust the thresholds for triggering force outliers in the [Timing Pane](#). Decreasing the "High Force Outliers" or "Low Force Outliers" sliders reduces the high or low force outlier range, resulting in fewer outliers. Increasing has the opposite effect. The **Defaults** button returns everything to their default values (setting of 3 and 1.5, respectively).



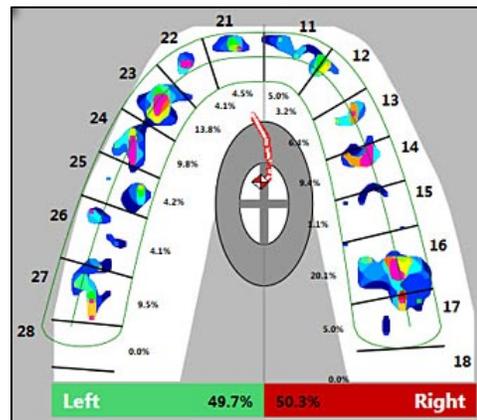


Sort force outliers by deviation: When selected, the Force outliers in the Occlusal Timing Table are listed in order of deviation (deviation column) from lowest deviation value at top to highest deviation value at bottom.

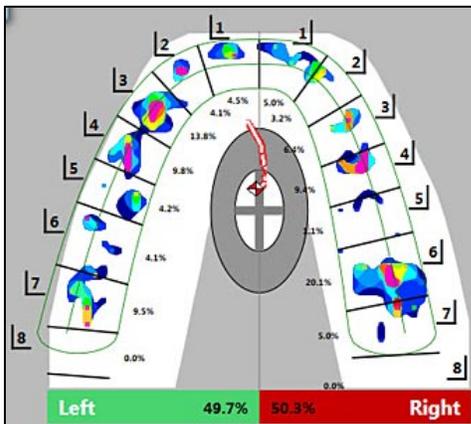
- **Tooth Numbers:** Defines how tooth numbers are displayed on the 2D ForceView Arch. Checking "Hide tooth numbers on arch" removes them from view. Tooth Numbering System provides four selections. By default, selection is based on "System Language" (Advanced tab), but can be changed any time.



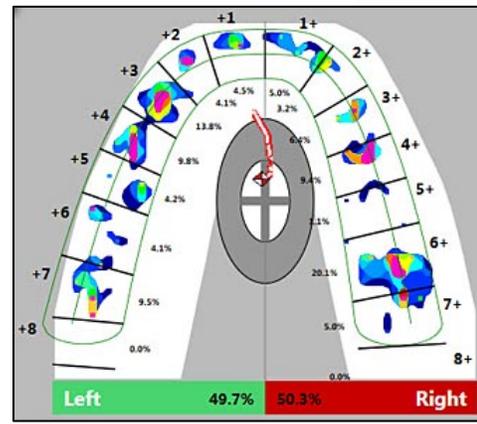
Universal



FDI / ISO

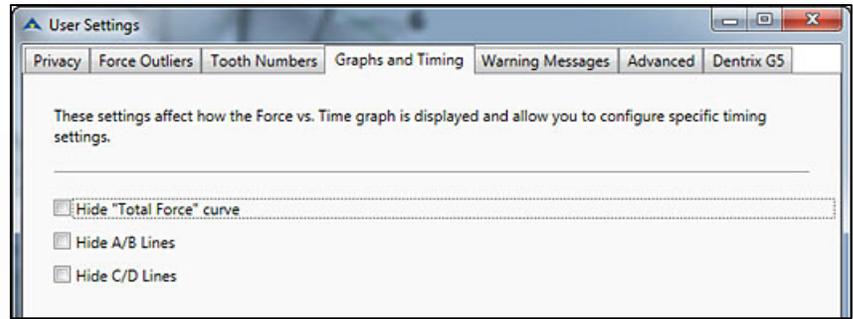


Palmer

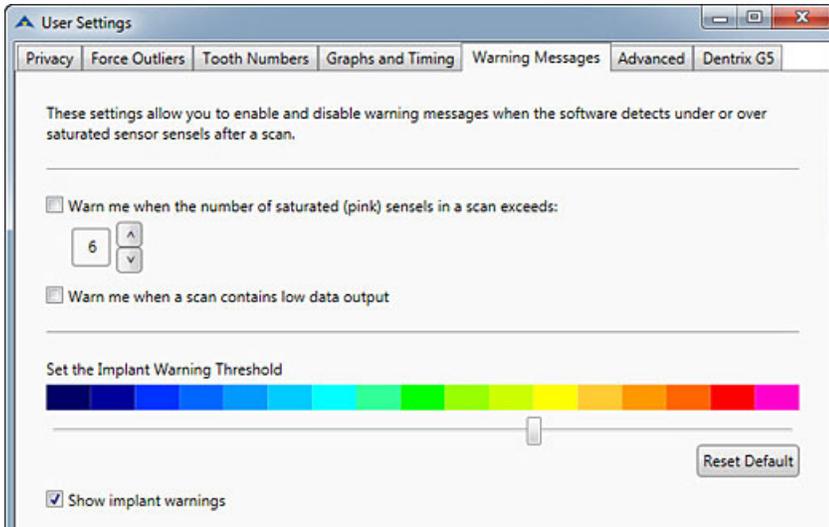


Haderup

- **Graphs and Timing:**
Show/hide elements within the Force vs. Time graph. See [Graph](#) and [Graphs and Timing Settings](#).



- **Warning Messages:**
Enable or disable software warning messages, such as when sensitivity is set too high or low, or implant warnings.



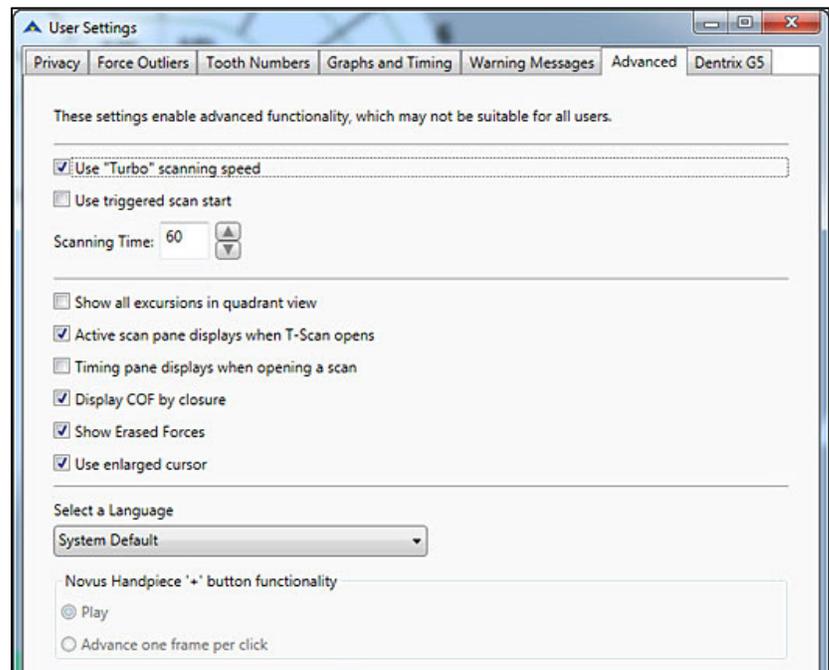
The lower the implant warning threshold slider is set (blue), the more warnings received. The higher it is set (red), the less warnings received, because implant forces must reach a higher threshold before triggering the warning.

Uncheck “Show implant warnings” to eliminate them. Click **Reset Default** to return the threshold to its default setting.

- **Advanced:**

Use "Turbo" Scanning speed & Scanning Time:

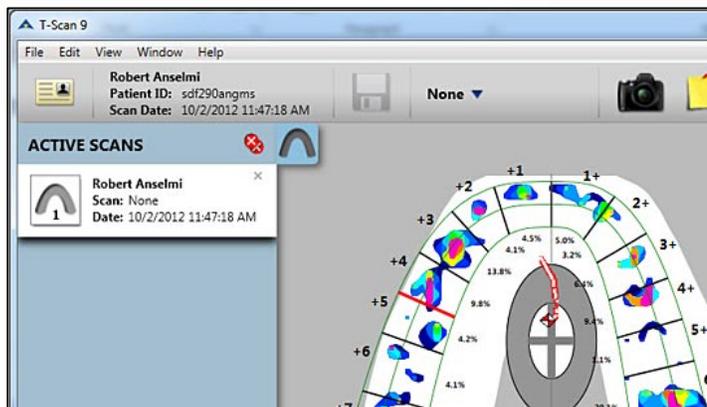
Check to scan at a faster speed than the normal 100 Hz, to maximize the number of frames that can be captured per second. This helps to see fast occlusal tooth interactions. However, turbo captures data up to 500 Hz (500 frames per second). Turbo frame rate depends on sensor load, sacrificing consistent frame rate to capture rapid transitory events. Scanning frame rate in Turbo mode for a typical occlusion is approximately 300 Hz (300 frames per second).



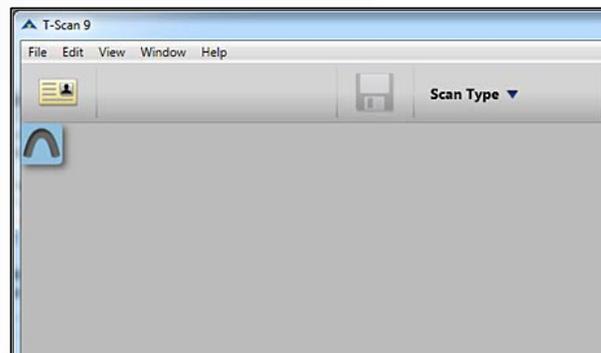
Use Triggered Scan Start: Unchecked, the recording starts immediately when "Record" is pressed. Checking arms the recording when the "Record" button is pressed. Subsequent pressure on the sensor triggers recording start. With [BioEMG](#) installed, this is checked to synchronize both applications.

Show all excursions in quadrant View: When checked, if a scan is an excursion (R or L Lateral, Protrusion), the 2D ForceView displays quadrants when scans are opened. This is the same option as **View > Arch in Quadrants**. Note: When checked, this View option cannot toggle off. The quadrant view is always enabled until unchecked on the "Advanced" tab.

Active Scan pane displays when T-Scan opens: Check to automatically open the [Active Scans Pane](#) when T-Scan is opened.

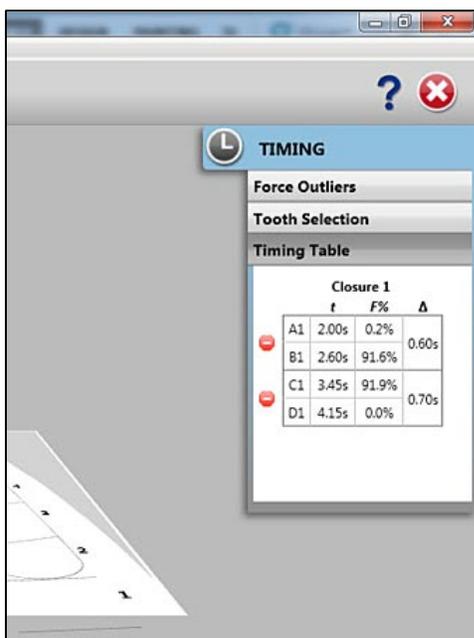


Checked.



Unchecked.

Timing pane displays when opening a scan: Check to open the [Timing Pane](#) with every scan.



Checked.



Unchecked.

Display COF by closure: Check to display only the COF related to the closure under review. Unchecked, the COF for each bite in a multi-bite movie is displayed cumulatively (overlapped), as the scan progresses.

Show erased forces: When using the [Force Eraser](#), by default, the erased force is grey. Uncheck to hide the erased force. Be careful turning off this setting, as there will be no visual display on the ForceView to indicate forces have been erased.

Use enlarged cursor: By default, a larger cursor is used in T-Scan software, for easier visualization. Checking reverts to the default MS Windows cursor.



T-Scan.

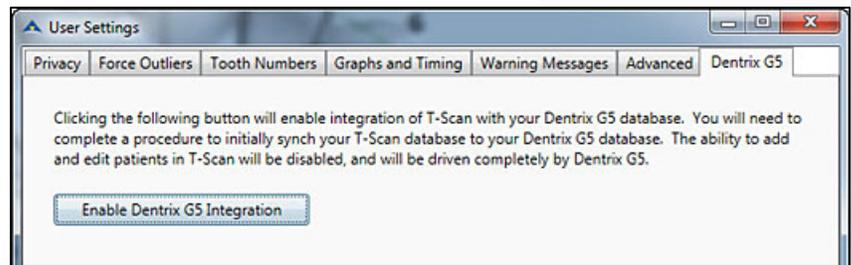


MS Windows.

Select a Language: Select default software language. Software Views, Windows, Dialogs, Menus, and Toolbars switch to the new language.

Novus Handpiece “+” button functionality: Allows you to determine what the Plus (+) button on the Novus handle does, either **Play** or **Advance one frame per click**. This functionality is greyed out for Evolution Handle users.

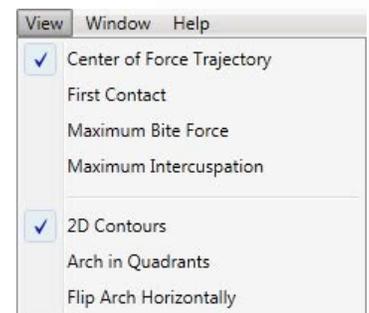
- **Dentrix:** Synchronizes [Dentrix](#) and T-Scan software databases (requires Dentrix software).



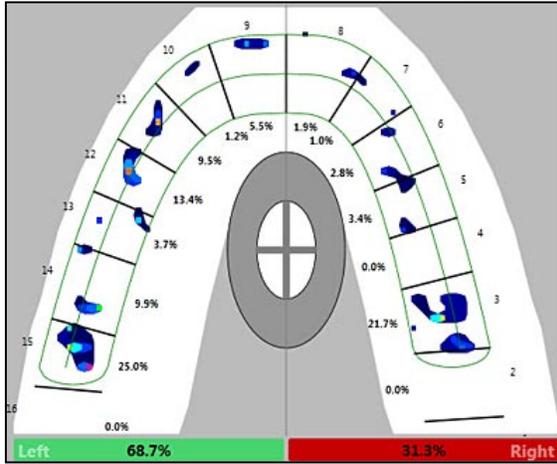
View Menu

View options enable the clinician to navigate quickly to scan events and summarize the occlusal contacts in useful formats.

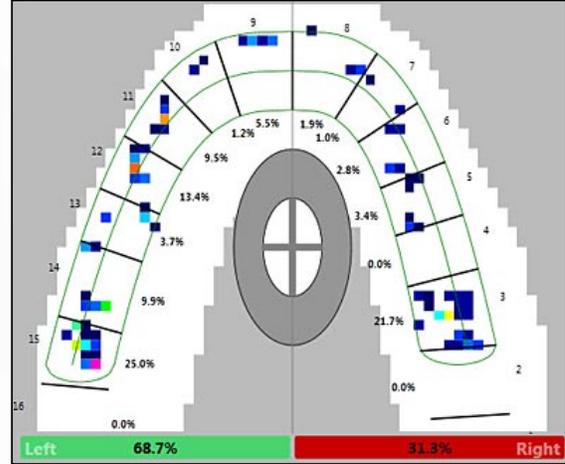
- **Center of Force Trajectory:** Illustrates the balance of the occlusion in the 2D ForceView throughout the closure, using a graphic Center of Force (COF) target and [Center of Force \(COF\) Trajectory](#) line. Select to show or hide the COF and COF Trajectory.
- **First Contact (1):** Navigates the 2D and 3D ForceViews, and graph to the first frame of the scan (initial force contact).
- **Maximum Bite Force:** Moves all views to the frame in the scan which contains the maximum bite force for the entire scan.
- **Maximum Intercuspation:** Moves all views to the frame where maximum intercuspation occurs - the largest area of tooth contact. Also referenced as MA (Max Area).



- **2D Contours:** Smooths out raw sensor output. Sensels are displayed in a continuous flow of force.

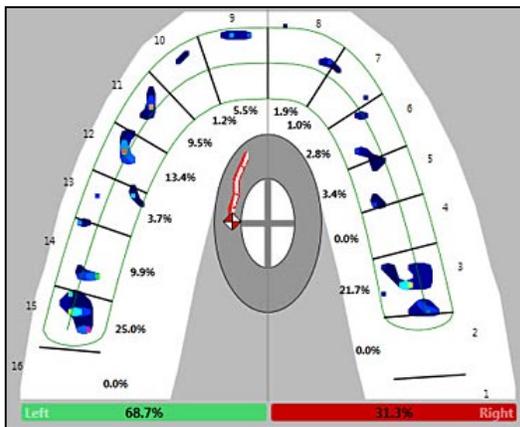
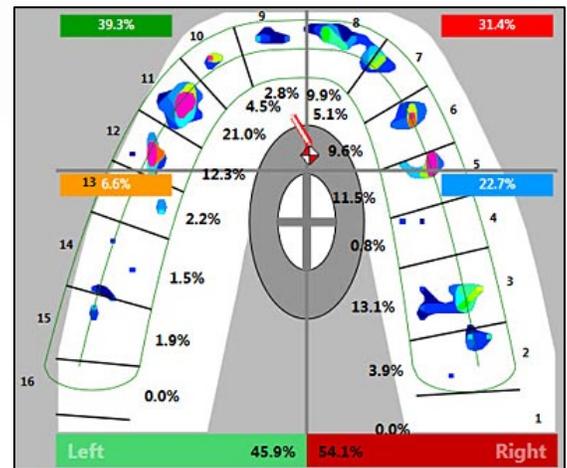


2D Contours enabled (default)

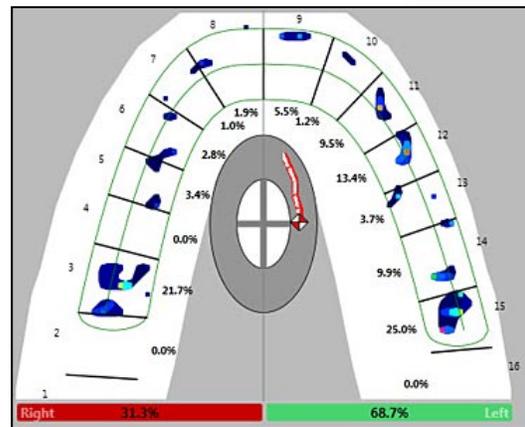


2D Contours disabled

- **Arch in Quadrants:** Splits the Arch Model into Anterior, Posterior, left, and right zones.
- **Flip Arch Horizontally:** Inverts the arch on the horizontal axis. By default, the left and right sides of the patient's arch equals the left and right sides of the ForceView, respectively.



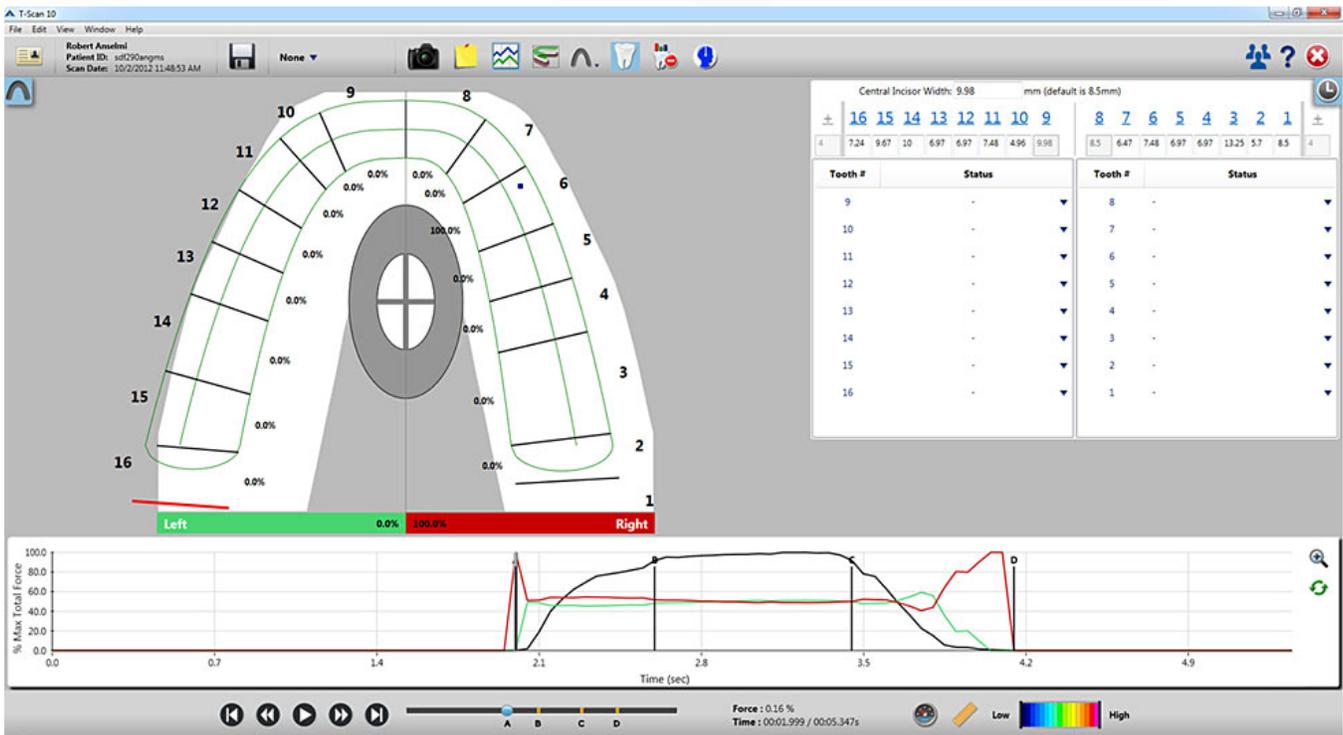
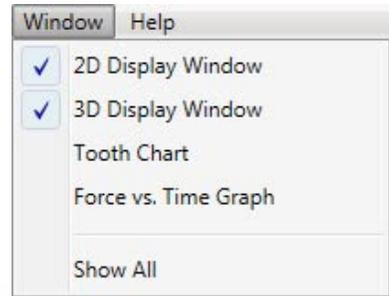
Default.



Flipped horizontally.

