

Hoffmann® LRF smarHEX™

Web Application
User manual



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Introduction

Important information for doctors and operating room staff:

This user manual is designed to aid in understanding of the workflow of the Hoffmann LRF smartHEX Web Application for effective use of its features. This user manual does not include all information necessary for selection and use of a device. For a complete overview of the entire Hoffmann LRF System, it is recommended that the user also references the Instructions for Use (700001224590), the Hoffmann LRF Operative Technique (700004267559), the smartHEX Strut Controller and Mobile Application User Manual (700004267606), the smartHEX Patient Guide (700004308965), and the Hoffmann LRF smartHEX Hole Offset Worksheet.

Before using any system component or any component compatible with this system, read and understand the instructions. See full labeling for all necessary information. Ensure that you are familiar with the intended uses, indications and contraindications, compatibility and correct handling of the system.

The use of these devices provides the surgeon with a means of bone fixation for the management of fracture and reconstructive surgery. These devices are intended only to assist healing and are not intended to replace normal bone structures. No fracture fixation device that is subject to material fatigue can be expected to withstand activity levels in the same way as would normal healthy bone. The fracture fixation system, therefore, will not be as strong, reliable or durable as a normal human bone.

The Hoffmann LRF smartHEX Web Application is a software program intended to assist the surgeon in the use of the Hoffmann LRF smartHEX struts in the correction of limb deformities. The web application has three basic modes of operation: pre-operative, post-operative, and residual.

The pre-op mode is used pre-operatively to define the deformity, ring, and strut configurations, and to calculate a deformity correction plan. The corresponding frame may then be pre-built and surgically attached to the patient.

Surgeons who prefer utilizing the rings-first approach may proceed directly to post-op mode after surgically applying the frame. The workflow is the same as in the pre-op mode; however, the post-op mode allows the surgeon to fine-tune the frame construct by using radiographic measurements or by uploading post-op or intraoperative radiographs.

For smartHEX, HexConnect or Hoffmann LRF Hexapod assistance, contact Stryker OR Assist Customer Service at: +1 (844) 393-4933

For non-urgent requests, contact the Hoffmann LRF helpdesk via email at: smarthex@stryker.com

General warnings and cautions

- Per the Health Insurance Portability and Accountability Act of 1996, no input fields may contain patient's full name or other patient identifiers. The user takes full responsibility for non-compliance.
- The bone models used in the Hoffmann LRF smartHEX Web Application can be manipulated to create a graphical representation of the anatomy being treated. This graphical representation is intended to mimic the general anatomy of the deformed bone and is not meant to include any patient-specific bone characteristics.
- The user takes full responsibility to ensure that the deformity values input into the smartHEX application are in accordance with the clinical evaluation.
- For reliable deformity measurements using the Deformity Measurement Tool (DMT), the user must ensure that patient X-ray and corresponding overlay match as closely as possible. Refer to the applicable sections of this user manual for a more detailed explanation of scaling X-ray images and the use of the DMT.
- For reliable measurements of bone offset from the reference ring center using the Mounting Parameter tool (MPT), the user must ensure the ring template is accurately placed at the ring edges. Refer to the applicable sections of this user manual for a more detailed explanation of the use of the MPT.
- It is recommended that the user define a limiting anatomical structure (LAS) and calculate a minimum correction time in accordance with the prescribed distraction rate. Use caution when overriding the recommended minimum correction time to avoid an unsuitable distraction rate.
- The user must ensure that the reference and moving ring type, size, and placement input into the software application are consistent with the frame surgically applied to the patient. This is critical for the web application to generate an accurate correction schedule.
- The user must ensure that the type and lengths (acute and gradual) of all six struts input into the web application are consistent with the frame surgically applied to the patient. This is critical for the web application to generate an accurate correction schedule.
- The Full-Length X-ray Analysis Tool allows the user to perform Joint Angle Analysis (JAA) on a full-length X-ray. The user must ensure anatomical markers are placed as accurately as possible for reliable joint angle measurements.

General warnings and cautions

Indications for use

The Hoffmann LRF System is indicated in pediatric (2 through 21 years of age) and adult patients for the treatment and fixation of:

- Open and closed fractures
- Post-traumatic joint contracture which has resulted in loss of range of motion
- Fractures and disease which generally may result in joint contractures or loss of range of motion and fractures requiring distraction
- Pseudoarthrosis or non-union of long bones
- Limb lengthening by epiphyseal, diaphyseal, or metaphyseal distraction
- Correction of bony or soft tissue deformity
- Correction of segmental bony or soft tissue defects
- Joint arthrodesis
- Management of comminuted intra-articular fractures of the distal radius
- Bone transport

The Hoffmann LRF System is indicated in adults for:

- Osteotomy
- Revision procedure where other treatments or devices have been unsuccessful
- Bone reconstruction procedures
- Fusions and replantations of the foot
- Charcot foot reconstruction
- Lisfranc dislocations

Contraindications

Since external fixation devices are often used in emergency situations to treat patients with acute injuries, there are no absolute contraindications for use. The surgeon's education, training and professional judgment must be relied upon to choose the most appropriate device and treatment for each individual patient. Whenever possible, the device chosen should be of a type indicated for the fracture being treated and/or for the procedure being utilized.

Conditions presenting an increased risk of failure include:

- Insufficient quantity or quality of bone which would inhibit appropriate fixation of the device
- Compromised vascularity that would inhibit adequate blood supply to the fracture or operative site
- Previous history of infections
- Any neuromuscular deficit which could interfere with the patient's ability to limit weight bearing
- Any neuromuscular deficit which places an unusually heavy load on the device during the healing period
- Malignancy in the fracture area
- Mental, physical or neurological conditions which may impair the patient's ability to cooperate with the postoperative regimen

Getting started

System settings

In order to accommodate the large quantity of information, including the detailed graphical images and proper sequencing of the correction methods, each screen of the Hoffmann LRF smartHEX Web Application has been designed to provide an efficient user interface. To ensure the best possible user experience, certain minimum system requirements and browser settings are required.

System requirements

- CPU: Intel Core i5 (equivalent) or better.
- Memory: min 4MB
- Display resolution: min 1400 × 900, 1920 × 1080 (recommended)
- Graphics adapter: WebGL supported
- Keyboard and mouse (or compatible cursor device)
- Software requirements:
 - **For Windows:** Windows 10 or above
 - **For Mac:** Mac OS version 12 or above
- Internet connection

Browser:

- Safari (latest version)
- Google Chrome (latest version)
- Mozilla Firefox (latest version)
- Microsoft Edge (latest version)
- Browser plug-in: WebGL and Java enabled flag set in browser settings

When logging in to the Hoffmann LRF smartHEX Web Application, the application automatically checks that the proper versions of software are installed. If the system is compatible, your login will proceed normally. If not, a screen will display the errors and identify the components that need to be upgraded.

When all required components are installed and updated, the screen will show green text and check marks. (**Figure 1**)

The compatibility status of your OS and browser components may be checked at any time by selecting Browser Compatibility from the dropdown menu located in the upper left display, next to the Home icon. (**Figure 2**)

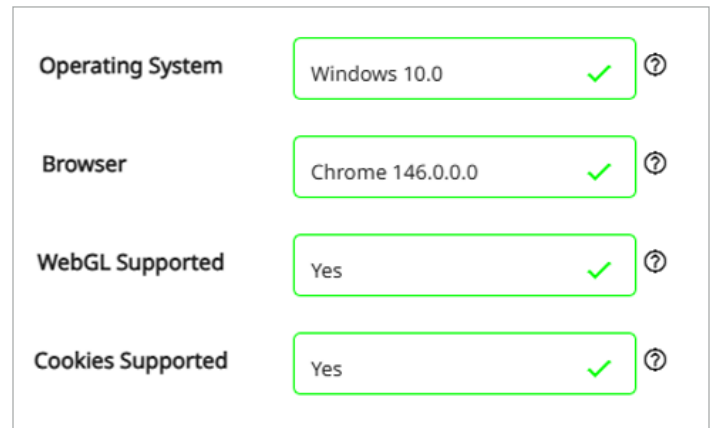


Figure 1

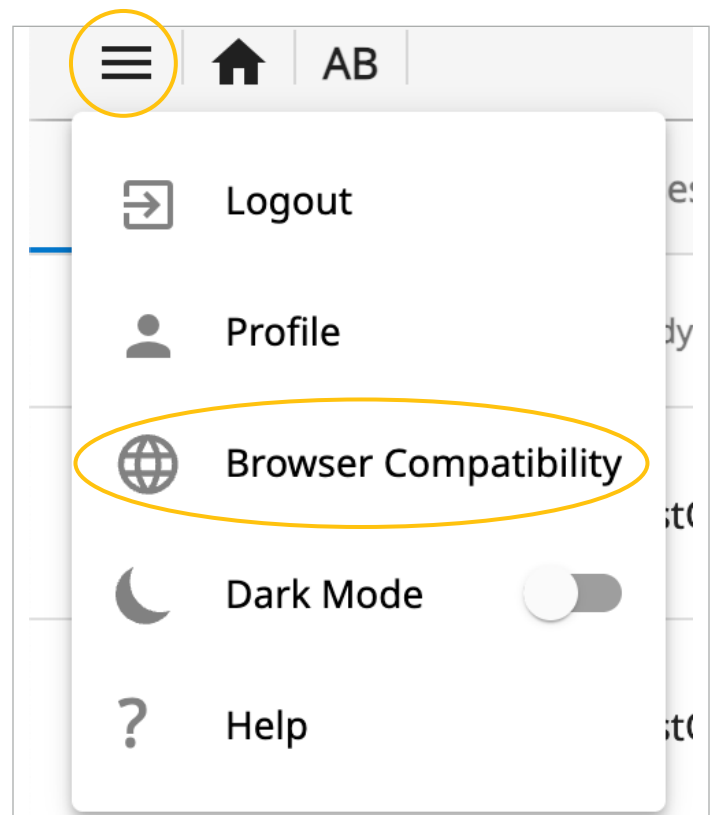


Figure 2

Getting started

Frame assembly assumptions



WARNING

For the required safety information and contraindications, please refer to the Instructions for Use, which can be downloaded at ifu.stryker.com, and the corresponding Hoffmann LRF Operative Technique. **(Content ID: 700004267559-EN Rev AA)**

As with any technical guide, the surgeon should consider the particular condition of the patient and perform the necessary adjustments if required. Safety and caution should always be utilized before proceeding.

Within the Hoffmann LRF smartHEX Web Application, the six struts are numbered accordingly (patient's view, proximal side):

1. If the reference ring is initially placed with rotation or translation to accommodate patient anatomy or is placed non-orthogonally to the reference fragment, the offsets must be input into the web application.
2. With the reference ring centered on the bone, the master marker (indicated by the Stryker logo) identifies the holes positioned directly anterior to the reference bone fragment. **(Figure 3)**
3. With the master marker of the proximal ring oriented directly anteriorly, Strut 1 (red) and Strut 2 (orange) are positioned to the immediate adjacent hole. **(Figures 3-4)**
4. On the proximal ring, Struts 3 (yellow) and 4 (green) are default-positioned on the next tab, counterclockwise to Struts 1 and 2. **(Figures 3-4)**
5. On the proximal ring, Struts 5 (blue) and 6 (violet) are default-positioned on the next tab, counterclockwise to Struts 3 and 4. **(Figures 3-4)**
6. The reference fragment refers to the bone fragment used as a reference point during deformity definition and correction. The reference fragment can be defined in the web application as either the proximal fragment or distal fragment with respect to the deformity.

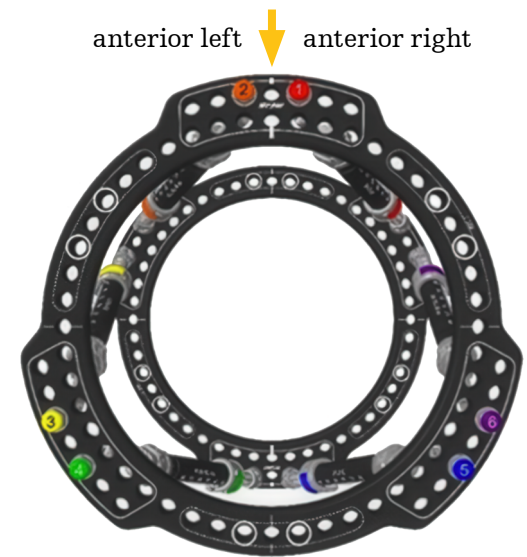


Figure 3

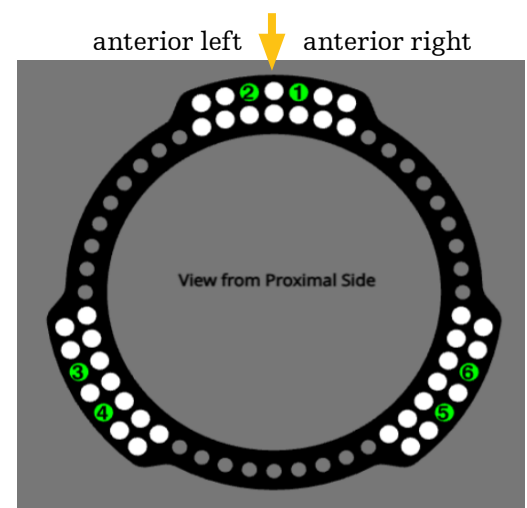


Figure 4



Getting started

Accessing the smarHEX Web Application

Creating a new user account

Access to the smarHEX Web Application is provided through Stryker’s Insight Center Customer Portal. For instructions on creating an account through the Insight Center Customer Portal, refer to [Appendix A](#).

Initial login

Upon initial login, users will be asked to accept the disclaimers and conditions for the **Hoffmann LRF smarHEX Web Application**. Upon careful review and acceptance of the disclaimers, users can check the option labeled “I agree with the terms and conditions” and click “Submit”. (**Figure 5**) Once submitted, the user will be redirected to the home page.

Hoffmann® LRF smarHEX™

stryker

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a. **Agreement** means the Ordering Document that references or is otherwise subject to these Software and Hosting Terms, together with these Software and Hosting Terms and the applicable Product Addendum.

b. **Customer Hosted Software** means Stryker Software, other than Embedded Software or Stryker Hosted Software, that Customer hosts on Customer's own equipment or that is separately installed on Equipment in accordance with this Agreement.

c. **Embedded Software** means Stryker Software that is embedded in or that runs on Equipment and is provided as part of a device and not separately installed, including any documentation, explanatory written materials and files, content, and code.

d. **Equipment** means instruments, tablets or other computing devices, printers, peripherals and spare parts that are provided to Customer by Stryker under a separate Ordering Document.

e. **Hosting Services** means data hosting and storage services that Stryker makes available, directly or through its third-party hosting provider to Customer, as described in the Product Addendum and set forth in the applicable Ordering Document, and any Updates thereto.

f. **Ordering Document** means a final quote and/or order for products and/or services as agreed to between Stryker and Customer.

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h. **Party** means Stryker or Customer individually, and Parties mean Stryker and Customer collectively.

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j. **Product** means, for the purposes of the Software and Hosting Terms, Stryker Software or Hosting Services.

k. **Product Addendum** means the then-current additional terms and conditions applicable to a specific Product as referenced in the Ordering Document or otherwise provided by Stryker.

l. **Product Documentation** means the then-current operational materials and documentation provided by Stryker relating to a Product.

m. **Service Term** means the subscription, support or hosting services period set forth in the Product Addendum or the Ordering Document, unless terminated earlier or extended in accordance with the terms of this Agreement.

n. **Stryker** means the Stryker company or division referred to in the Ordering Document.

o. **Stryker-Hosted Software** means Stryker Software that is not Embedded Software that is hosted by Stryker or its hosting provider and made available to Customer as a service via a customer provided internet connection.

p. **Stryker Software** means firmware, software, web-based or mobile applications or data compilations, and any services that are accessible through the foregoing, that are proprietary to Stryker, as described in the Product Addendum and set forth in the applicable Ordering Document, and any Updates thereto. Stryker Software does not include any open source or third-party licensed software, which are subject to the terms and conditions set out in the relevant open source or third-party license as set forth herein.

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r. **User** means any employee, contractor or representative of Customer that Customer has authorized to access and/or use a Product. Any installation, activation, access or use by or on behalf of Customer, or that occurs when the Product is in Customer's or a User's possession or control, is considered to have been performed by Customer. Users may only use and access the Products at and for the Permitted Facilities.

2. USE RIGHTS

Subject to the terms of this Agreement, Stryker grants to Customer a limited, non-exclusive, non-transferable, non-sublicensable and revocable right to allow Users to use Stryker Software and Hosting Services for internal business purposes as set forth in the Product Documentation. Stryker Software is licensed in read-access, object code form only. Product Documentation only may be used in connection with the specific Product with which it relates, and for no other purpose. In addition, unless otherwise set forth in the Product Addendum (for the avoidance of doubt, more than one category may apply to a Product):

a. For Stryker-Hosted Software and Hosting Services, Customer may only connect to the Stryker Software using authorized websites, mobile applications and/or software (**Authorized Connections**) as set forth in the Product Documentation and for use for the Permitted Facilities. The license for device based or user based software will be specified in the Product Addendum, if applicable.

b. For Customer-Hosted Software, Customer may make one copy of the Stryker Software to operate on one computer or device, and one copy for backup or archival purposes and NOT for use in production on one computer or device, as set forth in the Product Documentation, and for each copy at a single location at a Permitted Facility in the United States.

Customer must register, set up, and at all times keep accurate and complete, an authorized account with passwords, authentication keys, or security credentials that enable Users access to the Products (**Login Credentials**). Customer and User's must maintain the confidentiality and security of all Login Credentials, and Customer responsible for any consequences that may result from the improper disclosure or use of any such Login Credentials. If Customer or any User believes an account has been compromised, including any unauthorized access to or use or disclosure of any Login Credentials, Customer must notify Stryker immediately. As part of any registration or set up process, Stryker may request registration-related information, including a User's name and e-mail address. By providing this information, Customer consents, and is responsible for obtaining all User consent, to its collection and use by Stryker. Customer is responsible for all acts and omissions of Users, and for ensuring the compliance by all Users with all terms of this Agreement.

If Customer is aware of any violation by a User, Customer immediately must notify Stryker and suspend that User's access to the Products. Customer is responsible and liable for all acts and omissions by Users or by any other individual or entity to whom Customer or any User provides or allows access, or that accesses the Products through the Login Credentials. Stryker reserves the right to refuse service, terminate accounts, remove or edit content, or cancel logins in its sole and absolute discretion. The Products do not include network equipment or internet connection. Customer is responsible for obtaining equipment, software, supplies and connections sufficient to access and use the Products, and Customer is solely responsible for payment of any ("Computer Software") and 12.211 ("Technical Data"). If acquired by or on behalf of any agency within the Department of Defense, the U.S. Government acquires the software, software documentation and technical data subject to the terms herein as specified in DFARS 227.7202.3. This U.S. Government Rights clause is in lieu of, and supersedes, any other FAR, DFARS, or other clause or provision that addresses Government rights in computer software or technical data under these terms and conditions.

