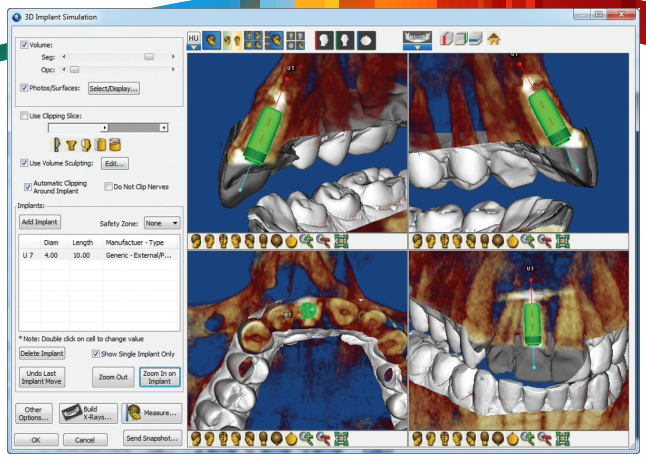
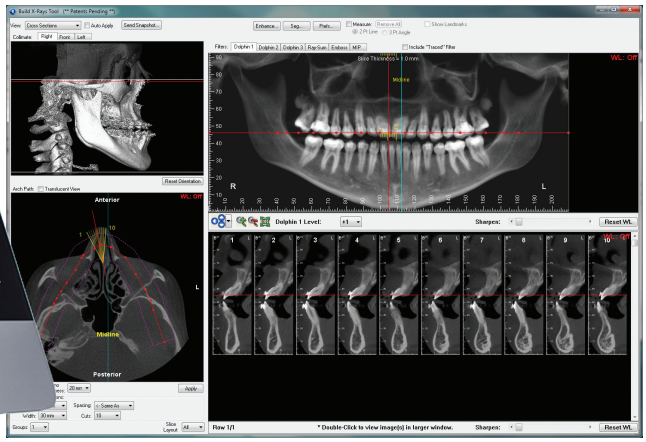
Dolphin Imaging

3D



Implant Planning with Digital Teeth



Panoramic x-ray with cross sections

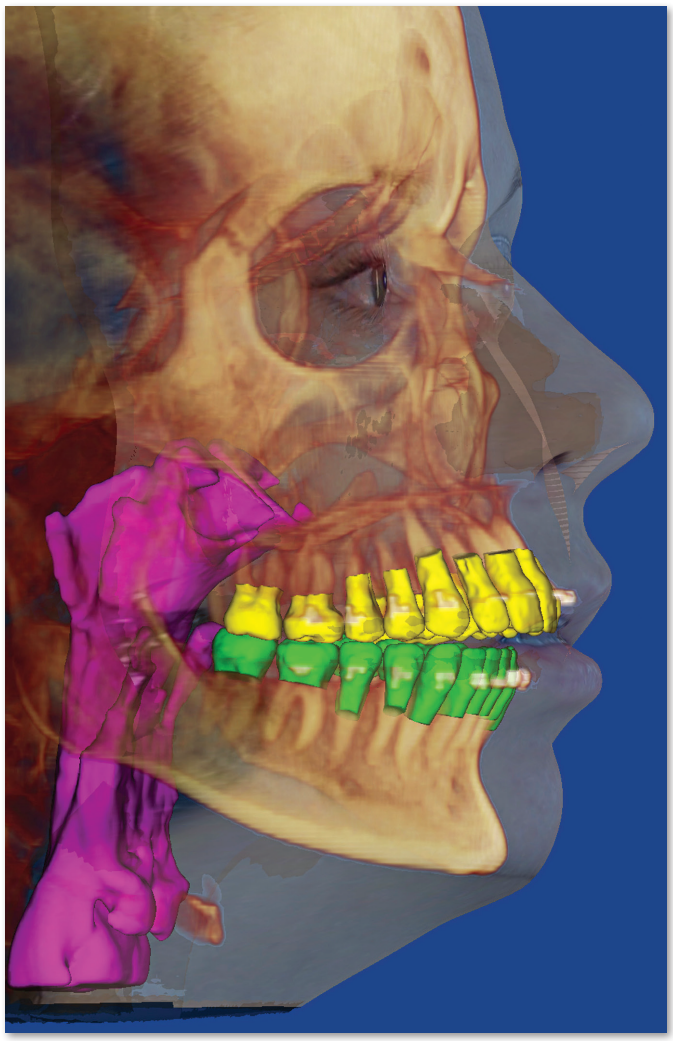
The Dolphin 3D software module is a powerful tool that makes processing 3D data extremely simple, enabling dental specialists from a wide variety of disciplines to diagnose, plan treatment, document and present cases. Dolphin 3D allows visualization and analysis of craniofacial anatomy from data produced by cone beam computed tomography (CBCT), medical CT, MRI, digital study model systems, and 3D facial camera systems.