Window Menu

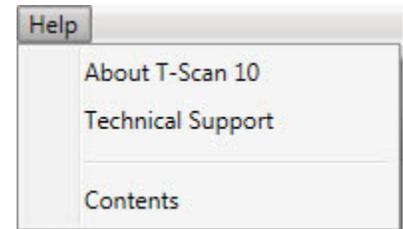
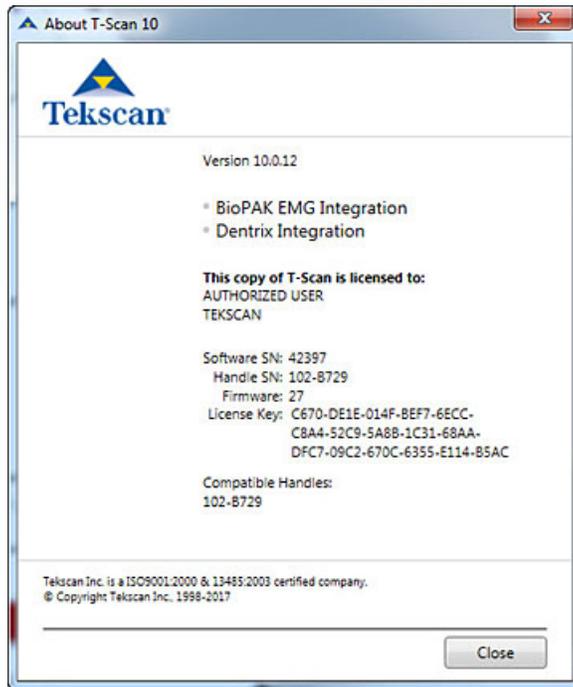
- **2D Display Window:** Shows or hides the 2D ForceView.
- **3D Display Window:** Shows or hides the 3D ForceView.
- **Force vs. Time Graph:** Shows or hides the Graph window.
- **Tooth Chart:** Shows or hides the Tooth Chart (same Tooth Chart found on the “Edit Patient” dialog). When displayed, the Tooth Chart replaces the 3D ForceView. Note: Adjusting the Tooth Chart with a scan open impacts that scan only, unless you answer **Yes** to the “Updated Arch Model” prompt when changes to the scan are saved.



- **Force vs. Time Graph:** Shows or hides the Graph window.
- **Show All:** Shows or hides all views.

Help Menu

- **About T-Scan:** Opens software technical information dialog.

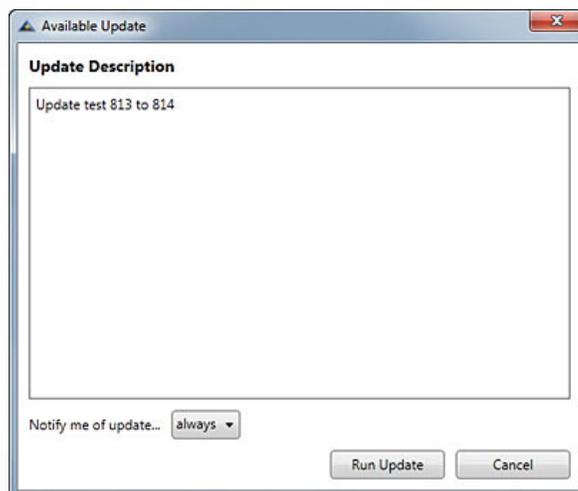


- **Technical Support:** Opens Technical assistance contact information.



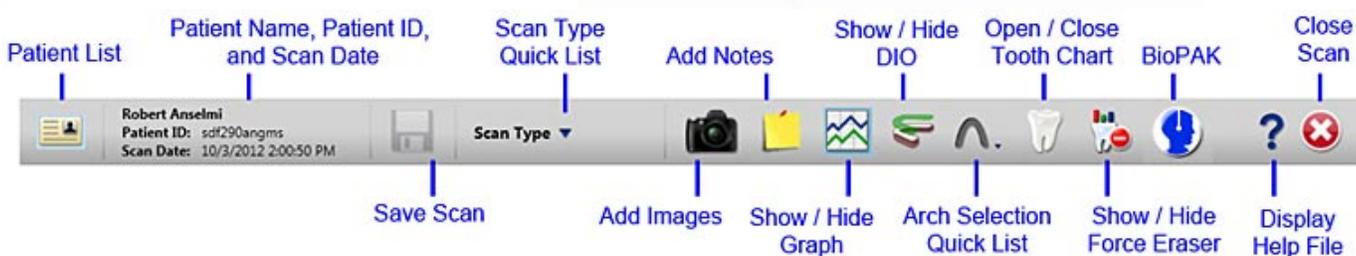
- **Contents:** Opens the Help File, providing T-Scan hardware and software documentation.

- **Update:** If this option appears under the Help menu, a software update is available to download. Click **Run Update** and follow on-screen instructions. See [Software Updates](#).



Toolbar

The Toolbar provides access to common software tasks. Not all Toolbar functions are available at all times. For example, if a scan is saved, the "Save Scan" icon is unavailable.

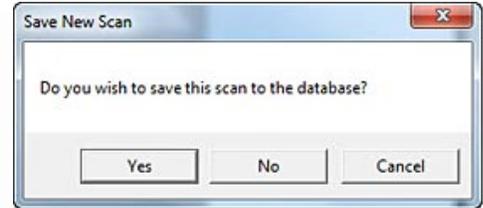


Hovering over an icon shows an informative "Tool Tip".



- **Patient List:** Opens the "Patient List" dialog. Add, edit, and delete patient records, and open or delete patient scans.
- **Patient Name, Patient ID, and Scan Date:** Displays the patient's record information.
- **Save Scan:** If a scan changes, this button is used to save the scan under the Patient Record.
- **Scan Type:** Used to categorize the scan by procedure. See [Scan Types](#).
- **Add Images:** Associate Images to the scan. See [Attaching an Image to a Scan](#).
- **Add Notes:** Associate comments with the scan. See [Including Notes with a Scan](#).
- **Graph:** Show or hide the graph.
- **Digital Impression Overlay:** View the T-Scan force data over the digital impression, after the DIO files (.stl) are loaded into the Patient Record. See [Creating a Digital Impression Overlay](#).
- **Arch Selection:** Select which patient arch to view: Upper, Lower, or both. Note: The Graph is not visible with both selected.
- **Tooth Chart:** Shows or hides the Tooth Chart (same Tooth Chart found on the "Edit Patient" dialog). When displayed, the Tooth Chart replaces the 3D ForceView. Note: Adjusting the Tooth Chart with a scan open impacts that scan only, unless you answer **Yes** to the "Updated Arch Model" prompt when changes to the scan are saved.

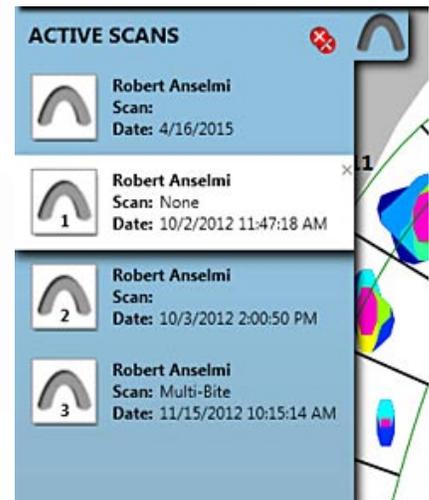
- **Force Eraser:** Helps eliminate artifacts created by Class II occlusions and other dentitions that cause excessive crinkling of the sensor. Use it to selectively discard areas of data that might throw overall force percentages and Center of Force (COF) off from their real values. See [Force Eraser](#).
- **BioPAK:** Opens the *BioEMG* software module to synchronize T-Scan with *BioEMG* (Requires *BioPAK* software). See [BioEMG Integration Module](#).
- **Display the T-Scan Help File:** Opens the Help File, providing T-Scan hardware and software documentation.
- **Close Scan:** Closes the currently active scan.



Active Scans Pane

The **Active Scans Pane** displays a thumbnail of all open scans on-screen (hidden by default). To always show this pane, check “Active Scans pane displays when T-Scan opens” under **Edit > User Settings (Advanced Tab)**. With multiple scans open, each scan is represented with an informational thumbnail. Click the thumbnail to make it the active scan. With multiple scans from different patients open, thumbnails are grouped by patient name.

The Active Scans Pane icon shows or hides the Active Scans Pane.

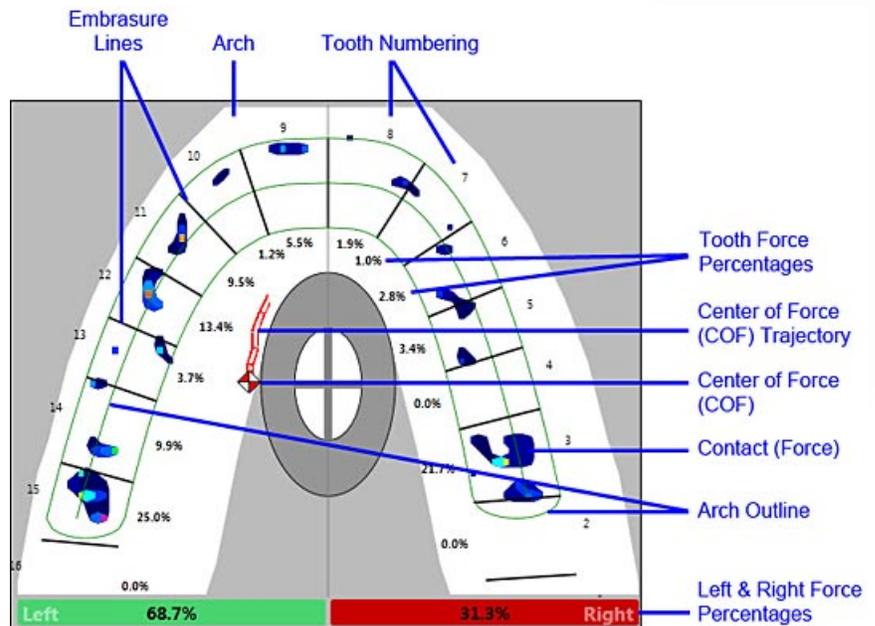


ForceView

The **ForceView** is the main window area where you can view the patient's bite force over time, in 2D and 3D perspective.

2D ForceView

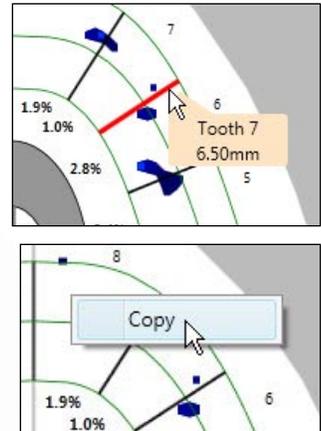
The **2D ForceView** displays bite force across the arch, broken out into left and right regions for easy bilateral balance analysis. As the patient bites down, the sensor's tooth force data is color-coded in real-time with lowest force (blue) to highest force (red or saturated pink). The software provides many options for displaying, [recording](#), and analyzing this real-time data.



As you play the scan forward, the patient's bite is viewed over time. You can pinpoint force amounts at any location at any time along the Arch. In the example here, the left side registers 68.7% and right side 31.3% of the force at that moment in the scan. Percentage of force on each tooth is written on the inside, and tooth numbers on the outside of the Arch Outline. For example, 13.4% of the bite force is attributed to tooth number 12. Straight edge lines dividing teeth are called "Embrasure" lines. The circular green line encompassing the teeth and Arch is called the Arch Outline, created by the software using a "best-fit" algorithm based on scan data.

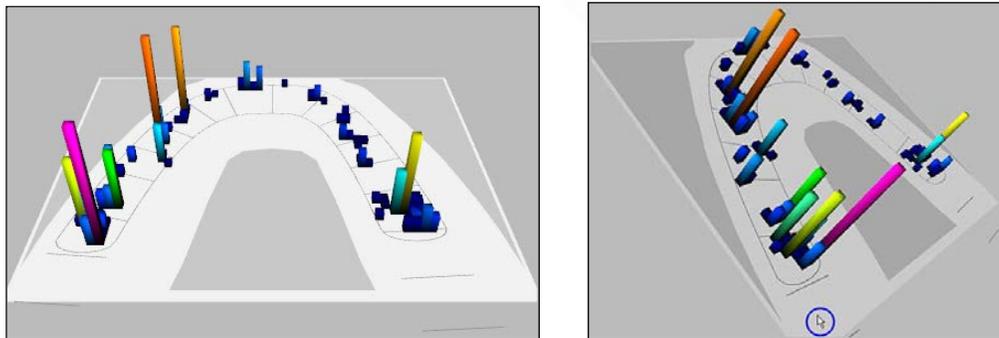
A Tool Tip shows width between teeth when the mouse hovers over embrasure lines. Click and drag the line to move it, extending or contracting the space between the two adjacent teeth.

Right-click over the 2D ViewForce and selecting **Copy** places the 2D ViewForce as an image on your clipboard. It can then be pasted into other programs (MS Word, Excel, etc.).



3D ForceView

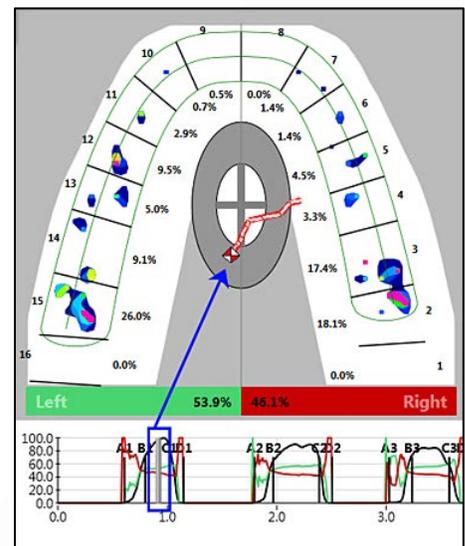
The **3D ForceView** displays bite forces as columns in 3D space. Both 3D and 2D ForceViews play forward in tandem. Rotate the 3D ForceView any direction by clicking and dragging anywhere over the view area. This lets you pinpoint a specific area of the patient's Arch Model.



Center of Force

The "**Center of Force (COF)**" and "**Center of Force (COF) Trajectory**" illustrate the "balance" of occlusion in the active window, using a graphic COF "marker" and "trajectory." The COF marker pinpoints the location of the sum of the total force of the occlusal contacts at that moment in the scan. This data is presented by superimposing the COF marker on the tooth contact data as a red and white diamond in the 2D ForceView.

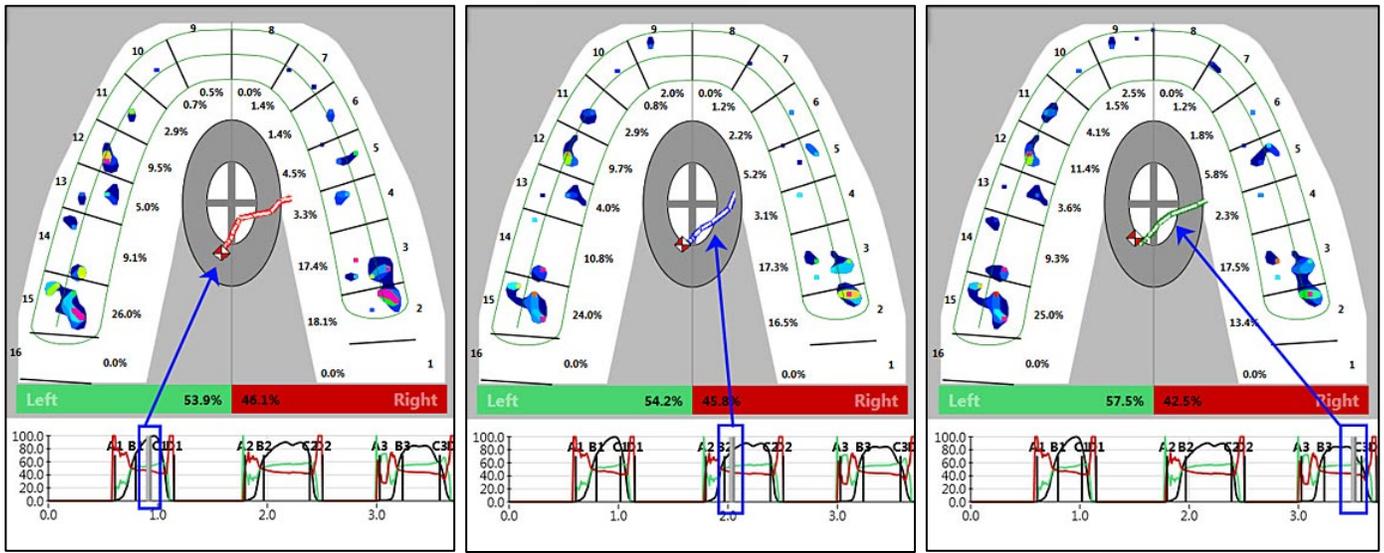
The COF Trajectory displays the history of the path of the Center of Force from frame one of the scan to the current frame, in relation to the COF target, represented on-screen by a colored line "trailing" the COF marker. Track the movement of the COF as the patient closes his/her teeth together by playing the scan frame by frame. Both COF and COF Trajectory are powerful analysis tools that help determine the influence of interceptive contacts, estimate stability of closure, and track trajectory of excursive movement.



Center of Force Trajectories with Multi-Bite Scans

When viewing a Multi-bite scan, each bite has its own unique Center of Force Trajectory displayed in a unique color. It can be viewed in isolation from other bites. As the scan plays forward, the timeline location determines which trajectory is displayed (red for the first bite, blue the second, and so forth).

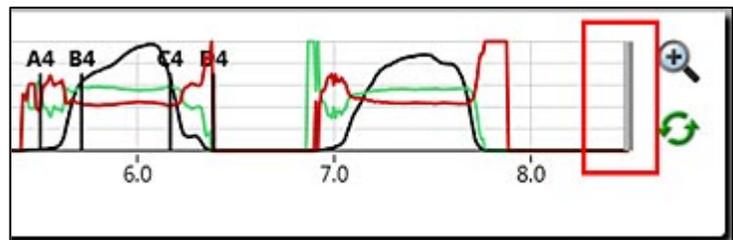
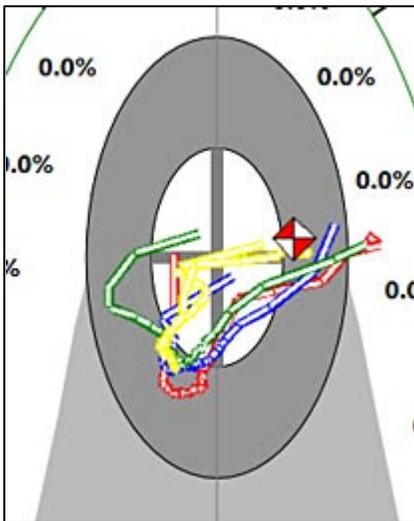
If you wish to see all trajectories superimposed, advance to the last frame of the scan, where all trajectories are shown simultaneously. This way you can compare patterns of closure.



First Bite (red)

Second bite (blue)

Third bite (green)



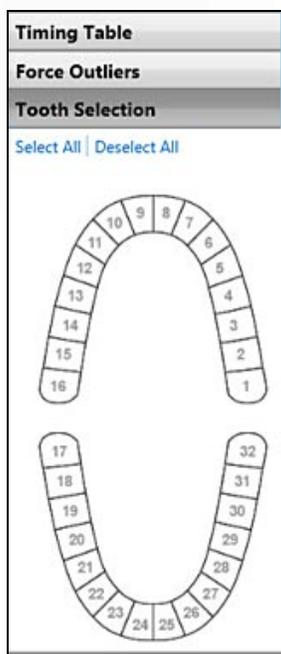
Last Frame (all trajectories superimposed).

Timing Pane

View bite timing measurements in the **Timing Pane**, as well as individual tooth timing (Tooth Selection), and Force Outliers. The Timing Pane correlates to the graph. Whereas the graph is a visual linear display, the timing pane provides numerical measurement values for the same data.

Force Outliers			
Tooth Selection			
Timing Table			
Closure 1			
	t	F%	Δ
⚠	A1	0.40s	3.1%
	B1	0.65s	71.9%
✓	C1	1.15s	92.1%
	D1	1.35s	0.0%

Timing Table



Tooth Selection

Tooth Selection			
Timing Table			
Force Outliers			
HIGH			
#	t	F%	σ's
11	0.50s	17.2%	4.23
12	0.65s	17.3%	4.11
15	0.60s	18.3%	4.12
23	0.50s	28.1%	4.23
22	0.65s	19.2%	4.11
20	0.60s	11.3%	4.12

Force Outliers



The Timing Pane icon shows or hides the Timing Pane.

Timing Table Tab

View the patient's total occlusal bite timing.

- **Line:** the A, B, C, and D lines. Lines are used to mark two separate sets of positions (frames) of the scan. A-B Increment/Differential lines denote the start and end of the Occlusion Time (OT) and C-D Increment/Differential lines denote the start and end of the Disclusion Time (DT).
- **Time:** Time at which Occlusion and Disclusion lines occur in the patient's bite, from the scan start.
- **Force %:** Force exerted on the sensor at Occlusion and Disclusion points, related to the overall scan force (as a percentage).
- **Differentials:** Time differential from Line A to B (Occlusion) and C to D (Disclusion).

Indicator icons to the left of the Line column:

- **Green checkmark:** OT or DT is within an acceptable, user-defined range.
- **Yellow caution indicator:** OT or DT is on the borderline of an acceptable, user-defined range.
- **Red warning indicator:** OT or DT is not within an acceptable, user-defined range.

Tooth Selection Tab

Select the tooth you wish to view in the **Tooth Selection** tab. Each tooth is color-coded. As a tooth is selected, the 2D ForceView updates with a corresponding tooth color outline defined by the tooth's embrasure lines. The contribution of tooth force is shown as a line (of same color) in the graph. Select multiple teeth to view and compare multiple tooth forces and timing in the graph. Select again to remove a tooth.

Force Outliers Tab

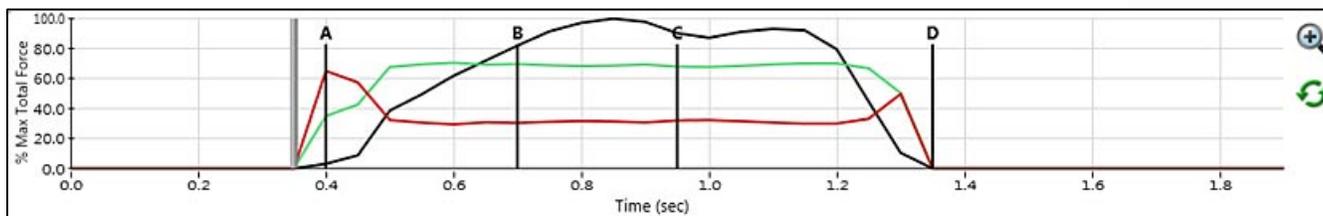
Force Outliers are individual tooth contacts with much higher relative force than others during closure; or a tooth with very low force at maximum area (MA). The 2D ForceView updates to show the corresponding tooth color outline defined by the embrasure lines on any teeth considered to have Force Outliers. The graph updates to display and compare tooth force contribution and timing.

