



The Physician Driven Imaging Solution®

**A Nemaris, Inc. Product**

**Mobile App User Guide:  
Addendum to Surgimap User Guide**

**For version 2.2.24 and higher**

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## Disclaimer:

Surgimap is intended as a decision support system for persons who have received appropriate medical training, and should not be used as a sole basis for making clinical decisions pertaining to patient diagnosis, care, or management. All information derived from the software must be clinically reviewed regarding its plausibility before use in treating patients. Any derivation of the application of medical information from the program, other than the original design or intended use thereof, is not advised and considered a misuse of the software product.

## Note:

Surgimap is a free medical device with measuring, case planning, and sharing functions. It is a cross-platform solution for multiple devices. The desktop software can be downloaded from [www.surgimap.com](http://www.surgimap.com), the online viewer called Surgimap Access is available at [surgimap.com/access](http://surgimap.com/access), and the mobile application (App) is downloadable from the Apple App Store.

This User Guide is an addendum to the Surgimap User Guide and describes the features of the iOS mobile application (App) that works in conjunction with the Surgimap software. The iOS App is compatible with iPhone and iPad.

Questions? Contact [support@surgimap.com](mailto:support@surgimap.com) for guidance or to request an online demo. We are here to help.

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# Chapter 1: Getting Started



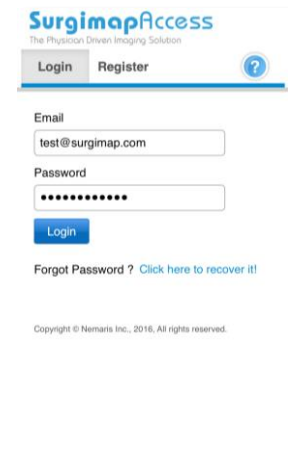
## Launching the App:

To begin using the Surgimap mobile application (App), you must first download it from the Apple App Store. Once the download is complete, tap the blue/white Surgimap Icon to launch the App.

## Login Screen:

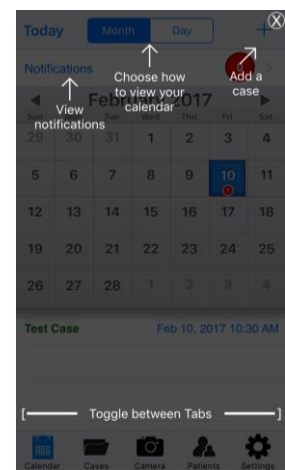
After a moment, the Login Screen will appear:

- ❖ Existing Surgimap users can log into the App with their username and password.
  - To request a password reset, use the recover password function at the bottom of the screen.
- ❖ New users must tap on the Register tab and complete the required fields to create their account.
- ❖ To request support, tap the “?” icon to access our contact information.



## Help Overlay:

When users open the Surgimap App for the first time, a help overlay will appear on each screen. This overlay explains the functionality of that page. Users can exit out of the overlay by tapping the “X” in the upper right hand corner or by tapping directly on the screen. The overlay will only appear the first time the user lands on that page unless it is reinstated by visiting the Settings tab and tapping “Reset help overlay”.



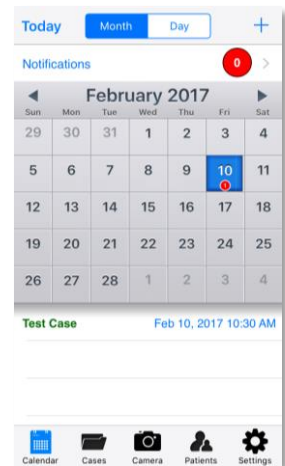
# Chapter 2: Screen by Screen

## Calendar Screen:

Once logged into the App, the user will see the Calendar Screen defaulted to the current month. If there are existing events scheduled for the user, they will see a red circle on each event date with a count of events for that date. By tapping on a specific date, the user will see a high-level description of the events below the calendar which can be tapped on for more details. When a calendar date with 1 event is tapped, the user will navigate to the Case Details tab with an overview of that case plan. If there are 2 events for a specific date, then the user will see the day view allowing user to subsequently tap into desired case detail.

From this screen, users can:

- ❖ Tap on specific dates to view their scheduled events.
- ❖ Switch calendar view to monthly, weekly, or daily view.
- ❖ Create a case by tapping the “+” sign and following the case flow.
- ❖ Tap to view existing scheduled cases.
  - Green font in description text indicates cases created by user.
  - Blue font indicates cases shared to user.
- ❖ Tap on the other tabs to navigate to other screens within App.

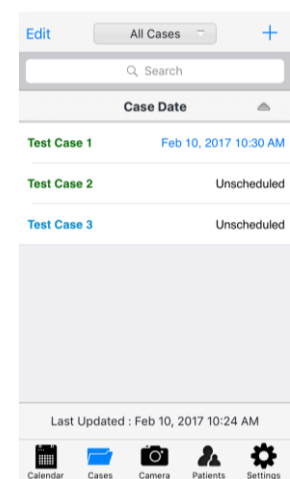


## Cases Screen:

This screen lists all cases for the user. Tapping this tab at any time from any location within the App will bring the user to the case overview. The top center filter can be used to toggle between All Cases and several other settings e.g., Scheduled, Owned, New. It is best to keep this set to “All Cases” until the case list becomes unwieldy. In addition, there is a search bar allowing users to search for strings of text that are attached to a case.

From this screen, users can:

- ❖ Tap to view existing cases.
  - Green font in description text indicates cases created by user.
  - Blue font indicates cases shared to user.
- ❖ Create a case by tapping the “+” sign and following the case flow.
- ❖ Tap the drop-down menu in the top center to filter by case status including scheduled/unscheduled, owned/shared, and modified/new.
- ❖ Delete a patient by swiping left on a patient record or by pressing “Edit” in top left.
- ❖ Use the search bar to search for a case.