11. TERM TERMINATION SUSPENSION

For subscription, support or hosting services, the provision of such services is limited to the applicable Service Term. Stryker may, at its option, immediately suspend Customer's use of any Stryker Software if: (a) Customer is in breach of this Agreement (including the Software and Hosting Terms or a Product Addendum); (b) Stryker believes that Customer's use of a Product poses a security risk; or (c) Stryker suspects fraud or abuse. Stryker will give Customer notice before suspending Customer's use if permitted by Law or unless Stryker reasonably determines that providing notice presents a risk of harm, in which case Stryker will notify Customer as soon as feasible or permitted. Stryker will promptly reinstate Customer's access once Stryker has determined that the issue causing the suspension has been resolved. Customer will remain responsible for all fees incurred before and during any suspension.

If either Party breaches a material term of this Agreement and fails to correct the breach within thirty days (except for failure by Customer to pay amounts under this Agreement, in which case the cure period will be ten days) of written specification of the breach, then the breaching Party is in default and the non-breaching Party may terminate this Agreement. If Stryker terminates this Agreement as specified in the preceding sentence, Customer must pay within ten days all amounts, which have accrued prior to such termination, as well as all sums remaining unpaid for Products ordered and/or received under this Agreement plus related taxes and expenses.

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Upon the termination or expiration of any Hosting Services, Stryker will make Customer's content (as it existed at the end of the date of termination or expiration) available for retrieval by Customer for up to thirty days (or such different period set out in the Product Addendum). At the end of such retrieval period, and except as required by Law or as otherwise set forth in this Agreement, Stryker will delete or otherwise render unrecoverable Customer's Content that remains in the environments hosted by Stryker for Customer. If Stryker hosts or stores Customer's Content beyond the Service Term, Customer will pay to Stryker, and will be responsible to Stryker for, Stryker's hosting and storage fees. Any terms that should survive termination by their nature will so survive, including limitations of liability and ownership rights of Stryker. Termination by any means will not affect the provisions of this Agreement relating to the payment of amounts due or the survival provision of this Agreement, regardless of the reason for termination.

12. GENERAL TERMS

Customer agrees that this Agreement and the information which is incorporated into this Agreement or Product Documentation by written reference (including reference to information contained in a URL, or referenced policy), together with the applicable Ordering Document, are the complete agreement for the Products ordered by Customer and supersede all prior or contemporaneous agreements or representations, written or oral, regarding such Products. It is expressly agreed that the terms of this Agreement will supersede the terms in any purchase order, procurement internet portal or any other similar non-Stryker document and no terms included in any such purchase order, portal or other non-Stryker document will apply to the Products ordered. Stryker may refer to Customer as a customer of the ordered Products in sales presentations, marketing vehicles and activities.

Except for the obligation to pay fees when due, neither Party will be liable to the other Party in respect of any hindrance, delay, or failure to perform that results from any event or cause that is beyond the reasonable control of the Party obligated to perform, including acts of God, labor disputes, the requirements of any governmental authority, war, civil unrest, terrorist acts, delays in manufacture, obtaining any required license or permit, and Stryker's inability to obtain goods from their usual sources. If for any reason a court or competent jurisdiction finds any provision of this Agreement invalid or unenforceable, the provision will be enforced to the maximum extent permissible, and the other provisions of this Agreement will remain in full force and effect. Stryker's failure to enforce any right or provision of this Agreement will not be considered a waiver of such right or provision. Except as expressly set forth in this Agreement, the exercise by Stryker of any of its remedies under this Agreement will be without prejudice to its other remedies under this Agreement or otherwise.

Stryker is an independent contractor, and nothing in this Agreement is intended to create a partnership or joint venture between the Parties. Customer has no power to bind or obligate Stryker in any manner. Except with respect to persons and entities that Customer agrees to indemnify as set forth above, nothing express or implied in this Agreement is intended to confer, or will confer, upon any person or entity other than Customer and Customer's permitted assigns any rights, remedies, obligations, or liabilities whatsoever. Customer may not assign, delegate, or transfer this Agreement (in whole or in part), by operation of Law or otherwise, without Stryker's prior written consent. Stryker may assign, delegate, or transfer this Agreement to any of its affiliated entities. Subject to the foregoing, this Agreement will bind and issue to the benefit of the Parties, and their successors and permitted assigns. Stryker reserves the right to amend any of the terms of this Agreement by posting notice on a Stryker designated web site, by email notification to an email address provided by Customer, by providing notice as part of the process in which Customer obtains updates, or by any other legally recognizable form of notice. If Customer does not agree to the amendment, Customer should promptly contact Stryker for instructions. Customer's continued use of a Product after the effective date of any such notice will be deemed Customer's agreement to be bound by such amendments. Except as otherwise set forth in this paragraph, no amendments may be made to this Agreement except in writing signed by both Parties, and any notice required under this Agreement must be provided to the other Party in writing. Except to the extent preempted by federal Law, the Laws of Michigan, other than its conflict-of-Laws principles, govern this Agreement and any claims and disputes (whether contract, tort, or otherwise) arising out of or relating to this Agreement or the Products. The Uniform Computer Information Transactions Act does not apply to this Agreement or any Products. EXCEPT TO THE EXTENT PROHIBITED BY LAW, STRYKER AND CUSTOMER EXPRESSLY WAIVE TRIAL BY JURY WITH RESPECT TO ANY MATTERS OR DISPUTES ARISING UNDER OR RELATING TO THIS AGREEMENT. Any claim or cause of action arising under this Agreement must be commenced within one year after the claim or cause of action arises.

☐ I agree with the Terms and Conditions

☐ I don't agree with the Terms and Conditions

Submit

Release: Smarhex 2.1...

Privacy Statement

Cookie Statement

Surgeon Disclaimer

Terms of use

Contact us

EIFU

Product Info

Copyright © 2026 Stryker Corporat...

Figure 5



Getting started

Navigating the home page

From the home page, users can access the navigation pane at the top of the screen (**Figure 6**) that contains the Dropdown Menu. The initials of the current user are also found here. The home page screen also houses the Surgeon Dashboard. Users may return to the home page from all areas of the site by clicking the home icon in the top left corner of the web page. (**Figure 6**)

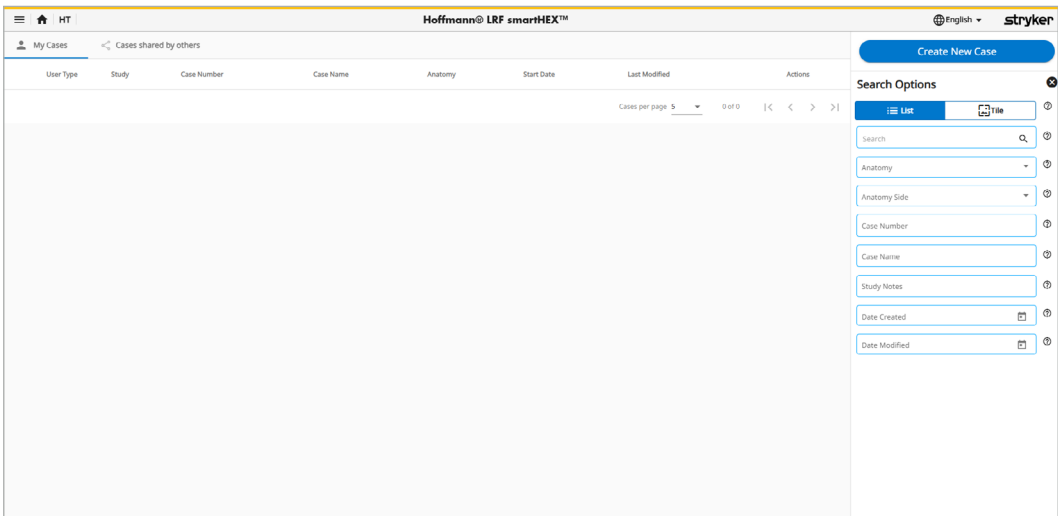


Figure 6

Dropdown menu

The dropdown menu is accessed by clicking on the three horizontal bars in the upper left corner of the display. (**Figure 7**) When opened the dropdown menu displays menu items for:

- **Logout:** logs the user out of the application
- **Profile:** displays the user profile including name, address, and email information; users may also change the default language of the web application
- **Browser compatibility:** displays information on the operating system, browser version, and whether WebGL and cookies are supported (necessary for performance)
- **Dark mode:** switches the display between light and dark modes
- **Help:** opens a new browser tab to the Stryker Hoffmann LRF Hexapod Circular External Fixation System home page.

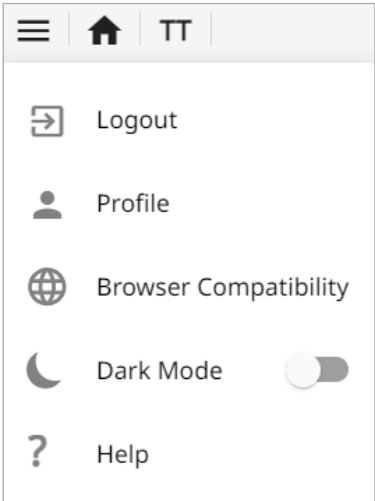


Figure 7

Contact us

At the bottom of each page, select “**Contact us**” to locate the contacts directory for the web application. (**Figure 8**)

- For web application assistance, contact the Stryker customer support team at +1 (844) 393-4933.
- For non-urgent requests, contact the web application help desk at: smartheX@stryker.com
- The web application UDI number is also displayed on this page for reference

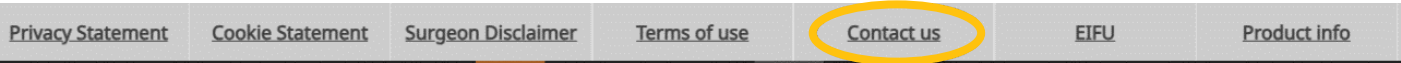


Figure 8

Getting around

Surgeon dashboard

The Surgeon Dashboard is found on the home page of the web application. Within the dashboard, there are two tabs: “My Cases” and “Cases Shared by Others”.

Within the “My Cases” tab, created cases are displayed in a list view (default) or thumbnail view. Toggle between views by selecting the list or tile icon in the upper right of the page. (Figures 9a&b)

Cases may be sorted by Study, Case Number, Case Name, Anatomy, Start Date, or Last Modified (date) by clicking the column title in the header. If sorted, an arrow appears next to the sorted column, indicating the direction of the sort.

The “Cases Shared by Others” tab will show a list of cases shared by other users with the current user account.

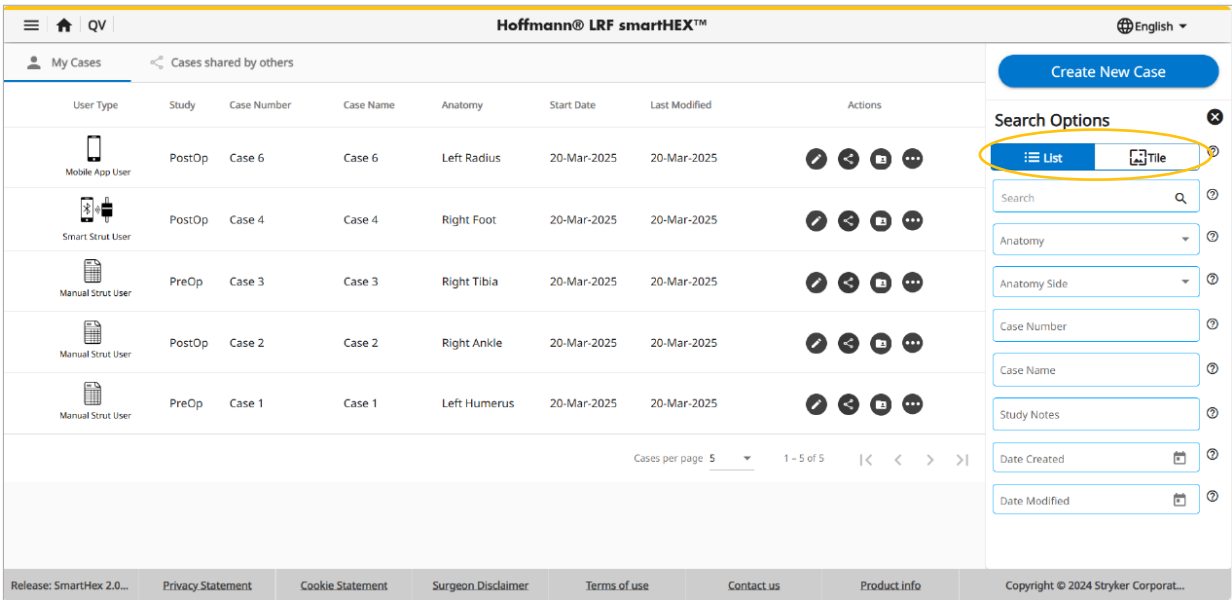


Figure 9a

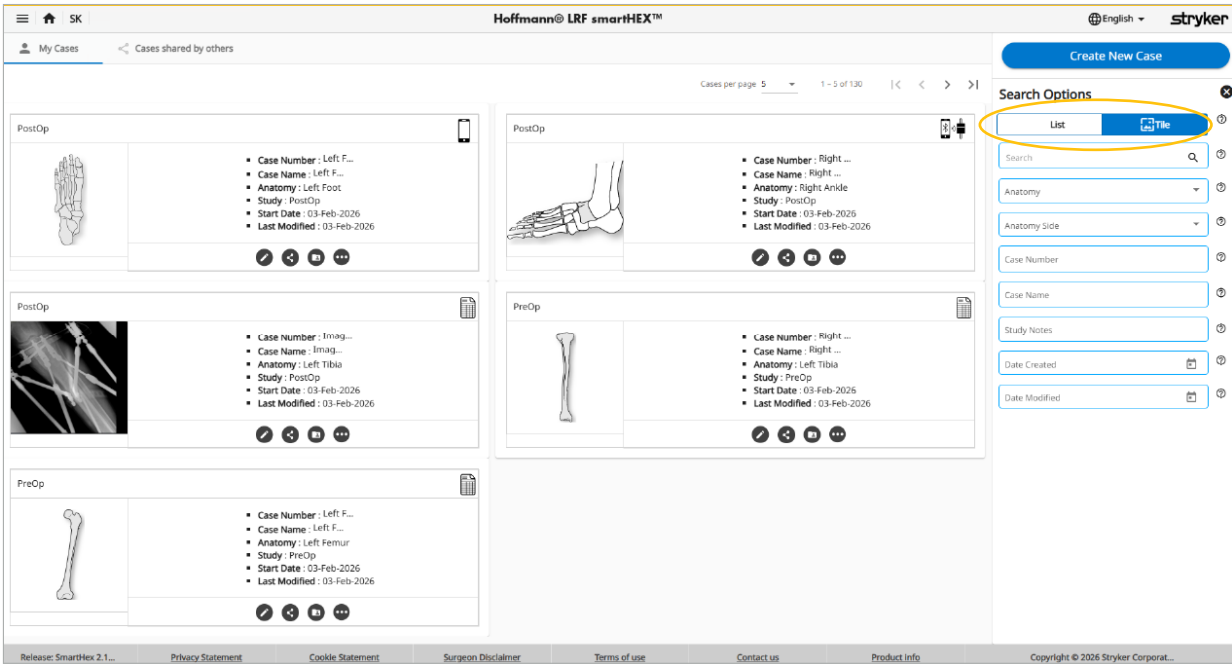


Figure 9b

Getting around

Case details

User type

The application supports three user types:



Mobile strut user

Manual strut user

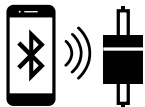
Struts are adjusted manually by the patient or caregiver in accordance with the correction plan generated by the web application. The surgeon provides the patient with the correction plan in printed or digital PDF format.



Mobile app user

Mobile app user

Struts are adjusted manually by the patient or caregiver in accordance with the correction plan generated by the web application. The correction plan is accessed through the patient's HexConnect Mobile Application, which also provides alerts, reminders, and instructions.



Smart strut user

Smart strut user

Struts adjust using smartHEX controller assistance in accordance with the correction plan generated by the web application. The correction plan is accessed through the patient's HexConnect Mobile Application, which also provides alerts, reminders, and instructions.

Study

This defines the workflow: Pre-op (pre-operative) or Post-op (post-operative)

Case number

Customizable case reference number generated by the user

Case name

Customizable case reference name

NOTICE

Do not enter personal health information (PHI) or other personal information in the customizable case fields.

Anatomy

Anatomies supported by the smartHEX application include left and right femur, tibia, humerus, radius, ankle, and foot

Start date

The date the case was created

Last modified

The date the case was last modified



Getting around

Actions

The action icons indicate which actions can be performed in each case.

-  **Edit case:** open a case for editing
-  **Share case:** share a case with another user; sharing a case provides an exact copy of the case to a designated user
-  **View shared versions:** shows a popup of shared cases and who they were shared with (if applicable).
-  **Case summary:** displays a summary of the case
-  **Case status:** Displays additional information including Correction Plan Duration (days), Current Day, Next Strut Change Date, Controller Battery Life (Max/Min), and a link for a Detailed Status Report. **(Figure 10)**

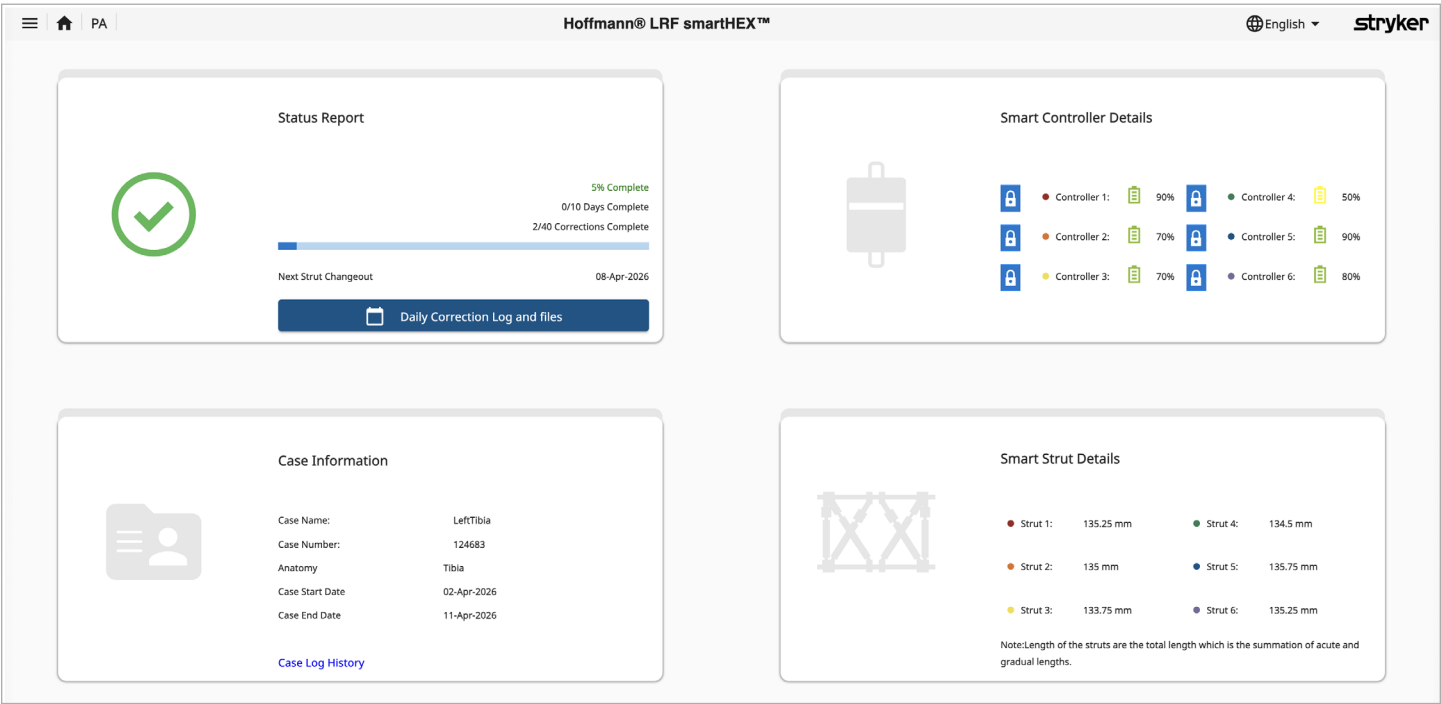


Figure 10

Getting around

Search options

Search for cases using the Search Options field on the right-hand side of the Surgeon Dashboard. **(Figure 11)**

Once a case has been entered into the system, it can be found via search by entering free text, or by selecting any of the following parameters from the drop-down:

- Anatomy
- Anatomy side
- Case number
- Case name
- Study notes
- Date created
- Date modified

After entering search criteria, click on the magnifying glass icon to start the search.