Dolphin Imaging software is designed for use by specialized dental practices for capturing, storing and presenting patient images and assisting in treatment planning and case diagnosis. Results produced by the software's diagnostic and treatment planning tools are dependent on the interpretation of trained and licensed practitioners.

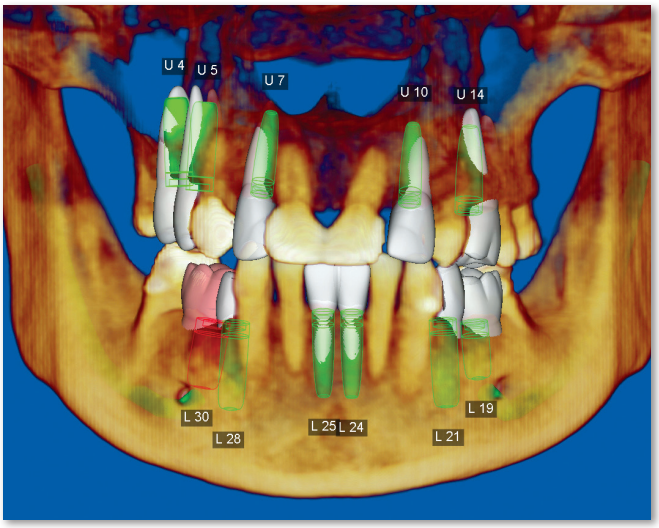
Dolphin Imaging software is an FDA-cleared Class II medical device.

Dolphin®
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Dolphin 3D software is widely used by research/teaching institutes and private practices worldwide. It features tools for onscreen manipulation and analysis of volumetric datasets: Images are easily oriented and rotated, and tissue density thresholds can be adjusted for detailed views of craniofacial anatomy. Measurements and digitization can be performed in both 3D and traditional 2D.

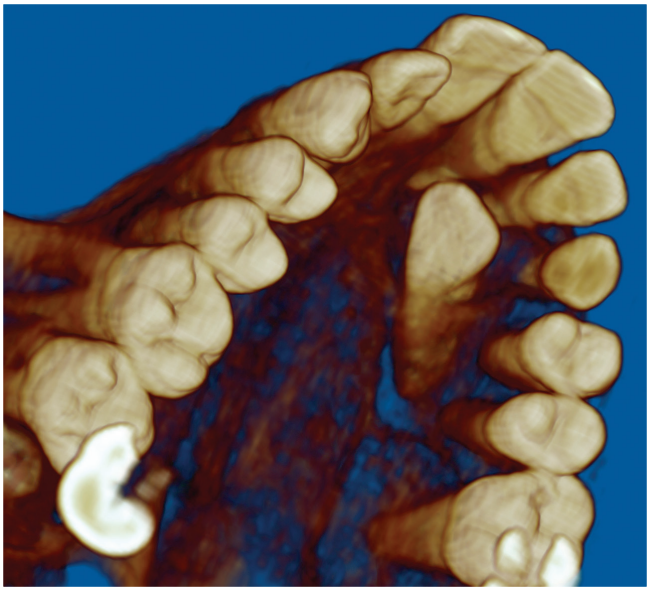


Simple Graphical User Interface (GUI)

Dolphin 3D includes powerful yet intuitive tools for you to process multi-dimensional datasets. There are no complicated commands or scripting languages to learn. Processing and analyzing three-dimensional data has never been easier.

Features:

- Import from a variety of 3D dataset formats
- Three-dimensional airway analysis
- Cross sections in Multiple Planar View (MPV)
- Precise volume orientation
- Volume stitching: combine two separate volumes into one
- 2D facial photo wrap onto volume
- Volume-to-volume superimposition
- 3D nerve marking
- TMJ analysis
- Generate cephalometric and panoramic radiographs
- 3D-2D measurements: distance, angle and area
- Create animated movies with automated scripts
- Design image layouts and reports
- Export images to other applications
- 3D implant and TAD treatment planning and simulation
- Distinguish biological structures via their radiolucency with a Hounsfield Unit measuring tool
- Render any desired combination of CBCT volume, 2D-wrapped or 3D photo, airway, digital teeth, and other surfaces
- Digital Study Model software supports .STL, .PLY, and .OBJ file formats
- Much more.



Isolate desired region of interest



View impacted teeth from any angle

Easy Data Segmentation and Visualization

You prepare the 3D object by grouping intensity levels in pre-set ranges for soft tissue and hard tissue. After this simple procedure, you can easily review the object's solid or translucent skeletal surface; solid, translucent, or photo of soft tissue surface; or both simultaneously.

