Dolphin Imaging Getting Started

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Welcome

Congratulations on your decision to purchase Dolphin Imaging. You are about to use the best and most advanced imaging and diagnostic system in the world. With Dolphin Imaging, you will produce the best records, the most effective consultation presentations, and the most accurate cephalometric tracings. In addition, the Dolphin Imaging program is easy to operate.

This manual describes how to use Dolphin Imaging features to improve information flow in your practice. It describes how to capture patient images into the Dolphin Imaging program, perform cephalometric analyses, modify images for patient presentations, and use treatment simulation and prediction tools.

Dolphin Imaging software is designed specifically for dental clinicians and trained assisting staff. Results produced by Dolphin's diagnostic and treatment planning tools are dependent on the interpretation of trained and licensed practitioners.

Getting Training

To help you get the most out of your Dolphin Imaging system, we highly recommend the comprehensive in-office training. You can also arrange to attend training in Dolphin's California facility. Dolphin trainers are experienced and certified in clinical and treatment coordination. With this background, they are very knowledgeable in how to enhance your practice by using the imaging and diagnostic tools that Dolphin Imaging provides. To arrange a training session, contact Dolphin.

Contacting Technical Support

If you need help, you can contact Dolphin in any of these ways:

By E-mail	support@dolphinimaging.com: A support technician will respond to your message within 24 hours.
By Telephone	Toll free from the US and Canada: 1 800.548.7241 Toll free from Australia: 1.800.881.011 (wait) 800.548.7241 Toll free from New Zealand: 000.911 (wait) 800.548.7241 From all other countries: +1 818.435.1368 Telephone support hours are 5:00 AM to 6:00 PM Pacific Time (8:00 AM to 9:00 PM Eastern Time). At other times, you may leave a message on our emergency pager by calling 1 818.687.6327.
By Fax	+1.818.435.1369
Web site	www.dolphinimaging.com: provides the latest product information and a list of local Dolphin representatives.

Typographical Conventions

File names and directory names: These are shown in boldface Courier. For example:

> The **`dolphin.ini`** file contains system settings for the Dolphin Imaging software.

Optional parameters and variables: Optional parameters appear in square brackets (**`[]`**). Variables that you replace with actual values are shown in italic boldface courier. In the following example:

> **`File#=`*`Label`*`,`** ***`Format`*****`,`** **`[`*`BitsPerPixel`*`,]`** ***`FileFormula`***
> **`[`*`ExitRoutineBatchFile=PathName`*`]`**

`Label`, ***`Format`***, ***`BitsPerPixel`***, ***`FileFormula`***, ***`ExitRoutineBatchFile`*** and ***`PathName`*** are all variables that you replace with actual values. ***`BitsPerPixel`*** and ***`ExitRoutineBatchFile=PathName`*** are optional parameters, which you may omit.

Keyboard combinations: Keys that you press together are shown with a plus sign between them. For example:

> Press ALT+O.

1 Imaging Basics

This chapterdescribes some of the basics for using Dolphin Imaging, including:

- Navigating the Program
- Adding a New Patient
- Adding a Timepoint
- Capturing Images
- Transferring Images to Microsoft Office Programs

The image capturing, slide show, and email features are available if you have purchased the Dolphin ImagingPlus™ module.

Note: Some of the procedures in this chapter are different depending on whether you are using the Standard Dolphin Imaging software or Dolphin Premium. For information on the differences between these two Dolphin products, see the *Dolphin Imaging User's Guide*.

Navigating the Program

This section provides a brief overview of the Dolphin Imaging software. It describes:

- Starting the program
- Using the Patient Charts (standard Dolphin) and Patient Lookup (Dolphin Premium) dialog boxes
- Using the Dolphin Imaging main screen
- Exiting the program

Starting the Program

To start the program:

1. Double-click the Dolphin Imaging short-cut icon on the Microsoft Windows desktop.

   If you do not have a special Dolphin utilities package installed and enabled, Dolphin Imaging starts, and the Patient Charts (if you have standard Dolphin) or Patient Lookup (if you have Dolphin Premium) dialog box is displayed (see below).

   If you have the Dolphin Premium Security Utilities installed, a dialog box appears asking you to log in to Dolphin Imaging.

To log in:

1. Enter you Dolphin Imaging user name and password.

   Or,

   If your practice uses finger scan login, use the fingerprint scanner to enter your fingerprint.

2. Optionally, specify a location in the Location text box.

3. Click OK.

Selecting a Patient

When you start Dolphin Imaging, one of the following dialog boxes appears so that you can select a patient:

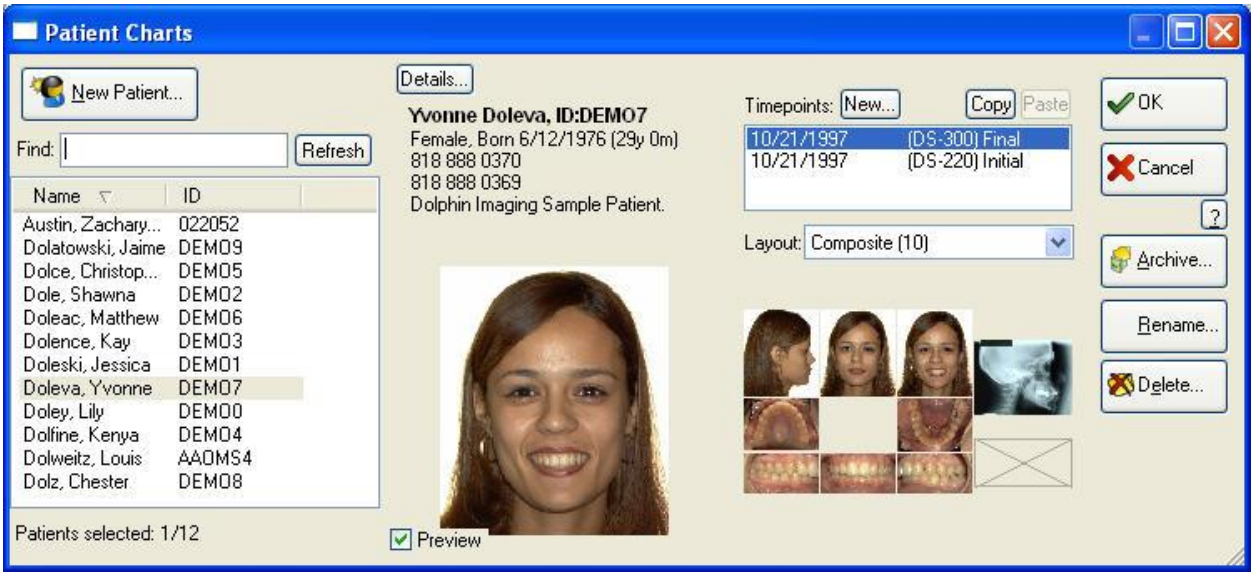
- If you are using Standard Dolphin, the Patient Charts dialog box opens.
- If you are using Dolphin Premium, the Patient Lookup dialog box opens.

You can also access these dialog boxes by clicking 

on the Dolphin Imaging main screen.

Using Patient Charts (Standard Dolphin)

The following figure illustrates the Patient Charts dialog box.



You use this dialog box to add or select patient records.

To find a patient record:

1. Select one of the patients from the patient list. Then, click OK.

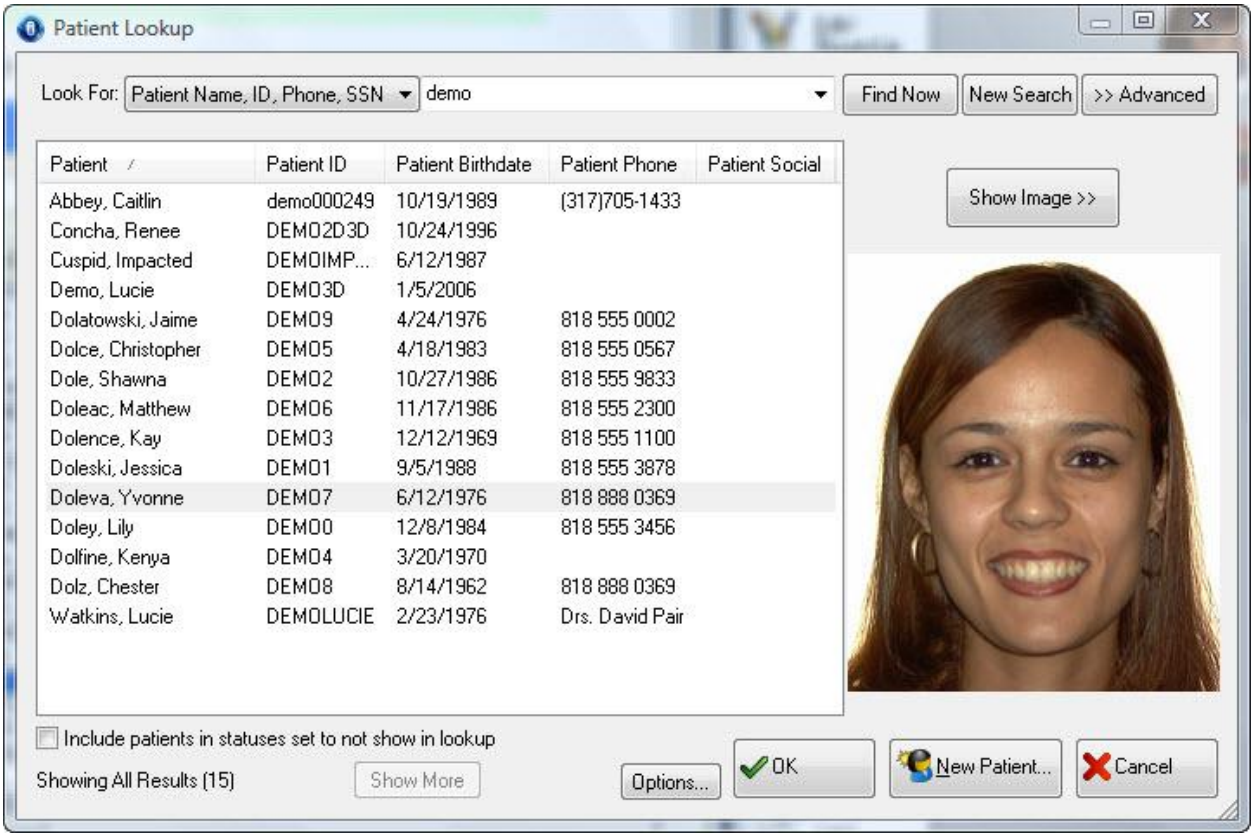
   When you click OK, the Dolphin Imaging main screen is displayed.

Using Patient Lookup (Dolphin Premium)

The Patient Lookup dialog box provides features that you use to search for a patient. This dialog box offers two views:

- The basic view offers an easy-to-use interface that enables you to search by patient name, patient ID, and billing party name.
- The advanced view offers a wide variety of search criteria so that you can perform more complex searches.