Graph

Graph displays force versus time for the patient's bite, individual teeth, or Force Outliers. Each graph line is color coded, providing a linear reference to Arch Model areas and individual teeth.

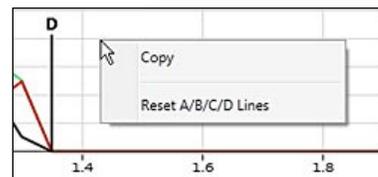
A black line maps the whole bite (Total Force). Green and red lines map the left and right sides of the arch, respectively.

Total Force is relative. When a scan is taken, the software determines the point at which highest force was achieved and this is measured to be 100% of the total force, and used as the Total Force line. In contrast, the left and right lines are relative to the overall force with the left and right percentages (summed to 100%). For this reason, the Total Force line is often lower than the left or right side force lines (as below).



Arch Model force vs. time bite.

Right-clicking over a graph provides two options: **Copy** the graph as an image to paste into programs, such as MS Word or Excel. **Reset A/B/C/D Lines** resets the line positions to default, if they have been moved to a different graph location.



Timeline

The graph's Timeline (grey) is a time indicator. When selected and moved to a new location, the 2D and 3D ForceViews update to reflect the new time display. Jump to any time during a patient's bite to view the forces at that time. Alternately, click any location in the graph. The timeline jumps to that location.

When selecting the Timeline, the cursor changes to a "hand" icon. Click (the "hand" cursor becomes double-sided arrow), drag, and let go to move the line to a new position.

A-B (Occlusion) and C-D (Disclusion) Lines

The A, B, C, and D lines mark two separate sets of scan positions (frames). A-B Increment/Differential lines denote the start and end of Occlusion Time (OT), and C-D Increment/Differential lines denote the start and end of Disclusion Time (DT). A and D lines are based on Relative Force (maximum scan force), while B and C lines are based on tooth position (COF Trajectory).

When a scan is taken, the computer calculates OT and DT. This is the "Computer Default Display" for A-B and C-D lines. This default is usually correct. As different patients have different conditions, this may not always be the optimal OT and DT. You can move the lines to a more appropriate position. When selecting the A, B, C, or D line, the cursor changes to a "hand" icon. Click (the "hand" cursor becomes double-sided arrow), drag, and let go to move the line to a new position.

Keep in mind the following:

- The A/B and C/D lines work in distinct pairs. Both A and B lines (Occlusion start and end) can never be placed beyond the C or D lines (Disclusion start and end), and vice versa.
- Likewise, the A line should never be placed beyond the B line. When moving the A line past the B line, the lines are switched (A becomes B and B becomes A). The same is true for the C and D lines.

Graph Zoom & Graph Reset

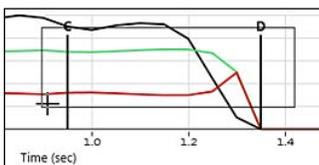
The Graph Zoom icon lets you enlarge a region of the graph. Click on the icon. The cursor becomes a crosshair. Click and drag to select a square region of the graph. When you let go, the graph zooms into that region. To reset the graph, press the Graph Reset icon.



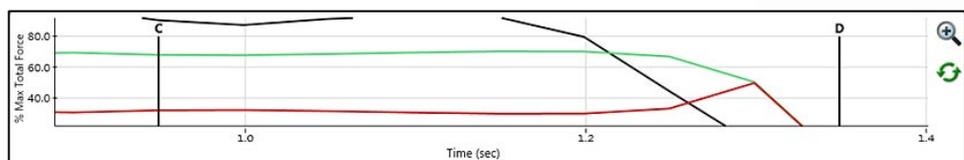
Graph Zoom icon.



Graph Reset icon.



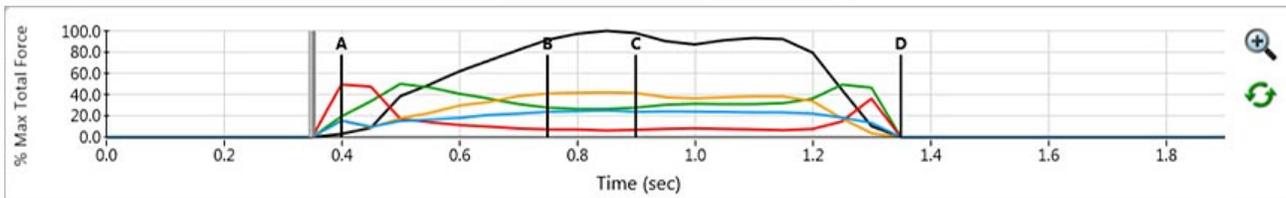
Selecting region.



Resulting "zoomed" view.

Arch in Quadrants

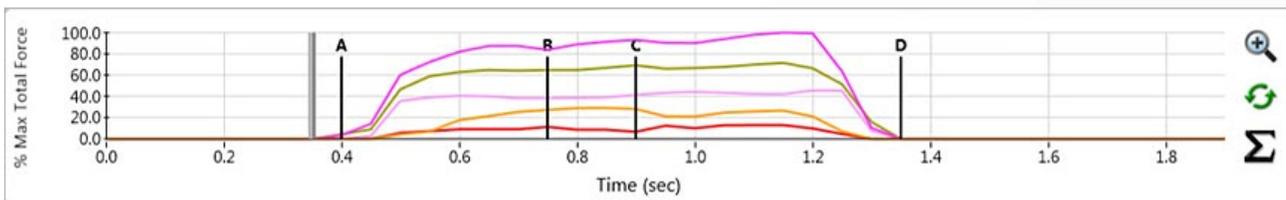
Selecting **View > Arch in Quadrants**, the left (green) and right (red) sides of the patient's bite are replaced by four quadrant lines: left anterior (green), left posterior (orange), right anterior (red), and right posterior (blue) quadrants.



Arch Model force vs. time bite quadrants.

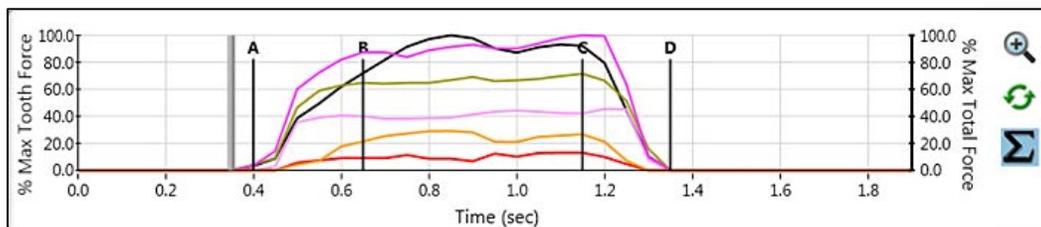
Tooth Selection

To view the individual tooth force and timing within the graph, select them from the Timing Table (Tooth Selection tab). This view is helpful to compare rise times from tooth to tooth. The most forceful of the selected teeth is used as the 100% “max tooth force baseline,” and force lines of the other selected teeth are drawn in proportion to it.



Individual tooth force vs. time for five teeth.

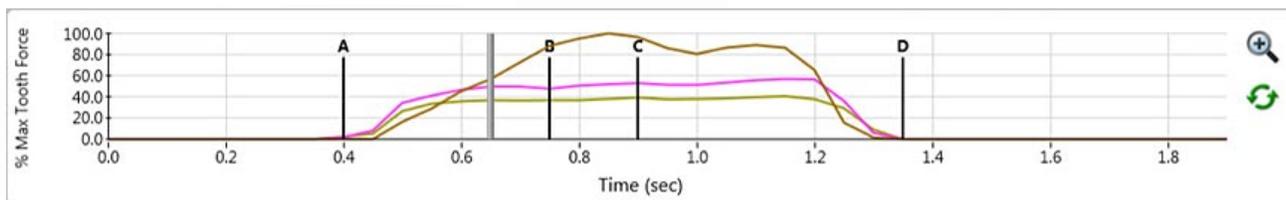
When selecting individual teeth, a **Sigma** icon displays at the bottom right corner of the graph. This icon toggles between showing tooth forces relative to each other (shown in the graph above –Sigma icon disabled), or showing tooth forces relative to the Total Scan Force Line (shown in the graph below --Sigma icon enabled).



Individual tooth force vs. time for five teeth with Total Scan Line overlay

When enabled, the Total Scan Force Line displays in black. A new axis relating to the Total Scan Force Line appears on the right of the graph, and the rise time of each individual tooth can be compared to the overall cumulative Total Force Line, to see if it is leading the pack.

To view the Force Outliers within the graph, select them from the Timing Pane (Force Outliers tab). When an Outlier is selected, the graph timeline (and scan) moves to the point where the Outlier occurs, so you can assess what caused the condition for the Outlier.



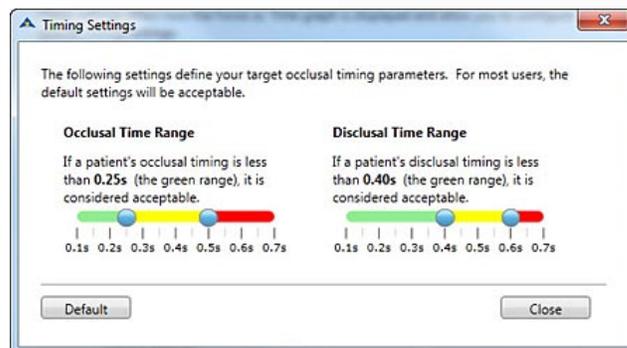
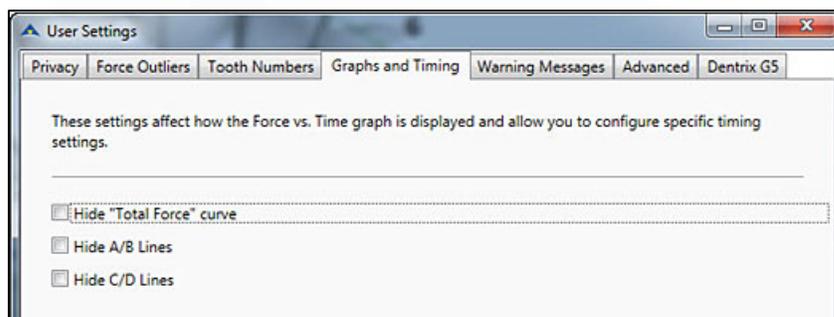
Force Outliers for three teeth.

Graphs and Timing Settings

Graph options in the “Graphs and Timing” tab (**Edit > User Settings**) let you show or hide elements of the graph, and calculate OT and DT. Show or hide the “Total Force” Curve, and the A / B or C / D Lines.

Pressing the **Timing Settings** button lets you set the range the software uses to calculate Occlusion and Disclusion. See [Timing Table Tab](#).

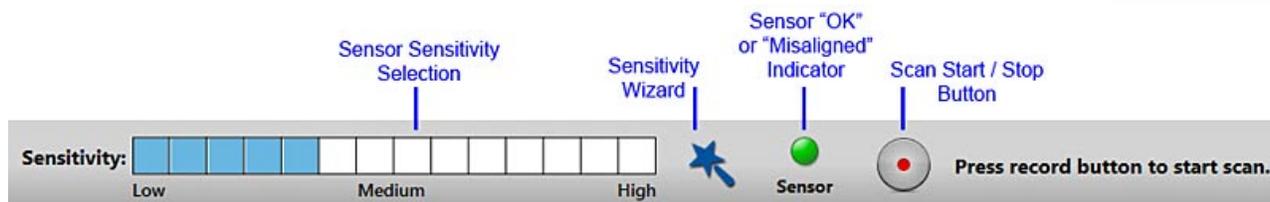
Click **Default** to reset to the original timings. Click **Close** to accept any changes and exit the dialog.



Navigation Bar

The **Navigation Bar** provides key scan operations. Record a new scan or review an existing scan.

Record



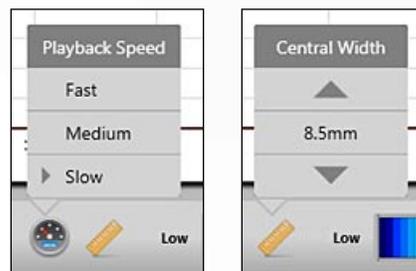
- **Sensitivity:** Select to make the sensor more or less sensitive to bite forces.
- **Sensitivity Wizard:** The software automatically adjusts sensitivity. See [Performing A Scan](#).
- **Sensor Indicator:** Displays the status of the sensor. If green, the sensor is aligned and ready to scan. If red, the sensor is misaligned.
- **Scan Start / Stop Button:** Initiates a scan. The navigation bar displays frame progression. After the patient’s bite concludes, pressing again stops the scan. By default, scans are 1200 frames at 20 frames per second (approximately 1 minute).

Review

Once recorded, the scan is displayed, and the Navigation Bar options change to "review" mode.



- **Move to Start:** Moves to the beginning of the scan (first frame).
- **Back One Frame:** Moves back a single frame from the current position.
- **Play / Pause:** Plays the scan forward from the current timeline position according to the Frame Rate setting. Pressing during playback pauses playback. The **Spacebar** can also play and pause the scan. To play forward continuously, press **Shift+Spacebar**.
- **Forward One Frame:** Moves forward one frame from the current position.
- **Move to End:** Moves to the end of the scan (last frame).
- **Timeline:** Advances the scan manually to any scan position. Views are updated dynamically. A, B, C, and D line markers are indicated here.
- **Force / Time Indicator:** Shows **Force** at the current scan position (as a percentage of overall scan force). The **Time** indicator shows current position time and total scan time.
- **Playback Speed:** Select from three play speeds: Fast, Medium, and Slow.
- **Central Width:** Adjust the patient's Central Incisor Width. Use the Up or Down arrows to increase or decrease the width.
- **Force Legend Color Scale, Noise Threshold Adjustment Slider, and Upper Limit Slider:** The Legend is a segmented force color scale, which shows the range of colors displayed in the scan, from red (highest forces) to blue (lowest forces). The Pink color above the red maximum indicates sensels that are fully saturated.



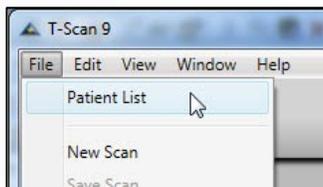
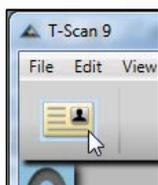
One legend controls all views, making it easy to compare between views. The Legend is a color scale, with digital range 0-255 (256 force levels or "Raw Sum").

Dragging the Noise Threshold Adjustment Slider to the right removes lower forces. Data is not removed, just eliminated from view. All sensed forces below the set slider level are not displayed. Use this to suppress low-level noise display that can be distracting. All views dynamically update as the slider moves. If the Upper Limit Slider is moved left, upper level force is filtered out, as are their related colors. If the sliders are not at default (full range), the legend pulses from full color to faded color, reminding you that forces are filtered out. Reset the sliders by right-clicking on the legend and selecting **Reset**.

Note that the legend settings affect every scan, and are saved even after you exit and reopen the software.

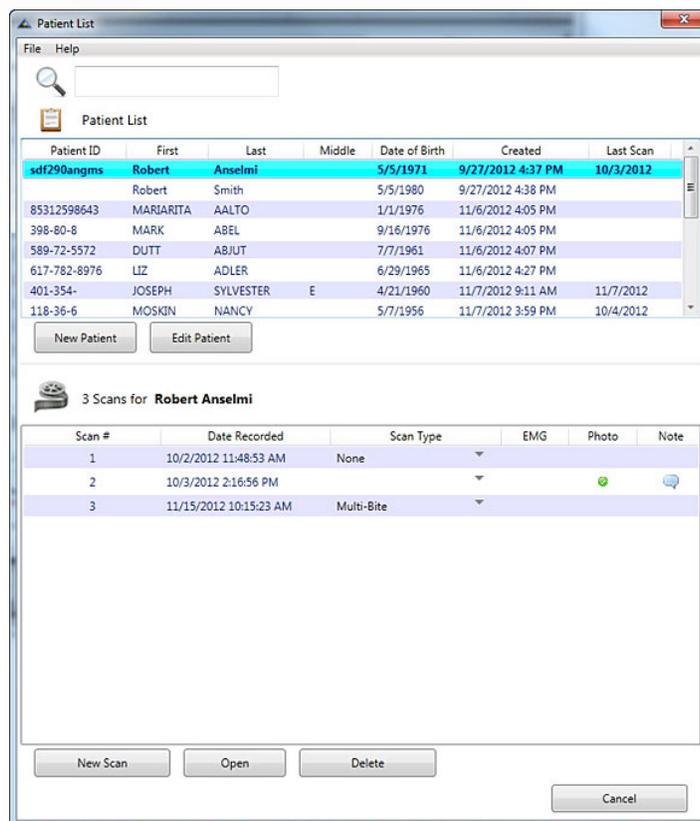
Patient List Window

The software contains a patient file management system that is used to store patient information (first and last name, patient ID, etc.) in a **Patient Record**, and store and track each patient's scans. Access and edit Patient and scan information through the "Patient List" window, accessed via the Patient List icon on the Toolbar or **File > Patient List**.



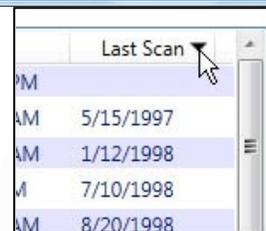
The "Patient List" window opens.

- Search Field:** The search field helps locate a patient by any of the patient's information (first, middle, last name, ID, Date of Birth, Created Date, etc.). Enter terms into the field. The List is filtered and searched, with results displayed as you type. To clear a search, delete text from the search field. Note: searching is constrained to the starting of first and last names. For example, when searching "AR", results are displayed for "Arnold" but not "Richard".
- Patient List:** Displays all Patient records in your database, listed in reverse chronology by "Last scan" date and patient. The most recent scan is at the top. Order the Patient List according to any column by clicking its heading. All records are then reordered and sorted ascending by that column (noted by an upward-pointing arrow). Clicking the column heading again reorders the list descending (arrow pointed downward).



Clicking **New Patient** opens a blank "New Patient Record" window, where you can enter a new patient into the list. See [Patient Record window](#). Selecting a Patient Record and pressing **Edit Patient** opens the "Patient Record" to make changes for that patient.

- Scan List:** Shows all scans for the currently selected patient. Scans are listed in descending order by scan number; the most recent scan is listed at the top. As with the Patient List, you can reorder and sort scans by any column. EMG (available only with optional [BioEMG Integration Module](#)), Photo, and Note fields have special icons to indicate whether or not a scan contains this related data.
- New Scan:** Opens a new scan window to take a recording.



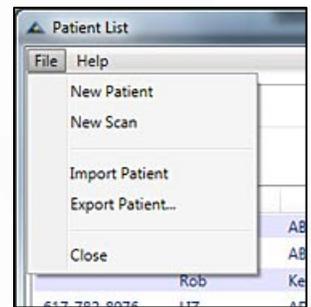
- **Open:** Opens the currently selected scan. Alternately, double-click directly on the scan. Use **Shift** or **Ctrl** to open multiple scans. Click the first scan, hold **Shift**, and then click the last scan. This selects all scans in between (contiguous selection), or click the first scan, hold **Ctrl** and click any additional scans (non-contiguous selection) Once selected, click **Open**. All scans open.
- **Delete:** Deletes the currently selected scan.
- **Cancel:** Closes the "Patient List" window without accepting any changes.
- **Show All Patients:** This hyperlink appears only after you have opened a patient's scan. Going back to the "Patient List" window displays only the current Patient and their related scans, so you can open additional scans for the current patient without disclosing names of other patients. Clicking **Show All Patients** or deleting search field text removes the patient "filter" and all Patients are displayed.



Menu Options

There are two menus in the "Patient List" window:

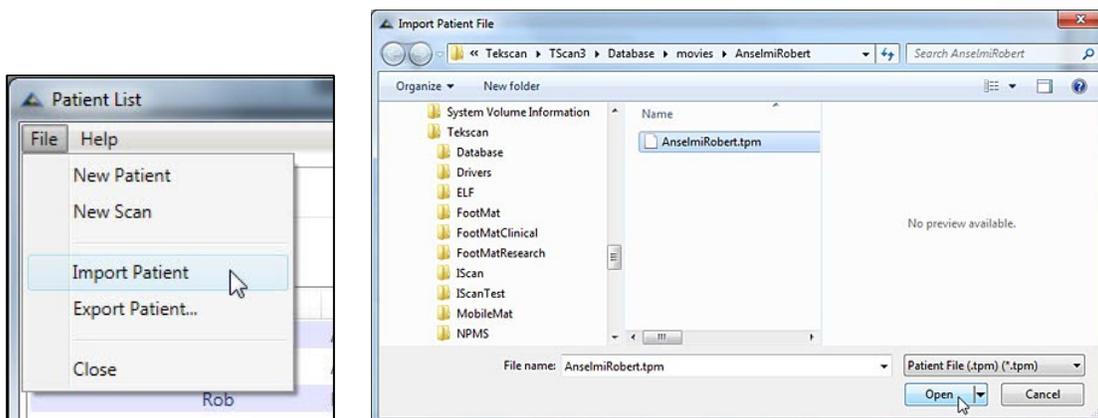
- **File Menu**
 - **New Patient:** Opens a blank [Patient Record window](#), where you can enter a new patient into the list.
 - **New Scan:** Opens a new scan window to take a recording.
 - **Import Patient:** Import a patient's entire record, including all scans, from another T-Scan database. When selected, you can select the patient's "patient record file" (**.tpm** or **.tpmc**). All scans and Arch model are imported into the software database.

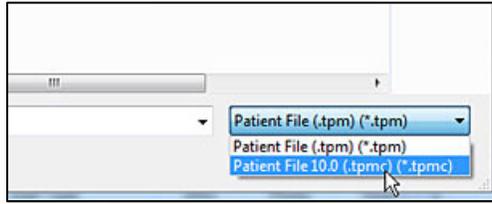


Note: *“*.tpm” files import the Patient record and patient scans. “*.tpmc” is a new file format for T-Scan 10, which additionally imports the patient’s *.ttl [DIO](#) files and [BioPAK](#) patient files.*

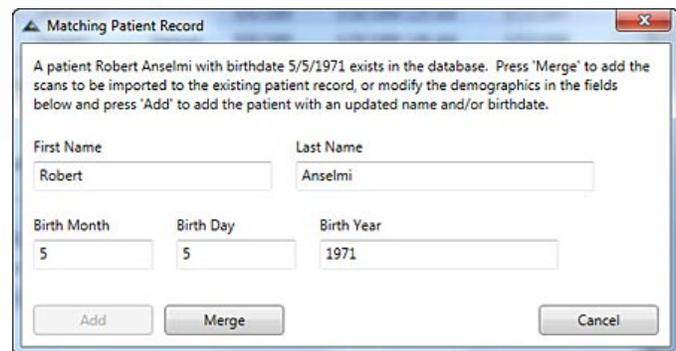
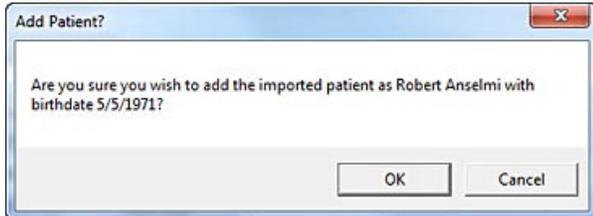
Note: *For BioPAK data to be included in the imported file, both T-Scan and BioPAK windows need to be open and linked side by side while importing via File > Import Patient.*

Select **File > Import Patient**. Locate and select the Patient (*.tpm or *.tpmc) file. Click **Open**.