Search Options

List View

Tile View

Search

Anatomy

Anatomy Side

Case Number

Case Name

Study Notes

Date Created

Date Modified

Figure 11

Getting around

Starting a new case



Figure 12

- To create a new case, select the “**Create New Case**” button in the upper right corner of the Surgeon Dashboard page. (Figure 12)
1. In the New Case window, an auto-generated Case ID will be listed, which is a unique control number assigned to this case. Enter the case information into the mandatory fields below, which include the custom case name and case number. (Figure 13)
 2. Mandatory fields are marked with a red asterisk (*).
 3. Once completed, select **Continue to deformity planning**. Details regarding the [Full Length X-ray Analysis](#) Workflow can be found in a later section.
 4. In the next window, “**Anatomy Selection**”, select the anatomy (bone) and side (left or right). Anatomy options include: Femur, Tibia, Humerus, Radius, Foot and Ankle, Left or Right. Alternately, you may select the appropriate bone and side on the skeleton image. (Figure 14)
 5. In the Create Study window, there is an option to enter notes about the case if desired. (Figure 15)
 6. Once all fields are complete, select “**Create Pre-Op Case**” or “**Create Post-Op Case**”.

NOTICE

Do not enter personal health information (PHI) or other personal information in the custom fields. (Figure 15)

The 'New Case' form is displayed with a title bar containing a plus icon and the text 'New Case'. It contains three input fields: 'Case ID' with the value 'CSF16NJB' and a help icon; 'Case Name*' with the value 'Demo' and a help icon; and 'Case Number*' with the value '1234' and a help icon. Below these fields are two blue buttons: 'Full Length X-ray Analysis' and 'Continue to deformity planning'.

Figure 13

The 'Anatomy Selection' form has a title bar with a person icon and the text 'Anatomy Selection'. It features two dropdown menus: 'Anatomy*' with 'Femur' selected and a help icon, and 'Anatomy Side*' with 'Right' selected and a help icon. Below the dropdowns is a diagram of a human skeleton with the right femur highlighted in blue and labeled 'Right Femur'.

Figure 14

The 'Create Study' form has a title bar with a pencil icon and the text 'Create Study'. It includes a text area labeled 'Enter Study Notes'. At the bottom, there are two blue buttons: 'Create Pre-Op case' and 'Create Post-Op case'.

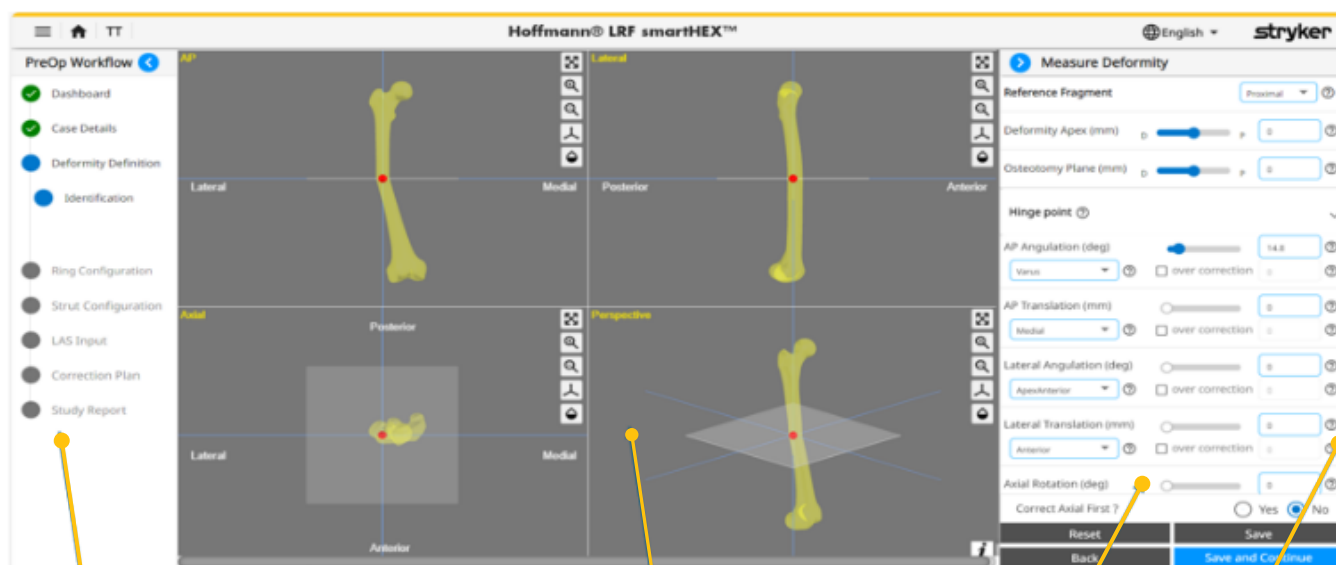
Figure 15

Getting around

Workflow navigation pane

The workflow navigation pane indicates the user's current place (step) within the preoperative or postoperative workflow. A preoperative workflow is used for this example. **(Figure 16)** Completed steps are marked with a green checkmark, the current step is indicated in blue, and future steps are indicated in gray.

Selecting steps in the workflow navigation pane allows forward or backward navigation. Forward navigation is limited to steps that have already been completed (e.g., after moving to an earlier step and then returning to a previous step).



Workflow pane

Multiplanar view

Control pane

Scroll bar

Figure 16

Multiplanar view (MPV)

The **Multiplanar View** is a four-paneled window that displays a representative 3-D bone model of the selected anatomy. Controls within each pane include:

- Expansion toggle:** maximizes the selected pane to fill the window
- Zoom in**
- Zoom out**
- Toggle grid lines**
- Toggle bone model transparency**

Control pane

Deformity definition controls are located in the Control Pane under the “**Measure Deformity**” header. Controls can be input by directly entering text, using the sliders, or selecting an option from the drop-down. Use the scroll bar located on the right side of the Control Pane to see all fields.



Getting around

System workflows

Pre-operative workflow

The pre-operative workflow is used to plan the possible methods for mounting the frame in advance of surgery.

In the pre-op workflow, the deformity is defined using the deformity measurement tool or manual input of parameters. Then type, position, and orientation of the moving and reference rings are entered. With this information, the software generates various strut combinations to correct the deformity as defined.

You can experiment with different values for the moving and reference ring parameters and calculate possible strut combinations. The smartHEX software automatically searches for the strut combination that will result in the fewest number of strut change outs and adjustments, given the defined deformity and frame configuration.

It is recommended to start with the pre-operative workflow to allow advanced planning and pre-construction of the frame, which may streamline the OR experience.

NOTICE

Use the pre-operative workflow to plan the construction and mounting of the frame on the patient. After mounting the frame on the patient intraoperatively, adjustments can be made to the deformity definition and frame configuration settings in the post-operative workflow of the web application.

To change an existing pre-op case to a post-op case:

Navigate back to the Surgeon Dashboard page.

1. Open the appropriate case for editing by clicking on the pencil icon in the Actions column
2. Click **“Convert to Post-Op”** in the Actions column. (Figure 17)
3. A **“Convert to Post-Op”** link is also located at the bottom right of the correction plan page. The post-operative workflow is used when the frame has already been mounted on the patient.

The primary difference between the pre-operative and post-operative workflows is that in the pre-operative workflow, upon input of the deformity, ring, and strut parameters, the software computes a range of possible solutions. In the post-operative workflow, the mounted frame parameters including placement are input, and the software computes a solution specific to the case.

Converting a pre-operative case

If the post-operative workflow has been initiated via the conversion of a pre-op case, the case parameters will auto-populate based on the pre-op inputs. Adjustments may be made to correct the inputs to accurately represent the surgically applied frame construct (e.g., osteotomy location is different than planned).

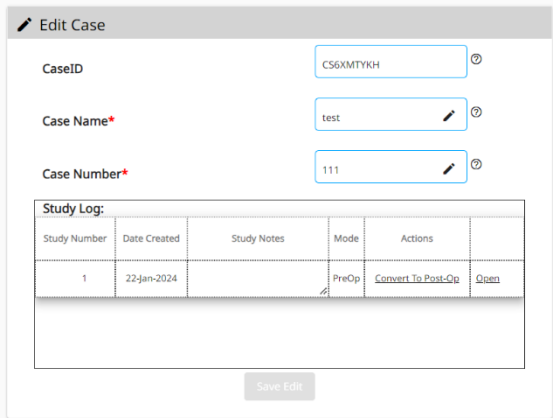


Figure 17

Getting around

Manual input deformity definition

The deformity may be defined in two ways: Image Assisted Deformity Definition or Manual Input Deformity Definition.

Manual input may be used when all deformity parameters are known beforehand. To use the manual input function, select the Manual Input Deformity Definition option and click “Continue”. (Figure 18)

Defining the deformity

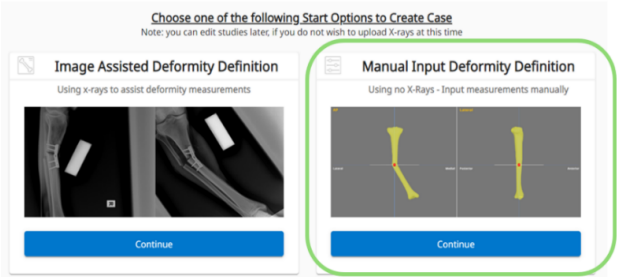


Figure 18

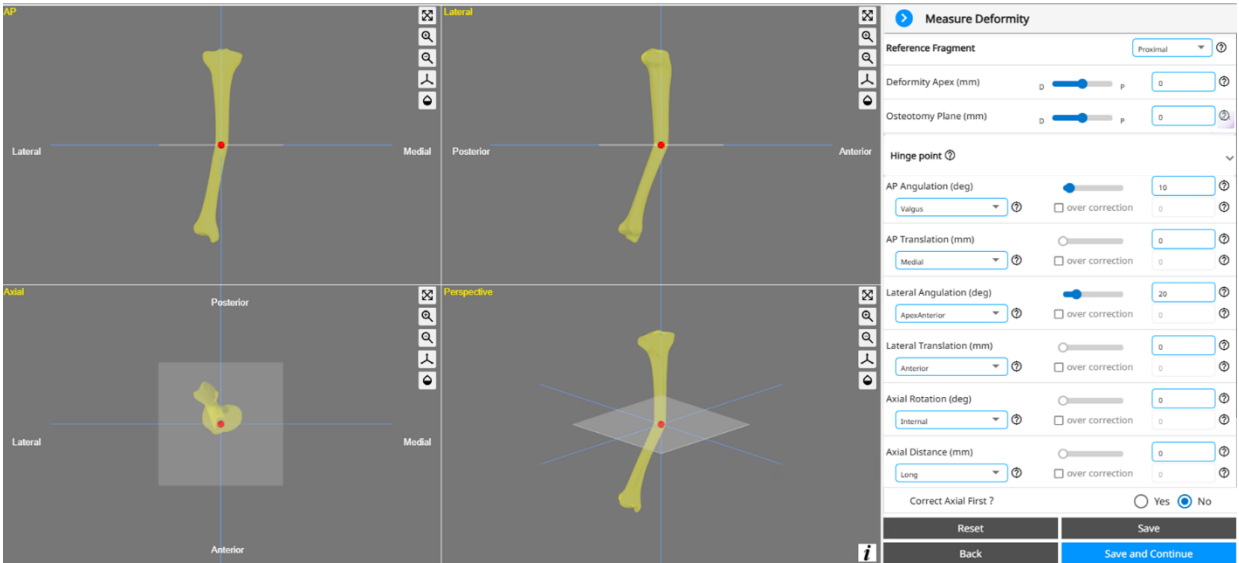


Figure 19

The Deformity Definition page allows users to define the deformity in the anteroposterior (AP), mediolateral (ML), and axial planes by inputting the following deformity parameters:

Reference fragment

Use the drop-down to select proximal or distal. (Figure 20)

- **Deformity apex:** enter the apex of the deformity in millimeters (mm)
- **Osteotomy plane:** enter the location of the osteotomy on the bone in millimeters (mm). In the MPV window, the deformity apex is represented by a red dot and the osteotomy plane is represented as a white line.

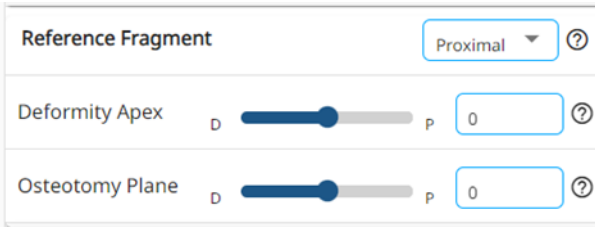


Figure 20

Getting around

Hinge point

If a hinge point other than the center of the bone is desired, select a different hinge point by clicking on the down arrow to access the hinge point menu. **(Figure 21)** The hinge point menu allows input of AP, Lateral, and Axial offsets that move the hinge point of the correction. In **Figure 21**, the hinge point (shown as a green dot in the MPV) has been moved 41.5mm laterally to place the hinge point of the correction on the fibula. The green dot may also be positioned by dragging and dropping.

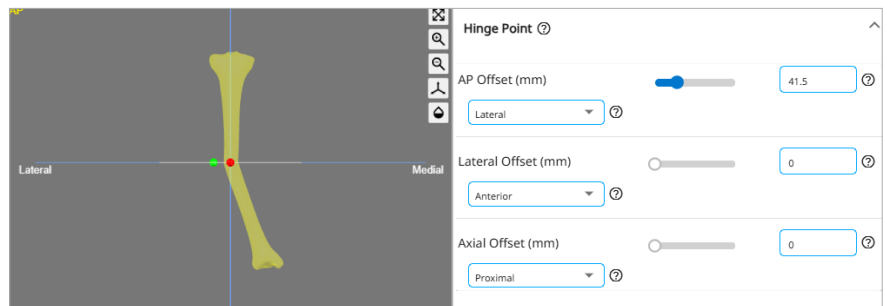


Figure 21

AP view

- **AP Angulation (deg):** enter a value in degrees; select varus or valgus from the drop-down **(Figure 22)**
- **AP Translation (mm):** enter a value in millimeters (mm); select medial or lateral from the drop-down

Lateral view

- **Lateral Angulation (deg):** enter a value in degrees; select apex anterior or apex posterior from the drop-down **(Figure 23)**
- **Lateral Translation (mm):** enter a value in millimeters (mm); select anterior or posterior from the drop-down

Axial view

- **Axial Rotation (deg):** enter a value in degrees; select internal or external from the dropdown **(Figure 24)**
- **Axial Distance (mm):** enter a value in millimeters; select long or short from the dropdown

Correct axial first?

Select “Yes” for the axial portion of the deformity correction plan to be performed before the angulation, translational, and rotational components of the correction. If this is not the preferred order, select “No” **(Figure 25)**

NOTICE

Depending on the type of osteotomy, correcting axially first may avoid bony impingement at the osteotomy site in certain cases.

Overcorrection

AP Angulation (deg), AP Translation (mm), Lateral Angulation (deg), Lateral Translation (mm), Axial Rotation (deg), and Axial Distance (mm) all have the ability to overcorrect. Checking the overcorrection check box and entering a value will force the correction plan to overcorrect by the input amount. Overcorrection may be useful in cases where rebound or regression of the finished correction is expected. **(Figure 26)**

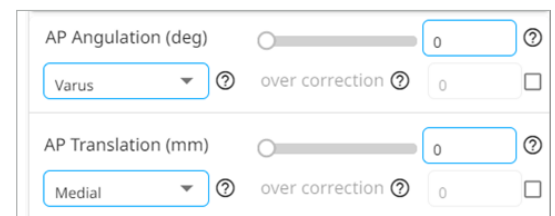


Figure 22

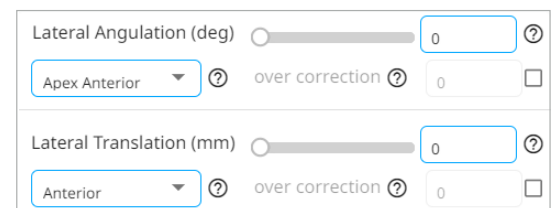


Figure 23

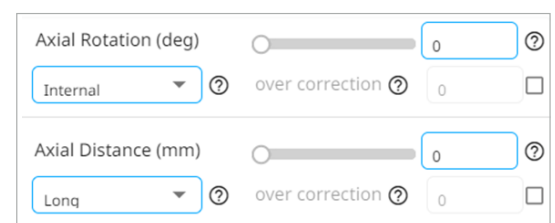


Figure 24



Figure 25

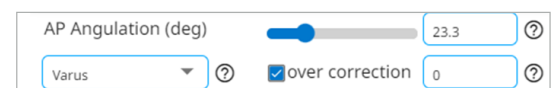


Figure 26

Getting around

Image assisted deformity definition

The Image Assisted Deformity Definition tool may be used as an alternative to entering in the deformity definition manually. After clicking “**Continue**” to open the tool, the page will display anteroposterior (AP) and lateral image panes where the AP and lateral radiographic images are uploaded. (Figures 27-28)

Uploading X-ray images

NOTICE

The following image file formats can be uploaded to the application: .jpg, .jpeg, .jpe, .jfif, .png, .bmp, .tif, .tiff, and .dcm.