In addition to switching from hard tissue and soft tissue views, you can also adjust the factor of translucency and intensity to reveal the structure you desire. Color tools help to further clarify anatomy and their spacial relationships.

Clipping tools allow you to quickly visualize hidden structures, or simply eliminate portions of the contents that are not relevant.

Enhanced Object Orientation

Establishing a default orientation is crucial to maximize the consistency of analysis of a 3D volume. Dolphin 3D provides tools for defining the mid-sagittal, axial and coronal planes. You can orient the volume based on an angle, such as the Horizontal Plane. You can also adjust the object's default yaw, pitch and roll. These operations can be performed on the CT soft tissue surface, CT hard tissue surface or 3D photo surface.

Multiple Planar Views and Layouts

Choose a layout that is best suited to your task:

- 3D volume (just the 3D volume view)
- Volume+3 planes (3D volume and 3 cross section planes on the side)
- 4-views (3D volume and the cross section planes in equal sized windows)
- Individual orthogonal projected slices: sagittal, coronal and axial planes
- 4-volume layout (displays four views of the same volume)

You can also adjust Window Level (traverse through 12-bit, 14-bit or 16-bit levels of intensity), zoom, pan, rotate, etc.

Instant Ceph/Pan

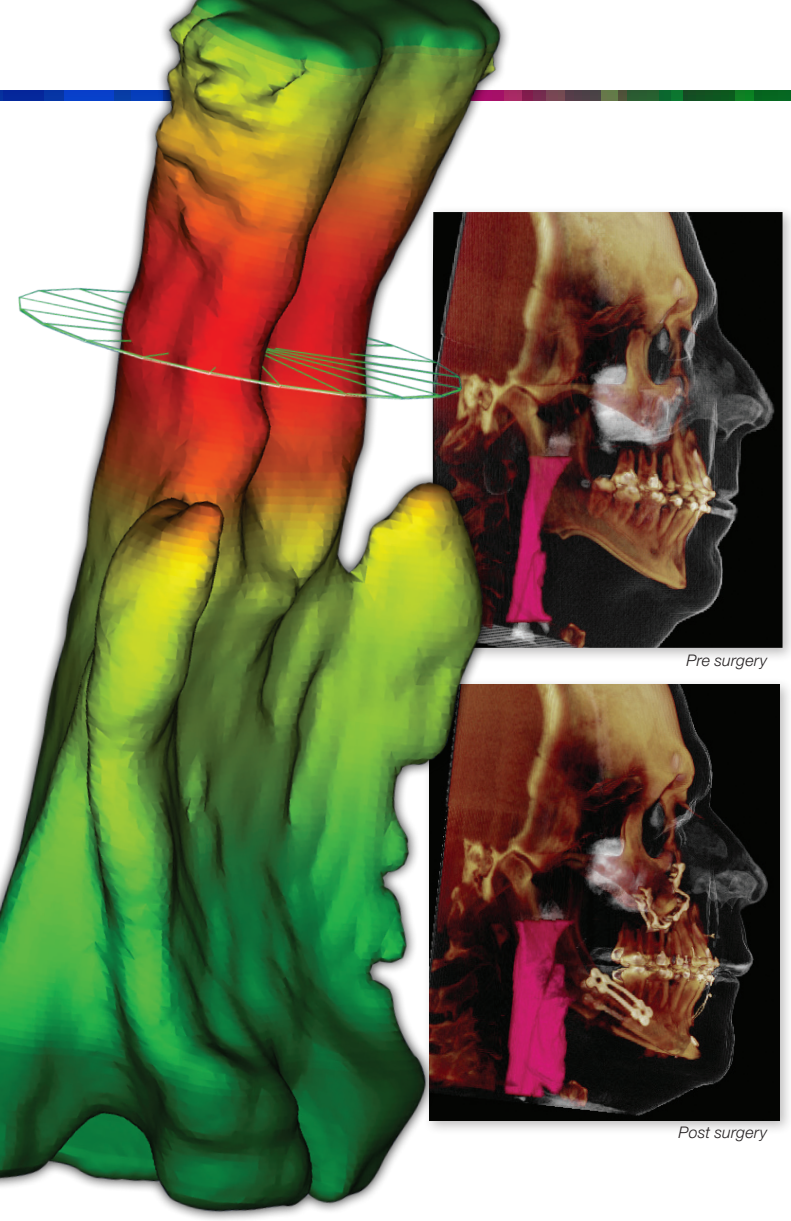
Create two-dimensional radiographic images from 3D volume dataset in the lateral, panoramic (OPG), frontal and SMV views. Reconstruct radiographs in:

- 1:1 projection (no distortion, no magnification)
- Simple orthogonal/magnification projection (input % of magnification desired)
- Complex "traditional x-ray perspective" projection (input detailed x-ray machine geometry; most accurately simulates traditional x-ray)

Image filters help emphasize different structures of interest; including: MIP (maximum intensity projection), Ray-sum (academic standard) and a collection of Dolphin proprietary filters.