The figure below illustrates basic view of the Patient Lookup dialog box. Depending on the options you have selected for this dialog box, it may list different information for each patient, it may show an image layout for the patient (rather than a single picture), or it may omit the patient's picture.



You use this dialog box to add or select patient records.

To look up a patient record:

1. Select the criteria that you want to use to look up patients in the Look For drop-down list box.

   You can look up patients by the patient's name or ID, or by the billing party name.

2. If you are selected Patient Name & ID in the Look For drop-down list box, enter part of a patient's first name, last name, or ID in the Look For text box.

   Or,

   If you are selected Billing Party in the Look For drop-down list box, enter part of a billing party's first or last name in the Look For text box.

3. Click Find Now.

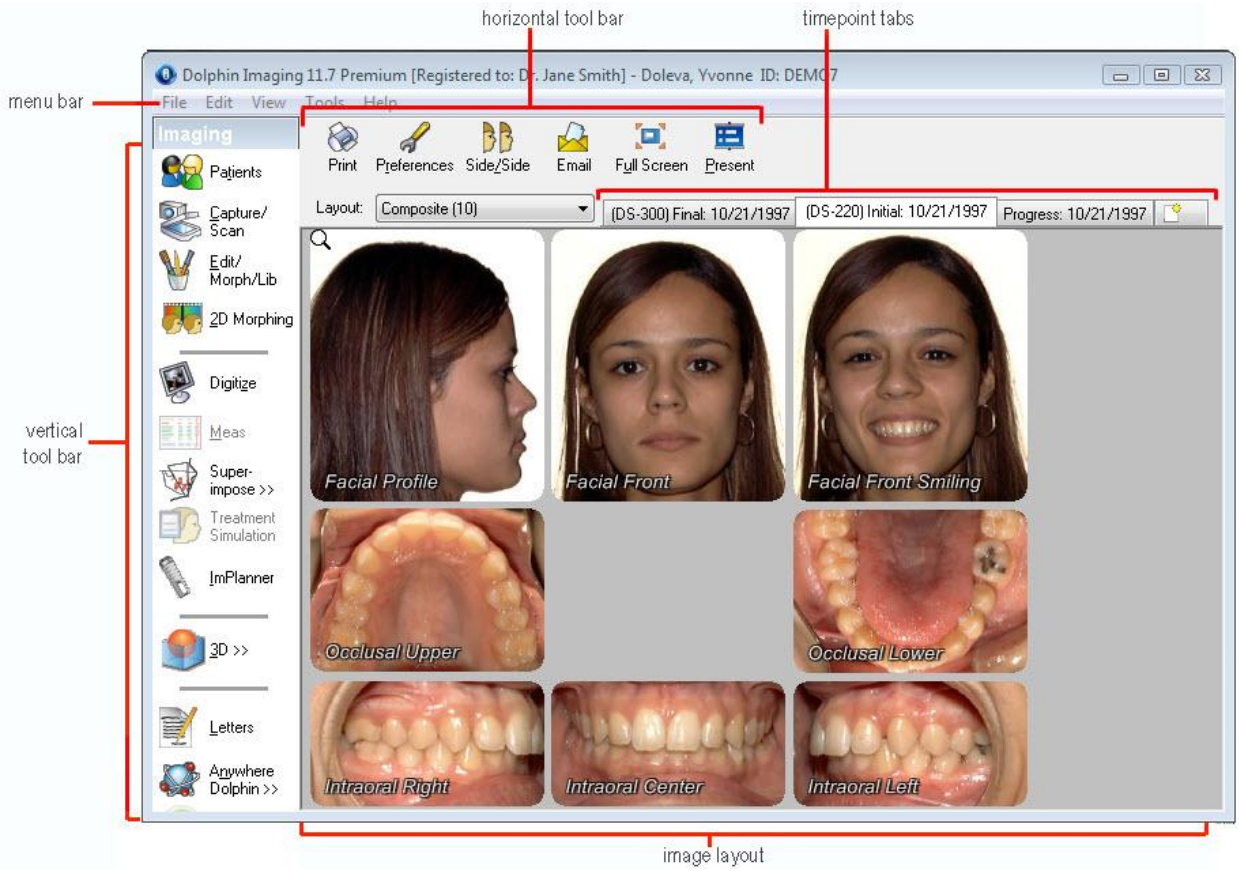
   The Patient Lookup dialog box lists all patients in your database that match the criteria you entered.

4. Select one of the patients from the patient list. Then, click OK.

   When you click OK, the Dolphin Imaging main screen is displayed.

Dolphin Imaging Main Screen

The figure below illustrates the Dolphin Imaging main screen:



Resizing and Zooming

To zoom in on part of the image:

1. Click  on the tool bar or press F2.

To zoom out after zooming in on part of the image:

1. Click  on the tool bar or press F3.

To fit the image in the window and reposition it in the center:

1. Click  on the tool bar or press F4.

To zoom in on a particular part of the image:

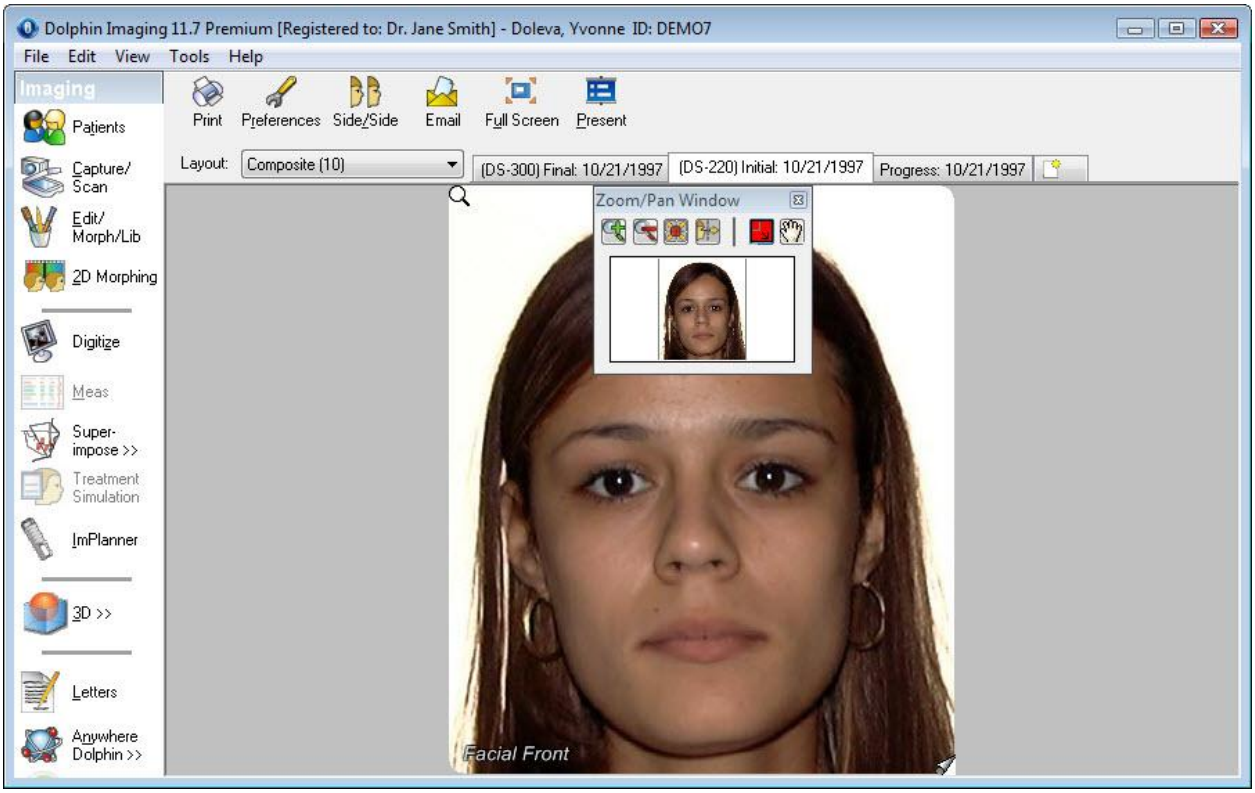
1. Click  on the tool bar or press F6.

   The Zoom/Pan window opens and the cursor changes to the corner of a box.

2. Click at one corner of the area that you want to zoom in on, and drag the mouse to the other corner of the area.

   The patient image in the main screen zooms to the area you selected.

3. To close the Zoom/Pan window, click  on the tool bar or press F6 again.



To reposition the image within the window:

1. Click  on the tool bar or press F7.

   The Zoom/Pan window opens and the cursor changes to the corner of a box.

2. Click and drag the image in the Zoom/Pan window.

   The patient image in the main screen pans as you move the image in the Zoom/Pan window.

3. To close the Zoom/Pan window, click  on the tool bar or press F7 again.

To close the Zoom/Pan window

1. Click  on the tool bar.

   Or,

   Press F6.

Maximizing an Image

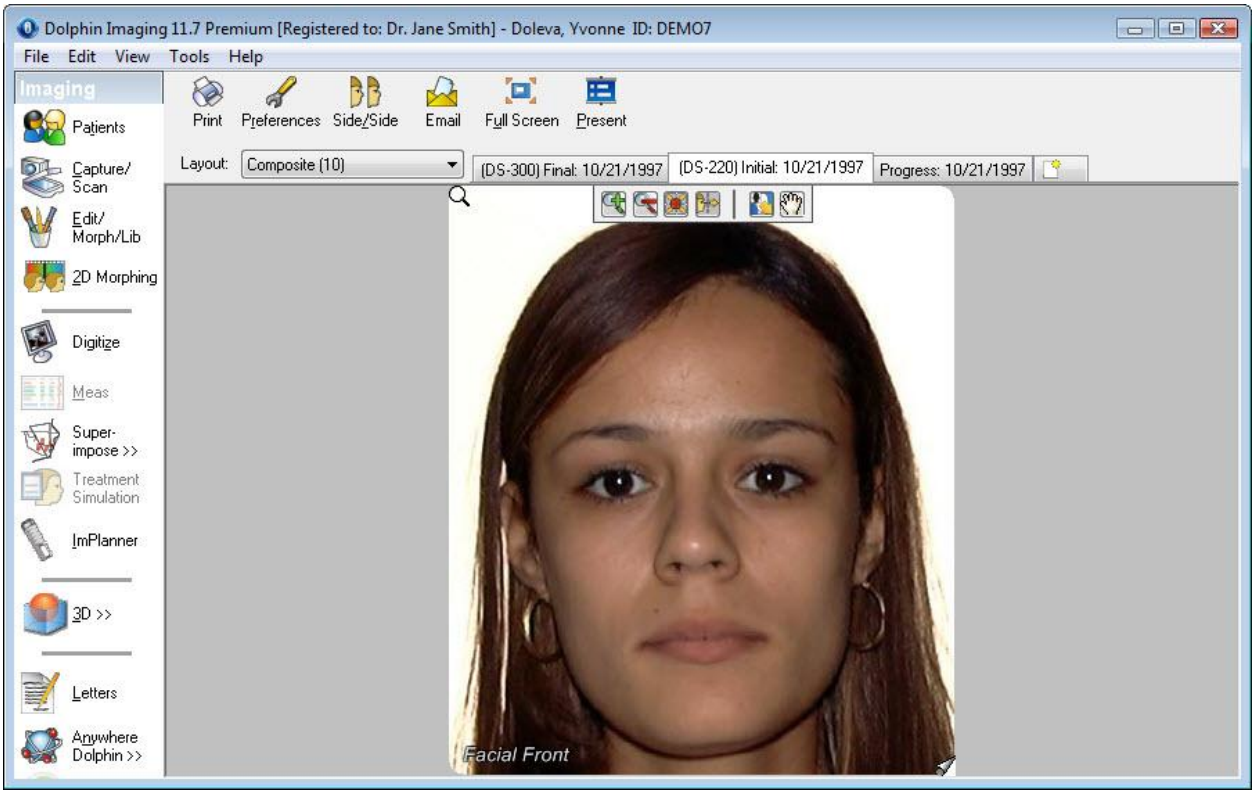
To maximize an image:

1. Click the image that you want to maximize.

   Or,

   Right-click the image, and select Maximize from the Image pop-up menu.