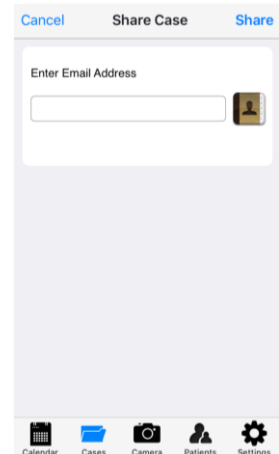
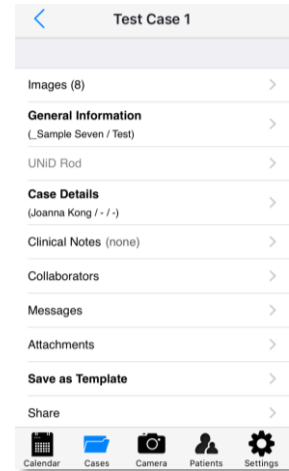
- ❖ Tap the arrow beside “Case Date” to sort by historical case date.
- ❖ Apply pull down to refresh list. New cases will populate if other users have shared them to the user, or if user has synced new cases from the desktop software or online account [www.surgimap.com/access](http://www.surgimap.com/access). The most recent sync date/time is displayed toward bottom center with “Last Updated: xx”.
- ❖ Tap on the other tabs to navigate to other screens within App.

## Case Info:

Tapping through to a case entry lets user see the Case Info Screen showing the Case Name in top row plus subsequent sections with high-level info in brackets, e.g. Images with image count listed in bracket. Each row can be tapped on to reveal more case information. Tapping on the Back button at the top left will bring user to prior page. Tapping on the bottom tabs will switch user to other screens.

Below are detailed explanations on the key screens within this section:

- ❖ **Image Thumbnails:** See section for Image Thumbnails screen.
- ❖ **General Information:** This section identifies case approval status, case description, patient name, surgeon name, hospital location, and OR date if applicable.
- ❖ **UNiD Rod:** If a UNiD rod has been simulated for this case, user may order the patient-specific rod directly from this section. Follow the on-screen instructions to place the rod order.
- ❖ **Case Details:** This section shows more case specifics such as the surgeon diagnosis, procedure type, surgical approach, required OR equipment, etc. At the bottom, users may select OR tray items required for the case from each of our vendor partners.
- ❖ **Clinical Notes:** User may choose to enter clinical notes here.
- ❖ **Collaborators:** Share your case with additional collaborators by selecting the existing user(s) from your Contacts List.
- ❖ **Messages:** If at least one collaborator has been added to the case, user may enter a message here. An email will be delivered to the collaborator’s inbox.
- ❖ **Attachments:** User may add a video or audio attachment to the case here.
- ❖ **Save as Template:** User may create a case template using this function.
- ❖ **Share:** Use this function to share a case to a collaborator not currently in your Surgimap Contacts List. You may tap the icon on the right to allow Surgimap to select from your iOS device’s Contacts.



## Camera Screen:

This screen allows users to take photographs to import into the Surgimap App. In order to capture photos, you must allow Surgimap access to your iOS device's built-in camera.

Below is an explanation of the import process:

- ❖ Tap the circle icon to capture a screenshot. Select "Retake" or "Use Photo"
- ❖ Use the image adjustment icons top right to adjust the image orientation, brightness, contrast, rotation, flip, etc.
- ❖ If in **International Mode**, user may calibrate image or apply Measuring or Surgical Tools.
- ❖ Tap "Cancel" to abandon image import, "Save" to create patient in Database, or "Share" to add collaborators to the case.

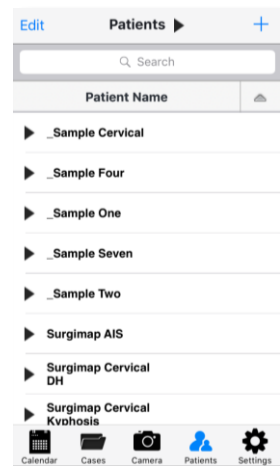


## Patients Screen:

This screen is initially blank until user adds a patient into their Surgimap App by tapping "+" or by syncing to their online account [www.surgimap.com/access](http://www.surgimap.com/access) where user may already have patients. To do this, simply swipe down on the screen.

From the Patients Screen the user can:

- ❖ Tap directly on patient to view patient images.
- ❖ Create a case by tapping the "+" sign and following the case flow.
- ❖ Tap on "Patients" top center to expand/minimize image studies and series for all patients.
- ❖ Delete a patient by swiping left on a patient record or by pressing "Edit" in top left corner.
- ❖ Use the search bar to search for a case.
- ❖ Tap "Patient Name" to filter by other categories including Case Date, Date of Birth, Image Count, etc.
  - Tap the arrow beside this field to sort by alphabetical or date order.
- ❖ Tap arrow to left of patient name to expand/minimize the studies and series.
- ❖ Apply pull down to refresh list. New patients will populate if other users have shared them to the user, or if user has synced new cases from the desktop software or online account [www.surgimap.com/access](http://www.surgimap.com/access).
- ❖ Tap on the other tabs to navigate to other screens within App.



## Image Thumbnails Screen:

Tapping a patient entry brings user to the Image Thumbnails Screen showing the image thumbnails for each study date. The thumbnails with a Surgimap icon in top left corner have measures applied that can be viewed. Tapping on an image will open it into full screen mode. If the image has not yet been downloaded from the server this may

take a while. Once in full screen mode, the user can see the image and measures applied and modify (depending on their settings). After changes, user can toggle to other parts of the App to trigger the sync which will then show the changes to case collaborators.

From the Image Thumbnails Screen the user can:

- ❖ Tap directly on image thumbnail to view it in Full Screen View.
- ❖ Tap to show all series or all images within each series.
- ❖ Tap “Edit” in the top right corner of screen to delete or manage images.
- ❖ Tap the “+” sign top right to add a photo from library or to take a new photo.
- ❖ Tap on the Back button at top left to return to prior page.
- ❖ Tap on the other tabs to navigate to other screens within App.

## Image Screen:

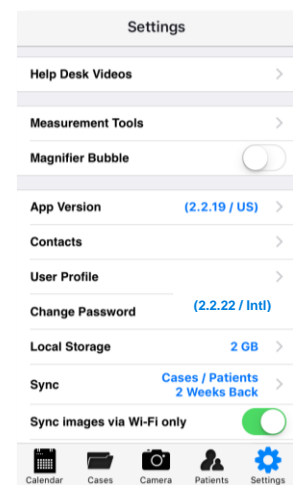
This screen allows for full-screen viewing of an image for measuring and analysis. See Chapter 3: Measuring and Simulation for more details.