3D Implant and TAD Planning

Easily add implants and TADs to a patient's 3D image for more precise treatment planning and presentation. Place, move, and rotate implants and TADs on the volume, slice or panoramic views. Select implant and TAD types from a library of manufacturer models and sizes, or from a template library. Zoom in and out on an implant or TAD; define a "safety zone" around each; segment and sculpt the volume to clip around the implant or TAD; measure distances and angles; locate nerve canals; export the final simulation as an iso-surface.



Pre surgery

Post surgery

Airway Analysis

Analyze and measure the airway along a curved path. The program will report the volume of airway space in cubic millimeters, and display the airway area in square millimeters at each slice perpendicular to the path, color-coded by constriction. You can also measure tissue levels other than just airway, and set threshold levels by Hounsfield Units.

Digitizing/Measuring

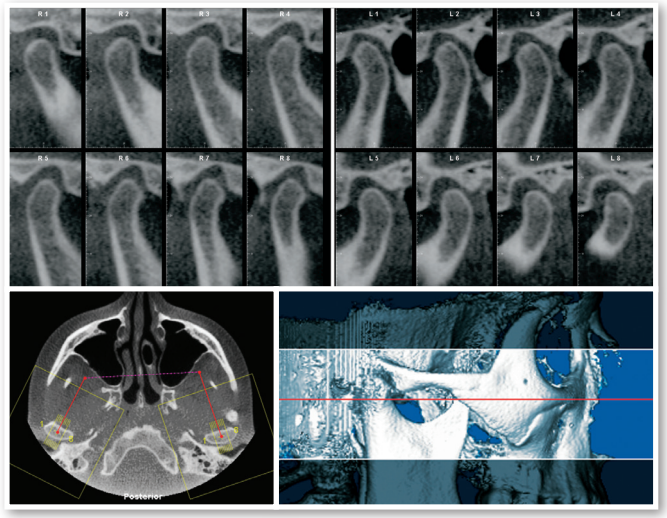
Dolphin 3D is an excellent tool for research and data collection. You can measure distances and angles in 3D; design your own analysis in 3D or in 2D (Dolphin Ceph Tracing software required for 2D analysis).

Landmarks can be used in a 3D analysis or translated into identified 2D lateral or frontal cephalometric analyses. Further, the 2D points can include x-ray magnification to be compatible with existing norm values.

Digitized landmarks can be saved in Dolphin Imaging and exported to a Microsoft Excel spreadsheet or other numerical analysis programs.

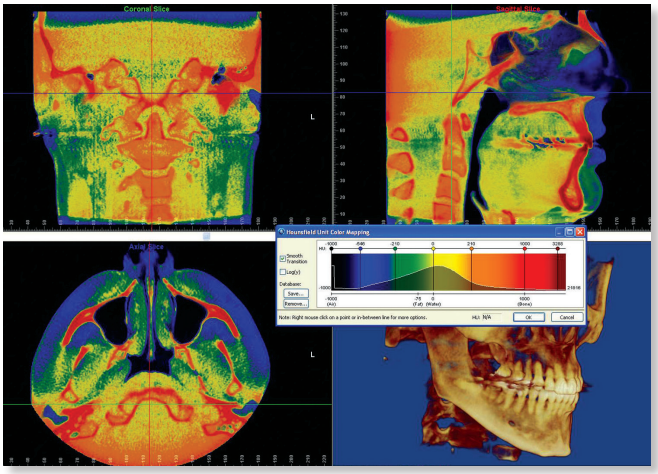
TMJ View

- Choose an area of interest; set center point and axis direction
- Choose desired slice thickness, width, number and direction (coronal, sagittal, or patent-pending circular)
- View key cross sections of the chosen axes



Hounsfield Unit Color Mapping

Distinguish between different biological structures according to their radiolucency measurements. A graph displays the colors as they fall on the Hounsfield Scale as a reference, while the image on the screen is colored accordingly.



Hounsfield Unit colorization

Dual Volume Superimposition

Superimpose volume scans from different time points to visually track and accurately measure treatment changes in bones and in airways.



2D Facial Photo Wrap

2D Facial Photo Wrap

Easily create a texture map on the facial surface of a scan. Simply import the 2D frontal photo, and Dolphin 3D guides you through a quick and simple step-by-step process to add the photo to the 3D volume.

Movie Scripts

Automatically create animated movies by collecting "key frames" from your 3D volume or slice views. By altering the volume's position, zoom factor, translucency, segmentation, clipping and timing attributes, create a movie script which may be reused for volumes of other patients.