   The image expands to fill the Dolphin Imaging main screen and the zoom and align tool bar appears.



Click these buttons to zoom in or out on the currently-selected image.

Click this button to fit the image in the window and align it in the center of the window.

Click this button to fit the image in the window and align it at the right side of the window.

Click this button to open or close the Zoom/Pan window to zoom in on a particular area of the image.

Click this button to open or close the Zoom/Pan window and reposition the image in the window.

To view the corresponding images for other timepoints:

1. Select one of the patient's images to maximize it. Then, click in the lower right corner.

   Or,

   Press TAB to move the magnifying glass to one of the patient's pictures. Then, press PAGEDOWN on your keyboard.

The  icon only appears if the patient's picture is maximized and the patient has corresponding pictures for other timepoints.

If you continue clicking  or pressing PAGEDOWN, Dolphin will cycle through all the timepoints, enabling you to compare pictures for different phases of the patient's treatment. For example, you could view all lateral facial pictures taken for this patient. For more information on timepoints, see Chapter 5 of the *Dolphin Imaging User's Guide*.

To return to the image layout after maximizing an image:

1. Click again or press any key (other than SHIFT or CTRL) to see all the images in the image layout.

   Or,

   Right-click the maximized image, and select Restore from the Image pop-up menu.

Exiting from Dolphin Imaging

1. Click the close icon  on the Dolphin Imaging main screen's title bar.

   Or,

   Choose Exit from the File menu.

Adding a New Patient

When you start Dolphin Imaging, the first dialog box you see is either the Patient Charts (Standard Dolphin) or the Patient Lookup (Dolphin Premium) dialog box. You use this dialog box to add or select patient record.

You can also access these dialog boxes by clicking 

on the Dolphin Imaging main screen.

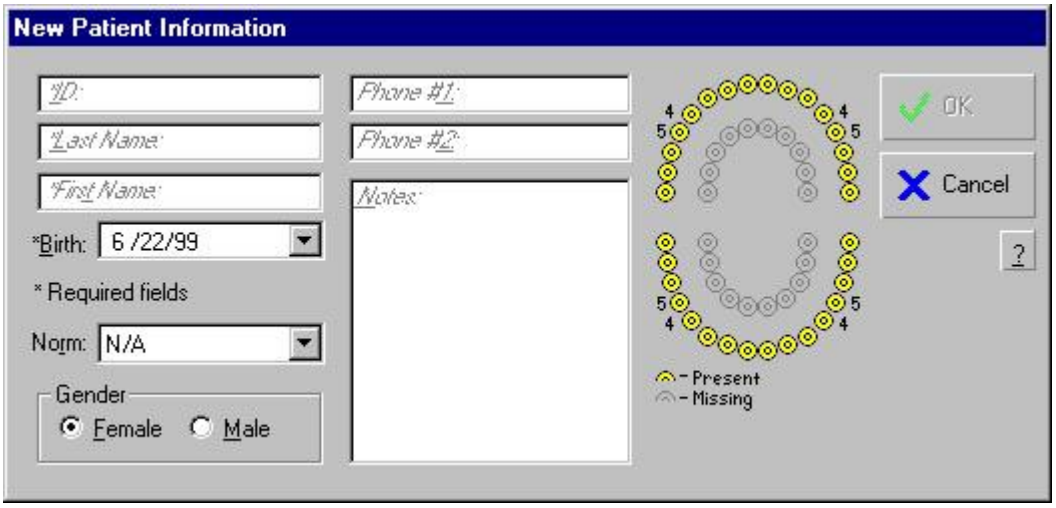
To add a patient:

1. If you are using the standard Dolphin software, click New Patient.

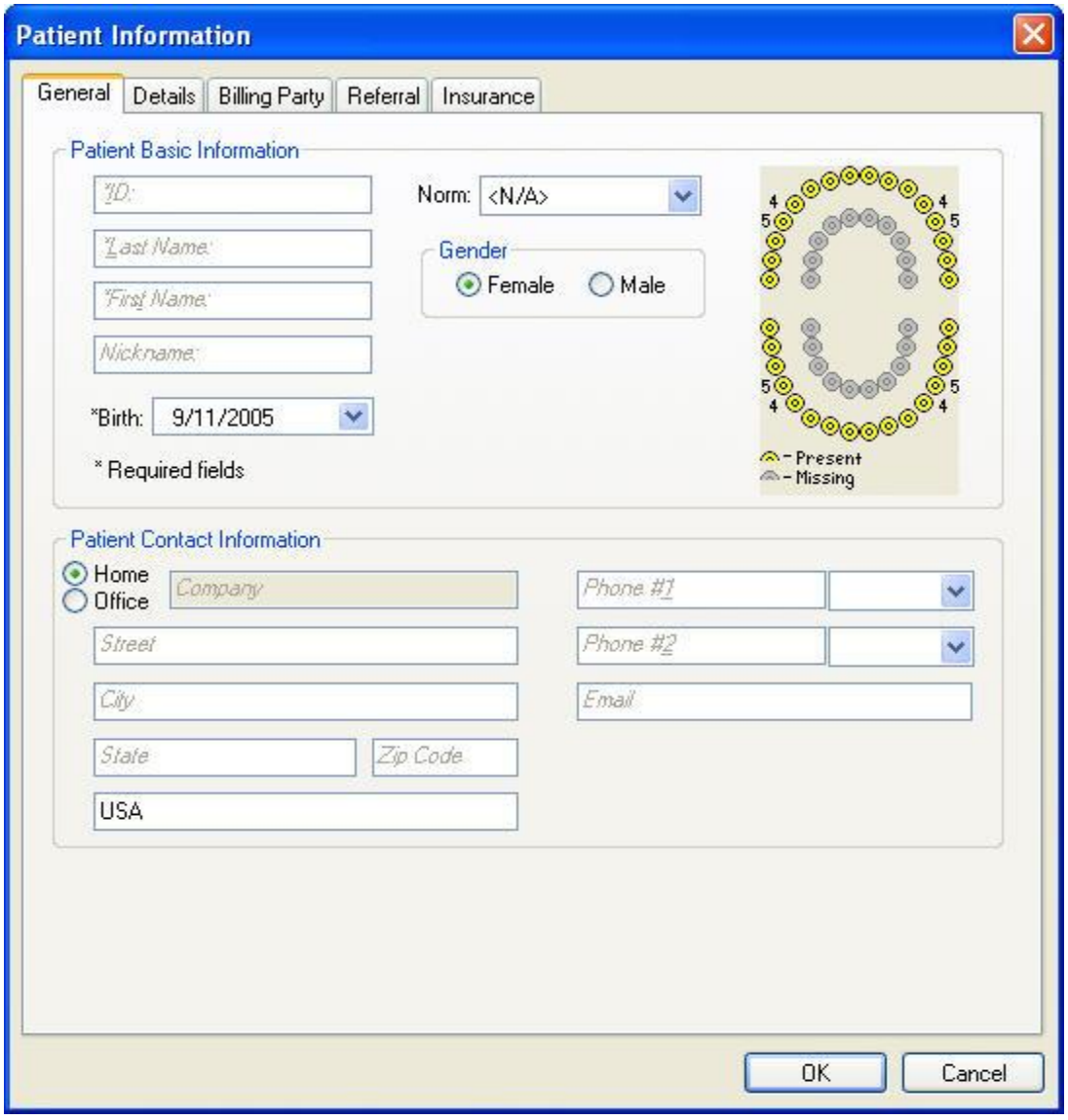
   Or,

   If you are using Dolphin Premium, click New Patient.... Then, select New Patient from the pop-up menu that appears.

   The Patient Information dialog box opens. If you are using the standard Dolphin software, this dialog box looks like the figure below.



   If you are using Dolphin Premium, this dialog box looks like the figure below.



The patent ID, last and first name, and birth date are the only required fields in this dialog box. All other fields are optional.

If you are using Dolphin Imaging with Dolphin Management, Dolphin Management launches if it isn't already running. In this case, you use Dolphin Management to enter new patient information.

2. Enter the patient ID used to keep track of the patient's records.

   For example, you can use the same patient ID that you use in your practice management computer system. The patient ID should be unique to this patient and can be any combination of up to ten characters including letters, numbers, hyphens, and underscore characters.

3. Enter the patient's last name and first name.

4. Enter the patient's birth date using your computer's regional date format.

   You must alter the default date and replace it with the patient's correct birth date.

Note: Dolphin supports regional date formats as configured for your computer in Microsoft Windows. For example, if you usually enter 21/3/02 for March 21, 2002, and your copy of Microsoft Windows is already configured to accept dates in this format, then you should enter the date in that format.

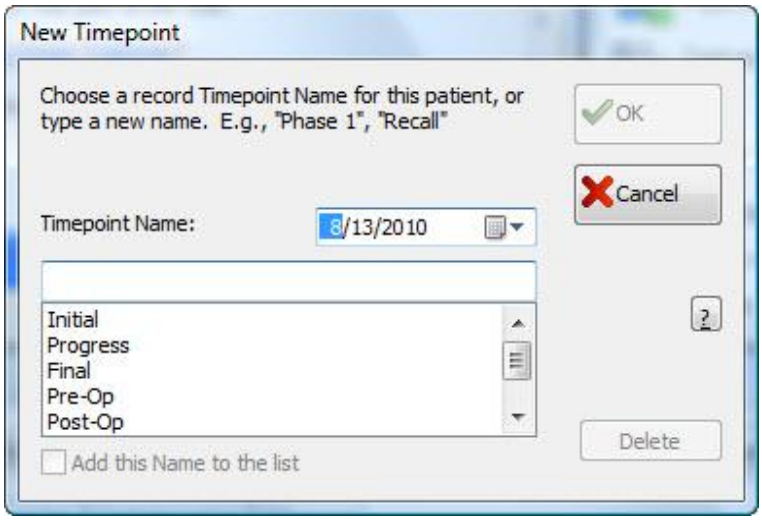
5. Enter any of the optional information. Then, click OK.