## Settings Screen:

This screen allows for personalization of Surgimap settings:

- ❖ **Help Desk Videos:** Provides tap-by-tap animations of Surgimap’s various measuring and surgical tools.
- ❖ **Measurement Tools:** Turn specific measuring and surgical tools on/off.
- ❖ **Magnifier Bubble:** Turn on magnifier bubble to better identify the anatomy for measurement accuracy.
- ❖ **App Version:** Select International or US. The US setting does not allow users to edit measures on images or to apply new measures.
- ❖ **Contacts:** Allows user to access and manage their contacts list.
- ❖ **User Profile:** Modify and sync back your first and last name to the online site. This is the name that will be visible to others when they add you as a contact. Here you can also adjust your time zone, case email notifications, and high precision measurements settings.
- ❖ **Shipping Address:** Add hospital address for the shipment of UNiD rods.
- ❖ **Quick Share Vendors:** Turn quick share for partner vendors on/off.
- ❖ **Change Password:** Change current password. Changes will sync back to user’s other Surgimap platforms e.g., online, desktop.
- ❖ **Local Storage:** Determine how much space on iOS device will be available before a pop-up warning tells user that Surgimap App is running out of space. If user exceeds set limit, they can either increase the limit or delete unwanted images / cases.
- ❖ **Sync:** Automatically all future and unscheduled cases are synced, however user can also elect to how many historical cases sync to their mobile device.
- ❖ **Sync images via Wi-Fi only:** Select this option to sync images exclusively when connected to Wi-Fi.
- ❖ **Sync to Native Calendar:** Sync user’s Surgimap calendar with the calendar on their device e.g., iPhone.
- ❖ **Show Notifications:** Turn App icon notifications on/off.
- ❖ **App Icon Count:** Switch between count of files remaining and count of unacknowledged notifications.
- ❖ **Remove case images from iPhone/iPad:** Allows user to decide when to remove case images from the device to allow enough storage space for new case images.



- ❖ **Remove patient images from iPhone/iPad:** Allows user to decide when to remove patient images from the device to allow enough storage space for new patient images.
- ❖ **Reset help overlay:** Reinstates the overlay with helpful instructions upon navigating to each new page.
- ❖ **Send Feedback:** Email your comments to help our developers improve the App.
- ❖ **Love the app? Rate us:** Write a review on the Apple App Store to give us feedback.
- ❖ **Help:** View our contact information to request support.
- ❖ **Logout:** Log out of user account.

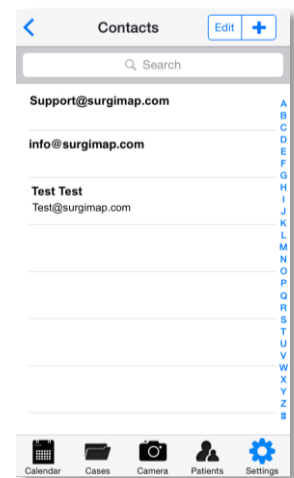
## Contacts Screen:

To locate the Contacts screen, go to the Settings tab and tap “Contacts”. This screen is initially blank until user adds a contact into their Surgimap App by tapping “+” or by syncing to their online account [www.surgimap.com/access](http://www.surgimap.com/access), where user may already have contacts.

When adding a contact, it is important to set the Access Level and Permissions for that specific contact. There are several Access Levels that determine the case plan content that gets shared (text fields in case plan):

- ❖ **View Cases:** gives contact access to view case details
- ❖ **View Case Images:** gives contact access to view case images
- ❖ **Edit Case Details:** gives contact access to edit case details (text)
- ❖ **Manage Case Images:** gives contact access to edit case images (including measurements and simulations)
- ❖ **Share My Cases:** permits contact to share your case to other users
- ❖ **Send Messages:** permits user and contact to exchange messages
- ❖ **De-Identified Access:** anonymizes patient name when sharing to contact

For HIPAA compliance, we recommend De-Identified and View Only Access (View Cases and View Case Images) for sharing from Surgeon to Industry Rep or business partner. For that reason, this is the default setting in the app.





# Chapter 3: Measuring and Simulation

## Measuring an Image:

An open image has image adjustment functions at top right. Here you can enhance contrast and brightness on the image, as well as adjust the image orientation, rotation, flip, etc. When user navigates away from the image, the image settings will revert to the original condition unless they are saved.

Only when using the **International version** can the user apply or modify measurements. If a user activates the International mode, user can select the desired tool option from the menu in the bottom row and then draw the desired measure on image following the instructions depicted on the help overlay. To adjust the measure, tap the tool you wish to adjust from top menu, then move the handles shown on the screen. To delete the active tool, tap “Delete” at bottom of image.



## Calibration

Non-DICOM images will need to be calibrated prior to drawing measurements. Select the Calibrate at bottom of image, then draw a line over a landmark of known length. Enter the length of selected line in the window that appears, then tap “Ok” to set calibration.

## Orientation

This function permits the user to set the orientation of the patient in the image. Sagittal images can be oriented from anterior on the left and posterior on the right, or the reverse. Coronal images can be oriented from left to right, or the reverse. Changing orientation affects the sign and value of some measurements. When set to “Orient.” this tool will automatically detect the orientation based on the values of some measurements; to override this you can **TAP** the tool and lock the orientation into anterior to posterior (Ant|Post), posterior to anterior (Post|Ant), left to right (LR), or right to left (RL).



## Measurements Table

Once measurements have been applied, measurement values will appear on the image and within the Measurements Table. To access this table, tap on the blue Surgimap icon in the top right. The Measurements Table displays the values of measurements added to an image. It has columns labeled “Measurement”, “Baseline”, and “Norm”. A “Simulated” column will appear once a simulated procedure is applied.

### Color Coding

The Measurements Table is color coded to allow users to quickly evaluate the need for surgical simulations and their impact on the measure values.