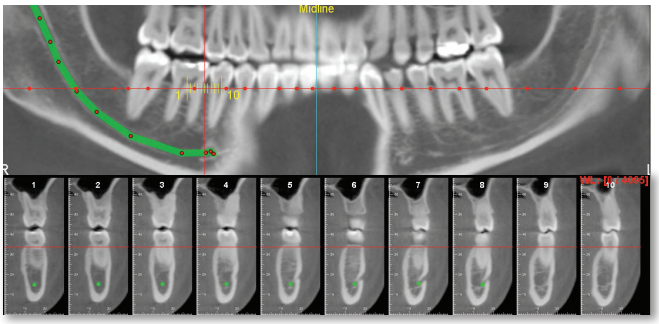
Dolphin 3D then creates a smooth animated movie from your script. Spin, fly-by and see-through your volumetric object. You control the movie's speed, resolution, quality and file size with selectable video settings.

Reports

Create diagnostic reports from your volumetric dataset. You build a workup report specific to a patient's indication and the specialty of the referral. Build your own library of templates for implant sites, TMJ, impaction studies, tissue pathology, sinus and airway evaluation, and more; a library of existing templates is provided. The template is easily populated on the fly with desired images and cross sections from the volume. Reports can be exported to a document file or hardcopy printout.

3D Nerve Marking (patented)

- Interactive tool to locate and isolate the nerve canal on a panoramic projection
- View/edit corresponding nerve positions on cross sections
- View the marked nerve canal within 3D rendering of the skull volume

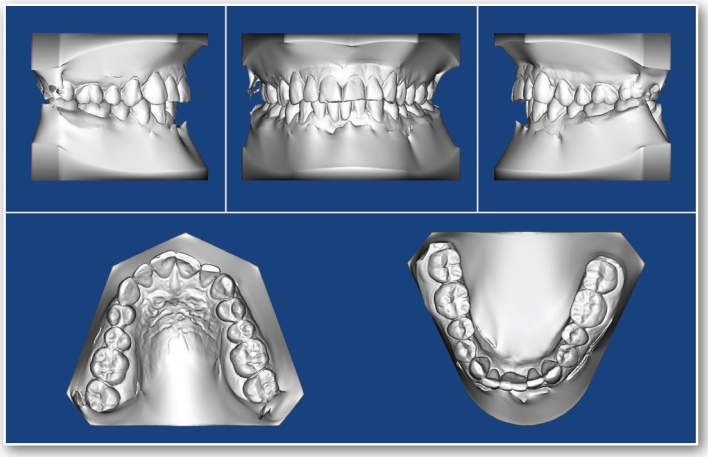


Easily locate and mark nerve

Digial Study Models

3D Digital Study Model software works with all intraoral and study model scanners that export to .STL, .PLY, or .OBJ file format, and also seamlessly integrates with CEREC Omnicam and CEREC Ortho Software from Sirona. Once your study model data is imported, you can:

- Set occlusion and orientation
- Display the models in various surface and volume views
- Take various 3D measurements
- Run traditional 2D arch-length-discrepancy analyses
- Sculpt away bases, leaving only crowns
- Turn color on or off
- Available as a standalone module