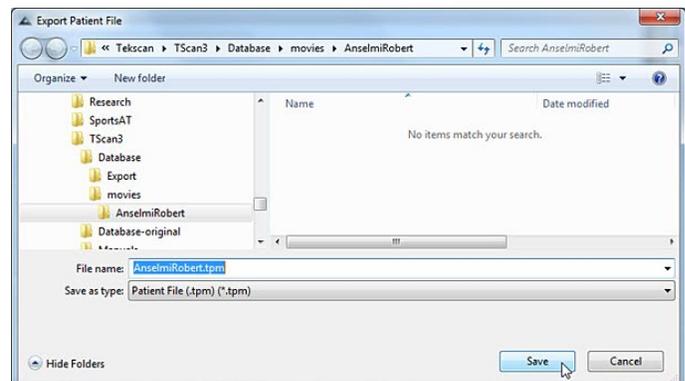
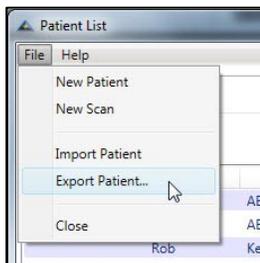
If the Patient doesn't already exist in the database, you are asked to confirm the addition of the patient. Click **OK** to add the patient. If the Patient already exists, you are presented with the "Matching Patient Record" dialog. Clicking **Merge** will merge all scans from this Patient with the existing Patient Record. Nothing is deleted. If you make any changes to the Patient's Name and/or birth date in the dialog and press **Add**, the existing patient's record is modified with the new information, and the scans are added to the existing patient's record (as Merge does). The only difference is the new modified Name and/or birth date alters the existing Patient's Name and/or birth date.



- **Export Patient:** Exports a patient's entire record, including all recorded movies, *.ttl [DIO](#) files, and [BioPAK](#) patient files from the software. When selected, a new "patient record file" is created (with the extension *.tpmc), with the name and location of your choice. All scans and Arch model are exported to the new file.

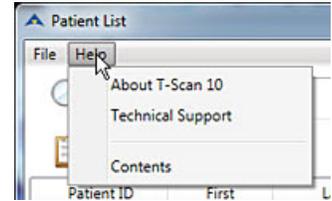
Note: For BioPAK data to be included in the exported file, both T-Scan and BioPAK windows need to be open and linked side by side while exporting via File > Export Patient.

To export a Patient, select **File > Export Patient**. If you choose to remove Personal Health Information (PHI), all patient names are redacted and displayed as "xxx" after import. The "Export Patient File" dialog opens, where you can save the file.



- **Close:** Closes the Patient List window.

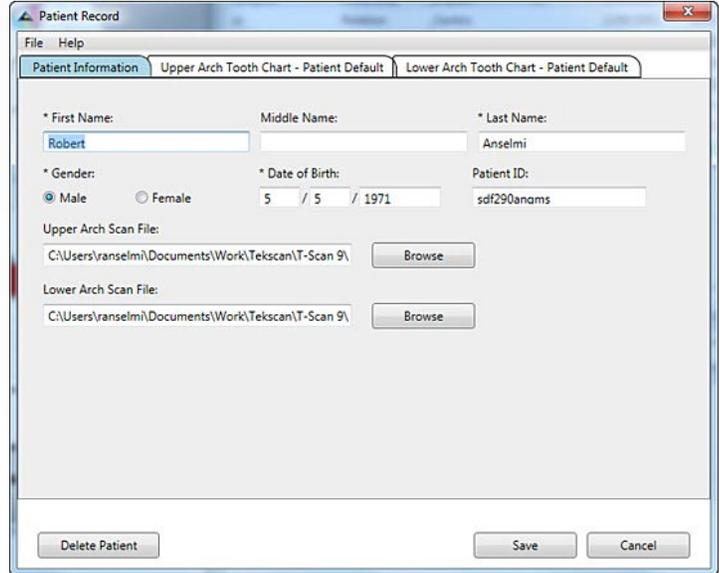
- **Help Menu:** See [Help Menu](#).



Patient Record Window

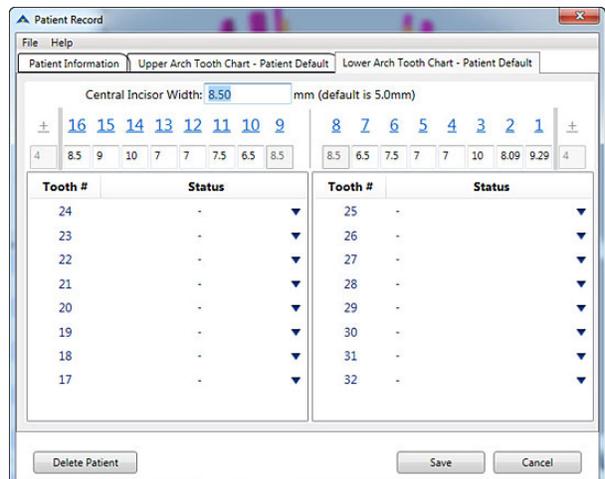
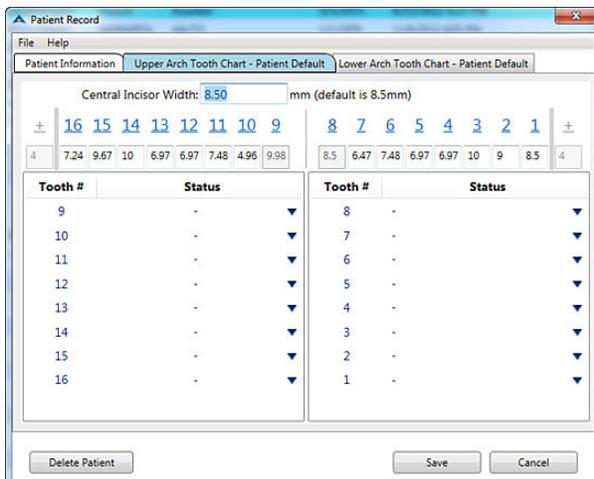
This window is used to enter or change patient information in the database.

- **Patient Information Tab:** Enter standard patient information, used to categorize the Patient for [Patient List](#) searches. An asterisk denotes required fields.



- **First Name:** Patient's First name.
- **Middle Name:** Patient's middle name.
- **Last Name:** Patient's last name.
- **Gender:** Patient's gender.
- **Date of Birth (M/D/YYYY or D/M/YYYY):** Patient's birth date. Note: dates can be entered by Day or Month first.
- **Patient ID:** Used to match records across applications, if BioEMG or other software is used. If the ID exists in BioEMG, the two patient records are synced. Patient ID can also be used if a proprietary ID system is used at your location.
- **Upper Arch Scan File:** Import a 3D Digital Impression (.stl) file associated with the Patient's upper arch. Clicking **Browse** opens a dialog where the file is loaded into the Patient Record. See [Creating a Digital Impression Overlay](#).
- **Lower Arch Scan File:** Import a 3D Digital Impression (.stl) file associated with the Patient's lower arch. Clicking **Browse** opens a dialog where the file is loaded into the Patient Record. See [Creating a Digital Impression Overlay](#).

- **Upper & Lower Tooth Charts - Patient Default Tabs:** Detailed Patient tooth and Arch settings.



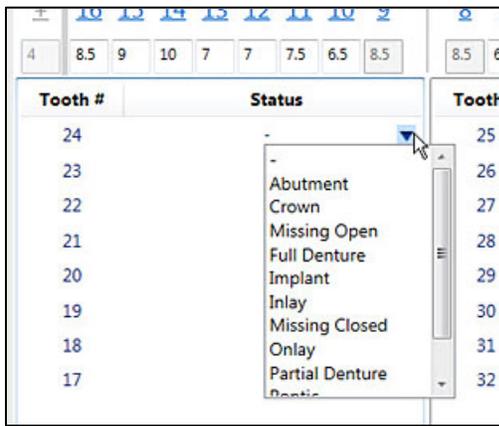
- **Central Incisor Width:** The Arch Model tooth proportions are based on the rule of golden proportions in reference to the Central Incisor width. Increasing or decreasing the "Central Incisor width" field changes these proportions. The software default width is 8.5 mm, which addresses most people. Use the following procedure to adjust this width.

Measure the patient's incisor width, and enter the value into the "Central Incisor Width" field. Tooth widths update. The Arch model uses the new widths on any subsequent scans.

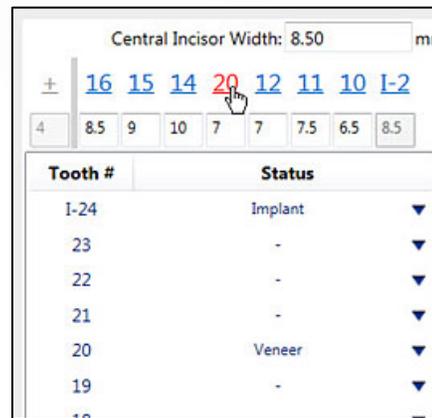
If you change the Central Incisor Width or tooth widths of a patient, all future scans from this patient update with the new widths. You will not see the change take effect on any open scans. Close, then reopen the scan to see the changes.

If you wish to document changes to the dentition for a scan, with the scan open, make the tooth chart visible (**Window > Tooth Chart**), make the change, and save the scan. You are prompted to make the changes for this scan only, or permanently for all this patient's scans.

- **Tooth Number and Position:** Click and drag tooth numbers left or right to adjust tooth positions. Tooth widths can be directly entered beneath each tooth number.
- **Tooth Number & Status:** Indicate each tooth's status using the drop-down selection list. Alternately, click the tooth number repeatedly to cycle through the list.



Selecting Status from drop-down list

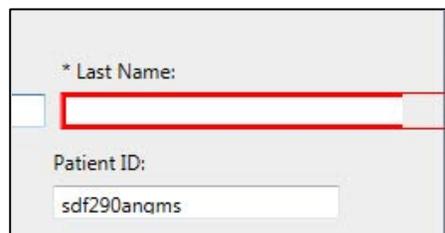


Selecting Status clicking tooth number

- **Create Button:** Available only when creating a new patient. Simultaneously closes the "Patient Record" window and adds the new Patient Record to the database. If a mandatory field (*) is missing or invalid, a red square surrounds it, to alert you. A warning also opens. Press **OK**, and fill out the required information. Press **Create** again.



Create button



Last Name missing

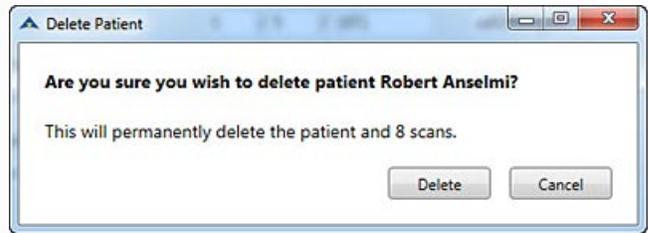


Alert

- **Cancel Button:** Closes the "Patient Record" window without making changes.
- **Delete Patient Button:** Available only when editing an existing patient record. Deletes the Patient, Arch model, and all related scans. Since this is permanent, answering a prompt is required before deletion.



Delete Patient button



Prompt

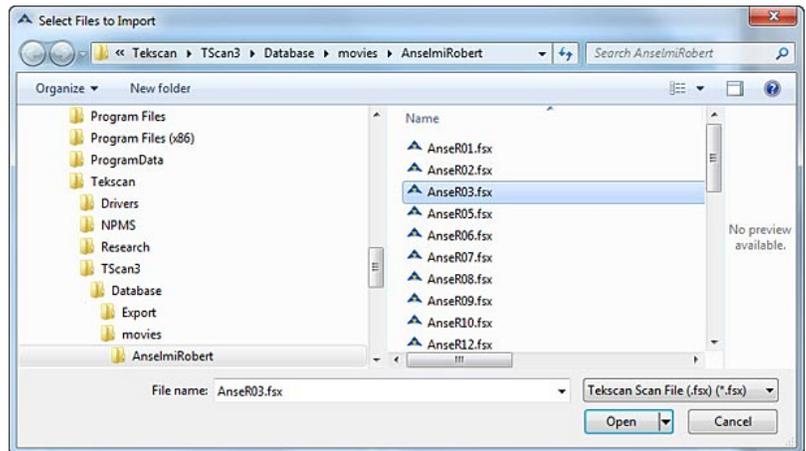
If you confirm this warning, you will see a deletion progress bar. You can press **Cancel** any time to cancel the operation and keep the patient and all associated files. Once completed, however, deletion is permanent.



Menu Options

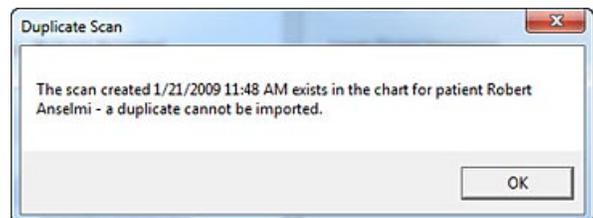
There are two menu options in the "Patient List" window:

- **File Menu**
 - **Import Scans:** Open a scan or multiple scans directly from your computer, importing them into the current patient's record. You can only import scans after a new patient record has been saved or if you open a currently existing patient record. Use **Shift** or **Ctrl** to open multiple scans. Click the first scan, hold **Shift**, and then click the last scan. This selects all scans in between (contiguous selection), or click the first scan, hold **Ctrl** and click any additional scans (non-contiguous selection) Once selected, click **Open**. All scans open.

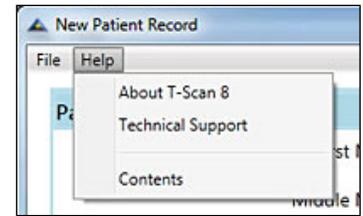


Scans can only be affiliated with a single patient. Trying to import a scan that already exists in the database triggers a duplication prompt.

- **Save:** Saves the current patient record in the database.



- **Help Menu:** See [Help Menu](#)

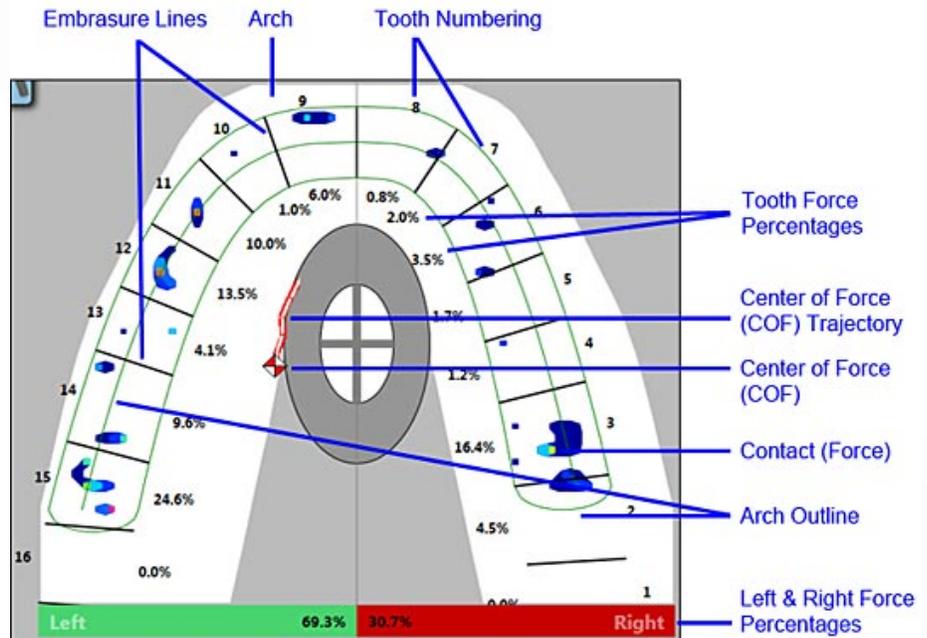


Arch, Arch Outline & Embrasure Lines

The **Arch Model** superimposes a model of the arch and **Arch Outline** (in green) on the tooth contact data in the 2D ForceView. The Arch Model uses a best-fit algorithm of the distribution of forces in combination with the proportionality of human teeth to establish the tooth interface approximations across the arch. The Arch Model and Outline are saved with a scan.

Embrasure Lines

The embrasure lines are the black lines that define tooth edge locations and follow the Arch Model set up in the [Patient Record](#). Percentage of force for each tooth is the aggregate value of all sensels within the tooth's area, defined by the embrasure lines. Moving embrasure lines likely changes neighboring tooth force percentages.



ADDITIONAL SOFTWARE FUNCTIONALITY

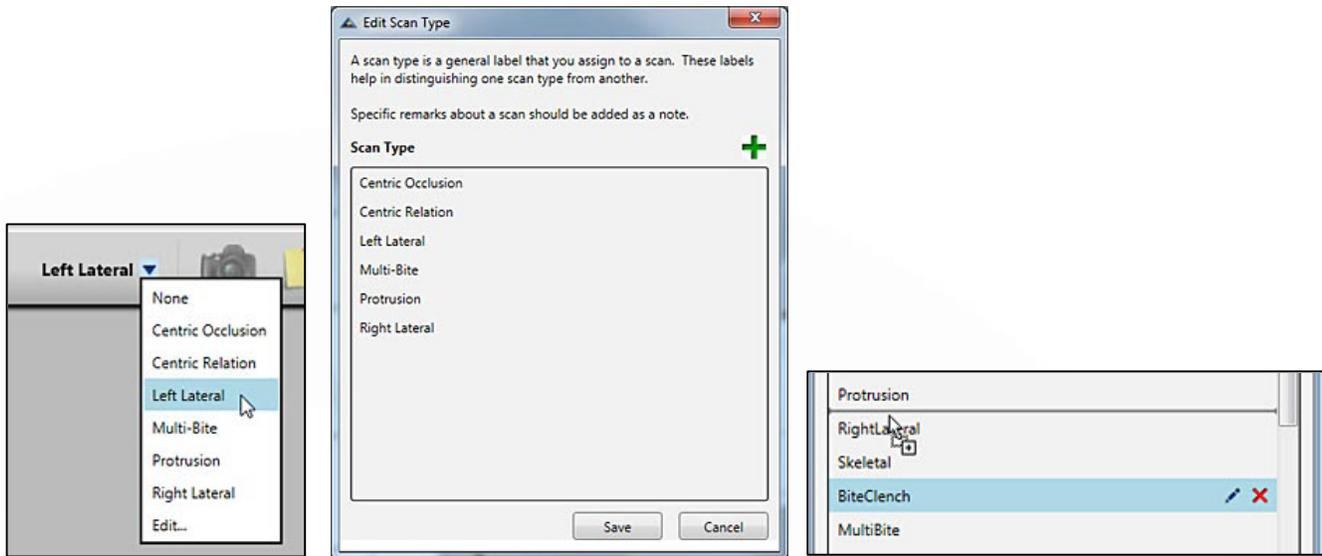
Additional software information useful when working with scans.

Scan Types

Categorize your scans by the movement used when recording the scan. Click the drop-down list from the Toolbar to select a movement. Select **Edit** to add custom procedures. The "Scan Types" dialog opens. Click plus (+) to add entries, or minus (-) to delete entries. Click **Save** to accept changes and exit.

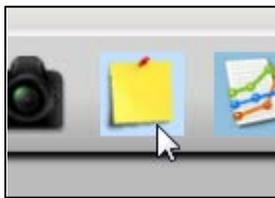
If you wish to reorder Scan Types within the list, click and drag the scan type to the new location above or below the other scan types (see below left).

Note: The software automatically deletes and auto-types multi-bite Scans.

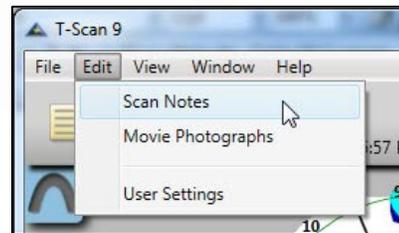


Including Notes with a Scan

1. Open the scan. Click the "Add Notes" Toolbar icon, or **Edit > Scan Notes**.

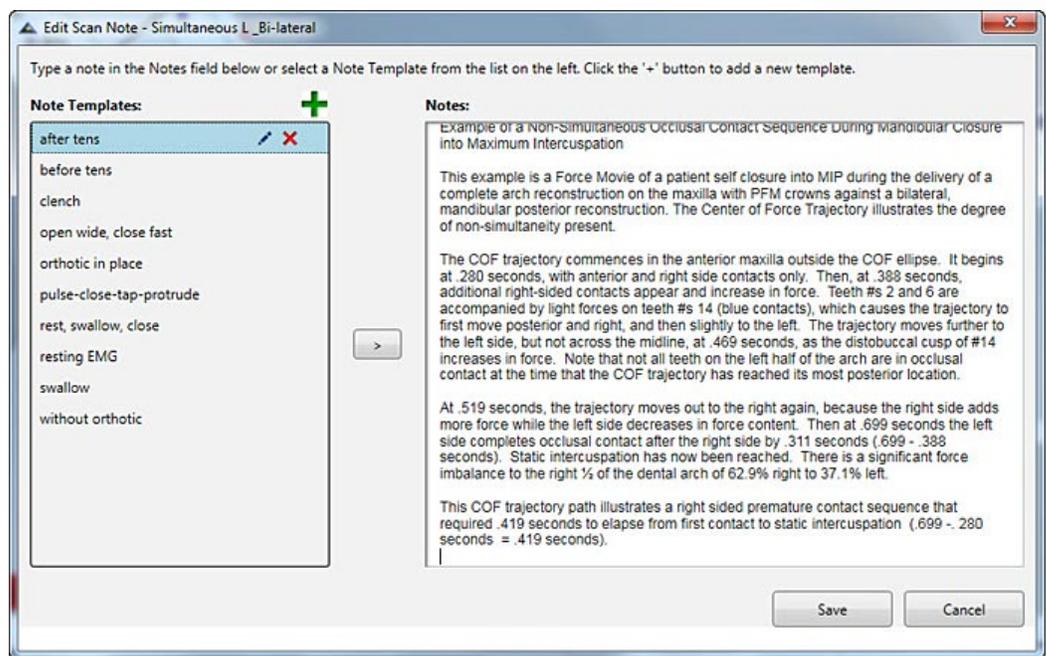


Add Notes icon



Edit > Scan Notes

2. The "scan Notes" dialog opens, where the cursor is automatically placed in the "Notes" field. Type your notes. Several stock "Note Templates" are available at left. Double-click to add their Template text. Alternately, select the Template and click **Insert (>)**.