   For a description of the optional information you can enter, see Chapter 5 of the *Dolphin Imaging User's Guide*.

   When you click OK, the New Timepoint dialog box appears (see below).

Adding a Timepoint

You use the New Timepoint dialog box to add timepoints for this patient. In the Dolphin Imaging program, timepoints enable you to organize images from different time periods or for other purposes.



To create a new timepoint for a patient:

1. Choose a name from the list of standard timepoint names. Then, click OK.

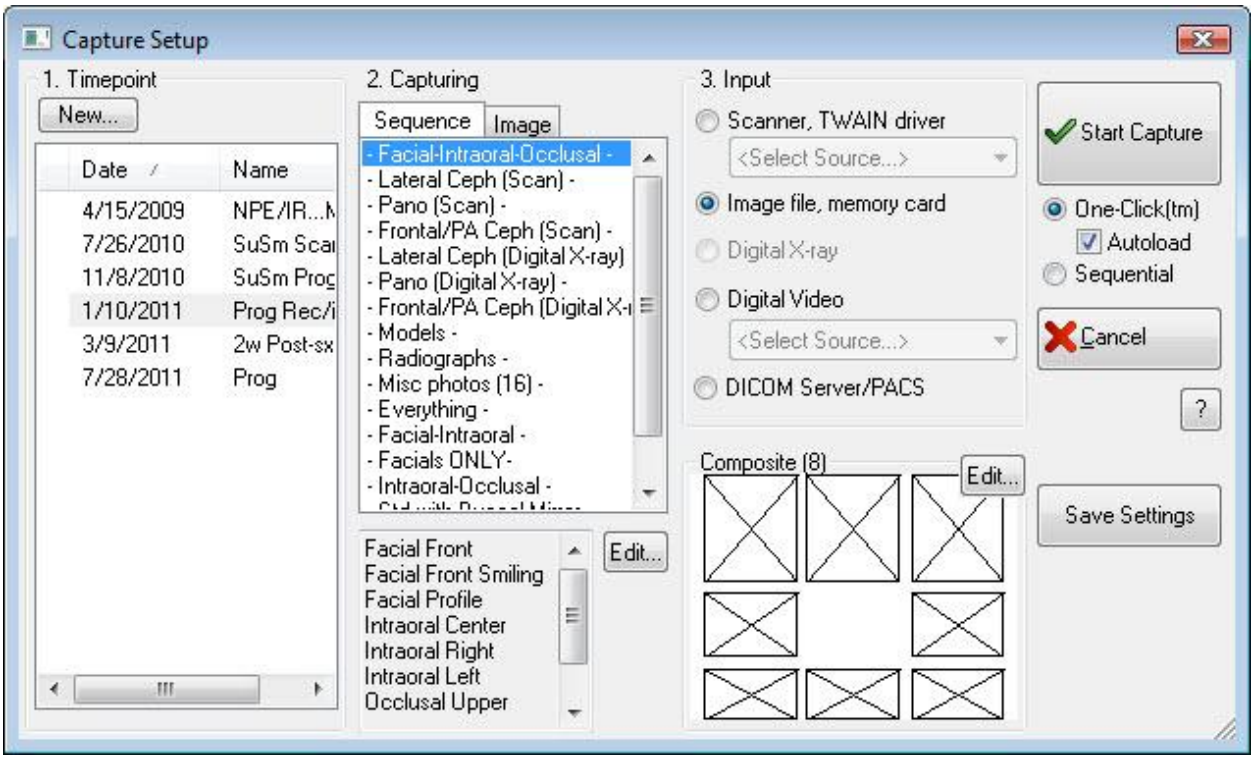
   The date for this timepoint is entered automatically.

   When you click OK, the Capture Setup dialog box appears (see below) so that you can begin capturing images for this patient and timepoint.

Capturing Images

With Dolphin Imaging, images can be captured from several types of input sources such as memory cards, scanners, and so on. For more information, see Chapter 6 in the *Dolphin Imaging User's Guide*.

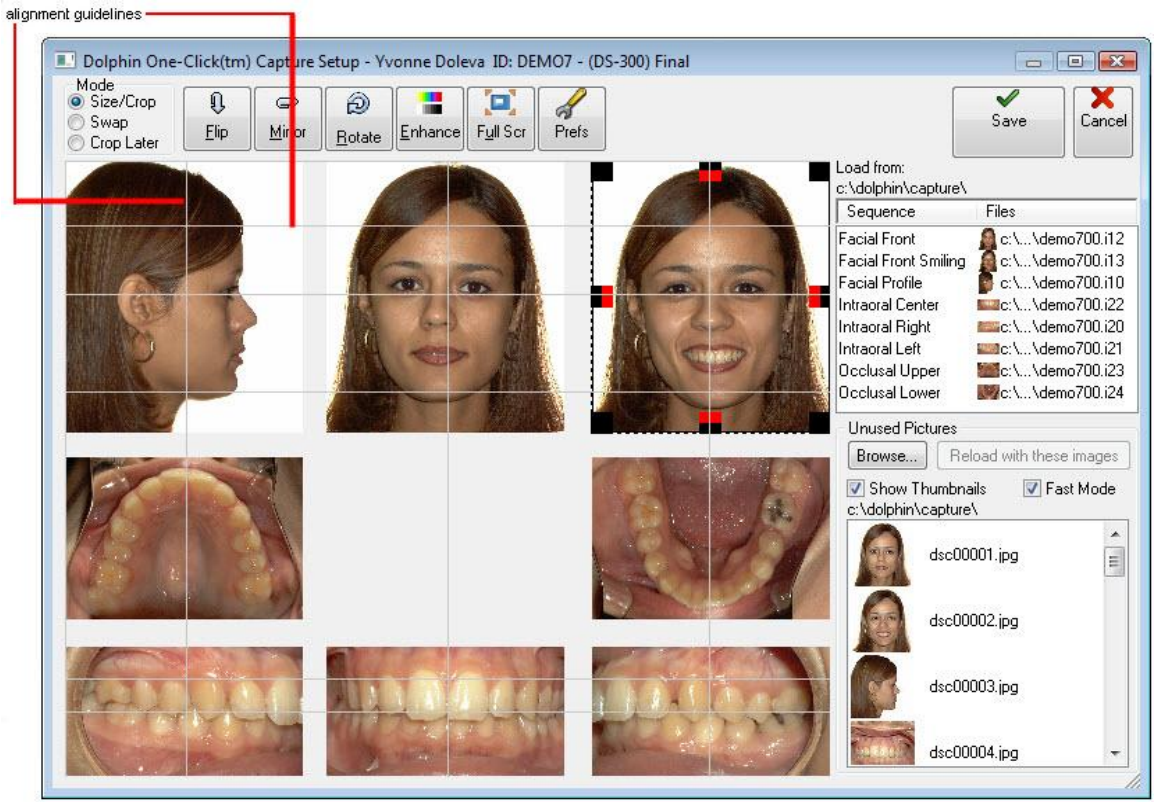
The figure below illustrates the Capture Setup dialog box:



To capture the patient's facial intraoral occlusal pictures from a memory card:

1. Select an existing timepoint from the Timepoint list box.
2. Select "Facial-Intraoral-Occlusal" from the Sequence tab in the Capturing group box.
3. Select Image File, Memory Card in the Input group box.
4. Make sure the One-Click radio button is selected. Then, click Start Capture.

   The One-Click Capture Setup dialog box displays all the images in the sequence as shown below.



For details on the options available on the One-Click Capture dialog box, see Chapter 6 of the *Dolphin Imaging User's Guide*.

To capture image files in another folder:

1. Click Browse....

   A dialog box opens where you can select a different folder from which to capture image files.

2. Select another folder and click OK.

   A dialog box appears asking whether you would like Dolphin to use the selected folder as its default image folder from now on.

3. Click Yes to use this folder as the Dolphin image folder. Otherwise, click No.

   The Unused Pictures list box shows file names for the image files in this folder. You can check the Show Thumbnail box to preview the images in this folder.

4. If the images are in the correct order for the Facial-Intraoral-Occlusal picture sequence, select the first picture in the sequence from the Unused Pictures list box. Then, click the Reload With These Images button to load the selected image files into the image layout.

   Or,

   If the images are not in the correct order for the Facial-Intraoral-Occlusal picture sequence, click and drag each picture to the correct slot in the image layout.

To save the images for this patient and timepoint:

1. Click Save.

   A progress dialog box shows the progress of the operation. Once the image layout is saved, it appears on the Dolphin Imaging main screen.

   For details on the options available on this screen, including the menus and tool bars, see Chapter 4 in the *Dolphin Imaging User's Guide*.

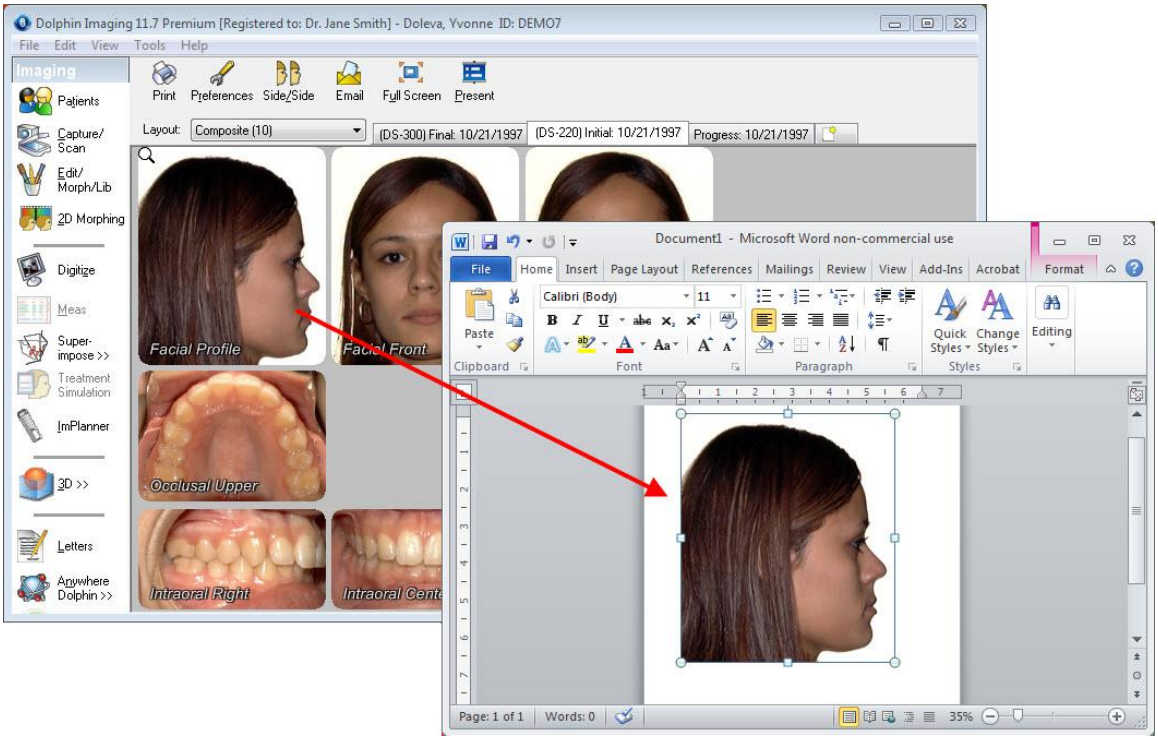
Transferring Images to Microsoft Office Programs

To drag and drop a picture from the Dolphin Imaging main screen into Microsoft Word or PowerPoint:

1. Start the application into which you want to drag and drop a Dolphin Imaging picture.
2. Arrange the Dolphin Imaging main screen and the other application window so that both are visible on your Microsoft Windows desktop.
3. On the Dolphin Imaging main screen, select the picture you want to drag and drop.
4. Click the selected picture, hold down the mouse button, and drag it into the other application's window. Release the mouse button.