- ❖ Green indicates a measurement value within the normative range.
- ❖ Yellow indicates a measurement value just outside the normative range.
- ❖ Red indicates a measurement value far outside the normative range.



### Surgical Simulations

To apply/un-apply a surgical simulation to the image, you must find it on the Measurements Table and check/uncheck the box to the left of the procedure name.

### Actions

Users may take the following actions within the Measurements Table window:

- ❖ **Orient:** Tap the “Orient.” Icon to switch patient orientation to determine how measurement values are affected.
- ❖ **SA Norm:** If a sagittal alignment tool has been applied, select the “SA Norm” button to simulate an age-appropriate spine (ideal alignment). The Patient Age will be auto-populated for DICOM images and needs to be entered for non-DICOM images.
- ❖ **Export:** Select this option to export all measured values for your image to send via email.

Measurements Table			
Patient Orientation :  Orient.  SA Norm		Patient Age 70	
Measurement	Baseline	Simulated	Norm
PT	22°	22°	[13.0 - 23.8]
PI	58°	58°	58.4
SS	36°	36°	[33.4 - 46.6]
LL	-18°	-50°	[-63.2 - -45.5]
PI-LL	40°	9°	[-5.8 - 10.9]
TL	-9°	-9°	[-6.3 - 8.2]
TK	37°	37°	[32.8 - 51.4]

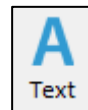


## Measuring Tools

### [Generic] Text

This function permits the user to create text within the application and display it directly on an image.

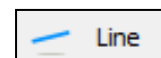
1. Select the “Text” tool.
2. **TAP** in main viewing panel.
3. Type desired text.
4. **TAP AND DRAG** the text to move it to a different location.



### [Generic] Line

This tool permits drawing of a single segment and displays the associated length (in mm) and horizontal angle (in degrees) onto images.

1. Select the “Line” tool.



2. **TAP** to set the first point of the line.
3. **TAP** to set the second point of the line.
4. The points can be moved after construction to better position the measurement.

### [Generic] Angle

The angle tool permits to measure a generic angle between two segments and displays the angle (in degrees).



1. Select the “Angle” tool.
2. **TAP AND DRAG** to draw the upper line of the angle.
3. **TAP AND DRAG** to draw the lower line of the angle.
4. When the angle measure is selected, a small arc appears on the measurement indicating which angle is being measured.
5. The points can be moved after construction to better position the measurement.

### [Generic] Circle

This tool permits the drawing of a circular segment and displays its radius (in mm).



1. Select the “Circle” tool.
2. **TAP** to set the first point of the circle.
3. **TAP** to set the second point of the line.
4. The points can be moved after construction to better position the measurement.

### [Cervical Spine] Cervical Lordosis: “C Lordo”

The Cervical Lordosis is a curvature (in degrees) of the cervical vertebrae in the neck region.



1. Select the “C Lordo” tool.
2. **TAP AND DRAG** to outline the C7 inferior endplate.
3. **TAP AND DRAG** to outline the C2 inferior endplate.
4. When the angle measure is selected, a small arc appears on the measurement indicating which angle is being measured.
5. The points can be moved after construction to better position the measurement.

### [Cervical Spine] Cervical Sagittal Vertical Axis: “cSVA”

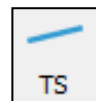
The cSVA is the distance (in mm) between C7 plumbline and the posterosuperior corner of C7 in the sagittal plane.



1. Select the “cSVA” tool.
2. **TAP** the center of C2.
3. **TAP** the C7 posterosuperior corner. This draws a line indicating the cSVA offset.
4. The points can be moved after construction to better position the measurement.

### [Cervical Spine] T1 Slope: “TS”

The T1 Slope (TS) is the angle (in degrees) between the horizontal and cranial endplate of T1.



1. Select the “TS” tool.
2. **TAP AND DRAG** to outline the T1 Superior Endplate
3. The points can be moved after construction to better position the measurement.

### **[Cervical Spine] Chin Brow Vertical Angle: “CBVA”**

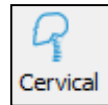
This function permits to measure the Chin Brow Vertical Angle (CBVA) on a sagittal image. CBVA is the angle (in degrees) subtended by a vertical line and a line from the chin to the forehead. NOTE: a positive value denotes a “downward gaze”, a negative value denotes an “upward gaze”.



1. Select the “CBVA” tool.
2. **TAP** on the chin.
3. **TAP** on the brow.
4. The points can be moved after construction to better position the measurement.

### **[Cervical Spine] Cervical Wizard: “Cervical”**

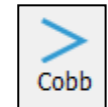
The Cervical Wizard tool permits angle measurements (in degrees) from C1-C2, C2 to C7 (CL), T1 Slope, & T1-CL, as well as cSVA (in mm).



1. Select the “Cervical Wizard” tool.
2. **TAP AND DRAG** to outline the anterosuperior corner of T1.
3. **TAP AND DRAG** to outline the anteroinferior corner of C2.
4. **TAP** on the anterior point of the C1 ring.
5. **TAP** on the posterior point of the C1 ring.
6. The points can be moved after construction to better position the measurement.

### **[Spine] Cobb Angle: “Cobb”**

The Cobb Angle tool permits to measure a generic angle (in degrees) between two segments.



1. Select the “Cobb” tool.
2. **TAP AND DRAG** to outline upper endplate.
3. **TAP AND DRAG** to outline lower endplate.
4. When the angle measure is selected, a small arc appears on the measurement indicating which angle is being measured. This is the Coronal Cobb Angle.
5. The points can be moved after construction to better position the measurement.

### **[Spine] Lumbar Lordosis: “LLordo”**

This function permits the user to measure the lordosis angle (in degrees) on a sagittal (lateral view) image by identifying two vertebral endplates (two Taps per endplate). The angle created between the two segments cannot be greater than 180° (see limitations notice to angles). NOTE: a negative value denotes a lordotic alignment, a positive value denotes a kyphotic alignment.