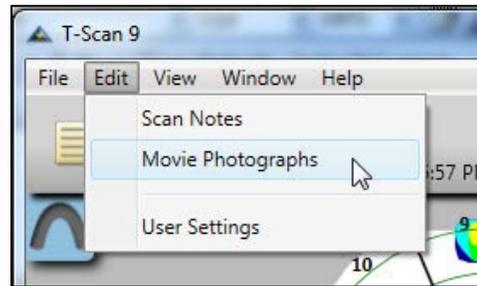
- To add a new template, press plus (+) and type in your entry. Once created, when you select it, two icons are displayed to the right. The "Pencil" and red "x" icons to edit and delete the Note Template, respectively. Click **Save** to save the notes, and **Cancel** to exit without making changes.

Attaching an Image to a Scan

- Open the scan. Click the "Attach Image" Toolbar icon, or **Edit > Movie Photographs**.

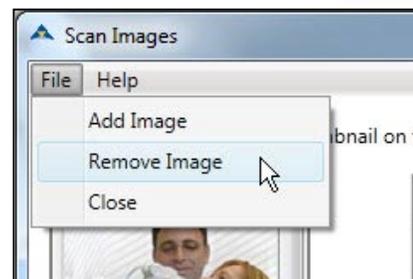
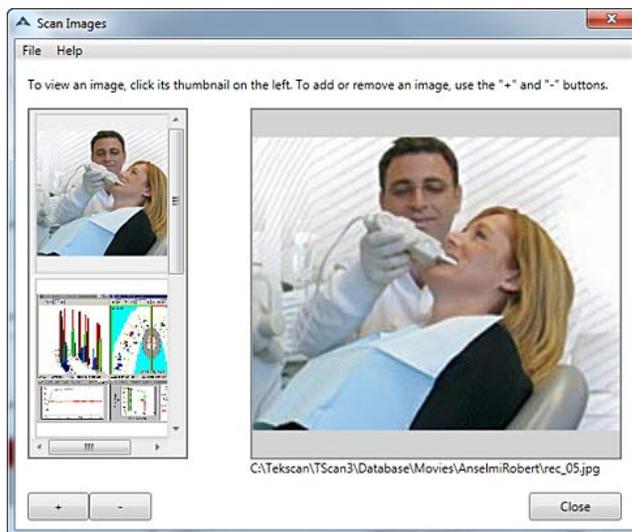


Attach Image Icon



Edit > Movie Photographs

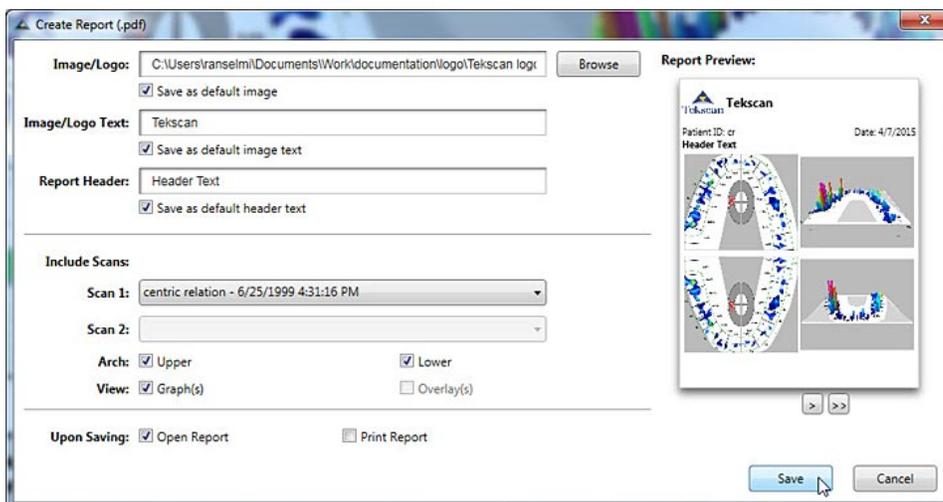
- The "Scan Images" dialog opens. The image thumbnails are left and preview right. Press plus (+) to select an image to add to the list. Select an image, and Press minus (-) to remove it from the list. Alternately, **Add** or **Remove** an image from the "File" menu, or **Close** the window.



Creating a Report

Export the contents of one or two scans (for comparison), including comments and graphs, to an Adobe Acrobat (.pdf) file or to your printer.

Go to **File > Create Report**. The "Create Report" dialog opens. Specify how you want your report to look and where it should be sent.



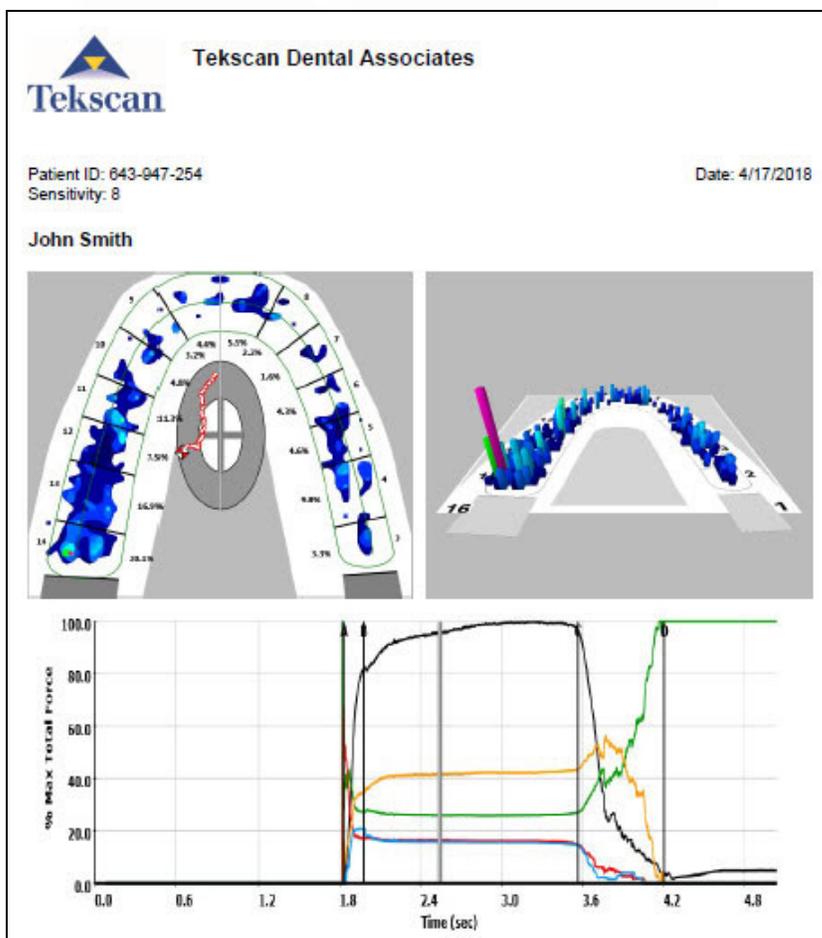
You can place a company logo, logo text, and header at the top of the report. These can be retained as the default for future reports.

With multiple scans open, use the drop-down to select which scans to include in the report. You can include up to two scans in one report. This can be useful if you are evaluating "before" and "after" treatment scans, for example. Options include exporting the 2D or 3D ForceViews, and Force vs. Time graph, for either or both arches, in either classic or overlay mode.

Note: With two scans, you can only display their Upper or Lower Arches, not both.

On the right side of the "Create Report" dialog, you can drag-and-drop the 2D ForceView, 3D ForceView, Graph, and Notes from one area of the report to another, to adjust where they are placed.

You can Open the report, Print it, or do both. Either way, clicking **Save** always stores it as a file on your computer in the location you specify.

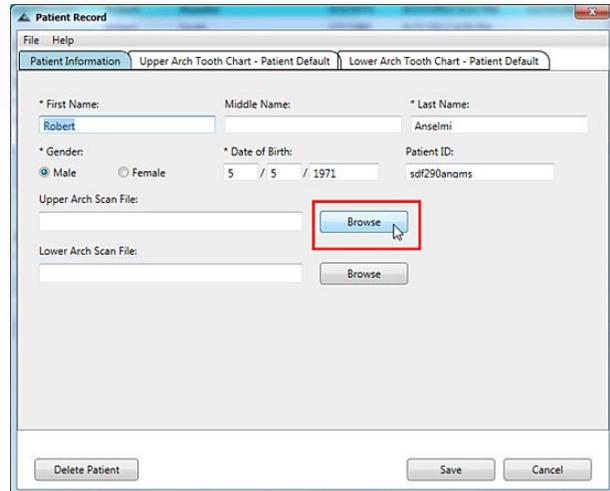
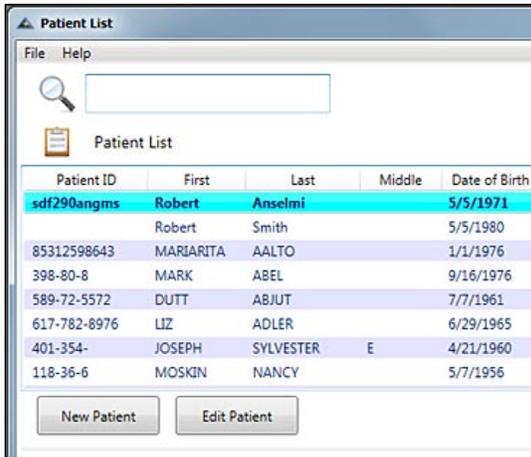


Creating a Digital Impression Overlay

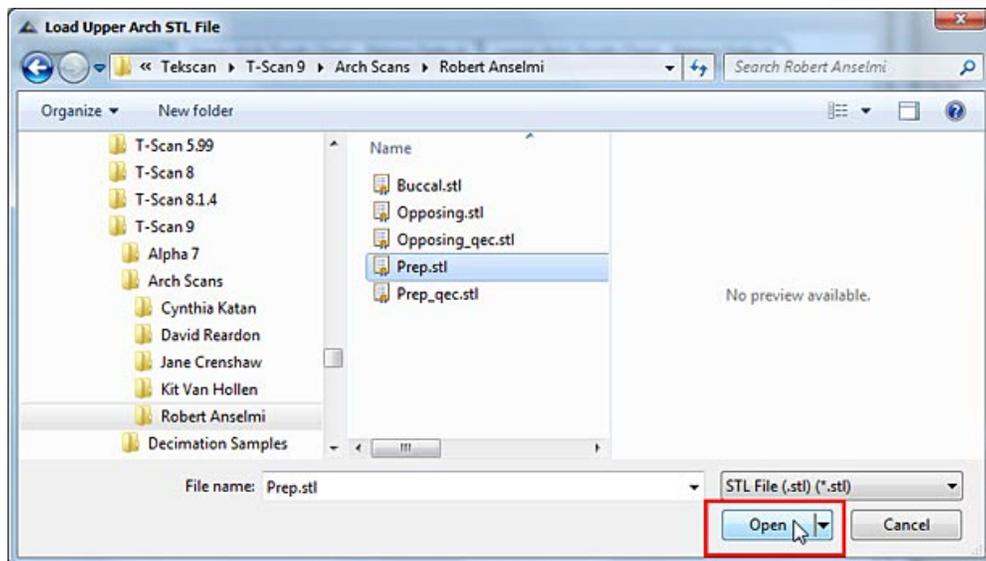
Importing and Simplifying the .stl Files

Import Upper and Lower Arch scan (.stl) files into the Patient Record.

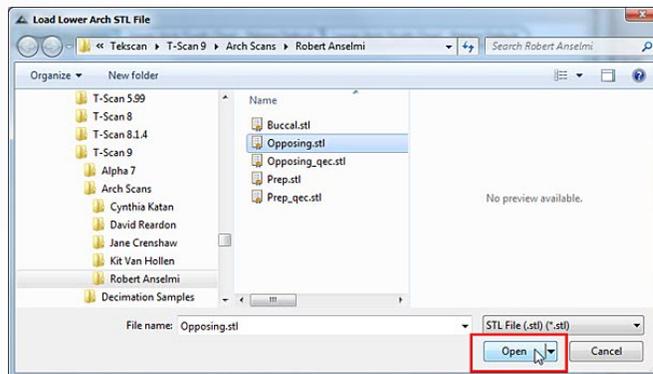
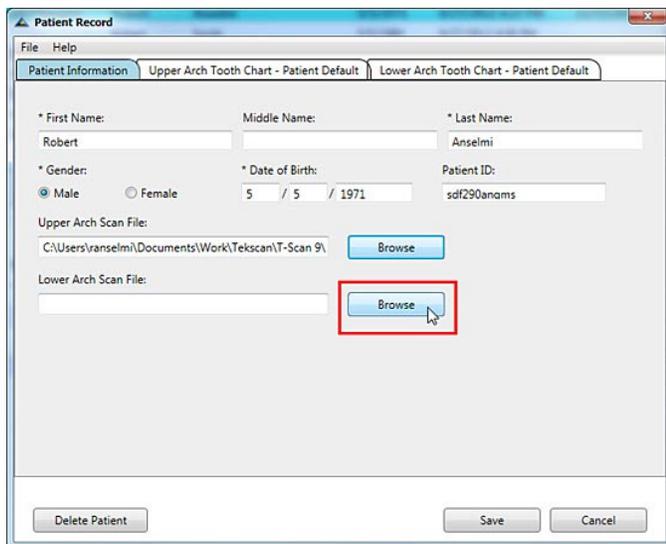
1. Select a patient from the "Patient List" and click **Edit Patient**. Click **Browse** for the Upper Arch scan File.



2. Locate the Upper Arch scan (.stl) file, and click **Open**.

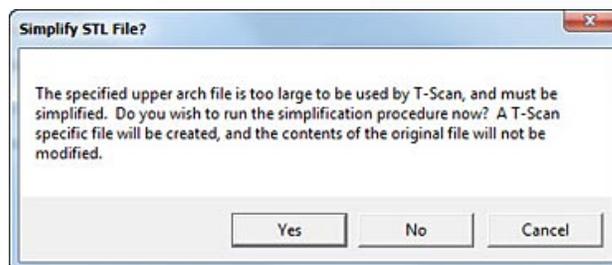
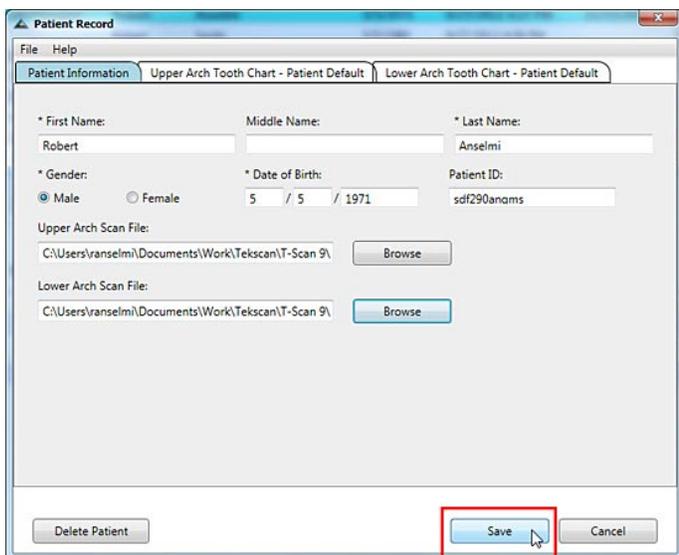


3. Repeat for the Lower Arch scan File.



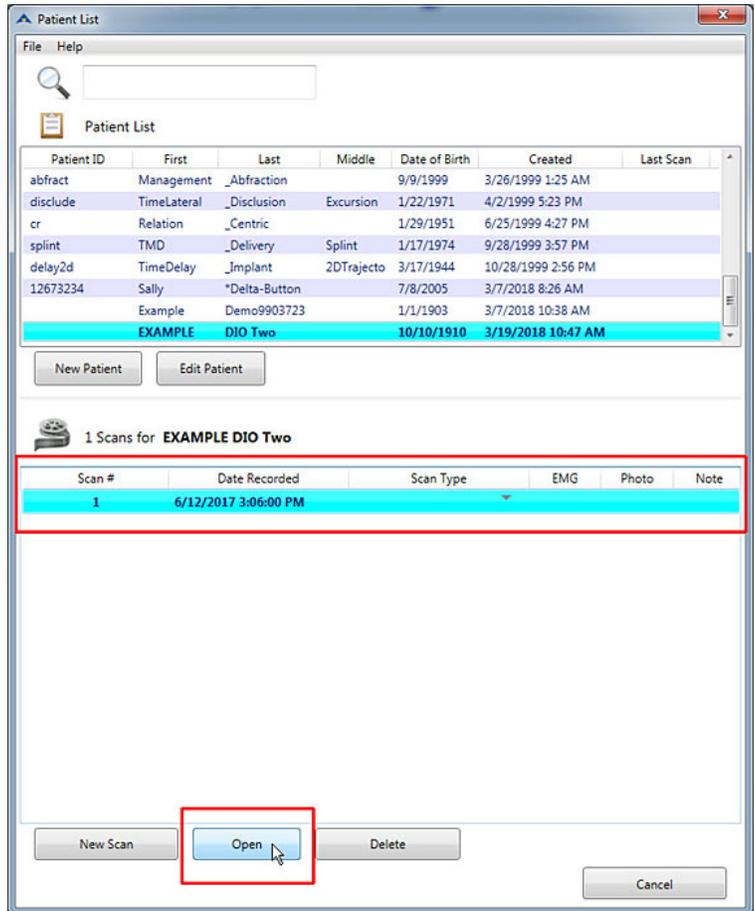
4. Click **Save**. The "Simplify STL File" dialog opens. Due to the high resolution of **.stl** files, T-Scan requires they be reduced into a smaller size. This reduction in size does not alter the **.stl** file. It creates a new **.ttl** file for each arch. Click **Yes**.

Be patient, as this process can take time. A yellow progress bar advances. After the first arch is complete, the software asks to process the other arch. Click **Yes**.

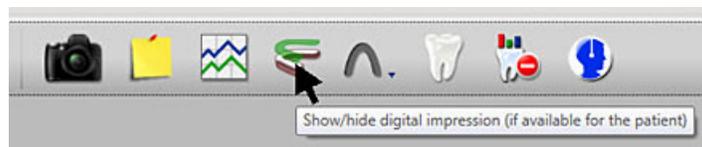
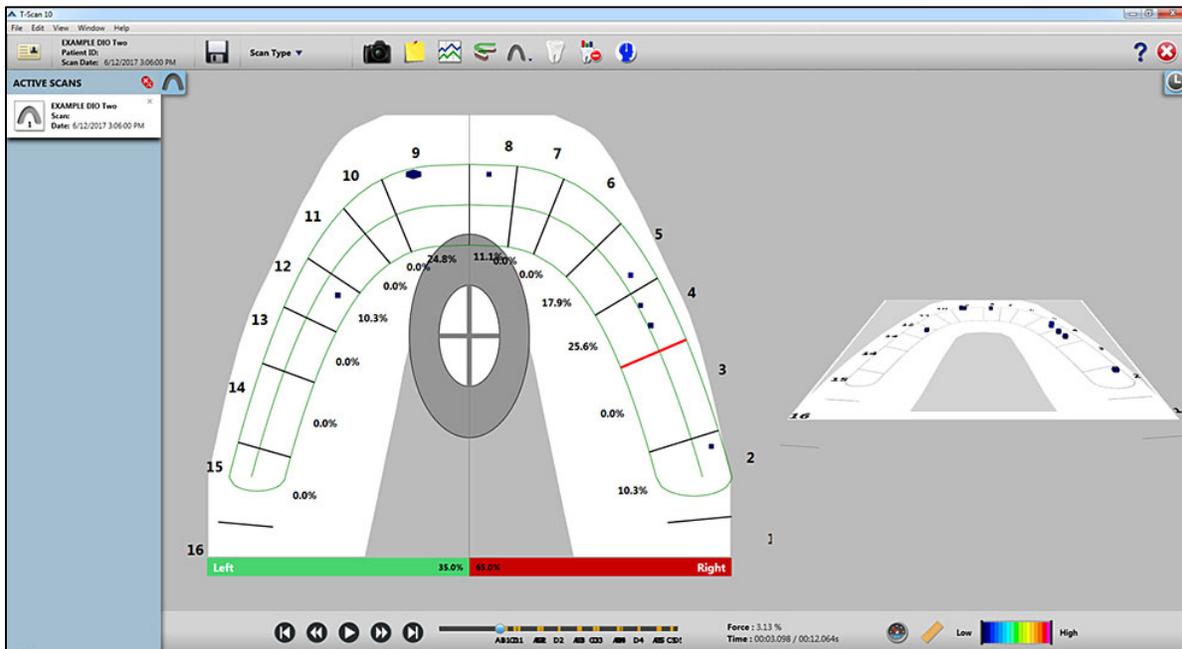


Aligning the Digital Impression Overlay

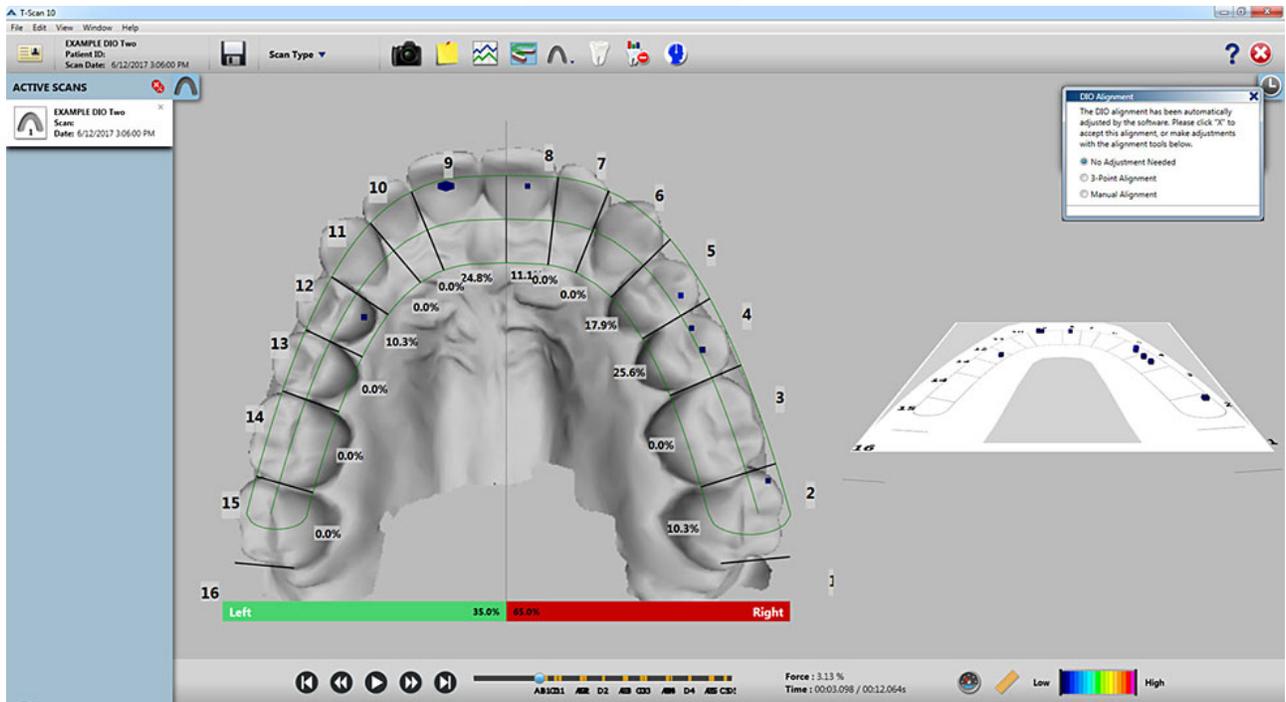
1. Once the files are simplified, select the Patient's scan to which the Digital Impression Overlay will be applied, and then click **Open**.