   The Dolphin Imaging picture appears in the other application's window, as shown below.

   Note: You can also transfer a "high resolution" version of these images, including images with cephalometric tracings. For more information, see Chapter 7 in the *Dolphin Imaging User's Guide*.



2 Cephalometric Tracing

This chapter provides a quick overview of capturing and digitizing an X-ray. In digitizing images, you specify landmarks on the image that are used for cephalometric analyses. You can also select specific cephalometric structures that you want Dolphin to draw automatically. Once you have properly digitized an X-ray, you can view or print a table of patient measurements and the appropriate cephalometric tracing diagram.

This chapter includes the following sections:

- Capturing an X-Ray Image
- Digitizing the X-Ray Image
- Viewing Cephalometric Measurements

These features are available if you have purchased the Dolphin Cephalometric Tracing and Analysis module.

Capturing an X-Ray Image

This section describes how to capture an X-ray from a scanner. Before capturing an X-ray image, refer to your scanner documentation for information about setting it up.

For more information on capturing X-ray images from a digital radiographic system, see Appendix C in the *Dolphin Imaging User's Guide*.

To capture an X-ray from a scanner:

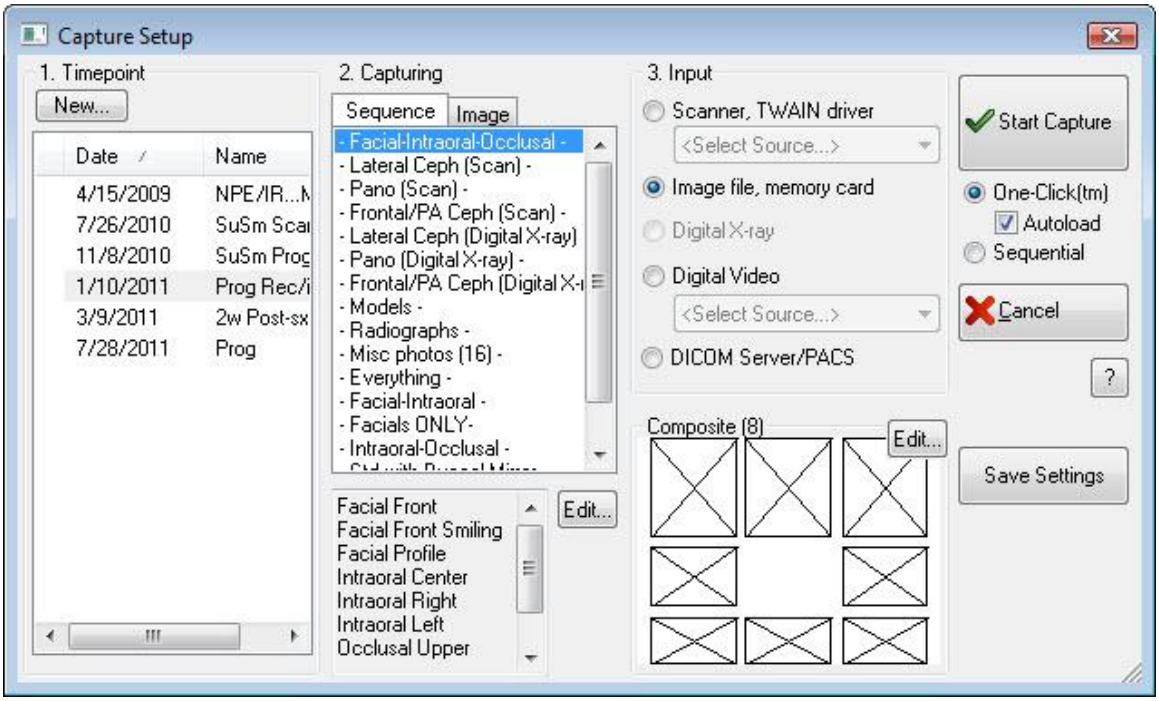
1. Using the Patient Charts dialog box, select the patient whose image you want to digitize.

   For more information on selecting a patient see Chapter 5 of the *Dolphin Imaging User's Guide*.

2. Click 

on the Dolphin Imaging main screen's vertical tool bar.

   The Capture Setup dialog box appears as shown below.



3. Place the X-ray and the Dolphin calibration ruler on the scanner.

   Note: It is very important that you include the Dolphin calibration ruler (or some other type of object with a known measurement) on the radiographic image itself. If you do not have a Dolphin calibration ruler, you can contact Dolphin to obtain one. For more information on the Dolphin calibration ruler, see Chapter 6 of the *Dolphin Imaging User's Guide*.

   Place the X-ray face down on the scanner. Place the top of the skull to the right side of the scanner. The X-ray image should face the Dolphin calibration ruler, and the ruler should be on top of the X-ray film.

4. Select an existing timepoint from the Timepoint list box.

5. From the Sequence tab in the Capturing group box, select the Lateral Ceph (Scan) capture sequence, which is a capture sequence containing only one picture.

6. Select Scanner, TWAIN driver as the source from which to capture these images in the Input group box.

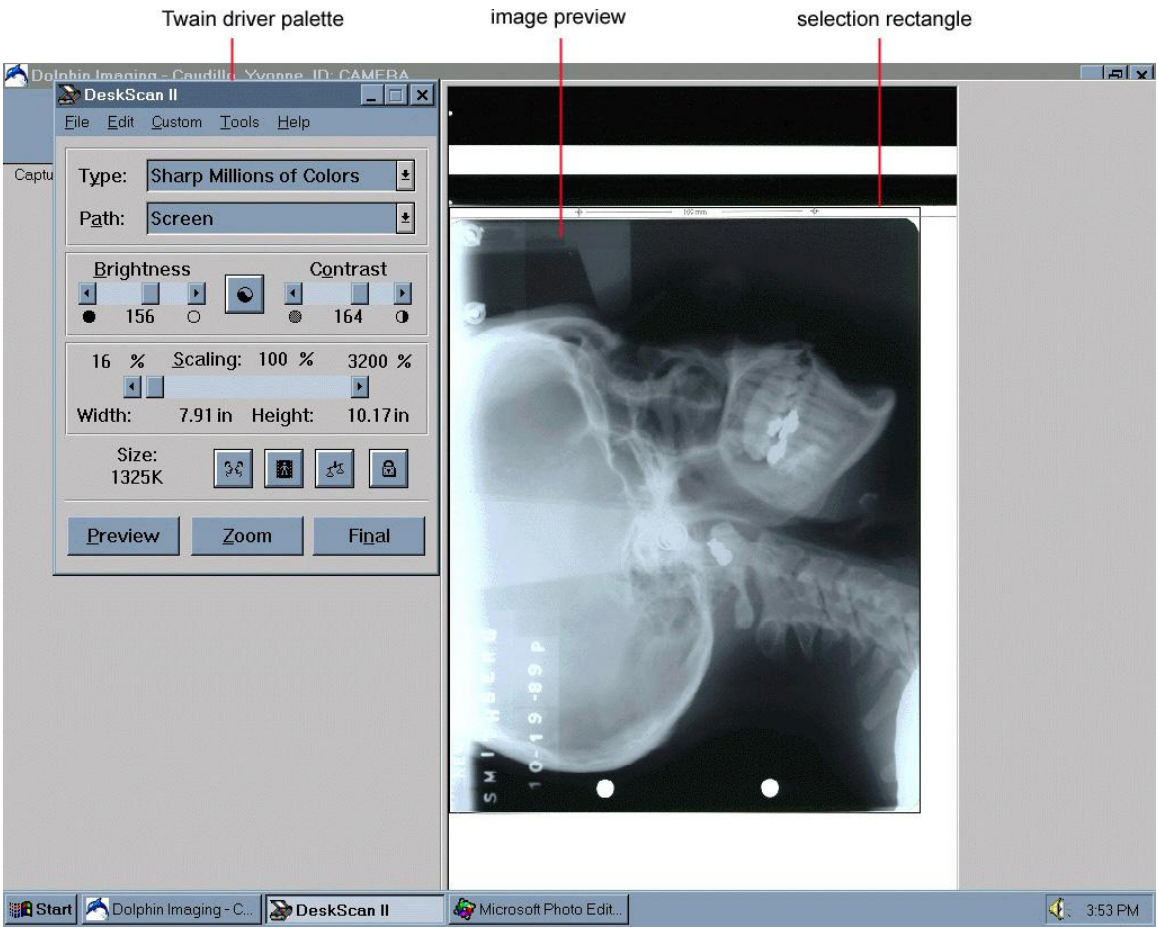
   Most scanners use TWAIN drivers to communicate with the computer.

7. Select the scanner you are using from the drop-down list box in the Input group box.

8. Click Start Capture.

   For information on the other options available on the Capture Setup dialog box, see Chapter 6 of the *Dolphin Imaging User's Guide*.

   At this point, the scanner driver program takes over the capture process. If this is the first image you are scanning and you are using an older scanner model, the scanner lamp may take about 30 seconds to warm up to achieve the correct color temperature. The scanner typically performs a preview scan of the image. Then, a dialog box similar to the figure below displays a preview of the scan.



Note: The appearance of the dialog box you see depends on the scanner you are using. The figure above shows the appearance of this dialog box for Hewlett-Packard Deskscan 4, 5, and 6000 series scanners. Refer to the Dolphin Imaging web site (www.dolphinimaging.com) for recommended scanners. Refer to your scanner documentation for information about setting your scanner up.