Clicking the upload icon will prompt a dialog box for selecting the appropriate image. Uploaded images are scanned for patient health information (PHI) or patient identifying information (PII), and this information is removed prior to importing the images to the server.

Scaling images

The imported images must be scaled pre-operatively to ensure that the measured deformity values are accurate. If a dedicated scaling marker is not available, one can be made using a combination of components with known dimensions. Ensure that the marker is located at the level of the deformity to create an accurate scale. Scale the images by selecting either the scaling circle or scaling line tools.

Scaling line tool

To use the line tool, drag and drop the red endpoints of the Scaling Line to the edges of a known element in the X-ray. In the example, the Scaling Line is placed on a 100mm linear marker. (Figures 29-30)

CAUTION

The accuracy of the scaling line is critical for the accurate generation of the correction plan by the software.

Scaling circle tool

To use the scaling circle tool, drag and drop the red scaling circle onto a known circular element in the X-ray. Then, adjust the diameter using the mouse’s scroll wheel or trackpad. In the example, the circle tool is placed on the circular marker which has a diameter of 20mm. (Figures 29-30)

CAUTION

The accuracy of the scaling circle is critical for accurate generation of the correction plan by the software.

Enter scaling factors

Enter the scale factors in millimeters in the AP View Scale and Lateral View Scale fields.

Cropping the image

The images may be cropped to remove unwanted information. Crop images by dragging and dropping the blue crop markers along the edges of each image.

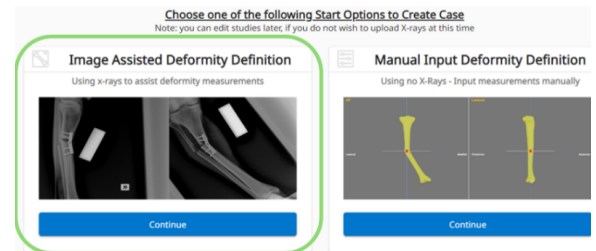


Figure 27

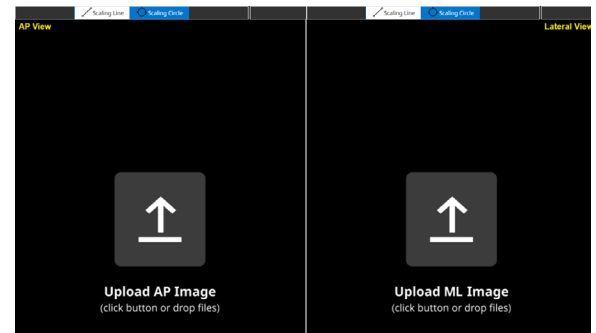


Figure 28

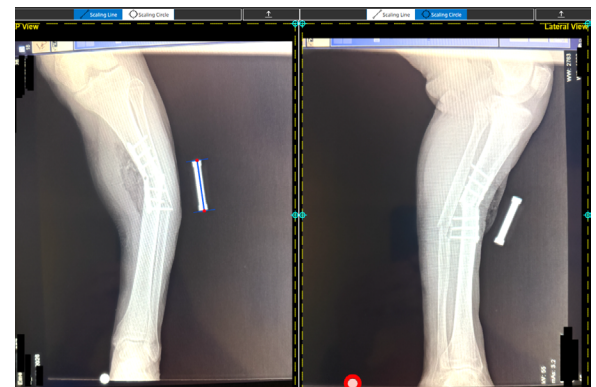


Figure 29

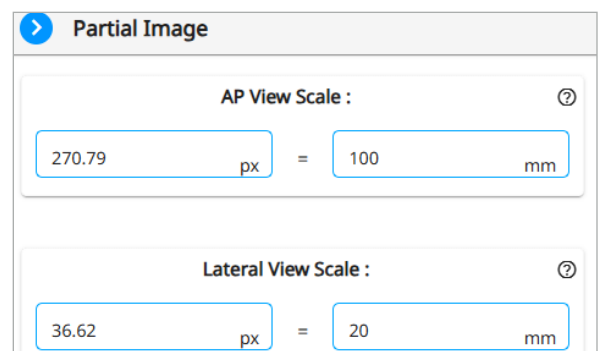


Figure 30

Getting around

Deformity measurement toolbar



Figure 31

The deformity measurement toolbar contains tools to manipulate the X-ray images and bone model to align with and match the deformity. Details for the function of each control can be accessed by hovering over the icons. The function of each tool is described in **Table 1**.

NOTICE

The image or bone model may also be moved by dragging and dropping.

Table 1

Symbol	Description
	Rotate clockwise/counter-clockwise (fine) Rotates the X-ray image one degree in the appropriate direction (available when Image is selected).
	Rotate clockwise/counter-clockwise (coarse) Rotates the X-ray image 45 degrees in the appropriate direction (available when Image is selected).
	Image zoom Zooms the X-ray image in or out (only available when Image is selected).
	Expand view Expands the selected view (AP or Lateral) to take up the entire view area.
	Ruler tool Places a ruler tool on the image. The endpoints of the tool may be dragged anywhere on the image to measure the distance between the points.
	Angle tool Places an angle tool on the image. The endpoints of the tool may be dragged anywhere on the image to measure the angle between two points.
	Increase/decrease opacity Controls the opacity of the X-ray image. Only available when image is selected.

Getting around

Bone overlay tool

The same deformity controls within the Deformity Measurement Toolbar are available in the Bone Overlay Tool. The goal of using the Bone Overlay Tool is to manipulate the yellow bone model into the same size and shape as the deformed bone of the X-ray image.

Align the yellow bone model to the X-ray image to get the deformity values. Using the tools or drag-and-drop, line up the X-ray image and the bone model by matching anatomical landmarks (e.g. lateral/medial tibial plateau, tibial plafond, medial malleolus, tibial shaft).

Use the tools in the toolbar to manipulate the X-ray or the bone model. The reshaped bone model will reflect the deformity measurements.

Steps to measure the deformity

1. Select **"Bone Overlay"** (which automatically deselects the Line Tool).
2. Select the image to be manipulated. Toggle between the X-ray image and the bone model by clicking on the associated icons (**Figure 32**).
3. Adjust the deformity parameters using the slider tool or by entering values into the textbox fields.
 - a. Adjust the deformity apex (represented by a red dot) and the osteotomy plane (represented by a white line) using the corresponding sliders in the toolbar.
 - b. Adjust the AP View values for angulation and translation.
 - c. In the AP View, select varus or valgus and medial or lateral.
 - d. In the Lateral View, adjust the lateral view values for angulation and translation.
 - e. In the Lateral View, select apex anterior or apex posterior and anterior translation or posterior translation.
 - f. In the Axial View, adjust the axial view values for rotation (degrees) and distance (mm).
 - g. In the Axial View, select external or internal and short or long.

Details for the function of each control can be accessed by hovering over the question mark icon next to the textbox fields. After inputting the deformity parameters, the deformity values auto-populate and appear on the Deformity Definition page. Click Save and Continue to move on to the next step of the workflow: [Ring Configuration](#)

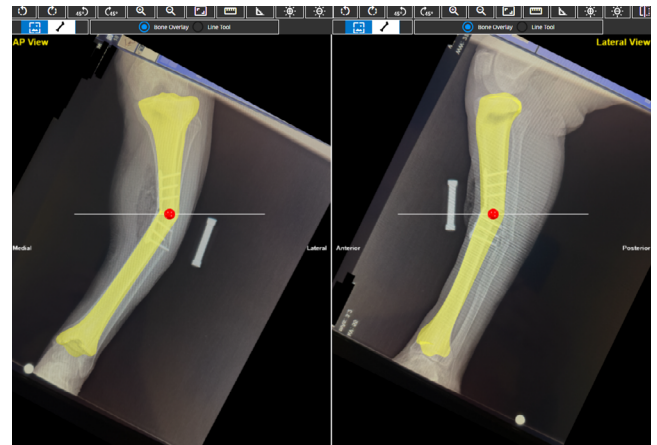


Figure 32

Partial Deformity Measurement			
Reference Fragment		Proximal	
Deformity Apex (mm)	91.8		
Osteotomy Plane (mm)	91.8		
Hinge point			
AP Angulation (deg)	23.3		
Varus		over correction	0
AP Translation (mm)	6.3		
Lateral		over correction	0
Lateral Angulation (deg)	0		
Apex Posterior		over correction	0
Lateral Translation (mm)	5.9		
Posterior		over correction	0
Axial Rotation (deg)	0		
Internal		over correction	0
Axial Distance (mm)	0		
Long		over correction	0
Correct Axial First?		Yes No	

Figure 33

Getting around

Line tool

Selecting “**Line Tool**” activates the line tool feature. (**Figures 34a&b**)

The deformity measurement screen allows users to define the deformity by directly measuring the deformity. The reference fragment is represented by a one vertical blue line intersected by two blue lines, and the moving fragment is represented by one vertical green line intersected by two green lines. The lines are positioned mid-diaphyseal on the bone fragments, and the deformity angles and translations are displayed.

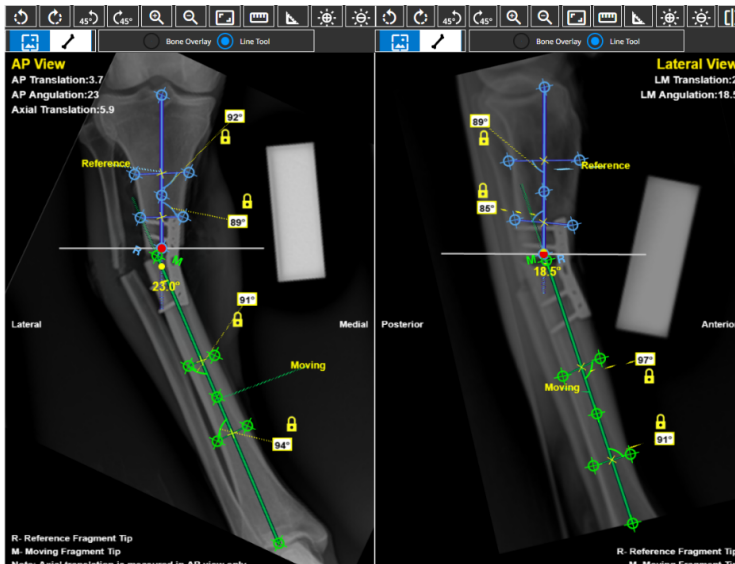


Figure 34a

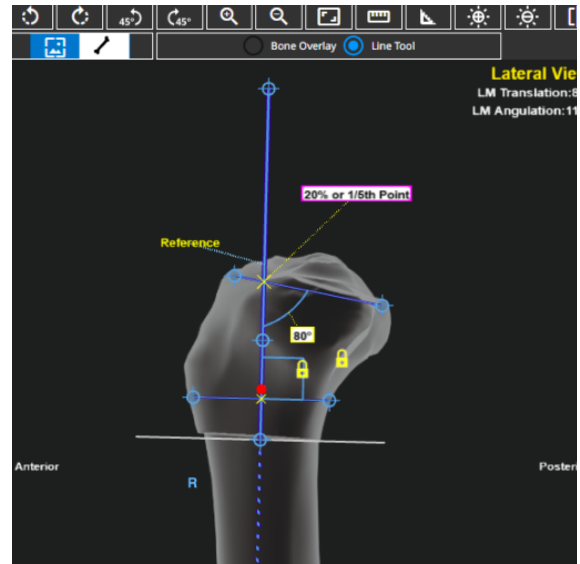


Figure 34b

Steps to measure the deformity:

1. Select “**Line Tool**” (automatically deselects Bone Overlay).
2. Using the target circles on the endpoints of the vertical lines, adjust the lines to represent the mid-diaphyseal lines of the bone fragments.
3. To achieve better mid-diaphyseal alignment, position the target circles of the horizontal lines on the bone cortex.
4. Lock/unlock the lines using the lock icon to manipulate the lines on fragments by changing its pivot point.
5. Achieve variable intersection points 10, 20 (or) 1/5th, 30, 1/3rd, 40, 50, 60, 2/3rd, 70, 80 (or) 4/5th, 90 by moving the intersection point between vertical and horizontal lines.
6. Position the endpoints of the vertical lines at the edge of the bone or deformity (the red dot represents the deformity apex). The distance between M and R (where M is the moving fragment tip and R is the reference fragment tip) represents the distance of translation.
7. Repeat in the lateral view.

After inputting the deformity parameters, the deformity values auto-populate and appear on the Deformity Definition page. Click Save and Continue to move on to the next step of the workflow:

Ring Configuration

Partial Deformity Measurement

Reference Fragment
Proximal

Deformity Apex (mm)
D
P
91.8

Osteotomy Plane (mm)
D
P
91.8

Hinge point

AP Angulation (deg)
23.3

Varus
over correction
0

AP Translation (mm)
6.3

Lateral
over correction
0

Lateral Angulation (deg)
0

Apex Posterior
over correction
0

Lateral Translation (mm)
5.9

Posterior
over correction
0

Axial Rotation (deg)
0

Internal
over correction
0

Axial Distance (mm)
0

Long
over correction
0

Correct Axial First?
Yes
No

Figure 35

Getting around

Ring configuration

The ring configuration screen allows users to define the reference and moving ring types and sizes and the planned ring placement on the bone. The ring configuration page displays the multiplanar view (MPV) on the left side of the screen and the control panels for the reference and moving rings on the right. The reference fragment (chosen during deformity definition) is displayed at the top of the control panel.

NOTICE

For detailed information on the placement of the rings and the operation of the Hoffmann LRF System, refer to the Instruction for Use (ifu.stryker.com) and the corresponding Hoffmann LRF Operative Technique.

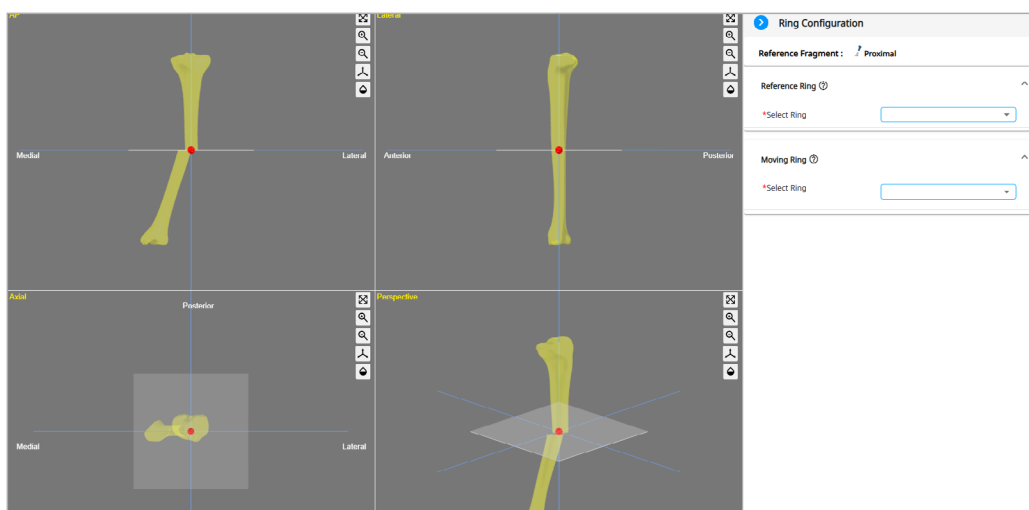


Figure 36

Configure the reference ring

1. Select the reference ring size and type from the drop-down field. The selected ring will appear on the bone model in the multiplanar view. The default position for the reference ring is 50mm from the osteotomy.
2. Adjust the reference ring parameter by using the slider tools or entering values in the textbox fields.
 - a. **Axial Translation (mm):** adjust value in millimeters
 - b. **Axial Rotation (deg):** adjust value and select External or Internal from the drop-down; can adjust in degrees or holes
 - c. **AP Translation (mm):** adjust value in millimeters and select Medial or Lateral from the drop-down
 - d. **AP Tilt (deg):** adjust value in degrees for non-orthogonal reference rings; select Medial Side Down or Lateral Side Down from the drop-down
 - e. **Lateral Translation (mm):** adjust value in millimeters and select Anterior or Posterior from the drop-down
 - f. **Lateral Tilt (deg):** adjust value in degrees for non-orthogonal reference rings; select Anterior Side Down or Posterior Side Down from the drop-down.

Figure 37

Getting around

Configure the moving ring

1. Select the moving ring size and type from the drop-down field.
The selected ring will appear on the bone model in the multiplanar view.
2. In pre-op mode only, click **"Suggest Moving Ring Parameters"**. This will place the moving ring in a nominal position and allow for modification of the moving ring parameters.
3. Adjust the moving ring parameters by using the slider tools or entering values in the textbox fields.
 - a. **Ring to Ring Distance Measurement:** Toggling on the Ring to Ring Distance (mm) feature measures the distance between rings based on their position on the bone model.
 - b. **Axial Translation (mm):** adjust value in millimeters
 - c. **Axial Rotation (deg):** adjust value and select External or Internal from the drop-down; can adjust in degrees or holes
 - d. **AP Translation (mm):** adjust value in millimeters and select Medial or Lateral from the drop-down
 - e. **AP Orientation (deg):** adjust value in degrees for non-orthogonal reference rings; select Medial Side Down or Lateral Side Down from the drop-down
 - f. **Lateral Translation (mm):** adjust value in millimeters and select Anterior or Posterior from the drop-down
 - g. **Lateral Orientation (deg):** adjust value in degrees for non-orthogonal reference rings; select Anterior Side Down or Posterior Side Down from the drop-down

Click Save and Continue to move on to the next step of the workflow: Select [Strut Holes and Offset Plates](#)

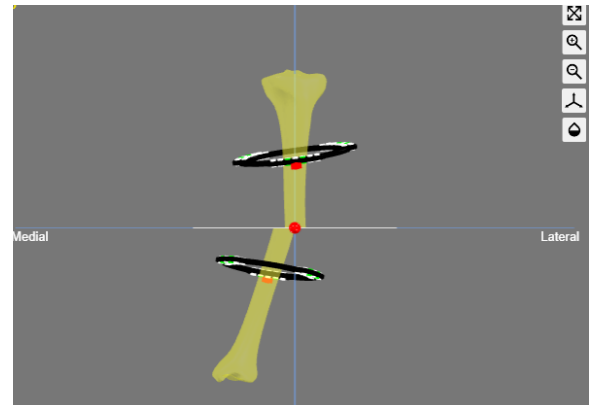


Figure 38

Figure 39

Getting around

Select strut holes and offset plates

Selection of strut holes

Strut placement defaults to the nominal positions, indicated in green. **(Figures 40a&b)** The struts may be repositioned to within the range of holes indicated in white. Hole availability will depend on ring size.

1. Select a strut by clicking the hole with the associated strut number. When the strut selection is made, certain holes will change from white to blue. **(Figure 40c)** The blue holes indicate the locations where the struts may be repositioned.
2. Click the desired blue hole to reposition the strut. **(Figure 40d)** Repeat for any other affected struts.