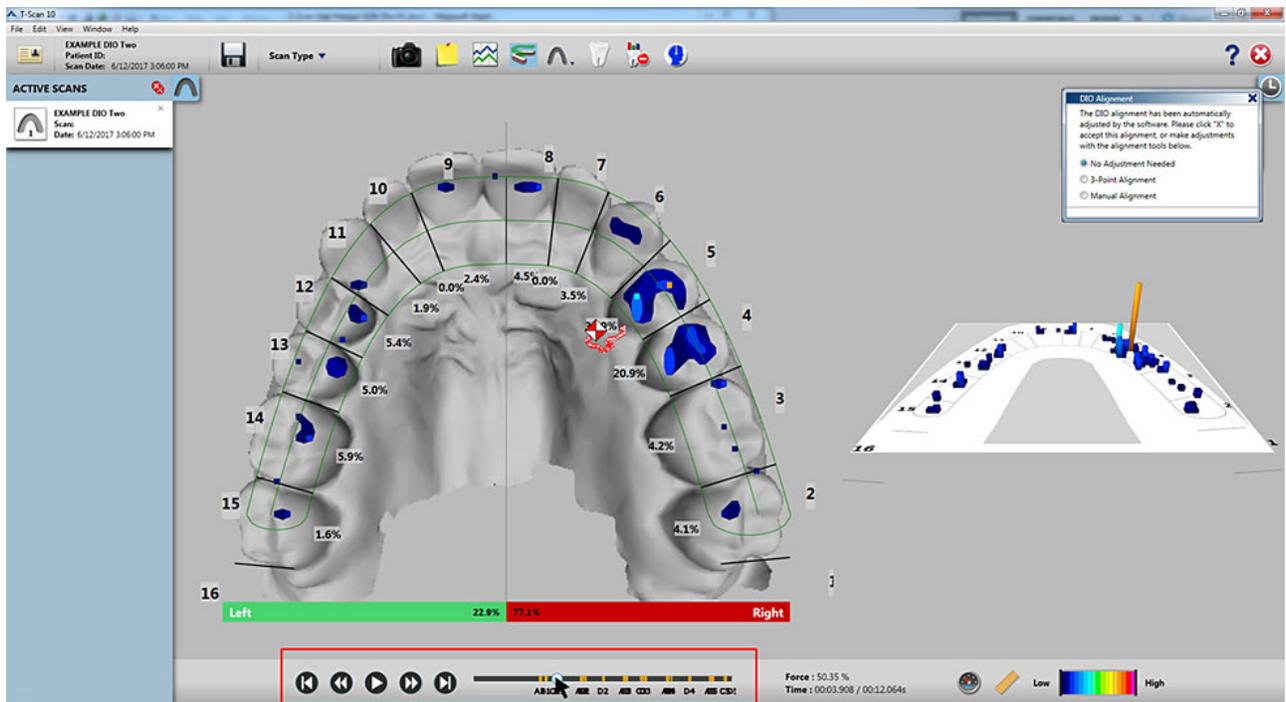
2. The scan opens. Click **Show/hide digital impression**.



3. The Digital Impression is loaded into the Arch with the force data overlaid on top.

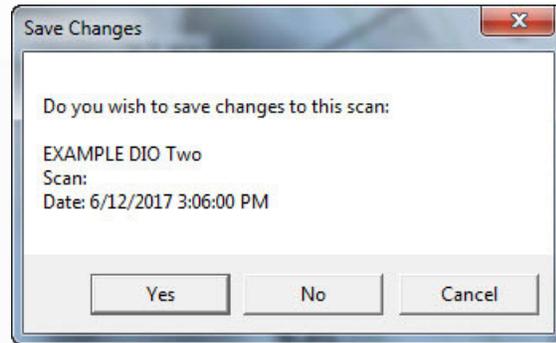
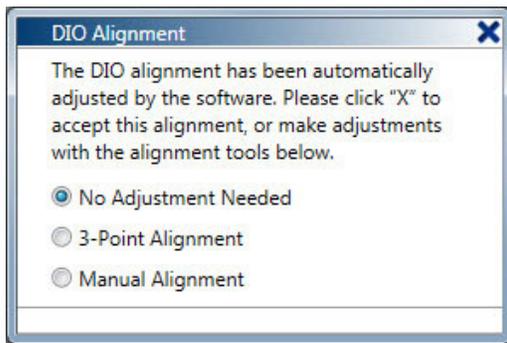


4. Play or scan through the movie using the navigation slider, to see how the T-Scan Force Data correlates to the imported DIO.



- a. If you are happy with the correlation of the T-Scan force data and DIO, press the upper left **X** icon in the "Alignment" dialog. You are prompted to "Save Changes." Click **Yes**. This means you are accepting that the initial DIO alignment is correct. The alignment is saved along with the T-Scan **.fsx** file.

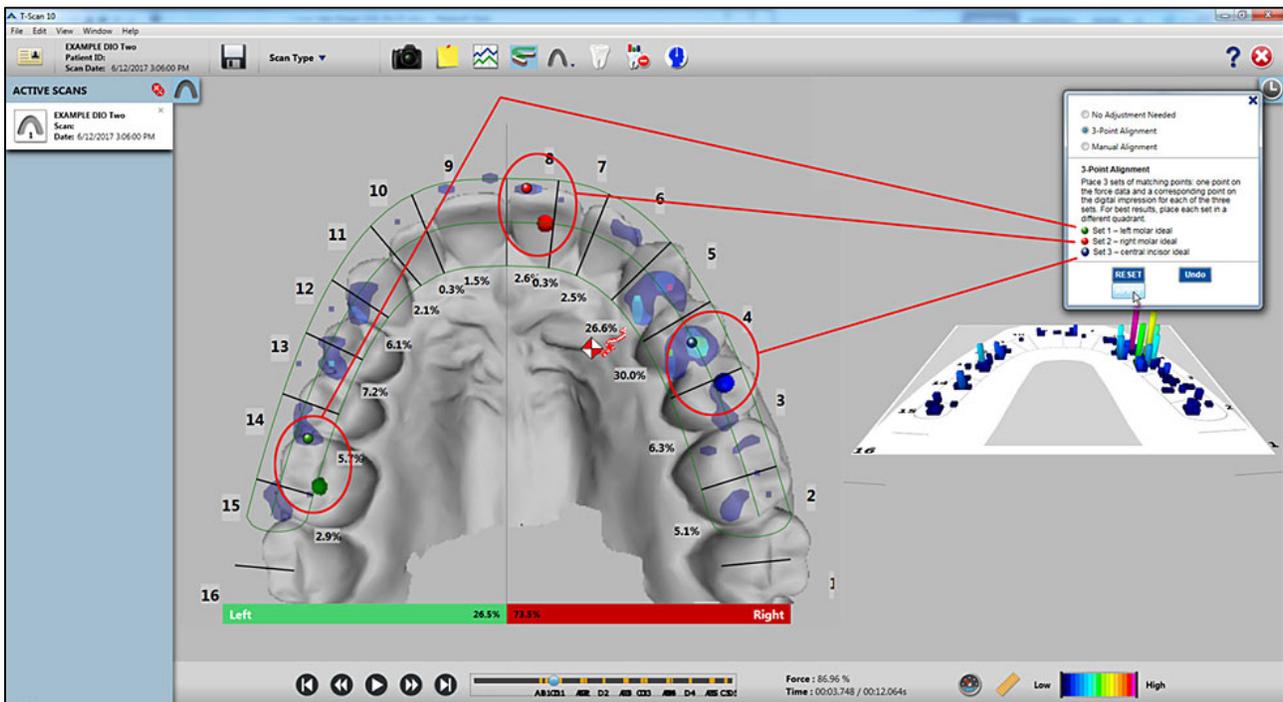
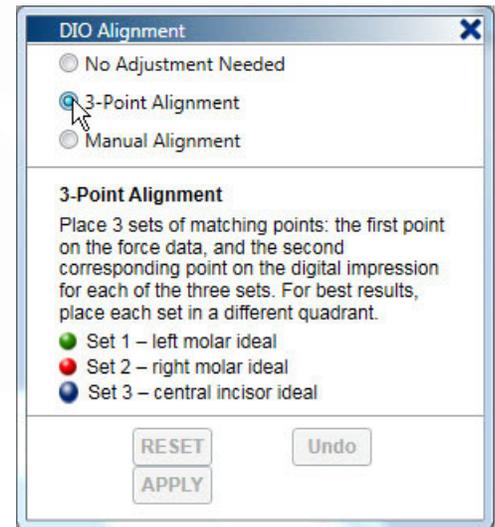
Clicking **No** would revert to the previous DIO position. Clicking **Cancel** returns to the “Alignment” dialog with no changes.



b. If you are not happy with the initial DIO alignment, adjust with either **3-Point Alignment** or **Manual Alignment**.

i. **3-Point Alignment** lets you place three sets of two points to match the T-Scan force data with the DIO.

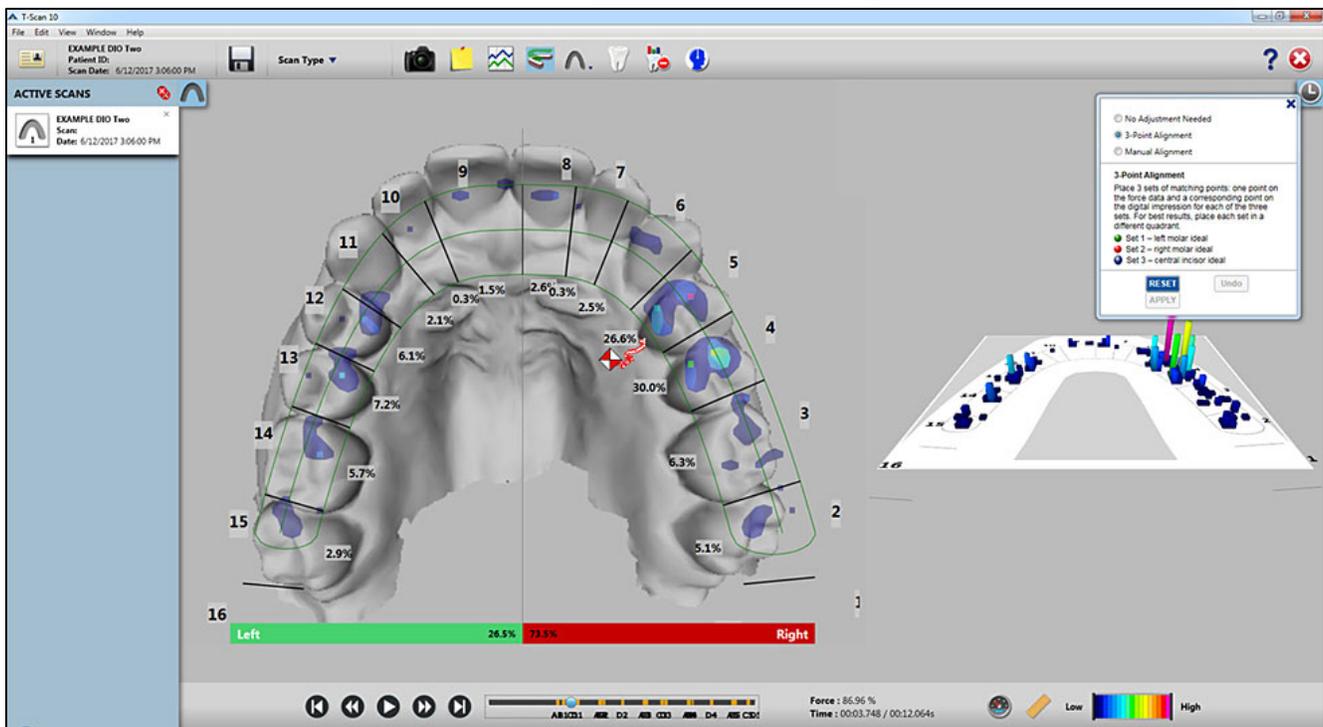
Place the three sets of data points in a triangular pattern.



Click **Undo** at any time to remove the previously placed points one at a time, in backward order, or click **Reset** to remove all points and start over.

When all points are in place, click **Apply** to have the alignment calculated. The DIO will shift into its new location, based on the three sets of data points. Note that alignment relies heavily on having good data in the Force data and the DIO, as well as being dependent on the user's best judgment for correlating these two sets of data. If you do not agree with the new alignment, Click **Reset** to revert the DIO to its previous position and start over.

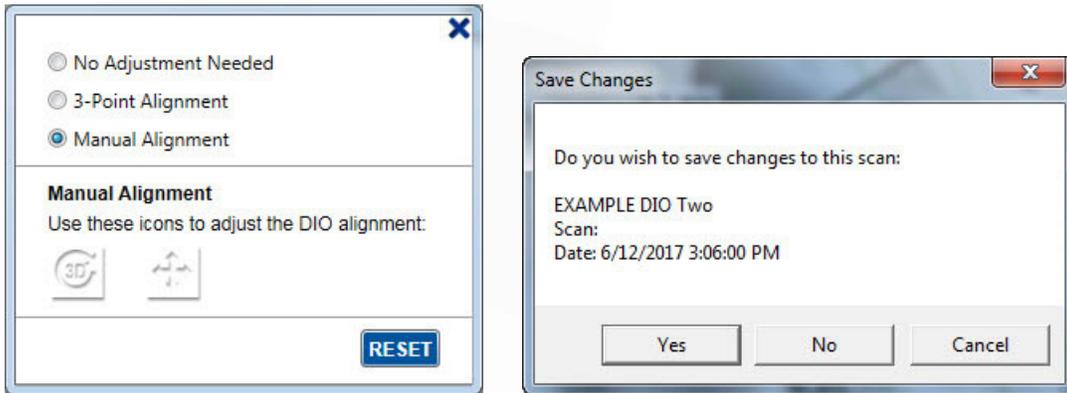
Note: If you have completed the Alignment, and wish to fine tune it, you can click on Manual Alignment (outlined below), or you can perform a new 3-Point Alignment. To perform a new 3-Point Alignment, click on either No Adjustment Needed or Manual Alignment, and then select the 3-Point Alignment again. Perform the 3-Point Alignment, as outlined above.



- ii. **Manual Alignment** allows you to align the DIO in two ways: 3-dimensional rotation to orient the occlusal plane (), and 2-dimensional shifting along the X- and Y-axes, to align force data to topology ().

Once you are happy with the DIO location, click the **X** icon in the “Alignment” dialog. You are prompted to “Save Changes.” Click **Yes**. This means you are accepting that the Digital Impression Overlay placement is correct. The placement is saved along with the T-Scan **.fsx** file.

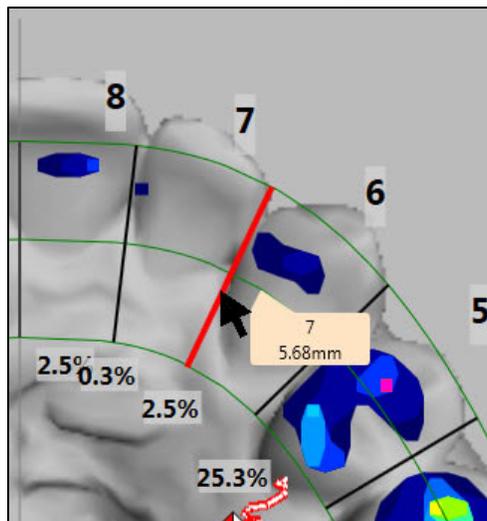
Clicking **No** would revert to the previous DIO position. Clicking **Cancel** returns to the “Alignment” dialog with no changes. Use **Reset** at any time in the “Alignment” dialog to revert to the previous DIO position.



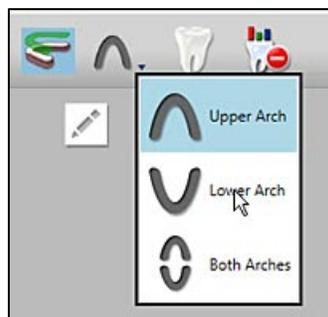
- c. Once the Alignment is saved into the .fsx file, a **3D Edit** icon (pencil) appears to the top right of the 2D ForceView. Use this icon to access the “Alignment” dialog at any time.

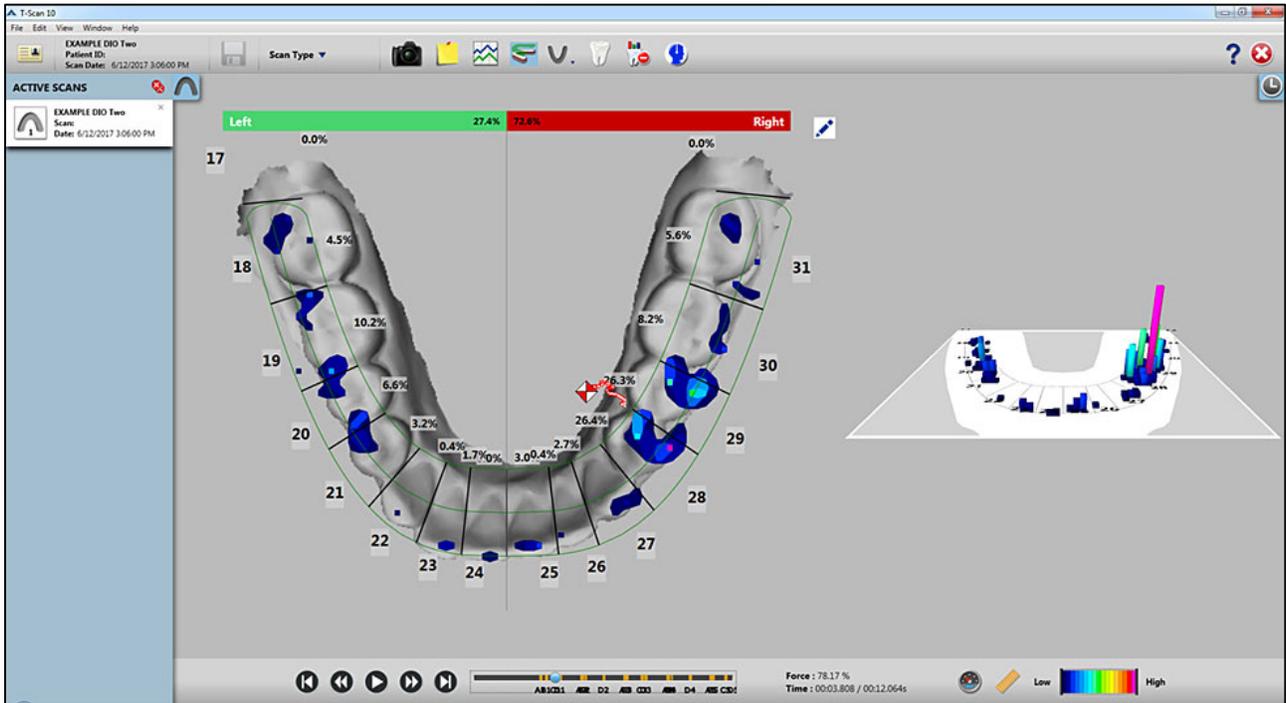


- 5. (Optional) Adjust embrasure lines to fall between teeth, as needed.

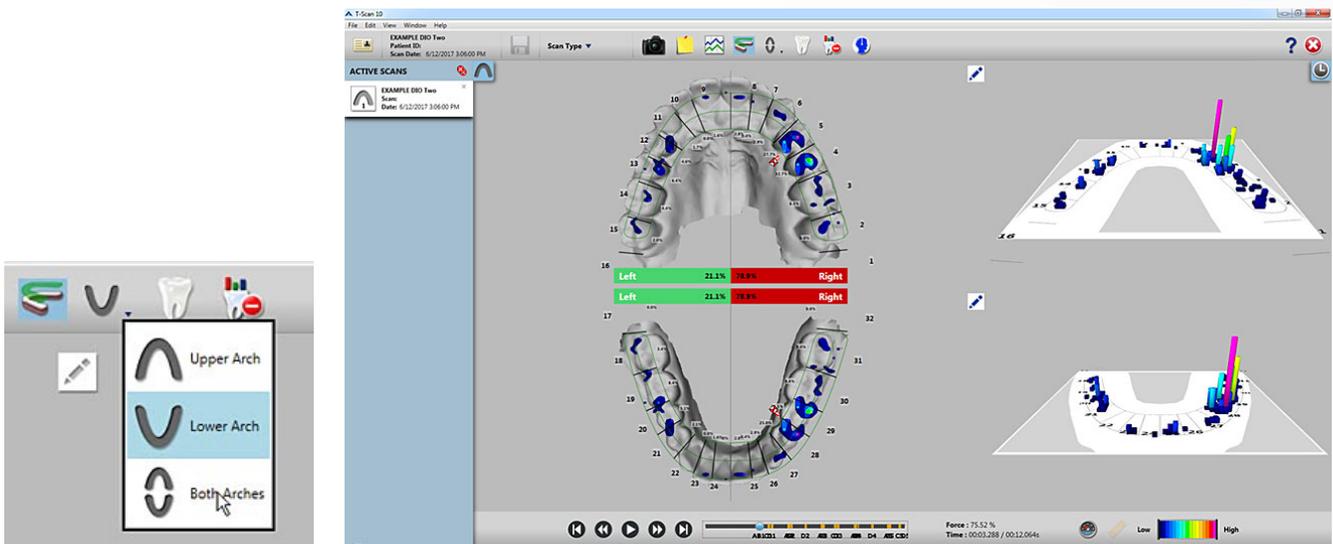


- 6. Repeat the same process of DIO alignment and Embrasure line adjustment for the Lower Arch.