1. Select the “LLordo” tool.
2. **TAP AND DRAG** to outline the S1 superior endplate.
3. **TAP AND DRAG** to outline the L1 superior endplate.
4. When the angle measure is selected, a small arc appears on the measurement indicating which angle is being measured.
5. The points can be moved after construction to better position the measurement.

### **[Spine] Thoracic Kyphosis: “TKypho”**

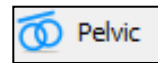
This function permits the user to measure the kyphosis angle (in degrees) on a sagittal (lateral view) image by identifying two vertebral endplates (two Taps per endplate). The angle created between the two segments cannot be greater than 180° (see limitations on angle measurements). NOTE: a negative value denotes a lordotic alignment, a positive value denotes a kyphotic alignment.



1. Select the “TKypho” tool.
2. **TAP AND DRAG** to outline the T12 inferior endplate.
3. **TAP AND DRAG** to outline the T4 superior endplate.
4. When the angle measure is selected, a small arc appears on the measurement indicating which angle is being measured.
5. The points can be moved after construction to better position the measurement.

### **[Spine] Pelvic Measures: “Pelvic”**

This tool permits the user to calculate the Pelvic Incidence, Pelvic Tilt and Sacral Slope parameters (in degrees) on a sagittal (lateral view) image. It requires identifying the sacral endplate as well as the two femoral heads.



1. Select the “Pelvic” tool.
2. **TAP AND DRAG** to outline the anterosuperior corner of the sacrum.
3. **TAP AND DRAG** to outline the perimeter of the first femoral head.
4. **TAP AND DRAG** to outline the perimeter of the second femoral head.
5. The points can be moved after construction to better position the measurement.

#### **Definition of Pelvic Parameters**

- ❖ Pelvic Incidence (PI): the angle between the perpendicular to the sacral endplate and a line from the center of the sacral endplate to the center of the femoral heads
- ❖ Sacral Slope (SS): the angle between the upper endplate of the sacrum and a horizontal line.
- ❖ Pelvic Tilt (PT): the angle a vertical line and a line from the center of the sacral endplate to the center of the femoral heads.
- ❖ Note:  $PI=SS+PT$

### **[Spine] T1 Spino-Pelvic Inclination: “T1 SPi”**

This tool permits the user to calculate the T1 Spino-Pelvic Inclination (in degrees) on a sagittal (lateral view) image. A prerequisite for the use of this tool is the existence of pelvic parameters on the image. NOTE: a positive value denotes an anterior alignment with T1 in from of the femoral heads, a negative value denotes a posterior alignment.



1. Select the “T1 SPi” tool.
2. **TAP** the center of the T1 vertebral body.
3. The points can be moved after construction to better position the measurement.

### **[Spine] Sagittal Vertical Axis: “SVA”**

This tool measures the horizontal offset (in mm) between a vertical line and any selected anatomical landmark. Most commonly, this is employed to measure the vertical offset between the C7 vertebra and posterosuperior corner of the sacrum. NOTE: a negative value denotes a plumbline posterior to the posterosuperior corner of S1, a positive value denotes a plumbline anterior to the posterosuperior corner of S1.



1. Select the “SVA” tool
2. **TAP** the center of C7.
3. **TAP** the posterosuperior corner of S1.
4. The points can be moved after construction to better position the measurement.

### **[Spine] Stenosis**

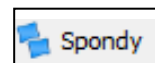
Spinal stenosis refers to the narrowing of anatomical passages for neurological structures. Most commonly stenosis is measured on axial images of the spine obtained by MRI or CT. The Stenosis tool permits quantification of the cross sectional area of the spinal canal in mm<sup>2</sup>.



1. Select the “Stenosis” tool.
2. **TAP** any point along the periphery of the cross-sectional area to be measured (ex. Spinal canal).
3. Continue to **TAP** along the contour of the spinal canal to create a continuous outline formed in spline fashion (curved segments, not straight line segments).
4. Once the canal is outlined, **DOUBLE-TAP** on the contour between the first and last point to close the measurement.
5. The points can be moved after construction to better position the measurement.

### **[Spine] Spondylolisthesis: “Spondy”**

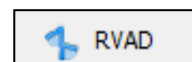
This function permits to measure a spondylolisthesis as defined by slippage of one vertebra versus another in the sagittal plane. This function requires the identification of two vertebral endplates and permits the user to calculate the angle between the segment as well as the slippage (in mm) and percentage (or grade).



1. Select the “Spondy” tool.
2. **TAP AND DRAG** from posterior to anterior to outline the inferior endplate of the superior vertebra.
3. **TAP AND DRAG** from posterior to anterior to outline the superior endplate of the inferior vertebra.
4. The points can be moved after construction to better position the measurement.

### **[Spine] Rib-Vertebra Angle: “RVAD”**

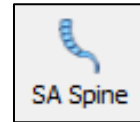
This function permits to calculate the rib-vertebra angles on the convex and concave side of a coronal deformity as well as the rib-vertebra angle difference. The rib-vertebra angles have to be measured at the apical level of the deformity and are defined as the angle between the perpendicular to the lower apical endplate and each rib (concave and convex side). The rib-vertebra angle difference (RVAD) is defined by the difference between the concave and the convex side.



1. Select the “RVAD” tool.
2. **TAP** the anterior point of the inferior endplate of an apical vertebra.
3. **TAP** the posterior point of the inferior endplate of the apical vertebra.
4. **TAP AND DRAG** to draw a line along the concave rib from head to neck (away from the spine).
5. **TAP AND DRAG** to draw a line along the convex rib from head to neck (away from the spine).