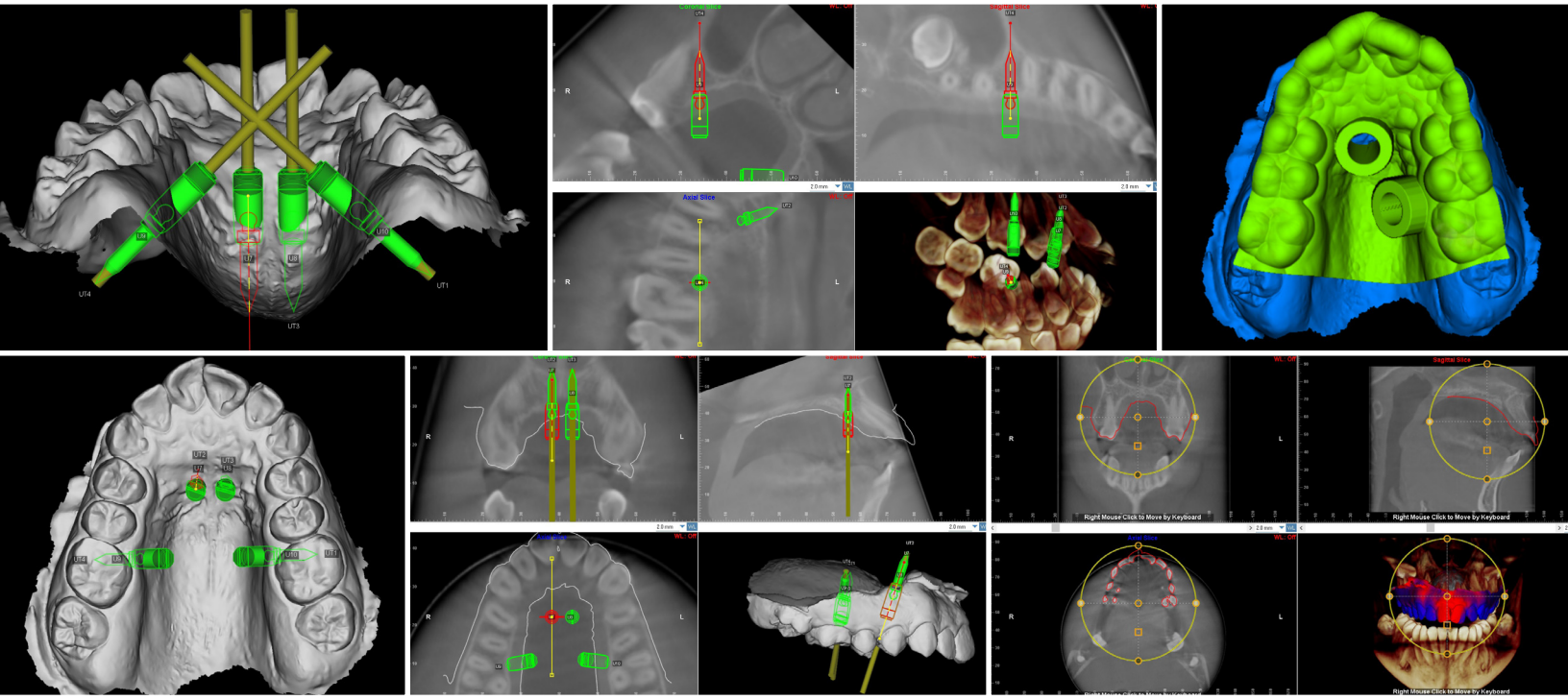
Whether you scan your models or take digital impressions, you can use the 3D Digital Study Models software module to store these records within the patient's chart. A patient CBCT is not required to store 3D model data.





3D Drill Guides

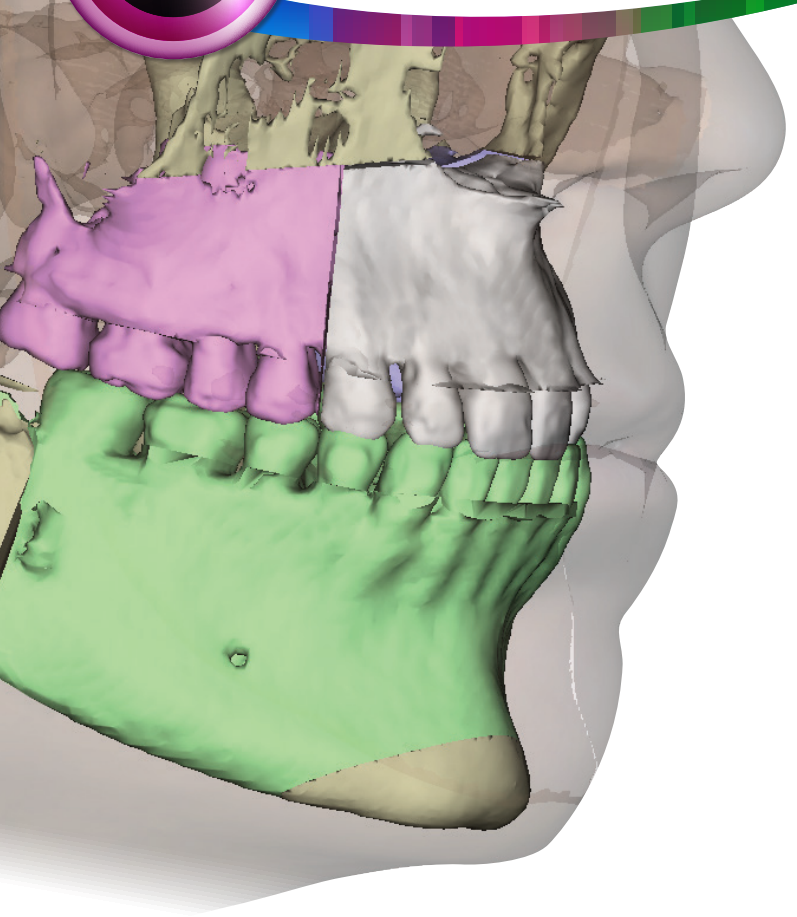
3D Drill Guides is designed to be an add-on software module to Dolphin 3D, expanding its existing Implant Planning tools to create an all-in-one implant and TAD treatment planning program. By adding 3D Drill Guides to your 3D system, you gain the ability to plan guided implant cases from start to finish in your own office. Choose from a comprehensive library of implants to add to a patient's 3D image for precise treatment planning, then with the 3D Drill Guides module you can create printable implant surgical guides. Print the guides yourself, or send to your favorite lab. No per-case fees.