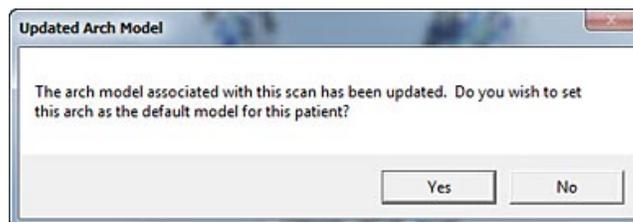




7. Select **Both Arches** from the submenu and verify they are both aligned.



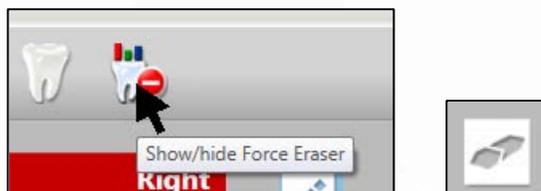
8. Click the **Save Scan** icon. If you adjust any embrasure lines, the arch model for the patient is saved and a message prompt appears. After selecting **Yes** or **No** your scan is saved with the Digital Impression Overlay.



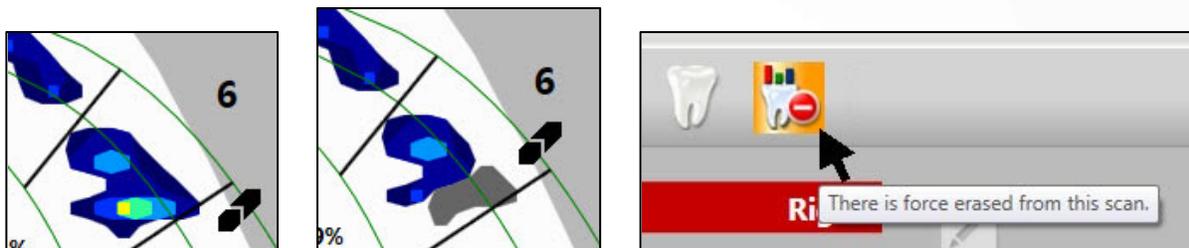
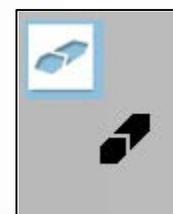
Force Eraser

Eliminates artifacts created by Class II occlusions, and other dentitions that cause excessive crinkling of the sensor (for example, overjet, underjet, and missing teeth). The Force Eraser can selectively discard data areas that might throw off the overall force percentages and COF from their real values. You should apply your clinical understanding of the patient's occlusion to guide you through any force erasing you perform.

1. Click the **Show / hide Force Eraser** Toolbar icon.

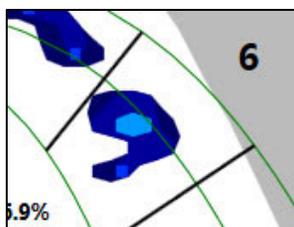


2. Click **Erase forces**. The software is in "Force Erase" mode. The cursor changes to an eraser.
3. Place the mouse over the artifact area in the 2D ForceView and click and hold the left mouse button. Move the mouse back and forth over the artifact area to remove it. Let go of the left mouse button. The 2D and 3D ForceView data is updated. The "Show / hide Force Eraser" Toolbar icon turns orange to indicate the scan is adjusted. Click **Erase forces** again to exit.

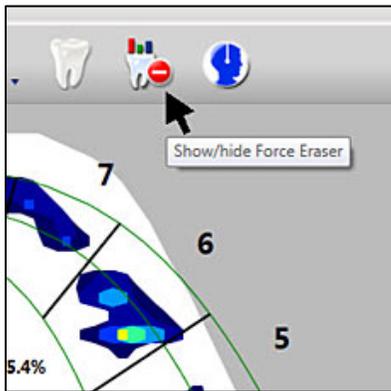


Note: Using the Force Eraser is non-destructive. When forces are removed, the data displayed changes, but is not deleted. Data that has been erased but not saved can be completely restored by clicking "Restore all forces" (Step 6). Data that has been erased in multiple prior sessions and saved can be restored by clicking the Force Eraser Icon to exit Force Eraser mode (Step 4).

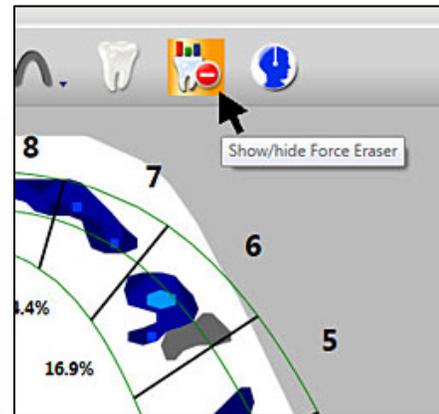
By default, the erased force is grey. Uncheck **Show Erased Forces** in the **Edit > User Settings > Advanced** tab to hide the erased force. Be careful turning off this setting, as there will be no visual display on the ForceView to indicate forces have been erased.



- (Optional) Click **Show / hide Force Eraser** to toggle between original and adjusted views. The icon's color toggles between orange (adjusted) and normal (original) scan.



Original Scan



Adjusted Scan

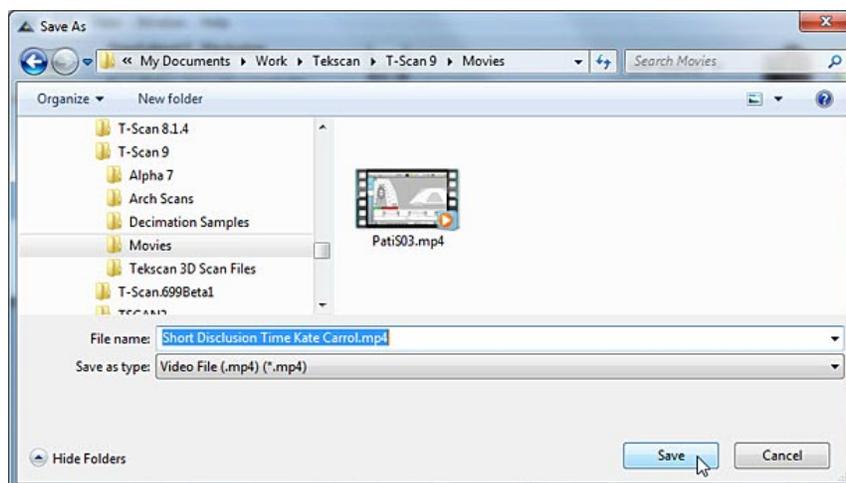
- (Optional) Click **Undo the last force erase step** to restore the most recently erased force. You can continue to click this icon to restore previous steps in reverse sequential order. 
- (Optional) To restore all original force data for this session, click **Restore all forces**. 

Note: Use caution. Once force data is restored, any force erase adjustments you made in the current session will be permanently discarded.

Converting a Scan to a Video

This saves any open scan as a compressed video (.mp4) file that can be played as a video in other video software, such as MS Media Player. This is useful for inclusion in an email attachment, or inclusion in an MS PowerPoint presentation.

- Open the scan. Place into 2D / 3D ForceView or Digital Impression Overlay mode.
- Go to **File > Save Video File**. Select a location to save the video.



- As the video is created, a progress bar indicates save progression. Click **Cancel** to halt the save process at any time.



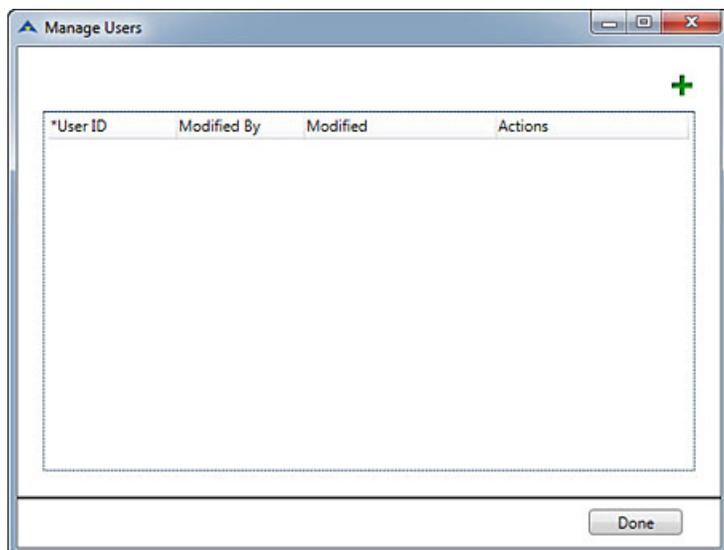
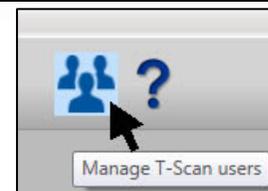
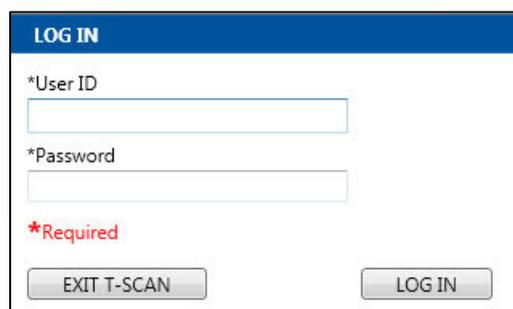
Privacy & User Settings

You can set up Privacy settings under the **Edit > User Settings > Privacy** tab. Select **Require login when opening the application**, and additionally **Require login to access the patient list**, if you wish. A prompt requesting login credentials will open each time the T-Scan is opened or a Patient list is opened, respectively.

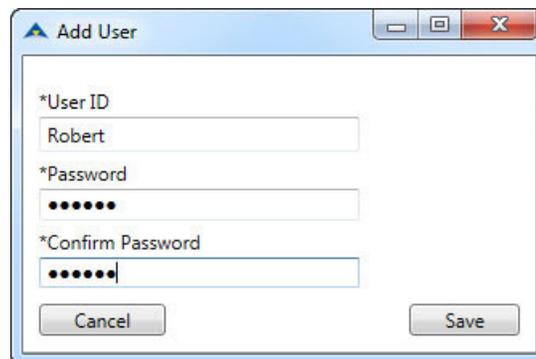
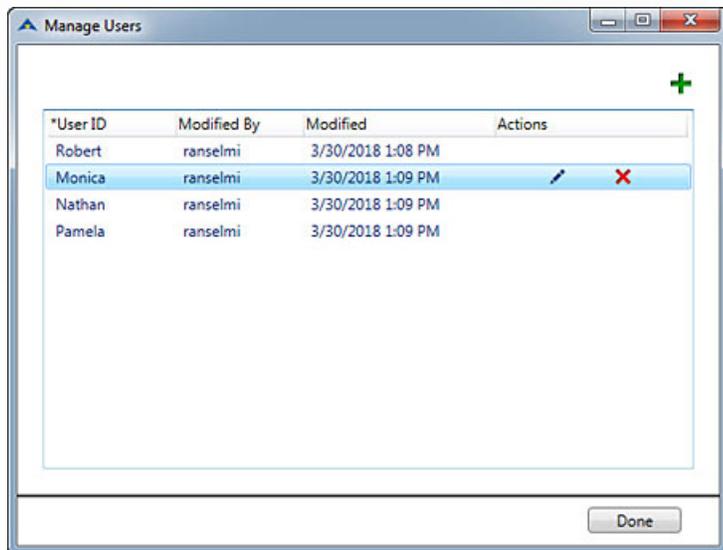


Assuming you have elected to **Require a login when opening the application**, The next time you open the T-Scan software, you are presented with a login prompt.

- Assuming you have administrator rights for the current computer / Domain, enter the Windows or Windows Domain **User ID** and **Password**. Then click **Log In**. The application opens.
- When logged in as the administrator, you can add / edit / delete users by clicking the **Manage T-Scan Users** icon at the top right corner.
- Then click the **+** (plus) icon.



4. Enter a **User ID / Password / Password Confirmation**, and click **Save**.
5. Repeat steps 2 & 3 to create additional users. Each user can now login to the T-Scan software using their credentials.



6. Click **Done** when finished adding users.

Keyboard Shortcuts

Keyboard shortcuts can be used in place of some Toolbar and Menu commands.

- **A / B / C / D:** Moves all views to the A / B / C / D line (most easily seen in the graph). Note: If multiple bites exist, each bite will contain its own numbered A / B / C / D lines. For example, A1, A2, A3, etc. Pressing A, then 2, takes you to the second bite's A line. Alternately, pressing A twice does the same.
- **Spacebar:** Play / Pause the scan.
- **Shift+Spacebar:** Play in a continuous loop. At the end of the scan, play continues from the beginning. Pressing the Spacebar stops play.
- **Left Arrow:** Moves back one frame.
- **Right Arrow:** Moves forward one frame.
- **Ctrl+F12:** Exits the T-Scan application.
- **Ctrl+S:** Saves the current scan.
- **Ctrl+Tab:** In the "Patient List" dialog, this toggles focus between "Search" field and "scan List." Use Up / Down arrows to scroll through patients or scans in the "Search" and "scan list" fields, respectively.
- **F1:** Opens the help file.

Novus Handpiece Functionality

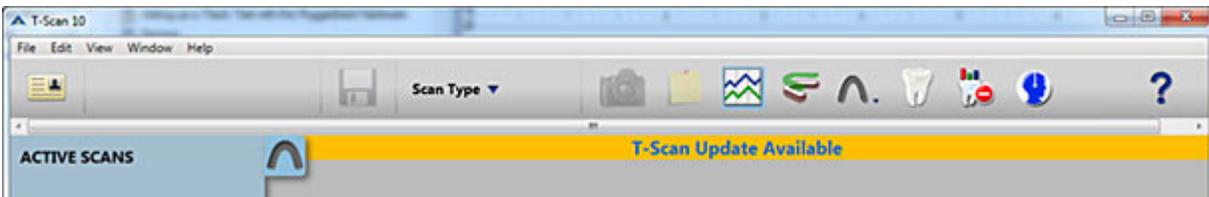
Mode	Button Press	Action
With Real-Time Window open	(+) Button	Raises Sensitivity
	(-) Button	Lowers Sensitivity
	(+) and (-) Button simultaneously	Start Sensitivity Wizard
	Record Button	Start recording
With Sensitivity Wizard open	(+) Button	Go forward a step
	(-) Button	Cancel Sensitivity Wizard
While Recording	Record Button	Stop recording
Navigating a completed Scan	(+) Button	Play Scan forward / Pause*
	(-) Button	Play backward one frame
	(+) and (-) Button simultaneously	Jump to A-line in Scan
	Record Button	Open a new Real-Time Window

* For the Novus Handpiece, you can customize the (+) button to your preferred way of working. Go into **Edit > User Settings > Advanced** tab. There, you can adjust the (+) button to either **Play forward** or **Advance one frame per click**.

Software Updates

This is an automatic notification system informing you when an update for T-Scan software is available, with scheduling options.

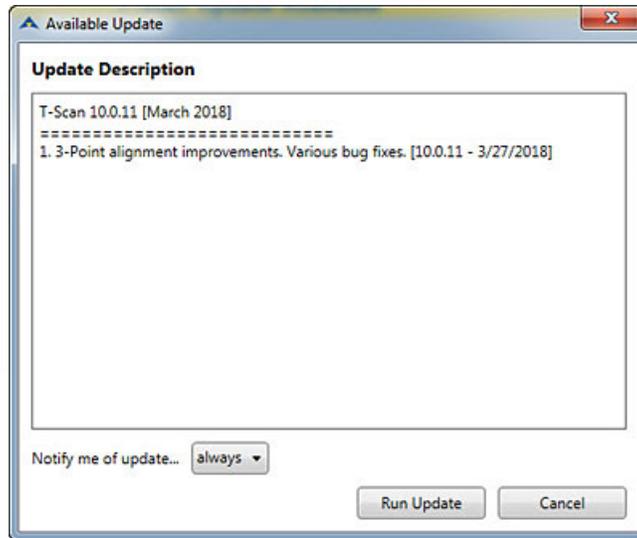
1. If an update is available, an update bar displays across the software window:



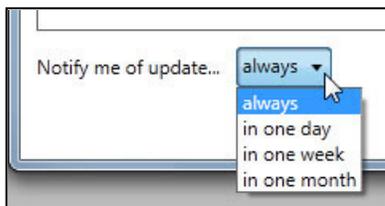
Click the bar

2. Software changes are listed in the "Available Update" dialog.

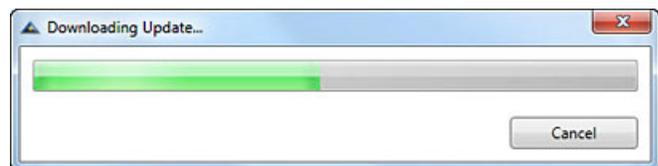
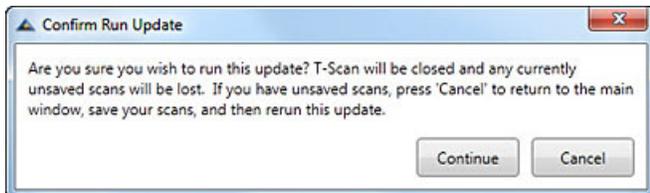




3. Click the "Notify me of update" drop-down list to schedule update notifications. Click **Save and Close** to save and close the dialog. Note: To run updates, you have to reopen this dialog.



4. To update software, click **Run Update**.
5. Click **Continue** to download the update, or **Cancel** halt the update.



6. Once completed, the software closes, and the Software update wizard opens. Run the wizard to install your software. When finished, click the T-Scan icon or go to **Start > Tekscan > T-Scan** to open the software.

TROUBLESHOOTING

If issues arise, visit <https://www.tekscan.com/support/faqs> for answers to common questions. [Contact Tekscan](#) for any other inquiries.

APPENDICES

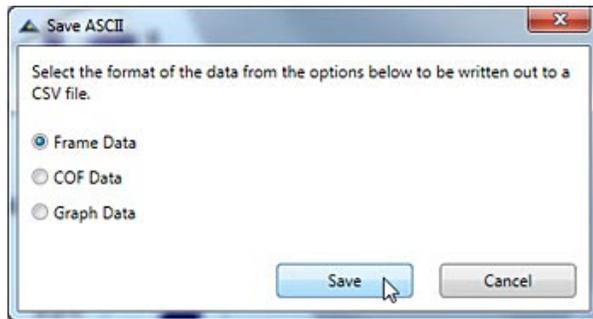
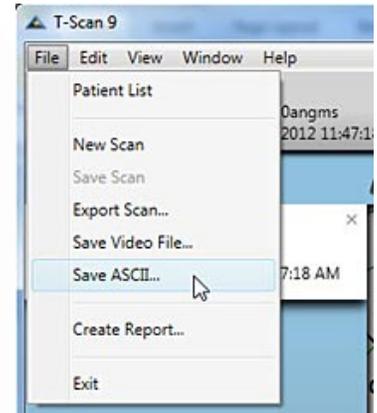
This section covers operation instructions for optional T-Scan system plug-in modules. Modules are available for an additional charge.

ASCII Output Module

Save ASCII outputs T-Scan data to ASCII format (scan frames, COF, and Graph data), for analysis in spreadsheet programs like MS Excel.

To create an ASCII file for an entire window:

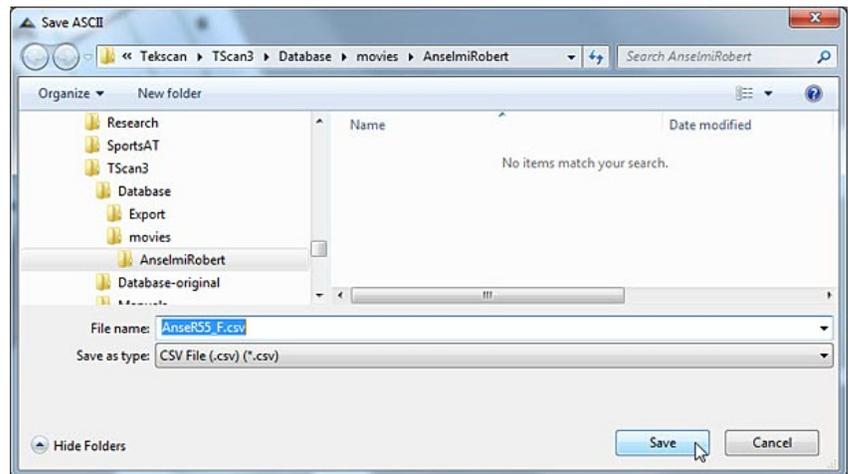
1. Open the scan. Go to **File > Save ASCII**.
2. Select the data type:



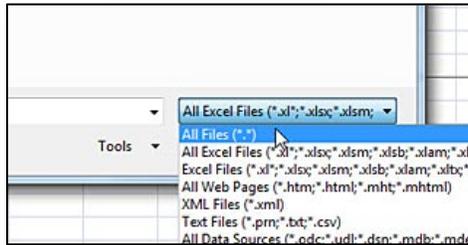
- **Frame Data:** Exports each frame of the scan, with sensel force values for each frame. The ASCII file is a force table in sensor row and column format.
- **COF Data:** Exports Center of Force data. Each frame contains Time, COF Row and Column position, and Raw Sum value. If no data exists in a frame, “(-1, -1)” is output.

- **Graph Data:** Exports Graph data. Each frame contains Time (X-axis), Percentage of Total Force, Relative Force (X-axis), and Relative Force (Y-axis).

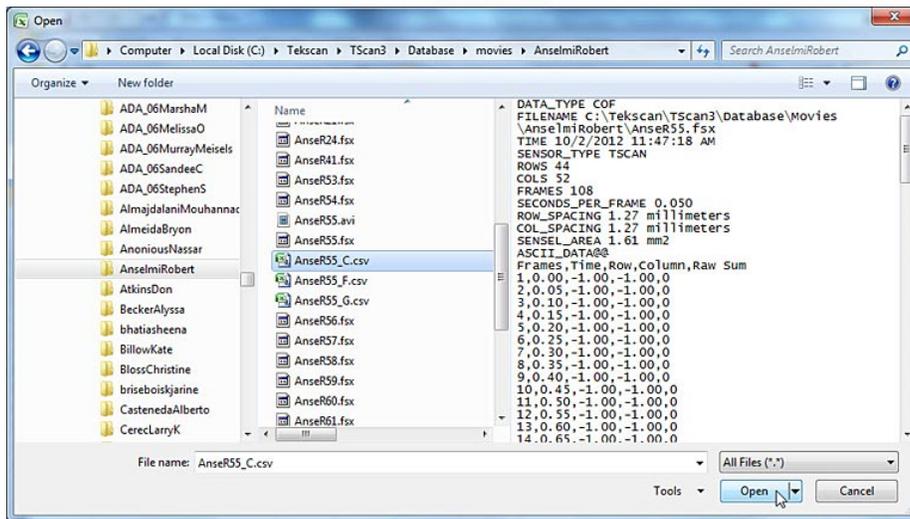
3. Click **Save**. Specify file name and location to save the file. By default, ASCII files are saved with the **.csv** extension. In the file name, Frame data contains the “**_F**” suffix, Center of Force data the “**_C**” suffix, and Graph data the “**_G**” suffix.