### **[Spine] Sagittal Alignment Wizard: “SA Spine”**

The sagittal alignment wizard permits the user to perform a full evaluation of the sagittal plane by following a step-by-step workflow displayed in the Help Desk. After proper identification of key anatomical landmarks (femoral heads, S1, L1, T1, and C2), key radiographic parameters will be computed and displayed. **NOTE: this tool does not necessarily require images up to C2 and is applicable for x-rays up to L1 or T1.**



1. Select the “SA Spine” tool.
2. **First femoral head**
  - a. **TAP** on the perimeter of the first femoral head.
  - b. **TAP** on the opposite edge of the first femoral head to draw a circle.
3. **Second femoral head**
  - a. **TAP** on the perimeter of the second femoral head.
  - b. **TAP** on the opposite edge of the second femoral head to draw a circle.
4. **Superior S1 endplate**
  - a. **TAP** the corner of the upper S1 endplate.
  - b. **TAP** the other corner to finish outlining the sacral endplate.
5. **Superior L1 endplate**
  - a. **TAP** the corner of the upper L1 endplate.
  - b. **TAP** the other corner to finish outlining the upper L1 endplate (or **DOUBLE-TAP** to end measurement at L1).
6. **Superior T1 endplate**
  - a. **TAP** the corner of the upper T1 endplate.
  - b. **TAP** the other corner to finish outlining the upper T1 endplate (or **DOUBLE-TAP** to end measurement at T1).
7. **Inferior C2 endplate**
  - a. **TAP** the corner of the lower C2 endplate.
  - b. **TAP** the other corner to finish outlining the lower C2 endplate.
8. **Adjust shape**
  - a. All segments remain modifiable with active handle points that can be dragged to improve accuracy.

To add an additional adjustable handle, **DOUBLE-TAP** any point along the displayed measure.

### **[Spine] Sagittal Alignment Wizard 2016: “Sagittal”**

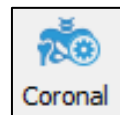
The sagittal alignment wizard permits the user to perform a full evaluation of the sagittal plane by following a step-by-step workflow displayed in the Help Desk. After proper identification of key anatomical landmarks (femoral heads, S1, L1, T1, and C2), key radiographic parameters will be computed and displayed. **NOTE: this tool does not necessarily require images up to C2 and is applicable for x-rays up to L1 or T1.**



1. Select the “Sagittal” tool.
2. First femoral head
  - a. **TAP** on the perimeter of the first femoral head.
  - b. **TAP** on the opposite edge of the first femoral head to draw a circle.
3. Second femoral head
  - a. **TAP** on the perimeter of the second femoral head.
  - b. **TAP** on the opposite edge of the second femoral head to draw a circle.
4. Superior S1 endplate
  - a. **TAP** the corner of the upper S1 endplate.
  - b. **TAP** the other corner to finish outlining the sacral endplate.
5. Superior L1 endplate
  - a. **TAP** the corner of the upper L1 endplate.
  - b. **TAP** the other corner to finish outlining the upper L1 endplate (or **DOUBLE-TAP** to end at L1).
6. Superior T1 endplate
  - a. **TAP** the corner of the upper T1 endplate.
  - b. **TAP** the other corner to finish outlining the upper T1 endplate (or **DOUBLE-TAP** to end at T1).
7. Inferior C2 endplate
  - a. **TAP** the corner of the lower C2 endplate.
  - b. **TAP** the other corner to finish outlining the lower C2 endplate.
8. Adjust shape
  - a. All segments remain modifiable with active handles to displace them.
  - b. Drag to adjust intermediate endplates until the schematic vertebrae overlay with the x-ray.

### ***[Spine] Coronal Alignment Wizard: “Coronal”***

The coronal alignment wizard permits the user to perform a full evaluation of the coronal plane anatomical landmarks (S1, L1, and T1), key radiographic parameters will be computed and displayed. NOTE: this tool does not necessarily require images up to T1 and is applicable for x-rays up to L1.



1. Select the “Coronal” tool.
  2. Superior S1 endplate
    - a. **TAP** the corner of the upper S1 endplate.
    - b. **TAP** the other corner to finish outlining the sacral endplate.
  3. Superior L1 endplate
    - a. **TAP** the corner of the upper L1 endplate.
    - b. **TAP** the other corner to finish outlining the upper L1 endplate (or **DOUBLE-TAP** to end measurement at L1).
  4. Superior T1 endplate
    - a. **TAP** the corner of the upper T1 endplate.
    - b. **TAP** the other corner to finish outlining the upper T1 endplate (or **DOUBLE-TAP** to end measurement at T1).
  5. Adjust shape
    - a. All segments remain modifiable with active handles to displace them.
    - b. Drag to adjust intermediate endplates until the schematic vertebrae overlay with the x-ray.
-



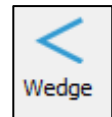
## Creating a Pre-Op Plan:

Once your image has been measured, you may choose to simulate surgical procedures on the patient. Our set of surgical tools create visual simulations for estimating interventional procedures. The application of a simulation leads to displacement or overlay of objects on image segments according to the function of the specific tool.

## Surgical Tools

### [Osteo] Wedge Osteotomy: “Wedge”

This tool permits the user to create a wedge-shaped resection of a portion of an image in the main viewing screen. The application of a simulation will remove a portion of the image in a wedge shape and displace other portions of the image. Upon application of the osteotomy tool, the image is modified (i.e. a portion is visually removed and image portions displaced around the removed wedge) and the existing measurements are updated on the image and within the Measurements Table.



#### Drawing the osteotomy

1. Select the “Wedge” tool.
2. **TAP** the anterior point of a desired resection wedge.
3. **TAP** to form the posterior point of the lower resection line.
4. **TAP** to form the posterior point of the upper resection line. An angle/wedge shape appears with a bisecting dotted yellow line between the created solid lines.

#### Modifying the osteotomy

1. All lines remain modifiable with handles that can be tapped and dragged. When handle points are moved, the angle and ratio of the simulated osteotomy will adjust accordingly.

#### Applying the osteotomy(ies) to the image

1. Check the box at the bottom of image to apply osteotomy; **OR**
2. Locate the “Wedge” measurement in the Measurements Table, then check the box associated with it.

#### Un-applying the osteotomy(ies)

1. Uncheck the box at the bottom of image to un-apply osteotomy; **OR**
2. Uncheck the box in the Measurements Table associated with the Wedge Osteotomy.

**[Osteo] Resect Osteotomy: “Resect”**

This tool permits the user to simulate the removal of segments within an image with adjustable variability in offset, distance and angulation between segments. Application of the simulation will resect a portion of the image between the user applied osteotomy lines and approximate the remaining image fragments to join at the user specified weld-points. Upon application of the osteotomy(ies), the image is modified and the existing measurements are updated on the image and within the Measurements Table.