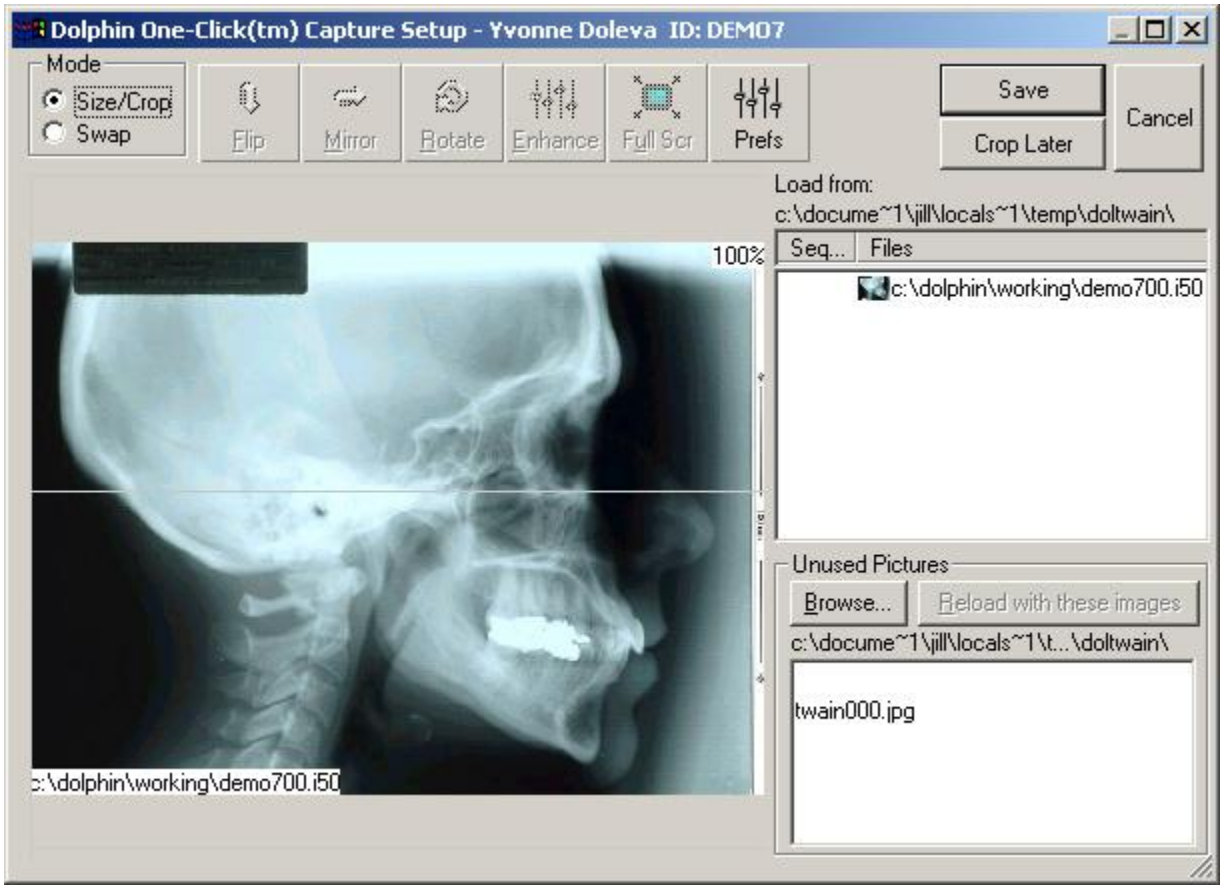
9. Examine the preview image to make sure that the image rectangle encompasses the part of the image you want to capture and the Dolphin calibration ruler. If necessary, change the image rectangle size or location using your scanner's driver program.

10. Make any modifications to the settings for the scanner driver program for the final scan.

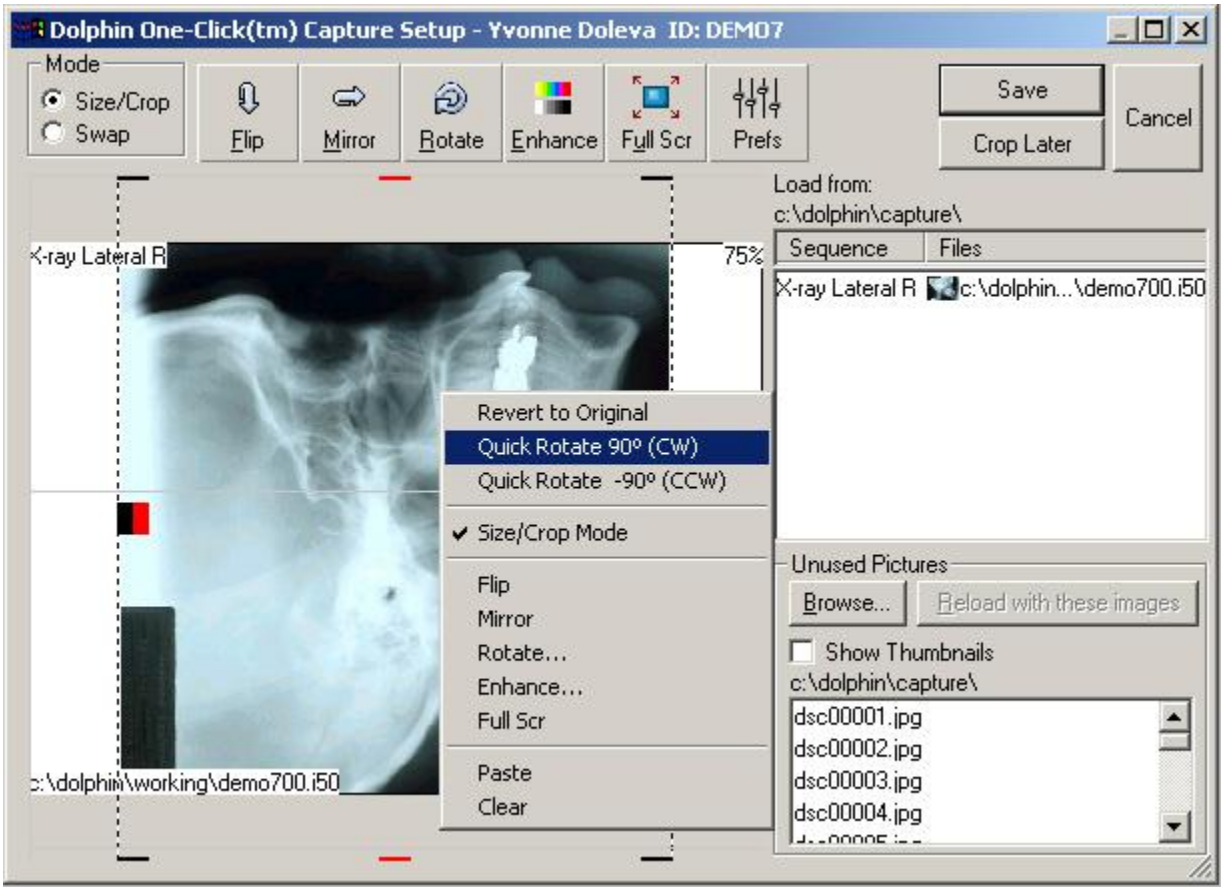
    For more information on the options available, refer to your scanner and scanner driver documentation.

11. Click Final to perform the final scan.

    At this point, the scanner driver program delivers the scanned image to the One-Click Capture dialog box.



Depending on your scanner driver and its settings, you may have to rotate the scanned image 90 degrees. You can easily rotate the scanned image by clicking the image with the right mouse button and selecting one of the Quick Rotate options from the pop-up menu.



For details on the other options available on this dialog box, see Chapter 6 of the *Dolphin Imaging User's Guide*.

12. Click Crop Later.

    A progress dialog box shows the progress of the operation. Then, the image appears in the Dolphin Imaging main screen.

Digitizing the X-Ray Image

To digitize the X-ray:

1. On the Dolphin Imaging main screen's vertical tool bar, click 

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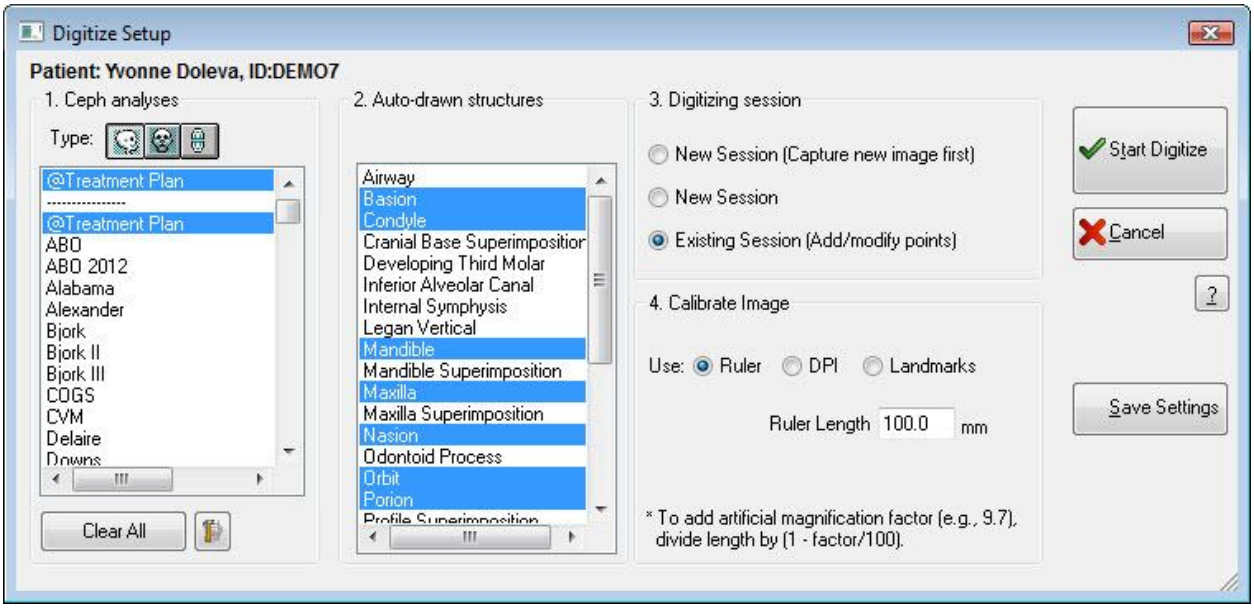
   The Digitize Setup dialog box appears as shown below.



2. In the Ceph Analyses group box, select the Type icon for a lateral X-ray.
3. Select one or more analyses from the Ceph Analysis list box.