- Open MS Excel. Go to **File > Open** and open the saved file. When looking for the ASCII file, you must select **All Files (*.*)** in the “Files of Type” drop-down.



- Locate the **.csv** (ASCII) file and click **Open**.



When the ASCII file is opened, the header lists sensor and scan information, followed by the scan data.

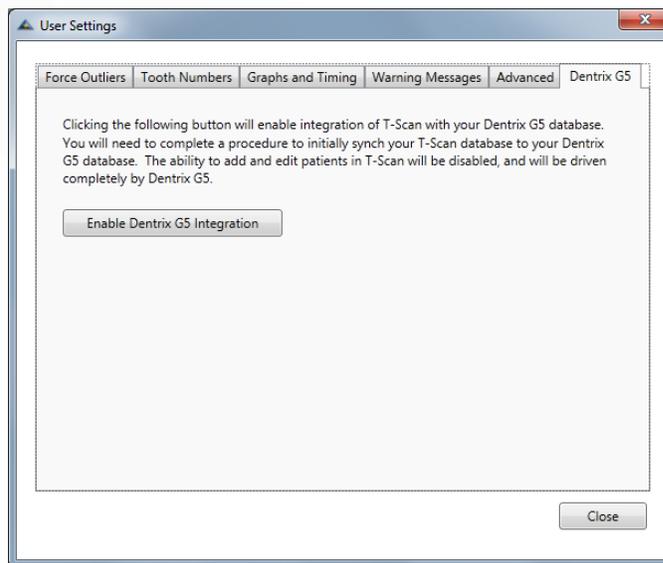
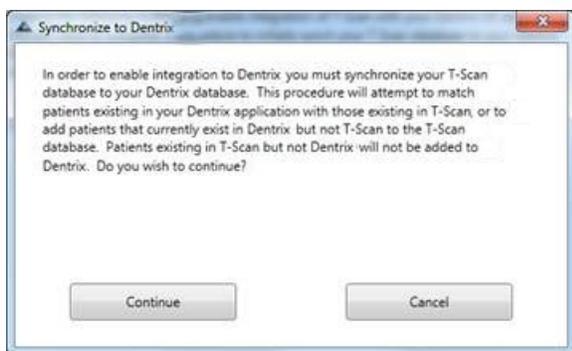
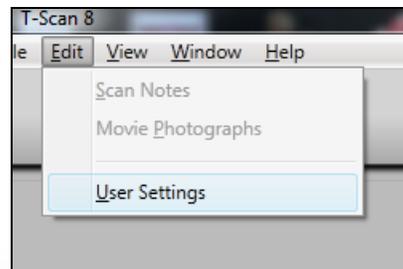
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	DATA_TYPE	MOVIE																				
2	FILENAME	C:\Tekscan\Tscan3\Database\Movies\AnselmiRobert\AnseR55.fsx																				
3	TIME	10/2/2012 11:47:18 AM																				
4	SENSOR_TYPE	TSCAN																				
5	ROWS	44																				
6	COLS	52																				
7	FRAMES	108																				
8	SECONDS_PER_FRAME	0.050																				
9	ROW_SPACING	1.27 millimeters																				
10	COL_SPACING	1.27 millimeters																				
11	SENSEL_AREA	1.61 mm2																				
12	ASCII_DATA@																					
13																						
14	Frame 1	0																				
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
34	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
35	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
36	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
37	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
38	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

ASCII frame data, showing the header and zero force data for the first frame.

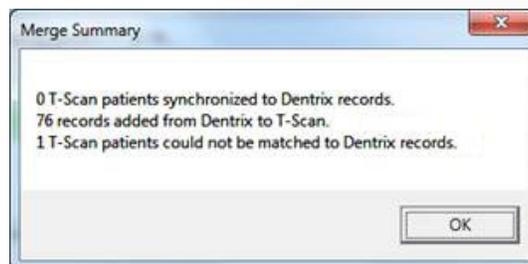
Dentrix Integration Module

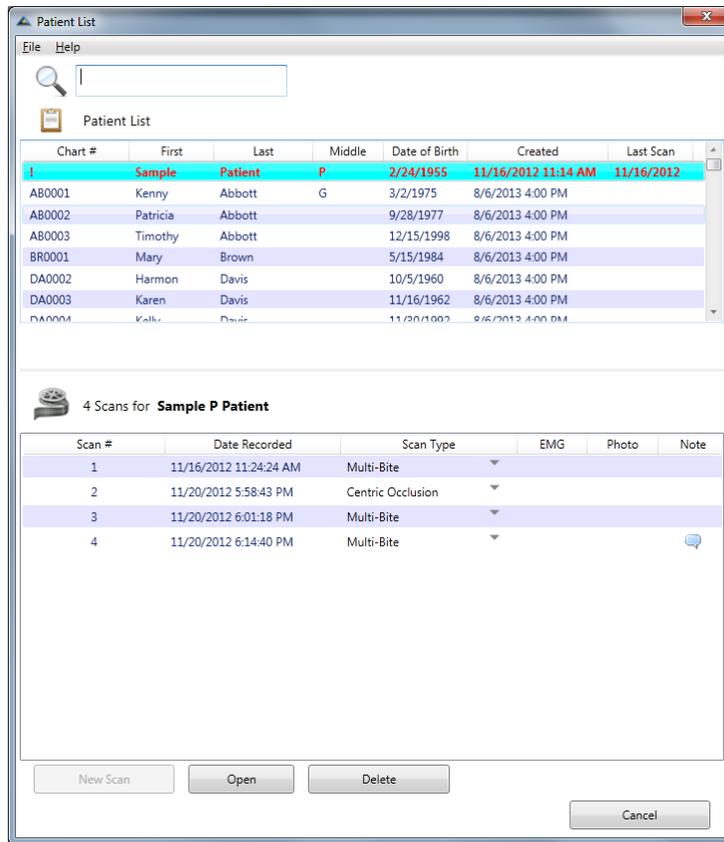
Integrates your T-Scan and Dentrix databases, synchronizing them together. Note: The Dentrix Practice Management database is manufactured by Henry Schein. This module is only compatible with Dentrix version G5 and higher.

1. Select **Edit > User Settings**.
2. Select the “Dentrix G5” tab, and press **Enable Dentrix G5 Integration**.
3. A message prompt opens explaining that once integration completes, patient editing is limited to the Dentrix software. Click **Continue**.

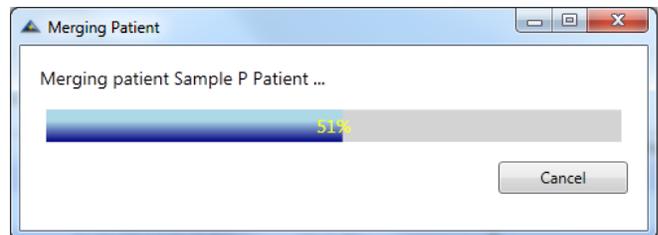
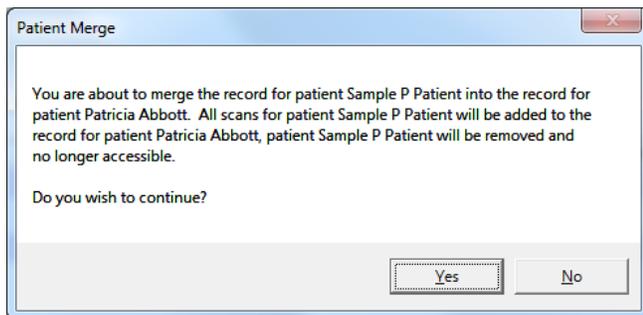


4. The “Merge Summary” window details the integration results. Note: Since T-Scan cannot alter the Dentrix database, unmatched patients must be manually entered into Dentrix.
5. With Dentrix integration enabled, the T-Scan patient window shows the Dentrix chart number in the first column of the patient list. Any patients that existed in T-Scan prior to the integration merge for which a Dentrix match could not be found display an exclamation (!) symbol and a red colored patient record. You can manually create the patient in Dentrix, or merge them to another record if mismatch is due to name variation (e.g.: Tom Smith in Dentrix, and Thomas Smith in T-Scan).

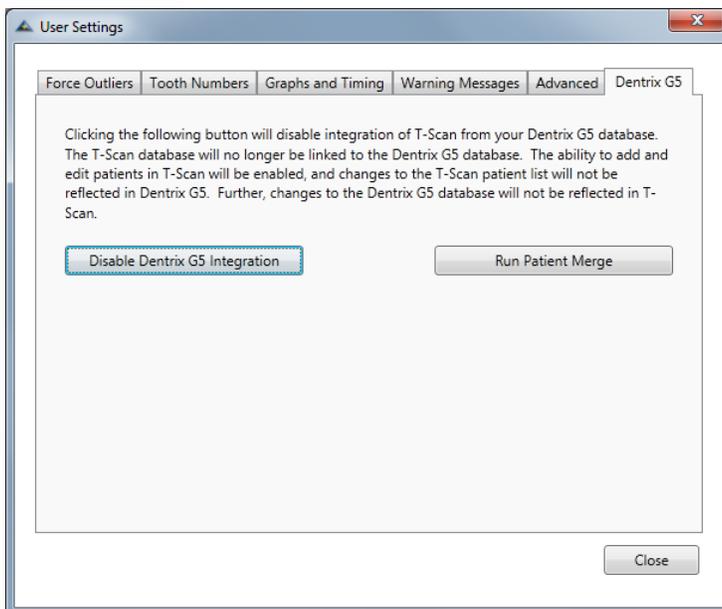




- To merge a mismatched record to another record with a valid chart ID, drag the record and drop it on the appropriate matching record. When the record is “dropped,” the “Patient Merge” dialog opens. Click **Yes**. Once merged, only one patient record exists.



- To disable integration to Dentrix, open the “User Settings” window, and click **Disable Dentrix G5 Integration** on the “Dentrix G5” tab. T-Scan returns to functioning as an independent application.



BioEMG Integration Module (BioPAK)

Integrates your T-Scan with the electromyography data of BioEMG (manufactured by BioRESEARCH Associates, Inc.), synchronizing them together. If you need operation information for either system, please refer to their respective manuals.

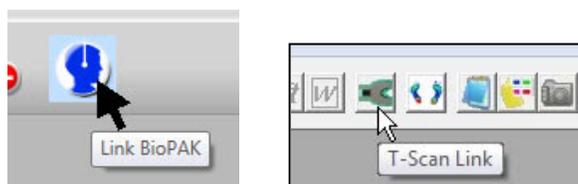
Note: The Integration Software consists of two pieces:

- Tekscan BioEMG Integration Module.
- BioRESEARCH BioPAK software, which may or may not already be included with your BioEMG purchase (check with your BioRESEARCH sales representative).

These software modules can be purchased from either company.

Activating Integration Mode

To open integration mode, click **Link BioPAK** in T-Scan or click **T-Scan Link** in BioPAK. Opening an integrated file in one program opens it in the other.



Acquiring Integrated Data or Opening Existing Data

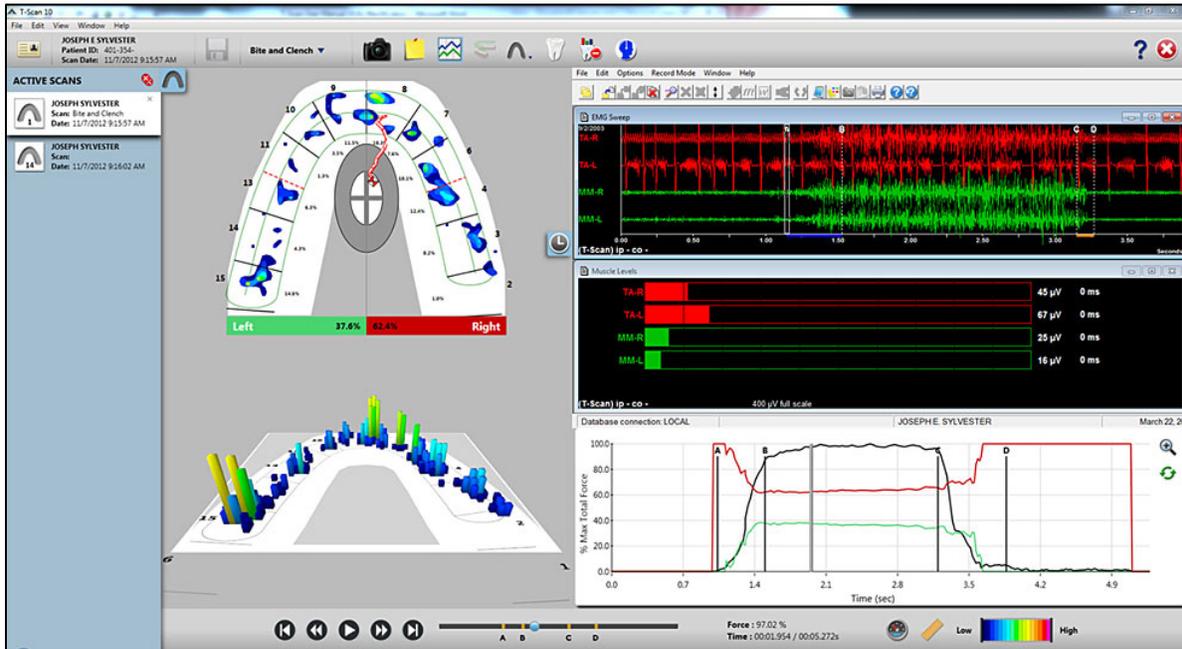
To acquire new data, open a new scan window in T-Scan and ensure the BioPAK program is running. Create a new recording by pressing **Record** on the T-Scan Handle or on the Navigation Bar in the T-Scan software. Data is recorded into both programs simultaneously.

Note: Ensure "Use Triggered Scan Start" is unchecked in "Edit > User Preferences (Advanced tab)". Recording starts when the "Record" button is pressed.

To open a previously recorded set of scans and traces, open the scan in T-Scan or the trace file in BioPAK. Click **Start BioPAK** or **T-Scan Link** (depending which program is open). Data is opened in both programs. By default, T-Scan opens on the left side and BioPAK on the right. If the Graph is open in T-Scan, it will be placed under the BioPAK program on the bottom right.

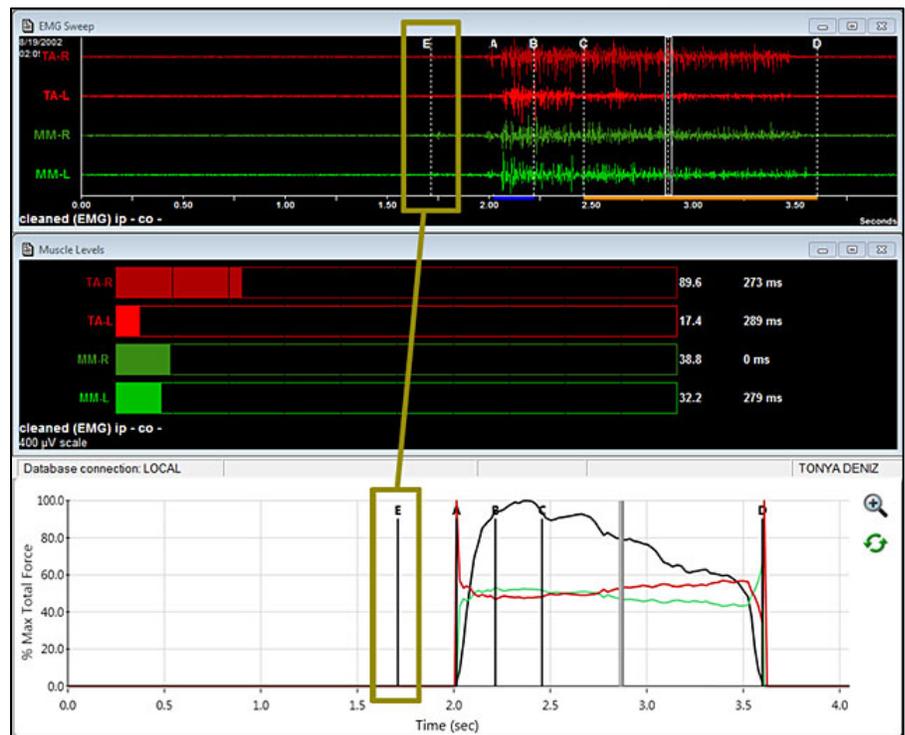
Note: If you don't have enough space to view things on-screen, try collapsing the

Active Scans Pane ()



Data between the two programs play in sync, and the A, B, C, and D lines in each graph correspond to the same lines in the other program. Additionally, there may be an "E" line placed on both the BioPAK "EMG Sweep" and T-Scan "Graph," marking initial point at which the EMG muscle movement begins (see images below). This line is usually before the "A" line. Any repositioning of these lines in T-Scan causes the corresponding BioPak line to reposition, and vice versa.

The Timeline controlling the "Time location" of the T-Scan graph view and BioPAK EMG Sweep window are synchronized. Changing the Timeline position in one program synchronizes it in the other.



Saving Integrated Data

When saving integrated data from either program, the data automatically saves in the other program if both files are open at the initial time of saving. When closing a file with unsaved changes in either program, you are prompted to re-save. You can elect to save data or close without saving.

BioPAK Sweep and Muscle Level files are included in the **.tpmc** file that is created when the user exports the patient from T-Scan. When the patient is then imported into T-Scan, these files are unpacked into the proper BioPAK directory structure as well.

Important! Both the T-Scan and BioPAK software windows need to be linked side by side during both the Export Patient and Import Patient process. Otherwise, the BioPAK data will not travel with the .tpmc file.

Notes

Saving [Notes](#) in one program saves them in the other (“Notes” in T-Scan, and “Comments” in BioPAK). This ensures the same messages are saved in both program files.

Closing Files

Closing the T-Scan scan automatically closes the BioPAK EMG Sweep file, and vice versa.

Identifying Scans that have Corresponding BioPAK Data

T-Scan scans that have corresponding BioPAK data have an EMG icon indicated in the [Patient List window](#) scan list. Similarly, an EMG trace with a corresponding T-Scan scan has a checkmark under “T-Scan.”

Declaration of Conformity

ISO: Tekscan is registered to the following standard(s): ISO 9001: 2000 & ISO 13485: 2003

Manufacturer:

Tekscan Inc.
307 West First Street
South Boston, MA 02127
USA

Authorized European Representative:

Winckels Medical Devices Expertise Europe
Bergerweg 18
6085 AT Horn
The Netherlands, Europe

Product:

T-Scan® III – Pressure Analysis System Evolution (EH-2) Based

T-Scan® Novus™ – Pressure Analysis System Novus (DH-1) Based

Description of Intended Use:

The T-Scan III and T-Scan Novus Pressure Analysis Systems are devices used to sense and analyze the occlusal contact force between human teeth.

Classification:

Class I, Rule 5, per MDD 93/42/EEC Annex IX

We herewith declare the products mentioned above meet the provisions of the Council Directives 93/42/EEC for medical devices. The declaration is issued under the sole responsibility of the manufacturer. All supporting documentation is retained under the premises of the manufacturer.

Standards Applied

Evolution Handle (EH-2)

Safety: IEC 60601 -1 IEC 60601-1:2005 + CORR. 1(2006) + CORR.2 (2007)

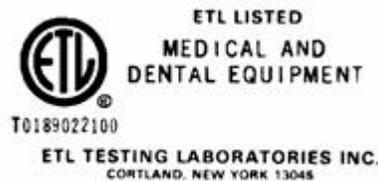
Medical electrical equipment

Part 1: General requirements for basic safety and essential performance

EMC: EN 60601-1-2:2001-09, Section 36 EN 55011:1998 per EN60601-1-1:2001-09, Section 36

Start of CE Marking: All lot/Serial Numbers

Place, Date of Issue: Boston, MA, USA, Nov 9, 2012



Novus Handpiece (DH-1)

Safety: IEC 60601 -1 IEC 60601-1:2005 + CORR. 1(2006) + CORR.2 (2007)

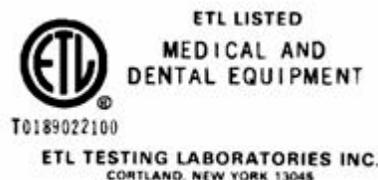
Medical electrical equipment

Part 1: General requirements for basic safety and essential performance

EMC: Radiated Emissions and AC Mains Conducted Emissions per IEC 60601-1-2 ed3.0 (2007-03)

Start of CE Marking: All lot/Serial Numbers

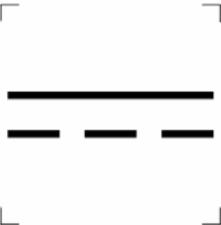
Place, Date of Issue: Boston, MA, USA, September 30, 2015



Warnings

1. Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the accompanying documents.
2. Portable and Mobile RF Communications Equipment can affect medical electrical equipment. If this occurs, or if there is a high level of noise on your display screen, try moving to a location that is not in proximity to other electrical devices (such as Televisions, radios, and cell phones).
3. Do not use or attach any components that are not explicitly stated within this manual.
4. ESD (Electro-Static Discharge) can halt the system. If the system stops functioning, shut down the system by turning the power switches on all attached parts off. Also shut down the software. Then turn on the system and restart the software. If problem persists, make sure the humidity in the room is >30% and refrain from touching patient after equipment is installed and powered up. If you are still having difficulty in operating the system, contact your local Tekscan representative.
5. The computer used with the applied part must be at a minimum approved to 60950-1. If the computer is to be used within the patient environment then it must also be approved to IEC60601-1 or have a medically approved isolation transformer between the computer and the mains voltage. This setup must be tested by a qualified technician to meet the requirements of IEC60601-1-1.
6. Computer placement – relative to the patient – should be at least 1.5 meters removed from the patient environment to prevent patient contact.
7. If a non-medically approved computer is being used, do not touch both the computer and the patient at the same time.
8. Sensor Replacement/Disposal: Always dispose of sensors in accordance with Federal and State guidelines pertaining to medical biohazardous waste.
9. No user-serviceable parts. Do not try to service or take apart any Tekscan hardware. Consult with your Tekscan representative if a component is not working correctly, or is not working as it should.

Markings, Safety Signs, Symbols

<p>Direct Current IEC 60417-5031</p> 	<p>Caution ISO 7000-0434A</p> 	<p>Operating Instructions ISO 7000-1640</p> 	<p>Type BF Applied Part IEC 60417-5333</p> 
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