**Drawing the osteotomy**

1. Select the 'Resect' tool.
2. Inferior line
  - a. **TAP** the anterior point of inferior line of desired resection.
  - b. **TAP** the posterior point of inferior line of desired resection.
3. Superior line
  - a. **TAP** the anterior point of superior line of desired resection.
  - b. **TAP** the posterior point of superior line of desired resection.

**Modifying the osteotomy**

1. All lines remain modifiable with handles that can be taped and dragged. When handle points are moved, the angle of the simulated osteotomy will adjust accordingly.

**Applying the osteotomy(ies) to the image**

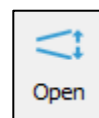
1. Check the box at the bottom of image to apply osteotomy; **OR**
2. Locate the “Resect Osteotomy” measurement in the Measurement Table, then check the box associated with it.

**Un-applying the osteotomy(ies)**

1. Uncheck the box at the bottom of image to un-apply osteotomy; **OR**
2. Uncheck the box in the Measurement Table associated with the Resect Osteotomy.

**[Osteo] Open Osteotomy: “Open”**

This tool permits simulation of procedures that involve the displacement by separation of anatomic landmarks. Simulation of opening osteotomy, anterior implant placement or devices can be applied to an image by the user. Application of the simulation will split the image and displace it above and below the lines to create a gap between image fragments. Existing measurements will be updated on the image and in the Measurement Table.

**Drawing the osteotomy**

1. Select the “Open” tool.
2. **TAP** twice to draw a line along the desired opening.
3. **TAP** and drag handles above and/or below the line to adjust the opening.

**Applying the osteotomy(ies) to the image**

1. Check the box at the bottom of image to apply osteotomy; **OR**
2. Locate the “Opening Osteotomy” measurement in the Measurement Table, then check the box associated with it.

**Un-applying the osteotomy(ies)**

1. Uncheck the box at the bottom of image to un-apply osteotomy; **OR**
2. Uncheck the box in the Measurement Table associated with the Opening Osteotomy.

**[Implant] Generic Cage: “Cage”**

This tool permits the user to plan the placement of an inter-vertebral graft (e.g., cage, bone graft, etc.). If the graft fits the inter-vertebral space, the application of the “cage” tool will simply draw the graft. On the other hand, if the graft placement aims to distract the inter-vertebral space, the application of the tool will expand the space and all existing measurements will be updated. This tool will provide the cage measurements on the image and in the Measurements Table (requires the image to be calibrated).

**Drawing the cage (graft)**

1. Select the “Cage” tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.

**Modifying the cage**

1. To expand the implant, **TAP AND DRAG** the middle handle point on the top line upward.
2. Move the handle points to adjust the cage shape and angle.

**Applying the cage to the image**

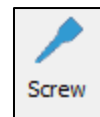
1. Check the box at the bottom of image to apply cage; **OR**
2. Locate the “Cage” measurement in the Measurements Table, then check the box associated with it.

**Un-applying the cage**

1. Uncheck the box at the bottom of image to un-apply cage; **OR**
2. Uncheck the box in the Measurements Table associated with the cage.

**[Implant] Generic Screw: “Screw”**

This tool permits the user to draw a screw on digital images. Use of this tool requires the images to first be calibrated. In addition to displaying a generic screw overlay on the image, this tool also provides the dimensions of the drawn screw on the image and in the Measurements Table.

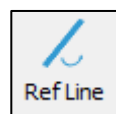


1. Select the “Screw” tool.
2. **TAP** to set the start point of the screw.
3. **TAP** to set the end point of the screw.
4. The points can be moved after construction to modify the screw dimensions, including diameter and length.

**[Implant] Generic Reference Line: “Ref Line”**

This tool permits to create a reference line.

1. Select the “Ref line” tool.
2. **TAP** to set the first point of the reference line.



3. **TAP** to set the second point of the reference line.
4. The points can be moved after construction to better position the line.

### Anatomical Landmarks: “Marker”

This feature allows the user to add anatomical landmarks to an image.



These markers include:

Anomalous Anatomy	Apex of Deformity	Cable/Wire
Direction of Segmental Force Application 1	Direction of Segmental Force Application 2	Downgoing Hook
Interbody Device	Left Arrow	Lumbar Lamina Hook
Monoaxial Screw	Pedicle Hook	Polyaxial Screw
Ponte Osteotomy	Pre-Operative Unstable Anatomy	Right Arrow
Thoracic Lamina Hook	Transverse Connector	Transverse Process Hook
Uni-Planar Screw	Upgoing Hook	

1. Select the “Marker” tool.
2. **TAP** on image to place the anatomical marker.
3. Choose the desired marker tool from pop-up.
4. At the top of the pop-up, adjust the marker size (in mm) if necessary.
5. Press “OK”.
6. To edit anatomical marker type and/or size, press “Edit” at bottom of screen.

### [Vendor] Medcrea Free Form UNiD Rod: “Free Rod”

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool permits the user to simulate rod implants and order pre-bent rods of specified dimensions from Medcrea for delivery to the operating room. NOTE: this feature requires the image to be calibrated.



1. Select the “Free Rod” tool.
2. **TAP** on image at upper location of initial rod attachment to pedicle screw.
3. Continue to **TAP** as you move cursor downward along the spine to outline the intended rod shape.
4. To complete the drawing, **DOUBLE-TAP** at the location of the desired rod endpoint. A 10 mm blue extension appears on either end of the drawn rod.
5. The points remain movable and can be dragged to reposition the rod.
6. **DOUBLE-TAP** any point along the rod to add a new handle for fine-tuning its shape.

### **[Vendor] Medicea UNiD Rod Sagittal Alignment: “SA Rod”**



This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. The purpose of this tool is to permit the user to generate a rod implant and order pre-bent rods of specified dimensions from Medicea for delivery to the operating room. This specific tool permits to directly generate a rod based on the shape defined by a sagittal alignment tool. NOTE: this feature requires the image to be calibrated, as well as the application of either the Sagittal Alignment Wizard or SA Spine tool.