Selection of offset plates

Standard or long offset plates may be utilized with a frame construct. Offset plates can be repositioned to different holes similarly to the struts.

When using offset plates:

1. Navigate to the control panel. **(Figure 41)**
2. Select **“Standard Offset”** or **“Long Offset”** by checking the appropriate box next to the associated strut number.
3. Select whether the offset plate is on the Top or Bottom of the ring. The rings will display the correct offset plate in the proper orientation from a top-down view of the frame.
4. Repeat for all offset plates on both the proximal and distal rings.

Example:

In **Figure 42**, the proximal ring displays Struts 1 and 2 with a standard and long offset plate positioned on top of the ring, Struts 3 and 4 with a standard and long offset plate positioned on the bottom of the ring, and Struts 5 and 6 with no offset plates.

Input changed notification

If strut combinations were previously calculated, they must be regenerated to reflect the new strut position and offset plate position inputs. **(Figure 43)**

Click **“Calculate Strut Combinations”** at the bottom of the page to continue to select strut combinations for the frame construct.

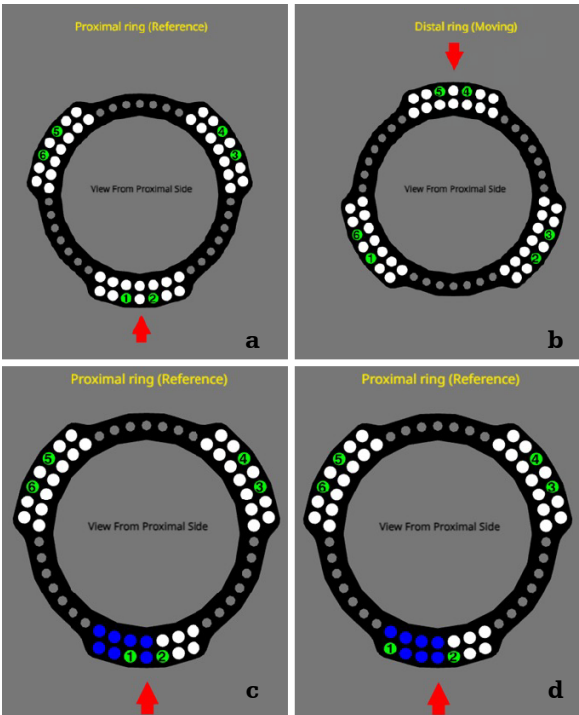


Figure 40

Proximal		Standard Offset	Long Offset	Flip	?
	Strut 1	☒	☐	Top Bottom	
	Strut 2	☐	☒	Top Bottom	
	Strut 3	☒	☐	Top Bottom	
	Strut 4	☐	☒	Top Bottom	
	Strut 5	☐	☐	Top Bottom	
	Strut 6	☐	☐	Top Bottom	

Figure 41

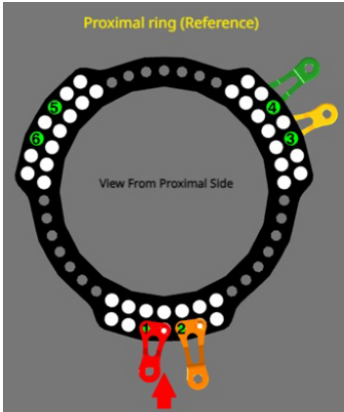


Figure 42

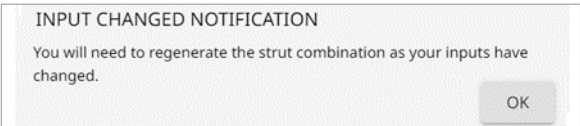


Figure 43



Getting around

Strut configurations

When in the pre-operative workflow, clicking Calculate Strut Combinations optimizes the strut placements and lengths for minimal strut changes and adjustments over the course of the correction period.

Select strut combinations

Strut Combination options for the frame construct are displayed in the Select Strut Combination table.

Option 1 (default) is the software-generated “best-case” strut combination with the minimum number of strut changes and adjustments.

The other options may be selected by clicking the option header. Successful selection is indicated by blue fill and a highlighted column. **(Figure 44)**

Use the slider bar at the bottom of the table to access additional Option columns (if available).

Strut lengths

Strut lengths for gradual and acute adjustments are displayed in the Strut Lengths table. These will change depending on what Strut Combination option has been selected.

Click Save and Continue to move on to the next step of the workflow: [Limiting Anatomical Structure \(LAS\)](#).

Select Strut Combination			
Struts	☒ Option1	☐ Option2	☐ Option3
 Strut 1	MEDIUM	MEDIUM	MEDIUM
 Strut 2	SHORT	SHORT	SHORT
 Strut 3	SHORT	MEDIUM	SHORT
 Strut 4	MEDIUM	MEDIUM	LONG
 Strut 5	MEDIUM	MEDIUM	MEDIUM
 Strut 6	MEDIUM	MEDIUM	MEDIUM
Changeout	0	0	0
Adjustment	1	1	1
Strut Lengths			
	Gradual (mm)	Acute (mm)	
 Strut 1	163.75	0.0	
 Strut 2	117.0	16.5	
 Strut 3	117.0	36.0	
 Strut 4	188.75	14.5	
 Strut 5	189.0	16.0	
 Strut 6	188.75	9.0	

Figure 44

Getting around

Limiting anatomical structure

The limiting anatomical structure (LAS) page allows users to define the anatomical structure at risk during a correction. An LAS may be a neurovascular bundle, soft tissue envelope, skin graft, or the cortical ends of a fracture that may be affected during the correction process.

Defining the LAS is important because the software computes the total correction time by applying the maximum distraction rate to the LAS location.

In this step, the LAS is identified in relation to the tip of the reference fragment in the AP, lateral, and axial planes.

(Figure 45)

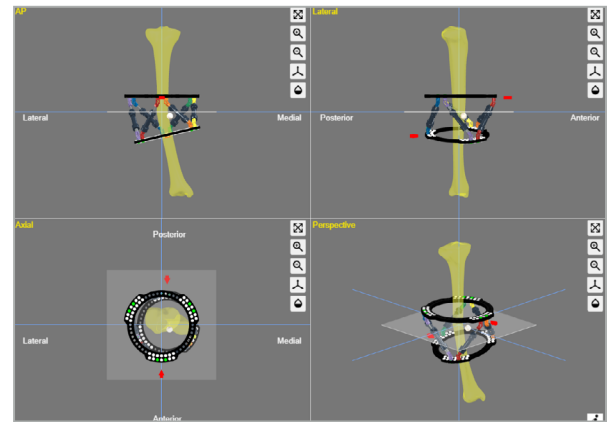


Figure 45

The LAS can be defined by dragging and dropping the LAS marker (represented by a white dot) in the AP and Lateral view panes. To define the LAS in the control panel using the slider tool or entering values into the textbox fields. **(Figure 46)**

1. **AP Offset (mm):** adjust the value in millimeters and select Medial or Lateral from the drop-down
2. **Lateral Offset (mm):** adjust the value in millimeters and select Anterior or Posterior from the drop-down
3. **Axial Offset (mm):** adjust the value in millimeters and select Proximal or Distal from the drop-down
4. **Maximum Distraction Rate (mm/day):** adjust the value in millimeters per day; 1.0mm/day is the standard of care
5. After inputting the LAS parameters, click **"Calculate Correction Time"**. The Correction Time: field will automatically update with the calculated correction time in days.
6. To override the calculated correction days, toggle on **"Override Correction Days"** and enter the desired number of days in the textbox field. Using the override feature may result in an unsuitable distraction rate.

CAUTION

It is recommended that the user defines the limiting anatomical structure and calculates a minimum correction time in accordance with the prescribed distraction rate.

CAUTION

Overriding the calculated minimum correction time may result in unsuitable distraction rates exceeding 1.0mm/day.

LAS

Limiting Anatomical Structure

*LAS allows you to define any anatomical structures at risk (Critical structure) during the correction. It can be a neurovascular bundle, soft tissue envelope, skin graft, or bone ends of the fracture, that may be affected during the correction process.

AP Offset (mm)

25.7

?

Medial

Lateral Offset (mm)

15

?

Anterior

Axial Offset (mm)

13.2

?

Distal

Max. Distraction Rate (...)

1

?

Calculate Correction Time

Correction Time: 8 Days

☐
Override Correction Days

0

?

Reset

Save

Back

Save and Continue

Figure 46



Getting around

Correction plan

The correction plan page allows users to generate a correction plan for the defined deformity based on the inputs from previous steps. The correction plan may be started on any day, with up to four time-stamped corrections per day.

- 1. **Correction Start Date:** enter the date by clicking on the date field to open a calendar view or manually enter the date using the indicated date format. The default date is the current date. The selected date may not fall before the current date.
- 2. **Number of Corrections:** this is corrections per day; select 1, 2, 3 or 4 corrections from the drop-down. The selected number of corrections will automatically generate the same number of Time # slots immediately below.
- 3. **Time #:** in each time slot, select the correction time from the drop-down.
- 4. **Select Appointment Days:** the software can adjust the correction plan to accommodate strut changes and adjustments on scheduled clinic days. To enable this feature, toggle to the “on” position. Toggling on will activate the Surgeon Appointment calendar where the clinic or office days can be selected.
- 5. Click “**Create Correction Plan**” to generate the plan.

Correction Plan

Correction Start Date

03/04/2026

Number of Corrections

4

Time 1:

08:00

Time 2:

12:00

Time 3:

16:00

Time 4:

20:00

Select Appointment Days

Surgeon Appointment
(Clinic/Office days)

APR 2026

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Figure 47

Correction plan strategy

When the “**Select Appointment Days**” feature is not utilized, the correction plan algorithm computes the maximum overlap across all struts for strut changeouts in order to determine potential changeout dates. The algorithm then selects the earliest date opportunity. The algorithm uses a similar strategy for acute adjustments, minimizing surgeon visits when acute adjustments and strut changeouts overlap.

When the “**Select Appointment Days**” feature is utilized, the algorithm tries to reconcile the surgeon-selected dates with the strut change-out and acute adjustment ranges. If no possibility exists, the earliest date opportunity is selected.

In both instances, the algorithm will attempt to skip an intermediate strut size. The algorithm also uses future correction plan data to minimize acute adjustments. Suitable gradual and acute lengths are maintained during changeouts in order to minimize total surgeon-patient interactions.

Getting around

The correction plan page shows the Strut Replacement Schedule, the Strut Change Schedule, and the Correction Schedule. (**Figure 48**)

Color Indicators

Strut Acute Adjustment Range

Strut Acute Adjustment Appointment Day

Strut Changeout Range

Strut Changeout Appointment Day

Strut Replacement schedule

Correction Range	From	To	Strut ID	Old Strut Size	New Strut Size
49 - 294	15-Apr-2026 Correction #49	15-Jun-2026 Correction #294	Strut 2	LONG	MEDIUM
147 - 225	09-May-2026 Correction #147	29-May-2026 Correction #225	Strut 3	-	-
148 - 213	09-May-2026 Correction #148	26-May-2026 Correction #213	Strut 2	-	-

Correction Schedule

Strut Length in:

Whole Numbers

Decimals

			Strut 1			Strut 2			Strut 3			Strut 4			Strut 5			Strut 6			
No.	Date	Time	Clicks	Gradual (mm)	Acute (mm)	Clicks	Gradual (mm)	Acute (mm)	Clicks	Gradual (mm)	Acute (mm)	Clicks	Gradual (mm)	Acute (mm)	Clicks	Gradual (mm)	Acute (mm)	Clicks	Gradual (mm)	Acute (mm)	
0	Initial Position		0	183.25	53.50	0	241.00	12.00	0	240.75	35.00	0	189.00	3.00	0	188.75	8.50	0	122.50	34.50	
1	03-Apr-2026 Friday	08:00	0	183.25	53.50	0	241.00	12.00	0	240.75	35.00	↺1	188.75	3.00	0	188.75	8.50	0	122.50	34.50	Revise Study
2		12:00	↺1	183.50	53.50	↺1	240.75	12.00	↺1	240.50	35.00	↺1	188.50	3.00	↺1	188.50	8.50	↺1	122.75	34.50	Revise Study
3		16:00	0	183.50	53.50	0	240.75	12.00	↺1	240.25	35.00	↺1	188.25	3.00	↺1	188.25	8.50	↺1	123.00	34.50	Revise Study
4		20:00	↺1	183.75	53.50	↺1	240.50	12.00	↺1	240.00	35.00	↺1	188.00	3.00	0	188.25	8.50	↺1	123.25	34.50	Revise Study
5	04-Apr-2026 Saturday	08:00	0	183.75	53.50	↺1	240.25	12.00	↺1	239.75	35.00	↺1	187.75	3.00	↺1	188.00	8.50	↺1	123.50	34.50	Revise Study
6		12:00	↺1	184.00	53.50	↺1	240.00	12.00	↺1	239.50	35.00	↺1	187.50	3.00	↺1	187.75	8.50	↺1	123.75	34.50	Revise Study
7		16:00	0	184.00	53.50	0	240.00	12.00	↺1	239.25	35.00	↺1	187.25	3.00	↺1	187.50	8.50	↺1	124.00	34.50	Revise Study

Figure 48

A color code legend is displayed at the top of the page to indicate which colors represent different activities within the schedule.

- Strut Acute Adjustment Range (light pink)
- Strut Acute Adjustment Appointment Day (pink)
- Strut Changeout Range (light yellow)
- Strut Changeout Appointment Day (orange)

Strut replacement schedule

- **Correction range:** the color-coded range of days when the strut changeout is possible
- **From:** the date the strut changeout window begins
- **To:** the date the strut changeout window ends
- **Strut ID:** the strut number that requires a change
- **Old Strut size:** the size of the strut being replaced
- **New Strut size:** the size of the replacement strut



Getting around

Correction Schedule

Strut length can be displayed in millimeters in “Whole Numbers” or “Decimals”. Select the preferred units next to “**Strut Length In:**” above the Correction Schedule Table. Selecting decimal units will display the 0.25mm minimum correction increments.

Correction progress

To display the progress of the correction for any day or individual adjustment, click on the number in the Correction No. column. This will prompt a status window which will display the state of the correction at the indicated time.

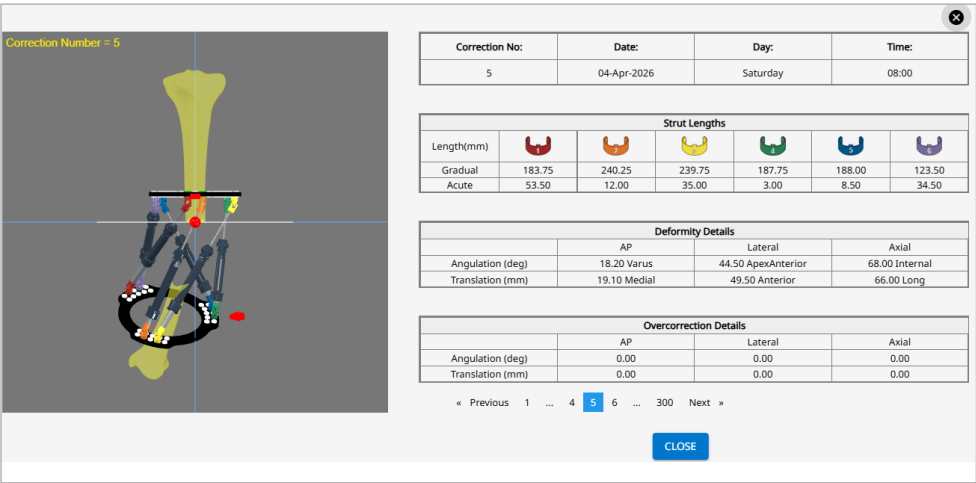


Figure 49

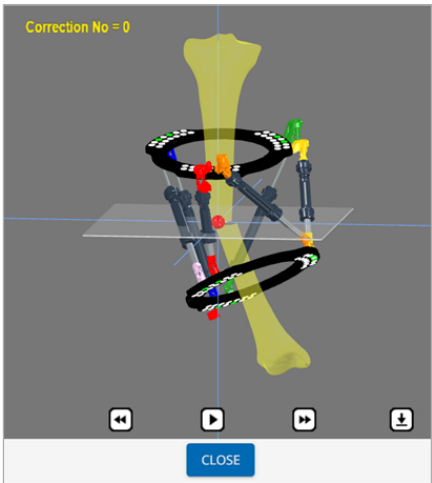


Figure 50

Run simulation

A simulation of the correction plan can be seen by clicking Run Simulation in the control panel. This feature can only be used after the correction plan is generated.

Press the play button (**Figure 50**) to start the animation that simulates the correction through completion. Press the pause button to pause the animation. Press the forward or rewind buttons to advance the animation one frame forward or backward.

The perspective view can be manipulated as desired within the window using cursor controls.

Click “Close” to return to the Correction Plan page.

Convert to the post-operative workflow

The current preoperative correction plan can be converted to a post-operative plan by clicking Convert to Post-Op. (**Figure 51**)

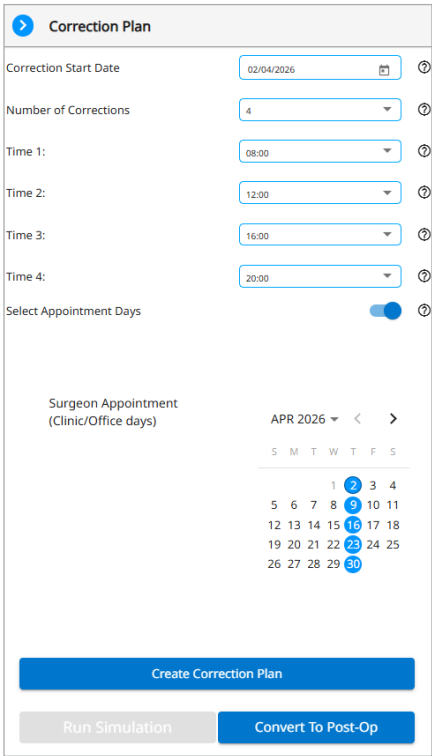


Figure 51



Getting around

Study report

The study report page (**Figure 52**) provides a complete report of the correction plan including:

- Case Details
- Deformity Definition
- Hinge point definition
- Reference Ring
- Moving Ring
- Strut Configuration (including offset plates)
- Limiting Anatomical Structure
- Correction Plan
- Strut Change Schedule
- Surgeon Visit Plan (for changing struts)

The Study Report may be saved in two PDF formats for archival and printing.

- Download Surgeon Report: click to download the full detailed report.
- Download Patient Report: click to download the patient-friendly report with limited details including the Strut Replacement Schedule and the Correction Schedule.

This concludes the **Pre-Operative Workflow** guidance.



Figure 52



Getting around

Post-operative workflow

Deformity definition

In the post-operative workflow, the deformity is defined based on the outcome of the surgical frame application by capturing the “as built” frame parameters. If a pre-operative correction plan was created for the case and converted to post-op, all previously input values will carry into the post-operative workflow.