Images courtesy of Dr. Agazade Hussein

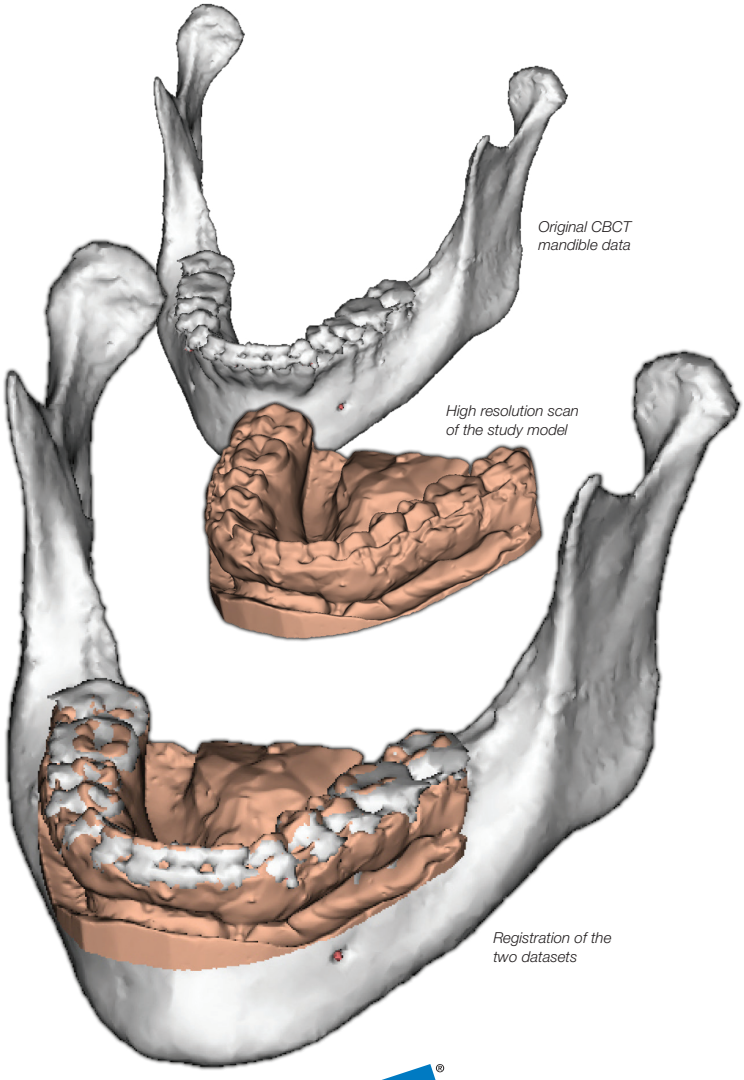
Dolphin Imaging

3D Surgery



Streamline your orthognathic planning and treatment process with Dolphin's 3D Surgery. This revolutionary software module can take you through each step of your treatment planning process, from initial evaluation and planning to generating intermediate and final interdental splints, all in industry-standard .STL file format. (*Additional fees may apply.*) You can send the file to your own 3D printer or to your favorite lab.

Also, demonstrate the patient's skeletal and facial soft tissue changes in real time animation. All you need to take advantage of this versatile software is a cone beam or medical CT dataset of the patient. You then have the option of augmenting the data with a 2D or 3D facial photo and/or laser-scanned stone models or optical scanned dentition.



Simple to Learn, Easy to Use

Begin with a quality 3D cone beam or spiral CT image. Then, simply follow the step-by-step Segmentation Wizard to create the proper virtual surgery patient. If you utilize 3D facial camera, Dolphin can process it; if not, Dolphin 3D Surgery can take full advantage of your clinical (2D) photographs.