1. After placement of a sagittal alignment tool (see Sagittal Alignment Wizard or SA Spine), select the “SA Rod” tool. A pop-up will appear.
2. Select the upper and lower instrumented vertebrae from the dropdown menus (max T1 to ilium).
3. Specify the desired rod thickness (in mm).
4. Press “OK”. A rod is now displayed on the image. At this stage, the rod is “attached” to the sagittal alignment tool so that the shape of the rod will be affected by any adjustments made to the sagittal alignment tool.
5. To detach the rod from the sagittal alignment tool, **TAP** and drag one of the rod’s handle points or **RIGHT TAP** on the rod and select “Detach Rod”.

### **[Vendor] NuVasive Interbody Cage Template: “NuVasive”**



This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the dimensions manufactured by NuVasive. NOTE: this feature requires the image to be calibrated.

1. Select the “NuVasive” tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.
5. Select the desired cage family and cage width.
6. Choose the cage option you would like to simulate.
7. Press “OK” to finalize selection.
8. To edit the cage, press “Edit” to reuse the cage selection menu.

### **[Vendor] NuVasive Japan Interbody Cage Template: “NuVasive Japan”**



This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the dimensions manufactured by NuVasive. NOTE: this feature requires the image to be calibrated.

1. Select the “NuVasive” tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.
5. Select the desired cage family and cage width.
6. Choose the cage option you would like to simulate.
7. Press “OK” to finalize selection.

- To edit the cage, press “Edit” to reuse the cage selection menu.

### **[Vendor] K2M Interbody Cage Template: “K2M Cage”**

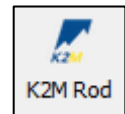
This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the dimensions manufactured by K2M. **NOTE: this feature requires the image to be calibrated.**



- Select the “K2M Cage” tool.
- TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
- TAP** the anteroinferior corner of the superior vertebra.
- TAP** the posteroinferior corner of the superior vertebra.
- Select the desired cage family and cage width.
- Choose the cage option you would like to simulate.
- Press “OK” to finalize selection.
- To edit the cage, press “Edit” to reuse the cage selection menu.

### **[Vendor] K2M Pre-bent Rod: “K2M Rod”**

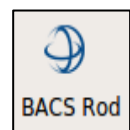
This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool generates a rod implant to the specifications manufactured by K2M. **NOTE: this feature requires the image to be calibrated.**



- Select the “K2M Rod” tool.
- TAP** to place rod center at thoracolumbar junction. A dialog window will appear.
- Select the type, material, and size of the desired rod.
- Press “OK”. At this stage, the rod is placed starting from the initially placed junction point.
- Drag the midpoint handles to rotate the rod
- To adjust the rod’s length, drag the endpoint handles to adjust the the thoracic and lumbar segments of the rod.
- To edit the rod, press “Edit” to reuse the rod selection menu.

### **[Vendor] K2M BACS Template Rod: “BACS Rod”**

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool generates a rod implant to the specifications manufactured by K2M. **NOTE: this feature requires the image to be calibrated, as well as the application of either the Sagittal Alignment Wizard or SA Spine tool.**

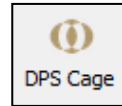


- Select the “BACS Rod” tool.
- If the Sagittal Alignment tool has not been applied, a dialog window will appear.
  - Press “OK” and proceed with drawing the Sagittal Alignment.
  - Once the Sagittal Alignment is drawn, select the “BACS Rod” tool again.
- A dialog window will appear. Select the Upper Vertebra, Lower Vertebra, TK, LL, and Rod Thickness.
  - The TK and LL values are calculated from the Sagittal Alignment tool, and are based on the age adjusted norm.
- Press “OK”. At this stage, the rod is attached to the Sagittal Alignment tool and is placed beside it.

5. To further adjust the rod's length, drag the endpoint handles to adjust the thoracic and lumbar segments of the rod.
6. To edit the rod, press "Edit" to reuse the rod selection menu.

### **[Vendor] DePuy Synthes Interbody Cage Template: "DPS Cage"**

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the specifications manufactured by DePuy Synthes. NOTE: this feature requires the image to be calibrated.



1. Select the "DPS Cage" tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.
5. Select the desired cage family and cage width.
6. Choose the cage option you would like to simulate.
7. Press "OK" to finalize selection.
8. To edit the cage, press "Edit" to reuse the cage selection menu.

### **[Vendor] Medtronic Interbody Cage Template: "Medtronic"**

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the specifications manufactured by Medtronic. NOTE: this feature requires the image to be calibrated.



1. Select the "Medtronic" tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.
5. Select the desired cage family and cage width.
6. Choose the cage option you would like to simulate.
7. Press "OK" to finalize selection.
8. To edit the cage, press "Edit" to reuse the cage selection menu.

### **[Vendor] Orthofix Interbody Cage Template: "Orthofix"**

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the specifications manufactured by Orthofix. NOTE: this feature requires the image to be calibrated.



1. Select the "Orthofix" tool.
2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
3. **TAP** the anteroinferior corner of the superior vertebra.
4. **TAP** the posteroinferior corner of the superior vertebra.

5. Select the desired cage family and cage width.
6. Choose the cage option you would like to simulate.
7. Press “OK” to finalize selection.
8. To edit the cage, press “Edit” to reuse the cage selection menu.

### **[Vendor] Globus Medical Interbody Cage Template: “Globus”**

This is a premium feature and may not appear in your Surgimap software. If you are interested in activating this feature, contact Surgimap User Support. This tool simulates interbody cage implants to the dimensions manufactured by Globus Medical. NOTE: this feature requires the image to be calibrated.



1. Select the “Globus” tool.
  2. **TAP AND DRAG** to outline the inferior vertebra from anterior to posterior.
  3. **TAP** the anteroinferior corner of the superior vertebra.
  4. **TAP** the posteroinferior corner of the superior vertebra.
  5. Select the desired cage approach, type, family, and dimensions.
  6. Choose the cage option you would like to simulate. If you selected an expandable cage, use the slider located at the bottom right of the menu to expand it.
  7. Press “OK” to finalize selection.
  8. To edit the cage, press “Edit” to reuse the cage selection menu.
-