The deformity definition page in the post-operative workflow is identical to that in the pre-operative workflow. Post-op X-rays can be used to measure deformity parameters to update the pre-op (planned) inputs.

As in the pre-operative workflow, these pages allow users to fully define the deformity in the AP, lateral, and axial planes using either manual deformity parameter entry or with image assisted deformity definition.

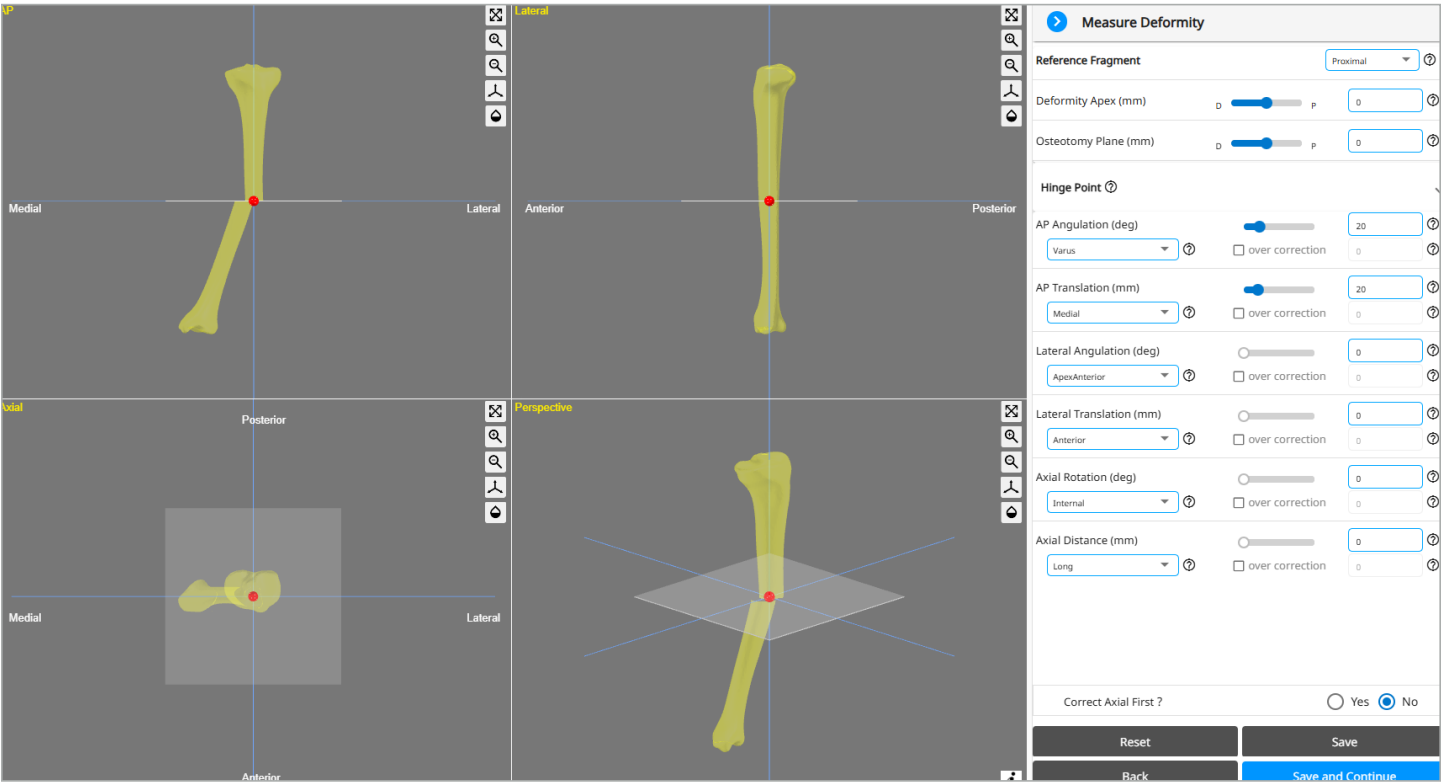


Figure 53

Ring configuration

In the post op ring configuration page, define the Reference and Moving Ring type and size, and the post-operative placement of the reference ring on the bone. The Ring Configuration page features the multiplanar view (MPV) and control panel for the ring configuration. (Figure 53)

NOTICE

In the post-operative workflow, the reference ring position is fully determined by the lengths and types of the struts used on the surgically applied frame. Therefore, until strut types and lengths are inputted in subsequent steps, the position of the moving ring may appear inaccurate.

WARNING

The user must ensure Reference and Moving Ring type, size and placement inputs are consistent with the surgically applied frame. Accurate inputs are critical for the software application to generate an accurate correction plan.

Getting around

Reference ring

Any pre-operative ring configuration inputs will auto-populate.

1. Select the reference ring size and type from the drop-down field (format: Type-Size, Material). The selected reference ring will appear on the bone model in the multiplanar view. The default position for the reference ring is 50mm from the osteotomy plane.
2. Adjust the reference ring parameters by using the slider tools or entering values in the textbox fields.
 - a. **Axial Translation (mm):** adjust value in millimeters
 - b. **Axial Rotation (deg):** adjust value and select External or Internal from the drop-down; can adjust in degrees or holes
 - c. **AP Translation (mm):** adjust value in millimeters and select Medial or Lateral from the drop-down
 - d. **AP Orientation (deg):** adjust value in degrees for non-orthogonal reference rings; select Medial Side Down or Lateral Side Down from the drop-down
 - e. **Lateral Translation (mm):** adjust value in millimeters and select Anterior or Posterior from the drop-down
 - f. **Lateral Orientation (deg):** adjust value in degrees for non-orthogonal reference rings; select Anterior Side Down or Posterior Side Down from the drop-down

Reference ring position may also be configured in the AP and Lateral views. Hover over the ring in the multiplanar view until it turns blue (**Figure 54**) and drag and drop to the correct position.

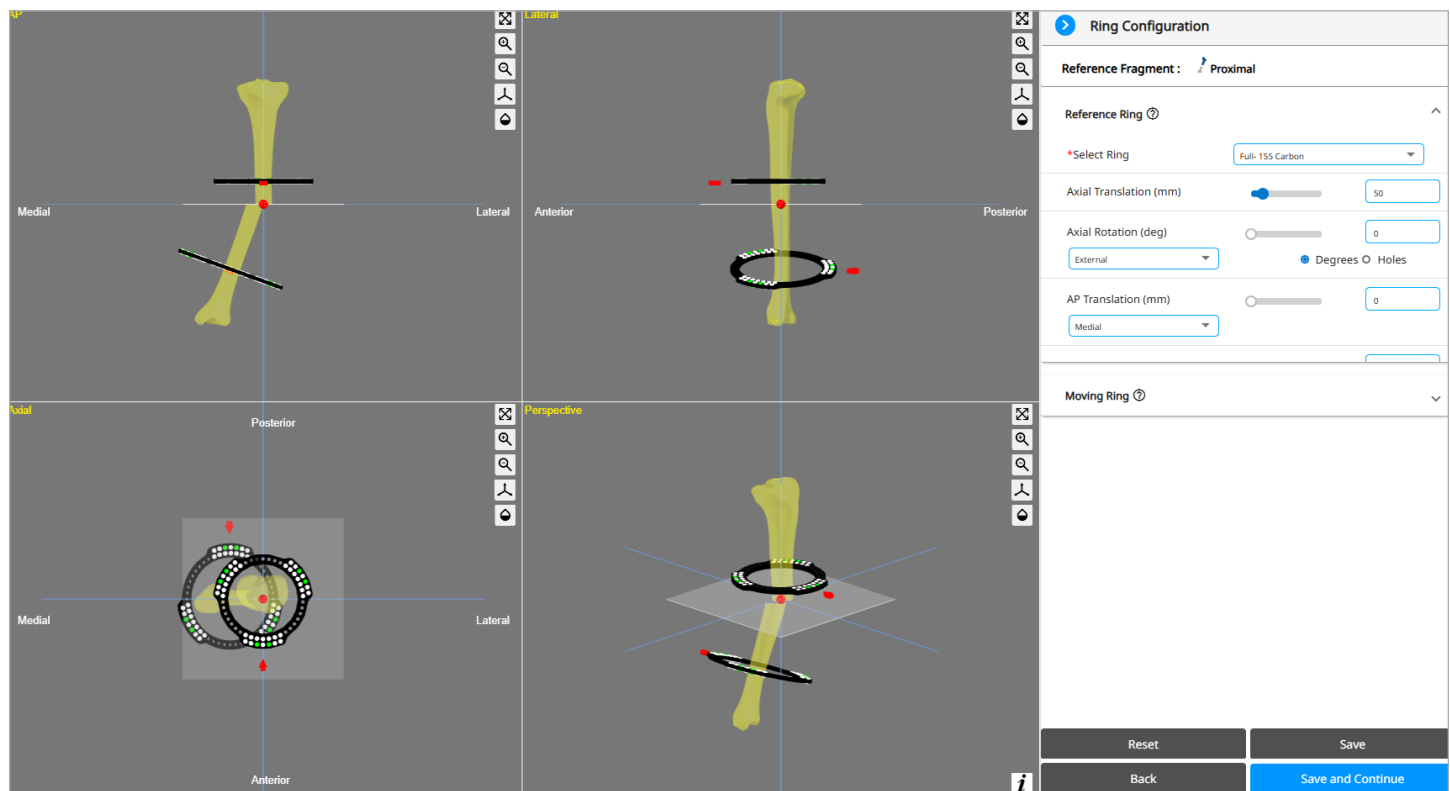


Figure 54



Getting around

Mounting Parameter Tool

The Mounting Parameter Tool helps users define the ring offsets with respect to the anatomy by allowing direct measurement of these values off the post-op radiographs. Enable the tool by toggling-on the Mounting Parameter Tool on the Ring Configuration page. The toolbar at the top can be used to manipulate the X-ray images. Hover over the toolbar icons for descriptions of the functions of each control. **(Table 2)**

Table 2

Symbol	Description
	Rotate clockwise/counter-clockwise (fine) Rotates the X-ray image one degree in the appropriate direction (available when Image is selected).
	Rotate clockwise/counter-clockwise (coarse) Rotates the X-ray image 45 degrees in the appropriate direction (available when Image is selected).
	Image zoom Zooms the X-ray image in or out (only available when Image is selected).
	Expand view Expands the selected view (AP or Lateral) to take up the entire view area.
	Increase/decrease opacity Controls the opacity of the X-ray image (only available when Image is selected)
	Flip image (Lateral only) Flips the image in the lateral view

Getting around

NOTICE

The image may be moved using a drag-and-drop method if desired.

1. In the AP View panel, align the L-shaped markers with the lateral edges of the reference ring. (**Figure 55**). The origin marker (represented by a target circle) is placed at the apex of the deformity.
2. The Ellipse Tool offers an alternative way to define mounting parameters.
 - a. Activate the ellipse tool by pressing the “w” key (“p” key for lateral) and aligning the ellipse to the interior of the reference ring.
 - b. Place the origin marker at the tip of the reference fragment (osteotomy).
 - c. Press the “q” key or the “o” key to return to the L-shaped tool.
3. Position the opposite end of the origin line as a mid-diaphyseal line extending through the end of the bone segment. (**Figure 56**)
4. Repeat Steps 1-3 in the Lateral View pane but align the ring markers anterior and posteriorly.

CAUTION

Ensure the L-shaped markers line up with the bottoms of the ring at the edge of the outer diameter. Inaccurate positioning of the markers will impact the accuracy of the measurement.

Click Save and Continue to move on to the next step of the workflow:
[Selection of Strut Holes and Offset Plates.](#)

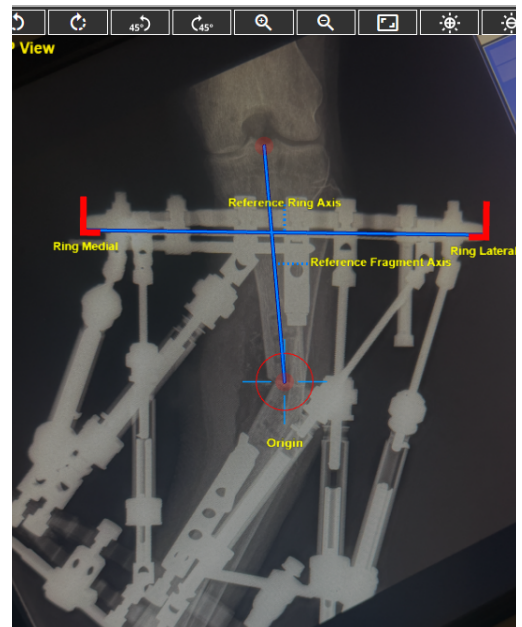


Figure 55

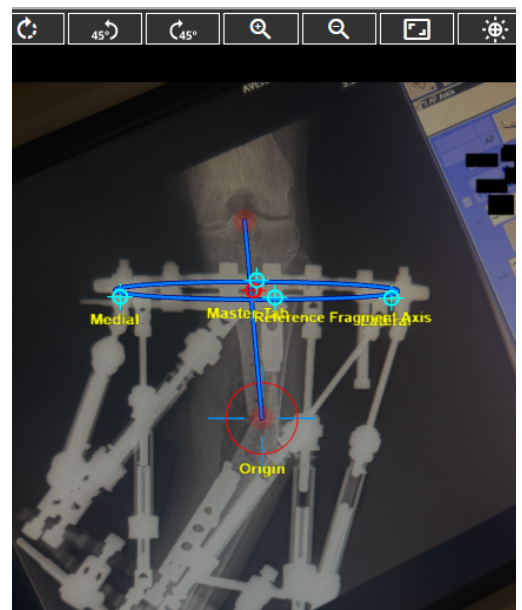


Figure 56

Getting around

Selection of strut holes

Any pre-operative strut location inputs will auto-populate, otherwise locations will default to the nominal positions, indicated in green. **(Figures 57a&b)** The struts may be repositioned to within the range of holes indicated in white. Hole availability will depend on ring size.

1. Select a strut by clicking the hole with the associated strut number. When the strut selection is made, certain holes will change from white to blue. **(Figure 57c)**. The blue holes indicate the locations where the strut may be repositioned.
2. Click the desired blue hole to reposition the strut. **(Figure 57d)**. Repeat for any other affected struts.

Selection of offset plates

Any pre-operative offset plate inputs will auto-populate. Ensure that all post-operative inputs accurately represent the surgically applied frame construct, which may mean removing, adding, resizing, or relocating offset plates.

To configure offset plates:

1. Navigate to the control panel **(Figure 58)**
2. Select **“Standard Offset”** or **“Long Offset”** by checking the appropriate box next to the associated strut number.
3. Select whether the offset plate is on the Top or Bottom of the ring. The rings will display the correct offset plate in the proper orientation from a top-down view of the frame.
4. Repeat for all offset plates on both the proximal and distal rings.

Example:

In **Figure 59**, the proximal ring displays struts 1 and 2 with a standard and long offset plate positioned on top of the ring, struts 3 and 4 with a standard and long offset plate positioned on the bottom of the ring, and struts 5 and 6 with no offset plates.

Input changed notification

If strut combinations were previously calculated, they must be regenerated to reflect the new strut position and offset plate position inputs. **(Figure 60)**

Click **“Calculate Strut Combinations”** at the bottom of the page to continue to select strut combinations for the frame construct.

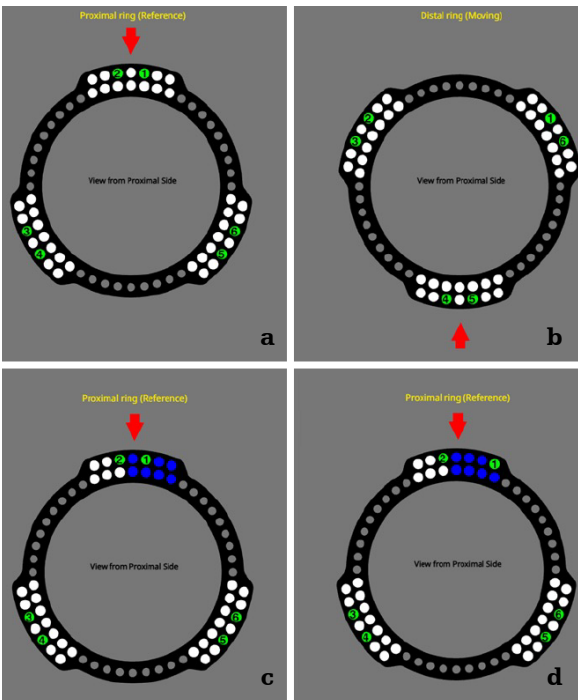


Figure 57

Proximal		Standard Offset	Long Offset	Flip	?
	Strut 1	☒	☐	Top Bottom	
	Strut 2	☐	☒	Top Bottom	
	Strut 3	☒	☐	Top Bottom	
	Strut 4	☐	☒	Top Bottom	
	Strut 5	☐	☐	Top Bottom	
	Strut 6	☐	☐	Top Bottom	

Figure 58

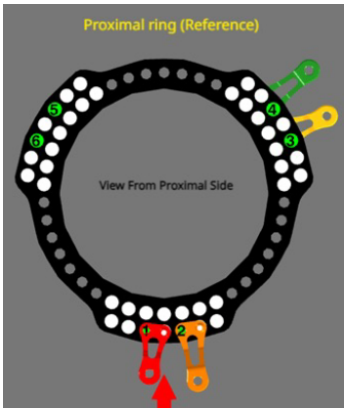


Figure 59

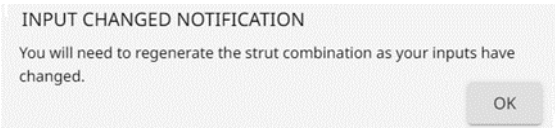


Figure 60



Getting around

Strut configurations

Any pre-operative strut configuration inputs will auto-populate and will likely require updates. The post-operative inputs must match the strut sizes and lengths of the surgically applied frame construct.



Figure 61

Select strut combination

1. Select the strut size from the dropdown field (sizes: mini, x-short, short, medium, long)
2. Use the slider tool or enter values manually into the textbox field for Gradual Length (mm) and Acute Length (mm)
3. Repeat for Struts 2-6

 WARNING

The user must ensure that the type and length of all six struts entered into the software application are consistent with the actual frame applied to the patient. This is critical for the software application to generate an accurate correction plan.

NOTICE

The Web Application considers 1mm of strut travel on each end of the strut as a buffer to prevent strut jamming due to minor errors when reading strut lengths. For this reason, struts should not be positioned at their maximum or minimum lengths. When assembling the frame, always allow at least 1mm between the ends of the struts and the set value

The difference between the physical strut ranges and the values allowed by the software are shown in **Table 3** on the following page.