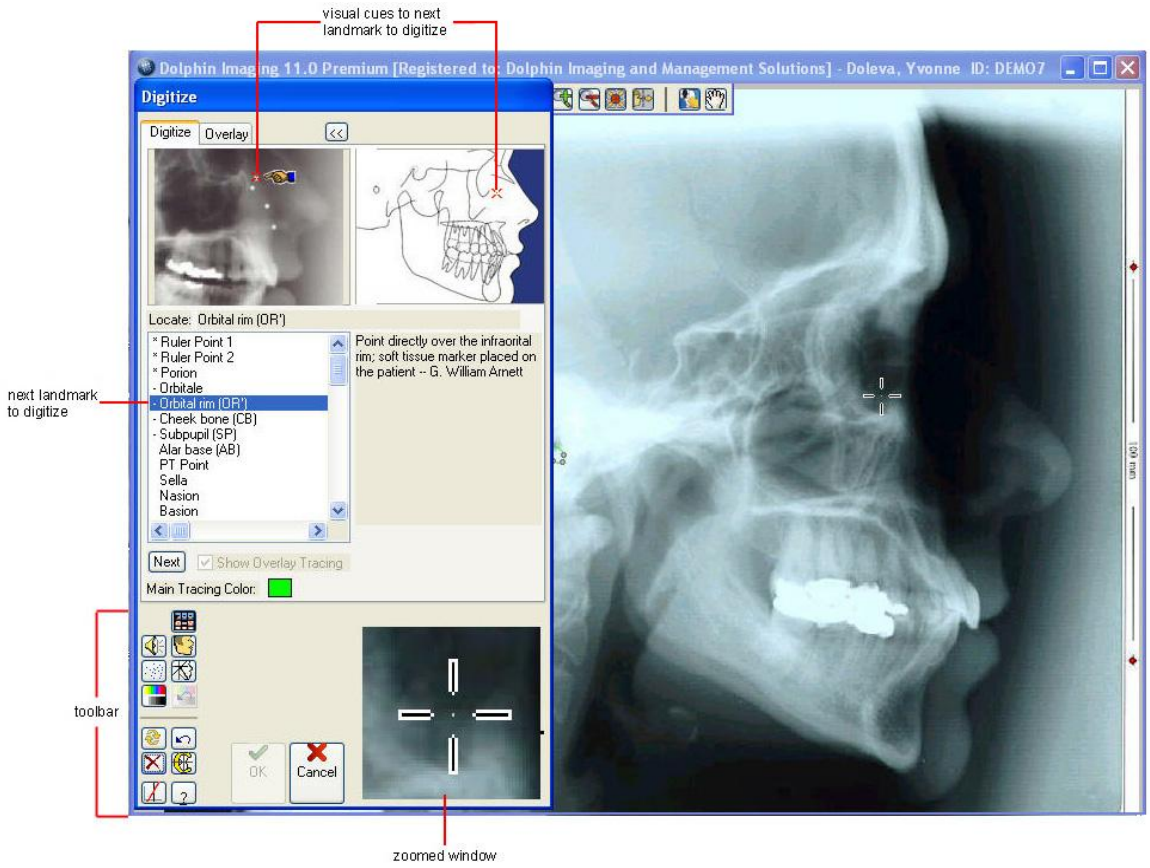
   The selection bar indicates each analysis you have selected. To deselect a selected analysis, click that analysis again. To deselect all selected analyses, click Clear All.

   Note: Please contact your Dolphin Representative if you want to customize your own cephalometric analysis.
4. Optionally, select any structures that you want Dolphin Imaging to draw automatically from the Auto Drawn Structures list box.
5. In the Session group box, select the New Session, since this will be the first time you will be digitizing this radiographic image.
6. In the Calibrate Image group box, select Ruler, and make sure that the correct calibration ruler length is entered in the input text box.

   The ruler length defaults to 100.0 mm, which is the correct value if you captured the image using a scanner and used a Dolphin calibration ruler. If you used a digital X-ray system or a ruler other than the Dolphin calibration ruler, you may need to change this value. For more information, see Chapter 11 of the *Dolphin Imaging User's Guide*..
7. Click Save Settings.

   Once you save the settings, the analyses, structures, and calibration settings you have selected will be automatically selected whenever you open the Digitize Setup dialog box. There is no need to select these settings explicitly again.
8. Click Start Digitize.

   The patient's X-ray image appears in the Digitize dialog box, as shown below:



For detailed information on the options available on this dialog box, see Chapter 11 of the *Dolphin Imaging User's Guide*.

9. If necessary, press F2 to zoom in on the image so that the landmarks are clearly visible.

10. Using the cartoon and the Landmarks list box as a guide, click each landmark in order.

    For a list of landmarks and a diagram indicating their locations, see Appendix A of the *Dolphin Imaging User's Guide*.

    If you selected any structures for Dolphin to draw automatically ("Auto Structures"), those structures are drawn immediately when you digitize the required landmarks. You can modify these structures by clicking and dragging the associated landmarks.

    When you click and drag points, the curve changes in different ways depending on the color of the point:

    - When you click and drag a red point (a digitized landmark), the curve and all the grey points between it and the next red point move to accommodate the new location of the red point you are moving.
    - When you hold down the CTRL key while clicking and dragging a red point, only the red point moves. The adjacent grey points do not move.
    - When you click and a grey point (a calculated landmark), only the curve adjacent to that point moves. The adjacent grey and red points do not move.

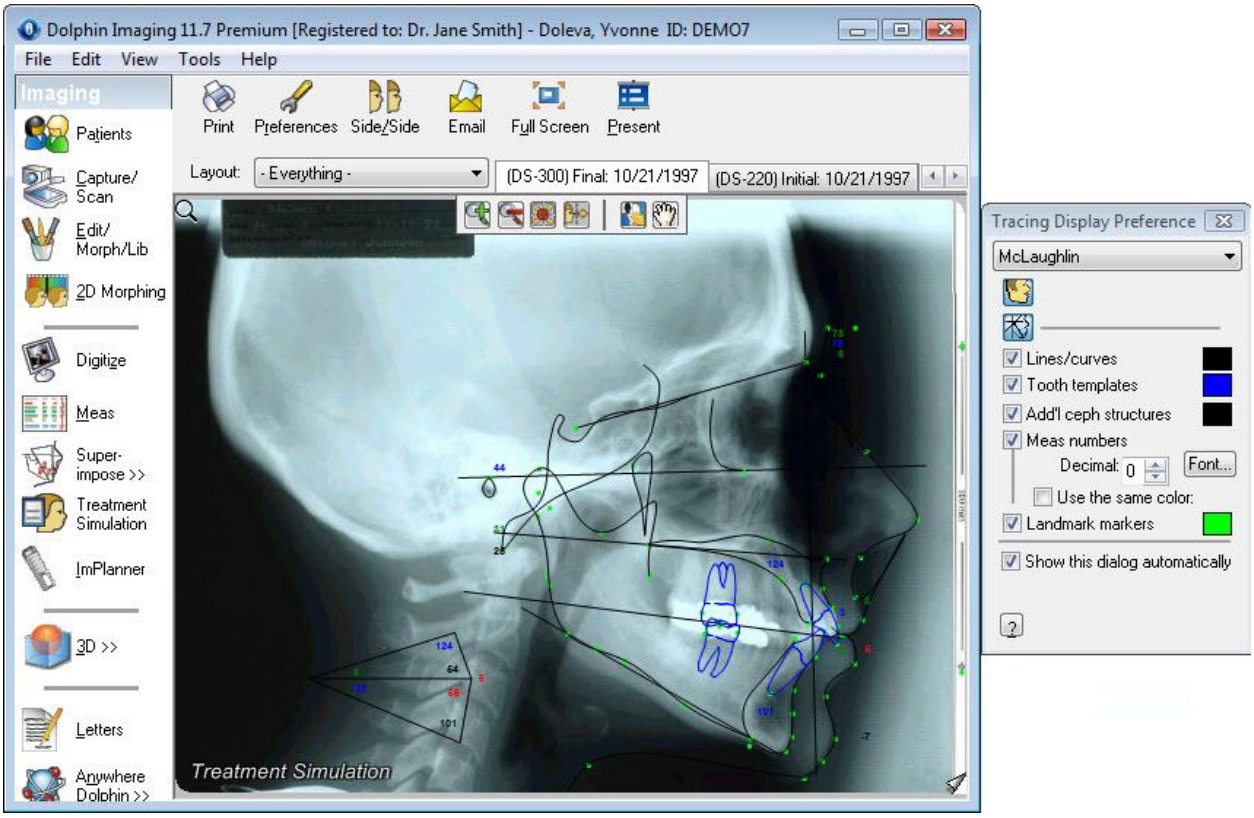
11. For each digitizing session, check the key components and results to ensure accuracy.

    The Dolphin Imaging program does not automatically check the validity of the landmark locations. You must verify that the landmarks are placed properly by you or your technician.

When you finish digitizing all the landmarks, the selection bar in the Landmarks list is on <<end of list>>.

12. Click OK to save the digitized image and return to the Dolphin Imaging Main Screen.

    The digitized X-ray appears in the Dolphin Imaging main screen.



Note: By default, the Tracing Display Preferences dialog box appears automatically whenever you view an image with tracings in the Dolphin Imaging main screen. You can use this dialog box to change the display settings for the patient's tracing. For example, you can:

- Click the check boxes to toggle the display of the image, tracing lines and curves, tooth templates, additional cephalometric structures, measurement numbers, landmark markers.
- You can click the color samples to change the color in which the associated element appears in the patient's tracing.

For more information on setting tracing display preferences, see Chapter 4 of the *Dolphin Imaging User's Guide*.

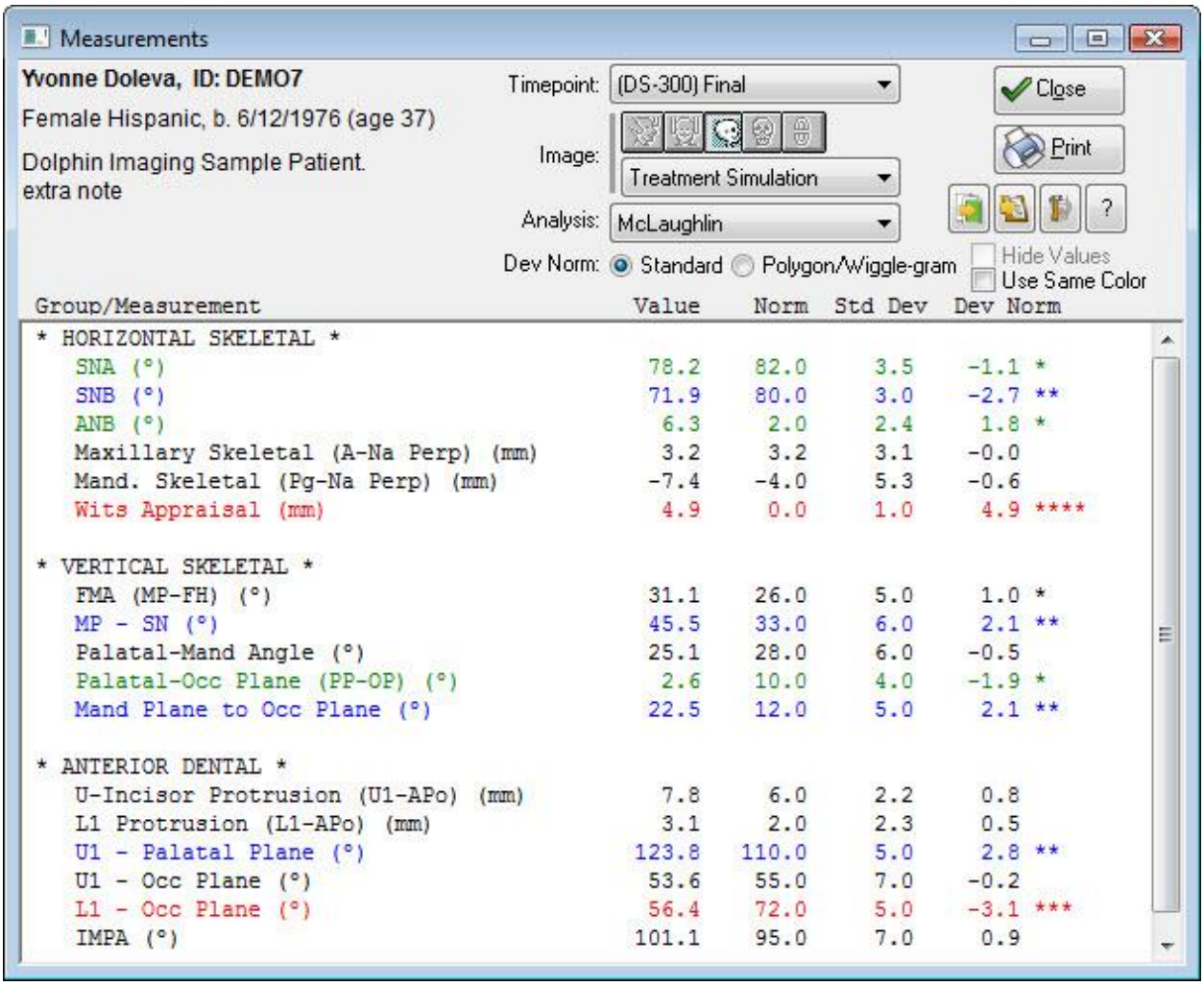
Viewing Cephalometric Measurements

To view a table of the cephalometric measurements:

1. Click 

on the Dolphin Imaging main screen's vertical tool bar.