Comprehensive Surgical Planning

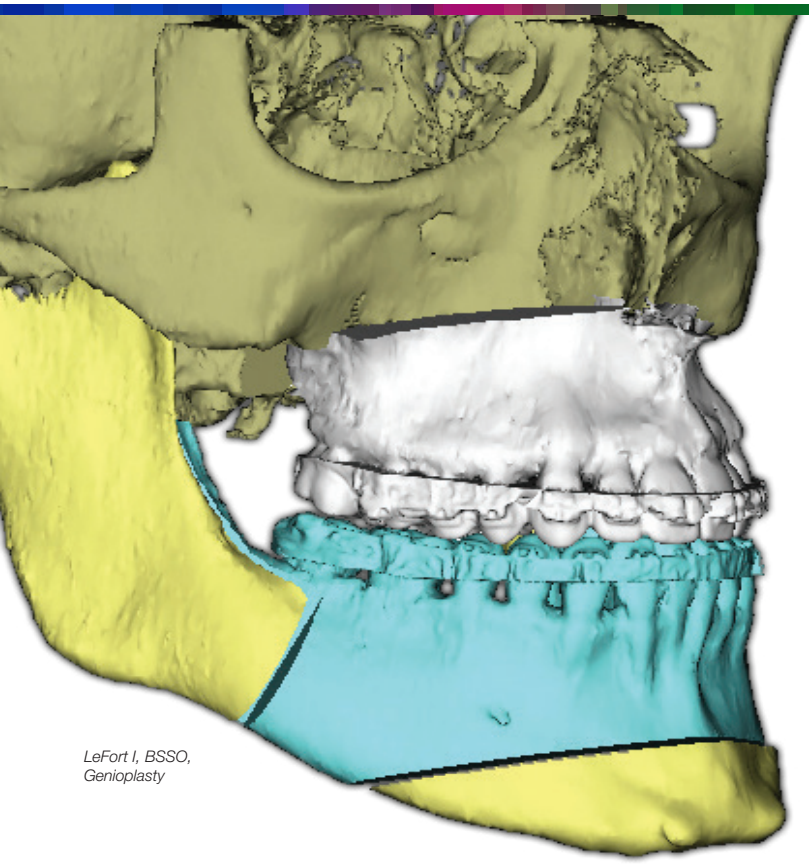
The heart of Dolphin's 3D Surgery module is a very powerful and comprehensive surgical planning tool called Treat. You can plan from lateral, frontal or submento-vertex (SMV) views. You have access to many useful clinical and numeric planning tools designed specifically by and for surgeons, technicians and researchers. Use these tools to produce quick workups; interactive discussion with other specialists; or a detailed plan with splints for the operating room.

Perform treatment simulation by moving skeletal structures and soft tissue contouring for profile; frontal nasal regions; and lip regions. Real-time soft tissue simulation occurs during each movement.

CE

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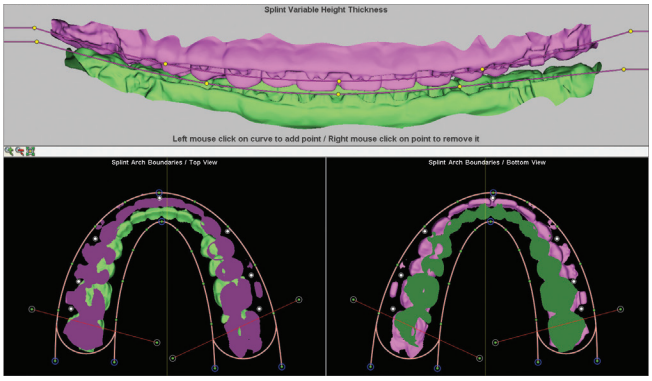
Animated Treatment Presentation

The Present tool uses the simulated treatment from Treat in an animated sequence of pre-/post-operation configurations in all three dimensions. This allows you to carefully study detailed treatment nuances; demonstrate your plan to the patient; or conduct case presentation to your surgical team.

Customizable Surgical Guide Fabrication

Splint tool allows you to select the width and thickness of the splint based on your treatment plans. Create an intermediate splint to position the maxilla or mandible based on the preferred order of your operation. All splint data files are generated in industry-standard .STL* files for physical printing in your office or at the lab of your choice.

** Additional fees may apply.*



System requirements:

See *www.dolphinimaging.com* for system requirements.

Verified compatibility list (as of July 2019):

CT (DICOM 3 multi-file or sing le file)

— Alphabetically listed —

- Acteon Group - WhiteFox scanner
- Asahi/Belmont Alphard series
- Carestream Health Kodak 9000
- GE 3D medical devices
- Gendex Dental GX CB-500™
- Hitachi MercuRay
- Imaging Sciences International (ISI) i-CAT
- Instrumentarium/PaloDEx Group/SOREDEX dental imaging lines
- IMTEC Imaging ILUMA
- J. Morita 3D Accuitomo 80 and Veraviewepocs® 3D
- MyRay SkyView
- NewTom 3G, VG and 9000
- Planmeca ProMax 3D, ProMax 3D Max
- PreXion 3D
- Sirona GALILEOS Comfort, GALILEOS Comfort^Plus
- Vatech Technology Picasso Trio series
- Any other system that is capable of generating a DICOM compliant data set.

3D Facial Camera (Wavefront .OBJ format)

- 3dMD
- 3D-Shape - FaceSCAN3D
- Bellus3D
- Canfield Scientific Vectra 3D
- Di4D
- Fuel 3D
- Motion View Facial Insight 3D
- Konica Minolta: Vivid 3D Scanner

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