Getting around

Table 3: Physical strut ranges vs. software range limits

Strut	Physical			Software		
	Gradual range (mm)	Acute range (mm)	Total range (mm)	Gradual range (mm)	Acute range (mm)	Total range (mm)
Mini	84-105	N/A	84-105	85-104	N/A	85-104
Extra short	102-126	0-24	102-150	103-125	0-22	103-147
Short	116-154	0-38	116-192	117-153	0-36	117-189
Medium	134-190	0-56	134-246	135-189	0-54	135-243
Long	160-242	0-68	160-310	161-241	0-68	161-309

Calculate moving ring position

The Moving Ring position is defined by the strut lengths, so it is unknown until strut sizes and lengths have been input and the Calculate Moving Ring Position button is clicked. The frame model in the multiplanar view will update once the software computes the entry.

Click Save and Continue to move on to the next step of the workflow: [Limiting Anatomical Structure \(LAS\)](#).

Getting around

Limiting anatomical structure

The limiting anatomical structure (LAS) page allows users to define the anatomical structure at risk during a correction. An LAS may be a neurovascular bundle, soft tissue envelope, skin graft, or the cortical edges of a fracture that may be affected during the correction process.

In this step, the LAS is identified in relation to the reference fragment tip in the AP, lateral, and axial planes. **(Figure 62)**

The LAS can be defined by dragging and dropping the LAS marker (represented by a white dot) in the AP and Lateral view panes. To define the LAS in the control panel using the slider tool or entering values into the textbox fields. **(Figure 63)**

1. **AP Offset (mm):** adjust the value in millimeters and select Medial or Lateral from the drop-down
2. **Lateral Offset (mm):** adjust the value in millimeters and select Anterior or Posterior from the drop-down
3. **Axial Offset (mm):** adjust the value in millimeters and select Proximal or Distal from the drop-down
4. **Maximum Distraction Rate (mm/day):** adjust the value in millimeters per day; 1.0mm/day is the standard of care
5. After inputting the LAS parameters, click **"Calculate Correction Time"**. The Correction Time: field will automatically update with the calculated correction time in days.
6. To override the calculated correction days, toggle on **"Override Correction Days"** and enter the desired number of days in the textbox field. Using the override feature may result in an unsuitable distraction rate.

CAUTION

It is recommended that the user defines the limiting anatomical structure and calculates a minimum correction time in accordance with the prescribed distraction rate.

CAUTION

Overriding the calculated minimum correction time may result in unsuitable distraction rates exceeding 1.0mm/day.

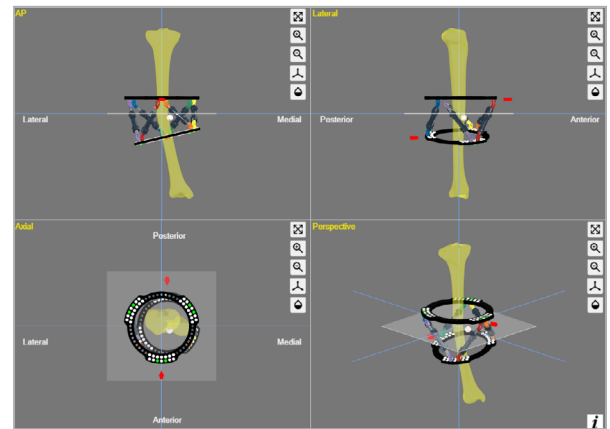


Figure 62

LAS

Limiting Anatomical Structure

*LAS allows you to define any anatomical structures at risk (Critical structure) during the correction. It can be a neurovascular bundle, soft tissue envelope, skin graft, or bone ends of the fracture, that may be affected during the correction process.

AP Offset (mm)

25.7

?

Medial

Lateral Offset (mm)

15

?

Anterior

Axial Offset (mm)

13.2

?

Distal

Max. Distraction Rate (...)

1

?

Calculate Correction Time

Correction Time:

8 Days

Override Correction Days

0

?

Reset

Save

Back

Save and Continue

Figure 63



Getting around

Correction plan

The correction plan page allows users to generate a correction plan for the defined deformity based on the inputs from previous steps. The correction plan may be started on any day, with up to four time-stamped corrections per day.

1. **Correction Start Date:** enter the date by clicking on the date field to open a calendar view or manually enter the date using the indicated date format. The default date is the current date. The selected date may not fall before the current date.
2. **Number of Corrections:** select 1, 2, 3 or 4 corrections from the drop-down. The selected number of corrections will automatically generate the same number of Time # slots immediately below.
3. **Time #:** in each time slot, select the correction time from the drop-down.
4. **Select Appointment Days:** the software can adjust the correction plan to accommodate strut changes and adjustments on scheduled clinic days. To enable this feature, toggle to the on position. Toggling on will activate the Surgeon Appointment calendar where the clinic or office days can be selected.
5. Click **“Create Correction Plan”** to generate the plan.
6. Once the correction plan has been created, modifying Correction Start Date, Number of Corrections, or any Surgeon Appointment Days will require the creation of a new correction plan by clicking on **“Create Correction Plan”**.

Correction Plan

Correction Start Date

02/04/2026

Number of Corrections

4

Time 1:

08:00

Time 2:

12:00

Time 3:

16:00

Time 4:

20:00

Select Appointment Days

Surgeon Appointment
(Clinic/Office days)

APR 2026

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1

2

3

4

5

6

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Create Correction Plan

Figure 64

Getting around

The correction plan page shows the Strut Replacement Schedule, the Strut Change Schedule, and the Correction Schedule. A color code legend is displayed at the top of the page to indicate which colors represent different activities within the schedule.

- Strut Acute Adjustment Range (light pink)
- Strut Acute Adjustment Appointment Day (pink)
- Strut Changeout Range (light yellow)
- Strut Changeout Appointment Day (yellow)

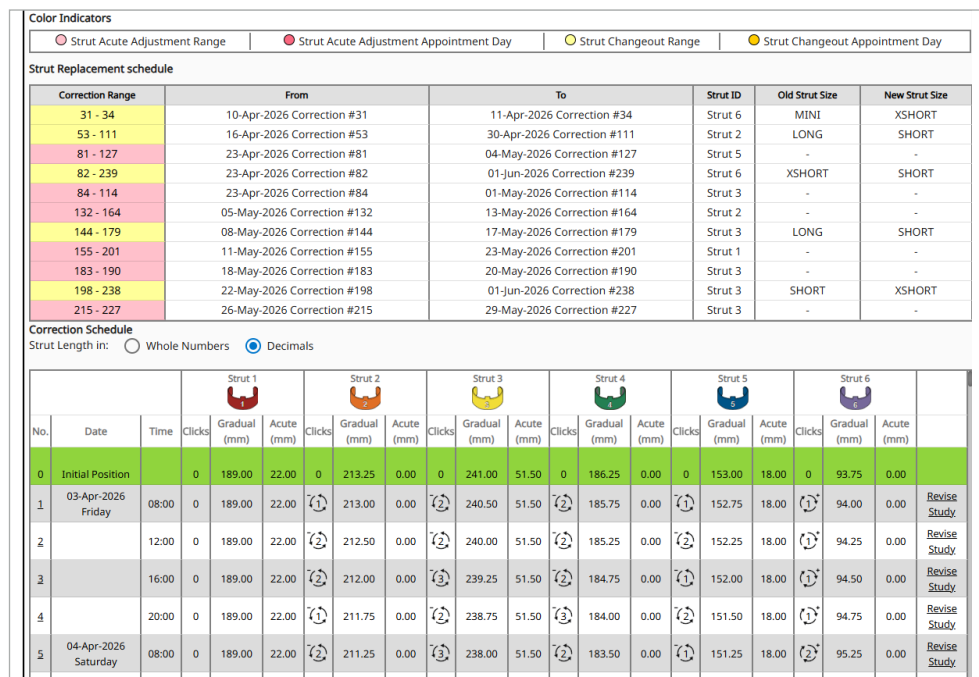


Figure 65

Strut replacement schedule

- Correction Range: the color-coded range of days when the strut changeout is possible
- From: the date the strut changeout window begins
- To: the date the strut changeout window ends
- Strut ID: the strut number that requires a change
- Old Strut Size: the size of the strut being replaced
- New Strut Size: the size of the replacement strut

Correction schedule

Strut length can be displayed in millimeters in "Whole Numbers" or "Decimals". (**Figure 66**) Select the preferred units next to "Strut Length In:" above the Correction Schedule Table. Selecting decimal units will display the 0.25mm minimum correction increments.

To perform a strut change-out or to make an acute strut adjustment before a scheduled appointment day:

- Hover the cursor over the desired adjustment range;
- A pop-up message will contain additional information

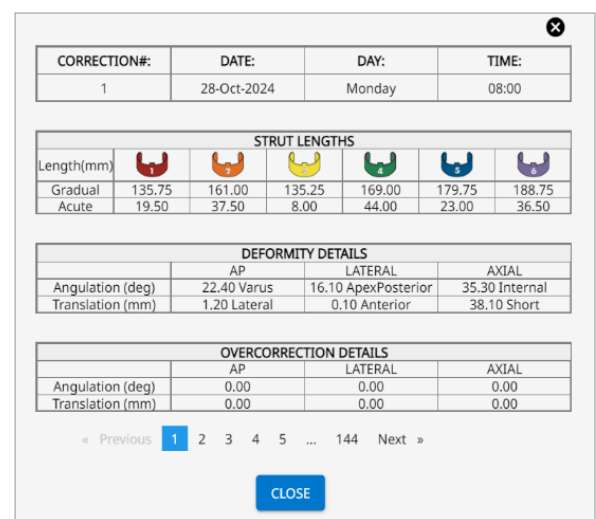


Figure 66



Getting around

Correction progress

To display the progress of the correction for any day or individual adjustment, click on the number in the Correction No. column. This will prompt a status window which will display the state of the correction at the indicated time.

Run simulation

A simulation of the correction plan can be seen by clicking Run Simulation in the control panel. This feature can only be used after the correction plan is generated.

Press the play button (**Figure 67**) to start the animation that simulates the correction through completion. Press the pause button to pause the animation. Press the forward or rewind buttons to advance the animation one frame forward or backward.

The perspective view can be manipulated as desired within the window using cursor controls.

Click “Close” to return to the Correction Plan page. (**Figure 68**)

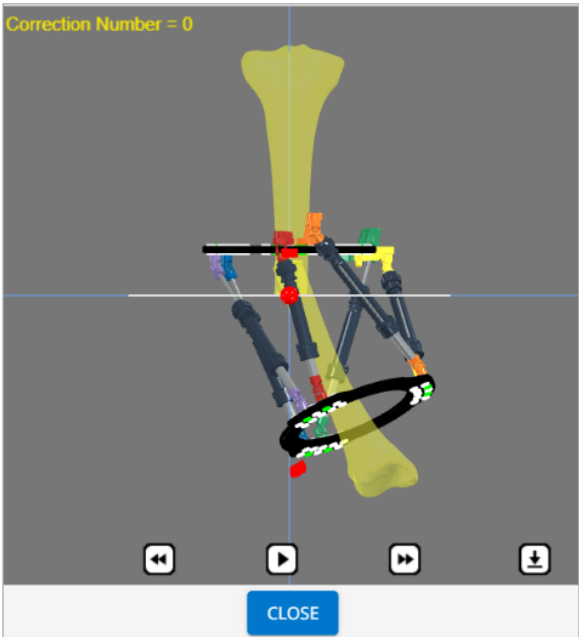


Figure 67

>

Correction Plan

Correction Start Date

02/04/2026

Number of Corrections

4

Time 1:

08:00

Time 2:

12:00

Time 3:

16:00

Time 4:

20:00

Select Appointment Days

Surgeon Appointment
(Clinic/Office days)

APR 2026

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Create Correction Plan

Figure 68



Getting around

Study report

The study report page (**Figure 69**) provides a complete report of the correction plan including:

- Case Details
- Deformity Definition
- Hinge point definition
- Reference Ring
- Moving Ring
- Strut Configuration (including offset plates)
- Limiting Anatomical Structure
- Correction Plan
- Strut Change Schedule
- Surgeon Visit Plan (for changing struts)



Figure 69

Getting around

Selecting the patient user type

The patient user type will depend on the nature of corrections prescribed by the surgeon. There are three options to choose from:

Manual strut

The patient is prescribed a manual correction plan in which the struts are adjusted manually in accordance with correction plan generated by the web application. The surgeon provides the Patient Study Report with the correction plan to the patient in printed or digital PDF format.

Manual strut & mobile app

The patient is prescribed a manual correction plan in which the struts are adjusted manually in accordance with the correction plan generated by the web application. The patient accesses the correction plan using the HexConnect Mobile Application, which also provides alerts, reminders and instructions.

Smart strut & mobile app

The patient is prescribed a correction plan in which the struts adjust with smartHEX Strut Controller assistance. The patient accesses the correction plan through the HexConnect Mobile Application, which also provides alerts, reminders and instructions.

If Manual Strut & Mobile App or Smart Strut & Mobile App are selected, additional fields will appear in the control panel.

(Figure70)

- **Frame name:** select an option from the dropdown field; if "Others" is selected, enter a custom name in the textbox field.
- **Notes:** enter any notes for the patient; notes will be included in the email to the patient; check the box below to save the input notes as a preferred template for future study reports
- **Patient Email:** enter the patient's email address in the textbox field

Send plan to patient

An email communication will be sent to patient's email address. The email communication will contain a secure deep link to the patient's Study Report as well as links to the Apple and Google Play stores for download of the HexConnect mobile application. Click Send Plan to send the email to the patient.

For more detailed instructions for the HexConnect Mobile Application and Smart Strut & Mobile App patient user types, refer to the Hoffmann LRF smartHEX Controller and Mobile App User Manual.

Save the report

The study report may be saved in two PDF formats for archival and printing.

- **Download Surgeon Report:** click to download the full detailed report.
- **Download Patient Report:** click to download the patient-friendly report with limited details including the Strut Replacement Schedule and the Correction Schedule.

This concludes the Post-Operative Workflow guidance.

Figure 70

Getting around

Correction plan revision workflow

After a correction plan has been executed, residual deformity may require correction.

A revision to the correction plan may also be performed at any time during the correction if the surgeon feels that the correction is not progressing as expected.

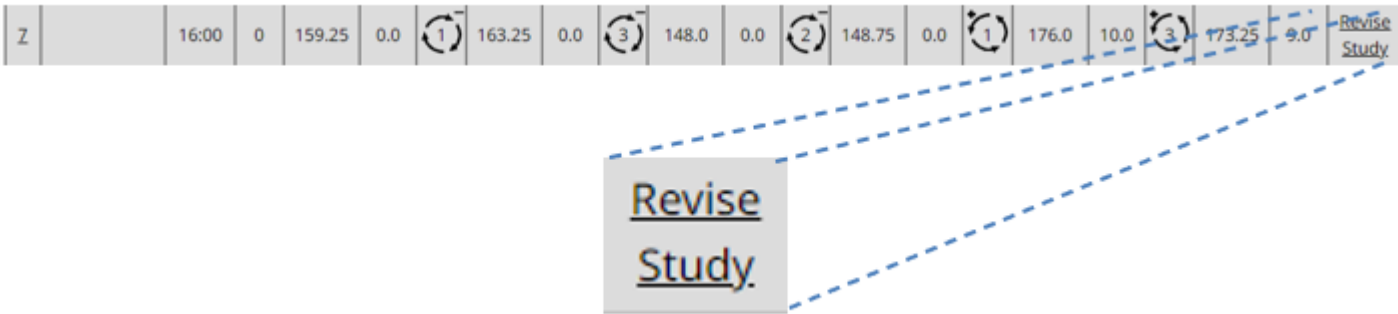


Figure 71

Revise study

1. To do initiate a residual deformity correction, navigate to the Correction Plan page and click “**Revise Study**”.
(**Figure 71**) This will trigger a pop-up window where study notes can be entered into the textbox field. (**Figure 72**)
2. Click START POSTOP to proceed to the Deformity Definition page or click CLOSE to cancel the request.

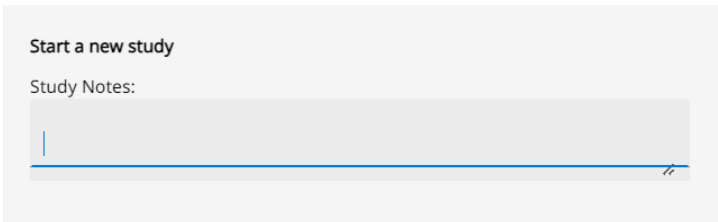


Figure 72

Revised deformity definition

In a revision workflow, the deformity parameters are pre-populated with the deformity values from the time of conversion. For example, revising a study on day 15 of a correction plan will pre-populate the deformity definition page with the deformity values that were computed for day 15 of the original correction plan. These deformity parameters can be manually adjusted if necessary.

The revision workflow operates the same as the post-operative workflow. Reference the Post-Operative Workflow steps to proceed with redefining the deformity and generating a new correction plan.

This concludes the Correction Plan Revision Workflow guidance.



Getting around

Full length X-ray analysis workflow

At the start of operative planning, it may be desirable to perform a full length X-ray analysis to help define the scope of the patient’s deformity. In these circumstances, the optional full length X-ray analysis workflow can be initiated by selecting “**Full length X-ray analysis**” in the New Case window. (Figure 73)

In this workflow, full length X-ray images (AP and lateral) are uploaded and scaled in the same manner as in the Image Assisted Deformity Definition section of the pre-Operative workflow.

Once the images are scaled and cropped, press Save and Continue to proceed to full length planning. (Figure 74)

Full length planning involves positioning landmarks on the X-ray image and measuring the joint angles. These joint angles are displayed on the screen along with their expected range and may help the surgeon determine the extent and location of the deformity. Initially these landmarks are placed in a default configuration in the center of the image and must be relocated to the anatomically correct locations.

New Case

CaseID

CSP1D803C

?

Case Name*

test

?

Case Number*

1

?

Full length x-ray analysis

Continue to deformity planning

Figure 73

AP View

Scaling Line

Scaling Circle

Lateral View

Scaling Line

Scaling Circle

Image Upload

AP View Scale :

14.3 px = 50 mm

Lateral View Scale :

14.3 px = 50 mm

Reset

Save

Back

Save and Continue

Figure 74

Getting around

AP joint angles

For the full-length image in the AP view, drag and drop each marker to the desired position. **(Figure 75)**

1. The proximal femur markers are placed at the center of the femoral head and the tip of the greater trochanter. **(Figure 76)**
2. The distal femoral markers are placed on the convexity of the medial and lateral condyles. **(Figure 77)**
3. The proximal tibial markers are placed on the medial and lateral concavities of the tibial plateau. **(Figure 78)**
4. The distal tibial markers are placed on the medial and lateral aspects of the distal tibial plafond or the proximal talar dome. **(Figure 79)**
5. Repeat on the contralateral side.

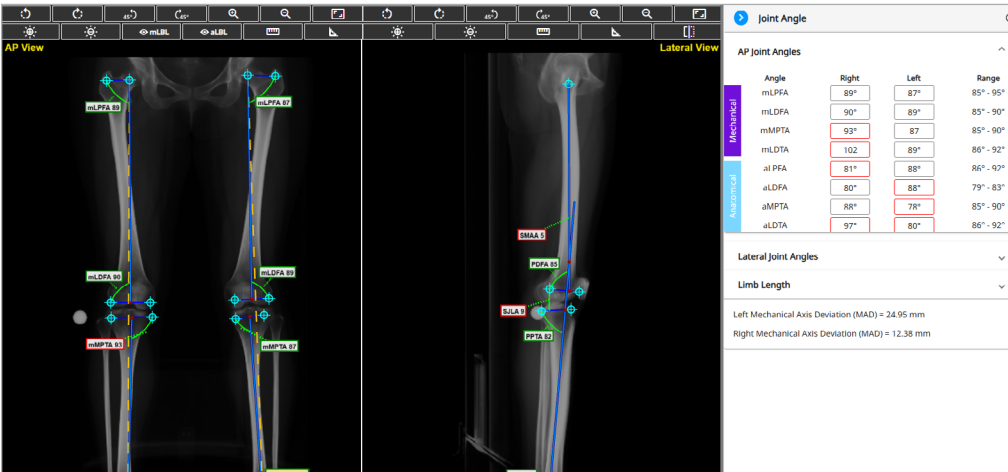


Figure 75

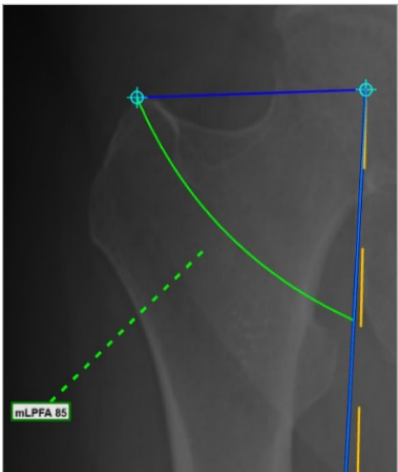


Figure 76

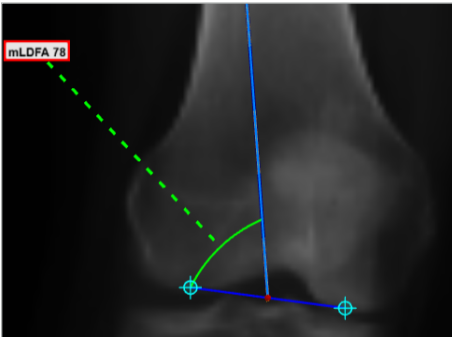


Figure 77

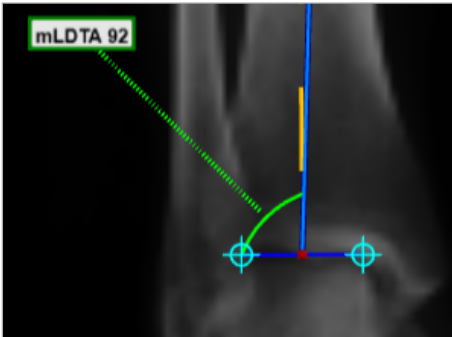


Figure 78

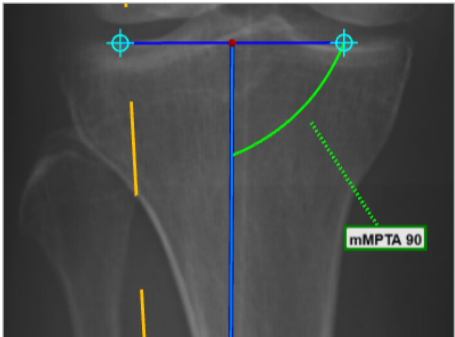


Figure 79

Getting around

Lateral joint angles

For the full-length image in the lateral view, drag and drop each marker to the desired position.

Place the proximal femur marker at the center of the femoral head. **(Figure 80)**

The distal femoral joint line is aligned by positioning the endpoints at the anterior and posterior margins of the physeal scar. **(Figure 81)** Note that the distal endpoint of the femoral axis is set at one-third of the length of the line between endpoints.

The proximal tibia joint line is defined by placing points on the anterior and posterior aspect of the tibial plateau. **(Figure 82)** Note that the proximal end point of the tibial axis is positioned at a point one-fifth of the total distance from the anterior cortex to the other end of the joint line.

The distal tibia landmarks are placed by locating them at the anterior and posterior peaks of the distal tibia. **(Figure 83)**



Figure 80

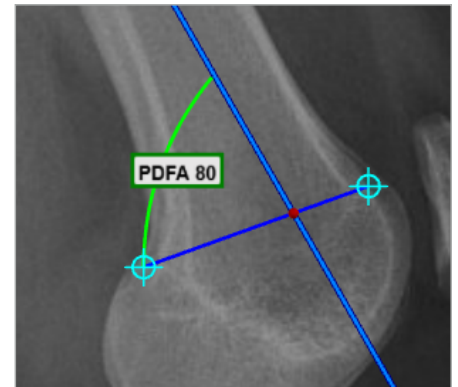


Figure 81

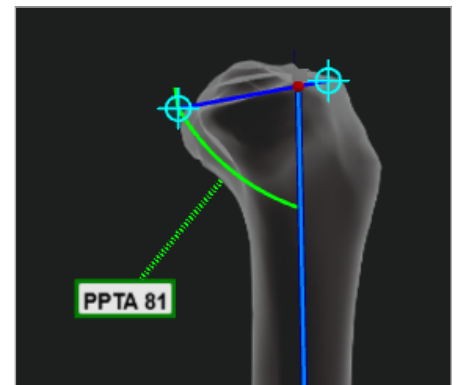


Figure 82

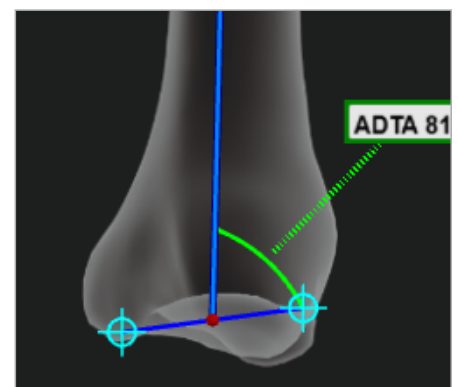


Figure 83



Getting around

The control pane displays the mechanical and anatomical joint angles with the acceptable ranges. Joint angles that fall outside of normal ranges are highlighted by a red box. **(Figures 84-85)**

Fields within the control pane can be expanded or collapsed by clicking the up/down arrow on the right side.

Limb length

The right and left limb lengths, broken down by Femoral, Tibial, and Full-Limb, are displayed in millimeters. The limb length discrepancy is calculated for each. **(Figure 86)**

Axis deviation

Left and Right Mechanical Axis Deviation are always displayed at the bottom of the panel. **(Figure 87)**

The Joint Angle Analysis is saved as part of the Case Summary. Selecting **“Save and Continue”** returns the user to the Create New Case screen from which the pre-op or post-op workflows can then be initiated.

This concludes the Full Length X-ray Analysis Workflow guidance.

Lateral Joint Angles				^
LAT Anterior & Posterior	Angle	Measurement	Range	
	PDFA	81°	79° - 87°	
	SJLA	16°	16° - 16°	
	PPTA	80°	77° - 84°	
	SMAA	3°	0° - 0°	
	ADTA	81°	78° - 82°	

Figure 84

AP Joint Angles					^
Mechanical	Angle	Right	Left	Range	
	mLPFA	85°	85°	85° - 95°	
	mLDFA	85°	86°	85° - 90°	
	mMPTA	87°	89	85° - 90°	
Anatomical	mLDTA	88	90°	86° - 92°	
	aLPFA	91°	91°	86° - 92°	
	aLDFA	79°	79°	79° - 83°	
	aMPTA	86°	90°	85° - 90°	
	aLDTA	87°	91°	86° - 92°	

Figure 85

Limb Length				^
Anatomy	Right (mm)	Left (mm)	Discrepancy (mm)	
Femoral	649.41	655.33	5.92	
Tibial	543.09	541.44	1.65	
Full-Limb	1,199.73	1,202.77	3.04	

Figure 86

Left Mechanical Axis Deviation (MAD) = 1.26 mm
Right Mechanical Axis Deviation (MAD) = 4.44 mm

Figure 87

Appendix A: Insight Center

Internal Stryker users and organizations using Microsoft AAD B2C (Azure Active Directory)

To login to the Insight Center, open your web-browser and navigate to insightcenter.stryker.com (For internal users using domains such as **stryker.com**, etc.). Click on **Register** to create an account or sign in with your email if you are an existing user and proceed with your single sign on credentials. (Figure 88)

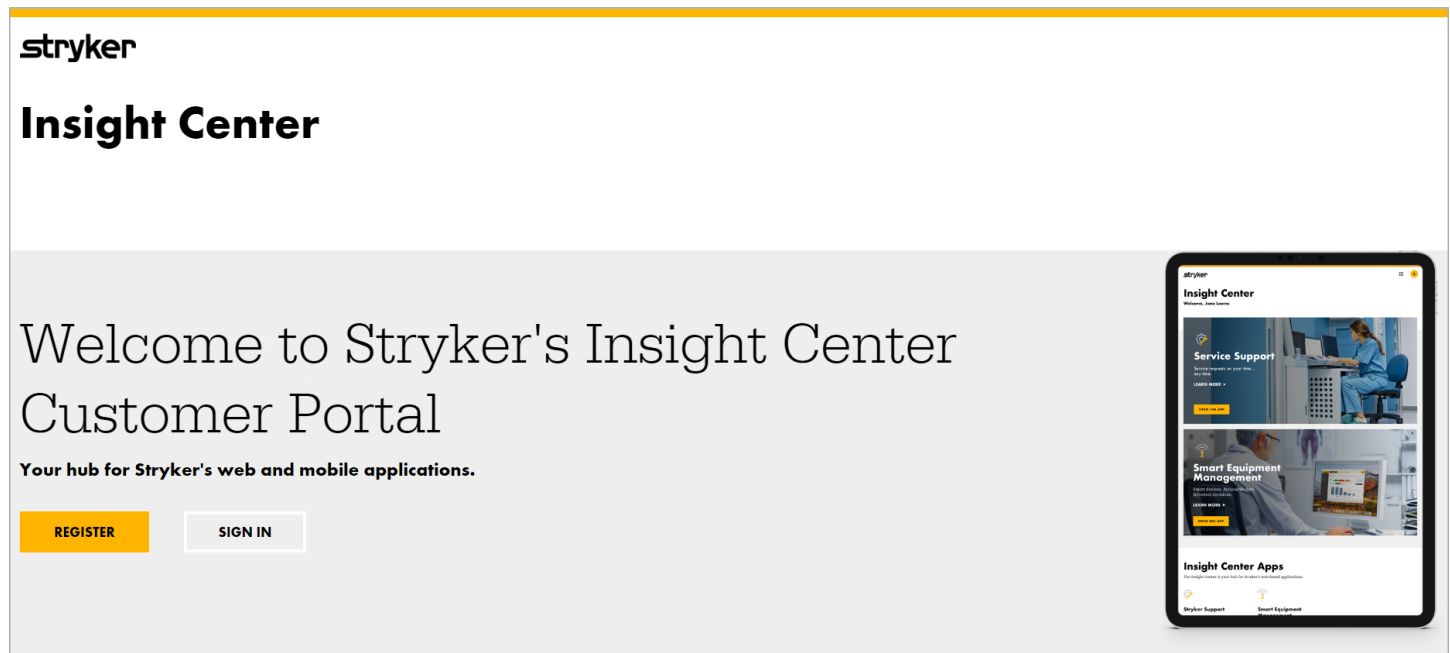


Figure 88

Customer does not use AAD B2C (Azure Active Directory)

For customers not using AAD B2C (For external customers using public domains such as "gmail.com", "yahoo.com", etc.) Contact the Hoffmann LRF helpdesk via email at: smarthex@stryker.com. Include the email address you wish to use as your username and the name of your Stryker sales representative to allow access to Insight Center as a local user.



Appendix A: Insight Center

Local user: First time login

If you are a local user, you will need to register and create a new account. Please follow the workflow prompts to create new password. (Figure 89)

Users may also reset or change their password on this page by clicking on 'Modify password' as well.

Enter your location information: Country, Language and Timezone and click Next. (Figure 90)

Read and accept the Terms and conditions. (Figure 91)

Figure 89

Figure 90

Figure 91

After accepting the Terms and conditions, enter remaining details: First name, Last name, Phone, Department, Speciality and then click on Next. You must go through verification before creating a new password, if you're a non AAD B2C account. (Figure 92)

Figure 92

Appendix A: Insight Center

Sign in help

Need help signing in? Click on Help in the footer for more information. You can also click on **Having issues signing in? (Figures 93-94)**

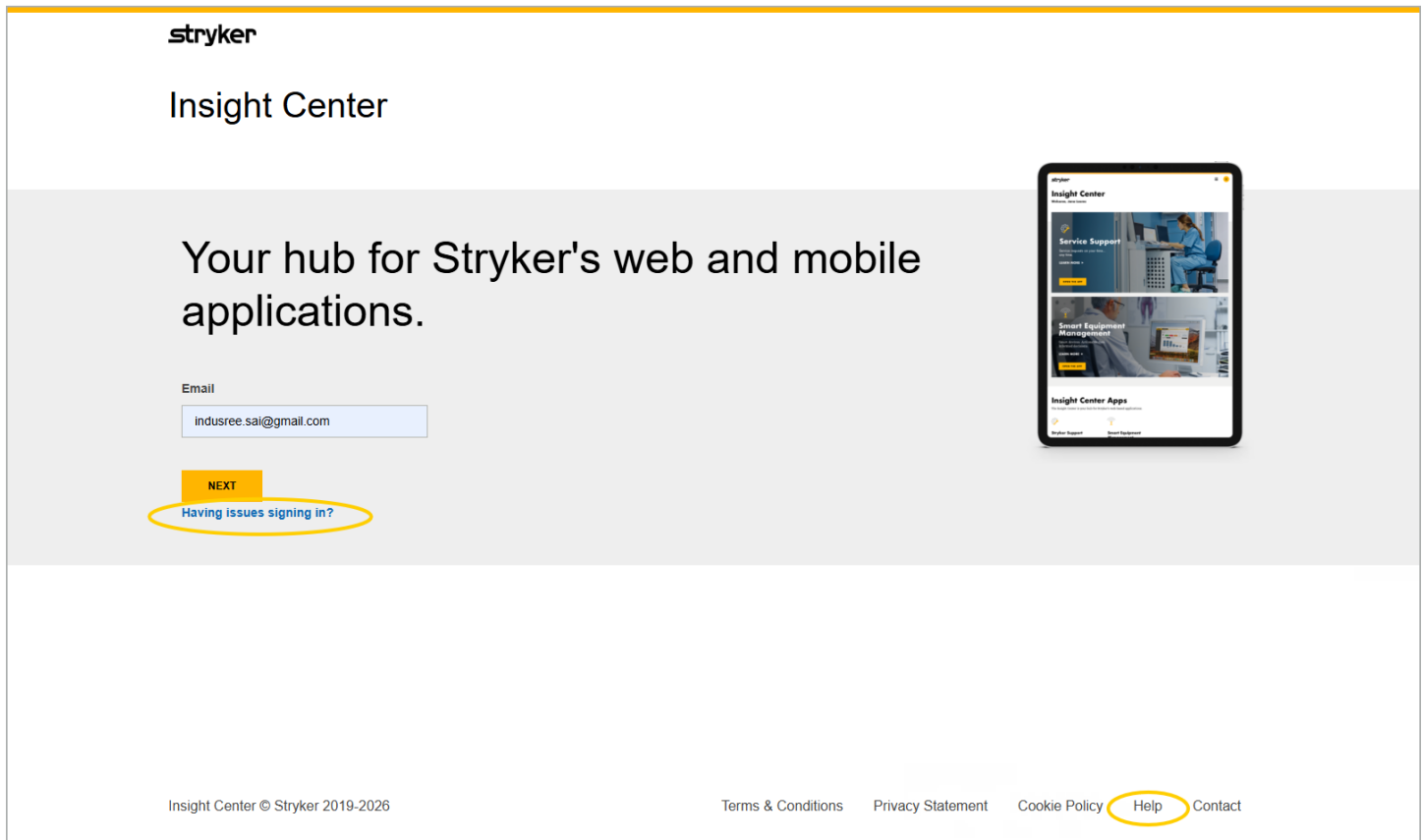


Figure 93

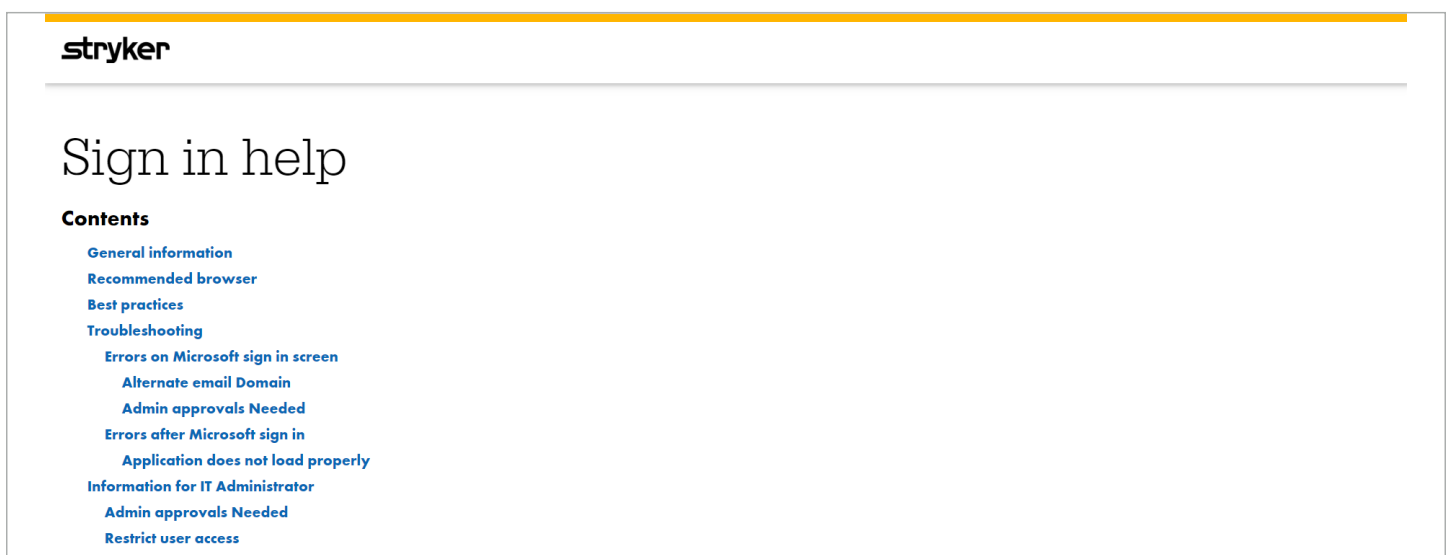


Figure 94

Trauma & Extremities

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