   The following figure illustrates the Measurements dialog box:



   For details on the information and options available in this dialog box, see Chapter 13 in the *Dolphin Imaging User's Guide*.

3 Superimpositions

This chapter describes how to:

- superimpose two or more of the patient's tracings
- superimpose a patient's tracing over the profile image

These features are available if you have purchased the Dolphin Cephalometric Tracing and Analysis module.

Tracing Over Tracing

If you have two or more digitized images for a patient, you can superimpose the tracings for analysis and comparison. You might want to compare:

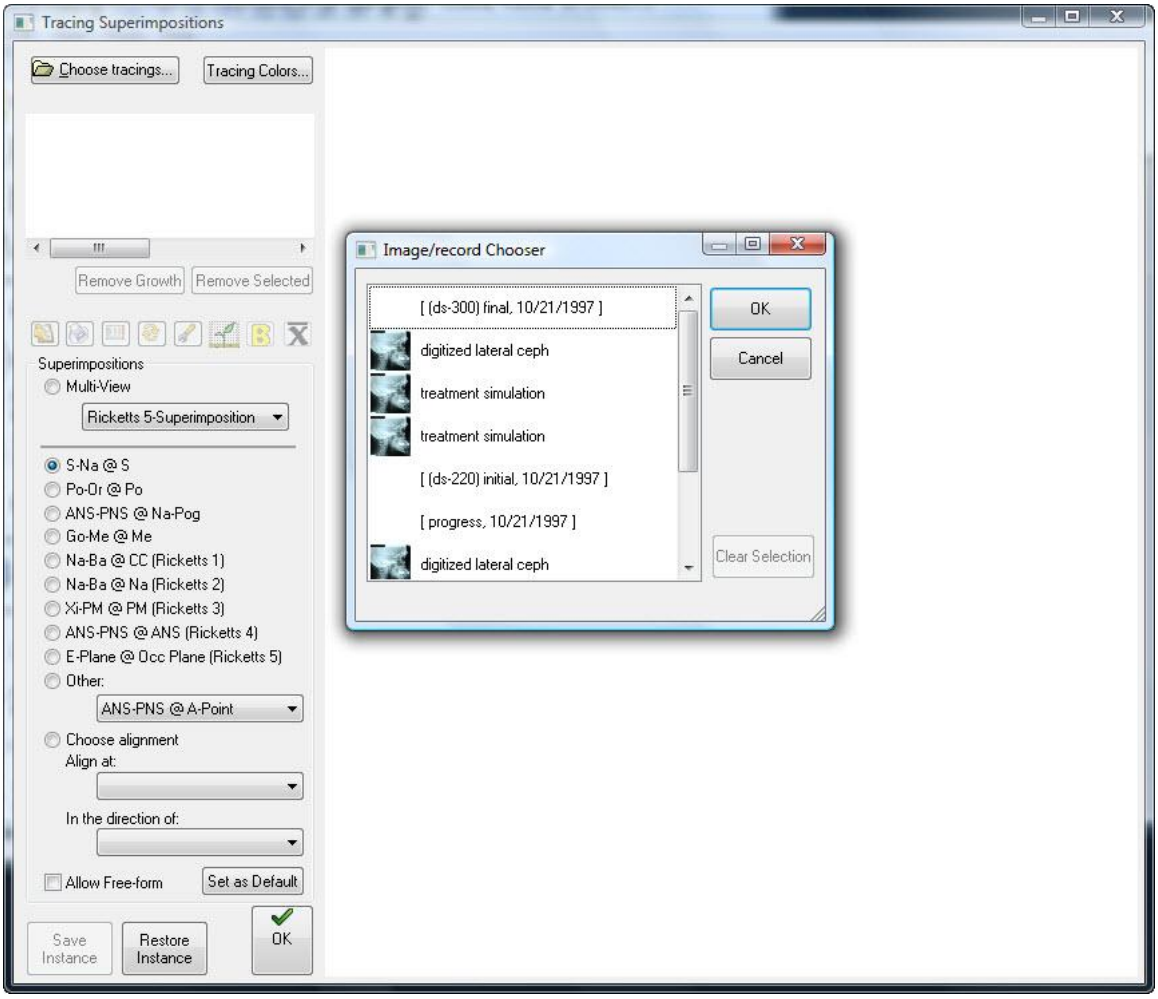
- tracings from different timepoints to analyze and monitor before, during, and after treatment progress.
- one or more simulated tracings (created using Treatment Simulation, Growth, or CO/CR) to the original tracing.

To superimpose one tracing over another:

1. Select a patient for whom you have two or more tracings using the Patient Lookup dialog box (see Chapter 5 of the *Dolphin Imaging User's Guide*). Then, click OK.
2. On the Dolphin Imaging main screen, click 

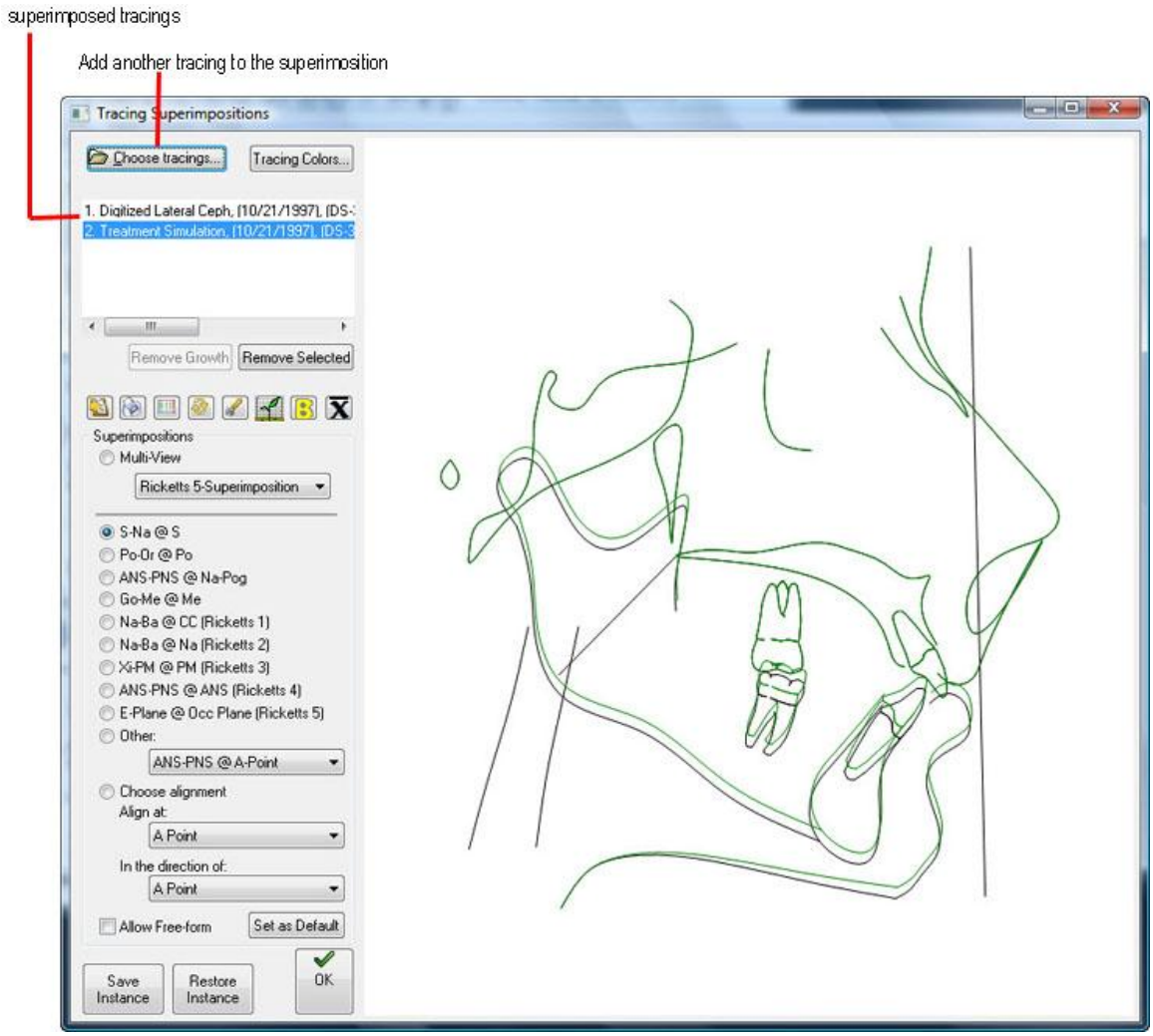
on the vertical tool bar. Then, select Tracing Superimpositions from the pop-up menu.

   The Tracing Superimpositions dialog box appears, along with the Image/Record Chooser dialog box.



3. Select the tracings you want to use in your superimposition. Then, click OK.

   The selected tracings are displayed using different colors in the Tracing Superimpositions dialog box, as shown below.



To return to the Dolphin Imaging Main Screen:

1. Click OK.

Tracing Over Image

You may superimpose the patient's cephalometric tracing over the profile photograph for the following purposes:

- You want to analyze the patient's soft tissue profile against the patient's cephalometric tracing.
- You want to perform common treatment simulation procedures such as CO/CR conversion and growth forecasting using the patient's soft tissue profile image.
- You want to prepare a case for a patient consultation or a conference with a referring doctor.
- You want to give the patient a print-out of the profile image with cephalometric tracings for documentation purposes.

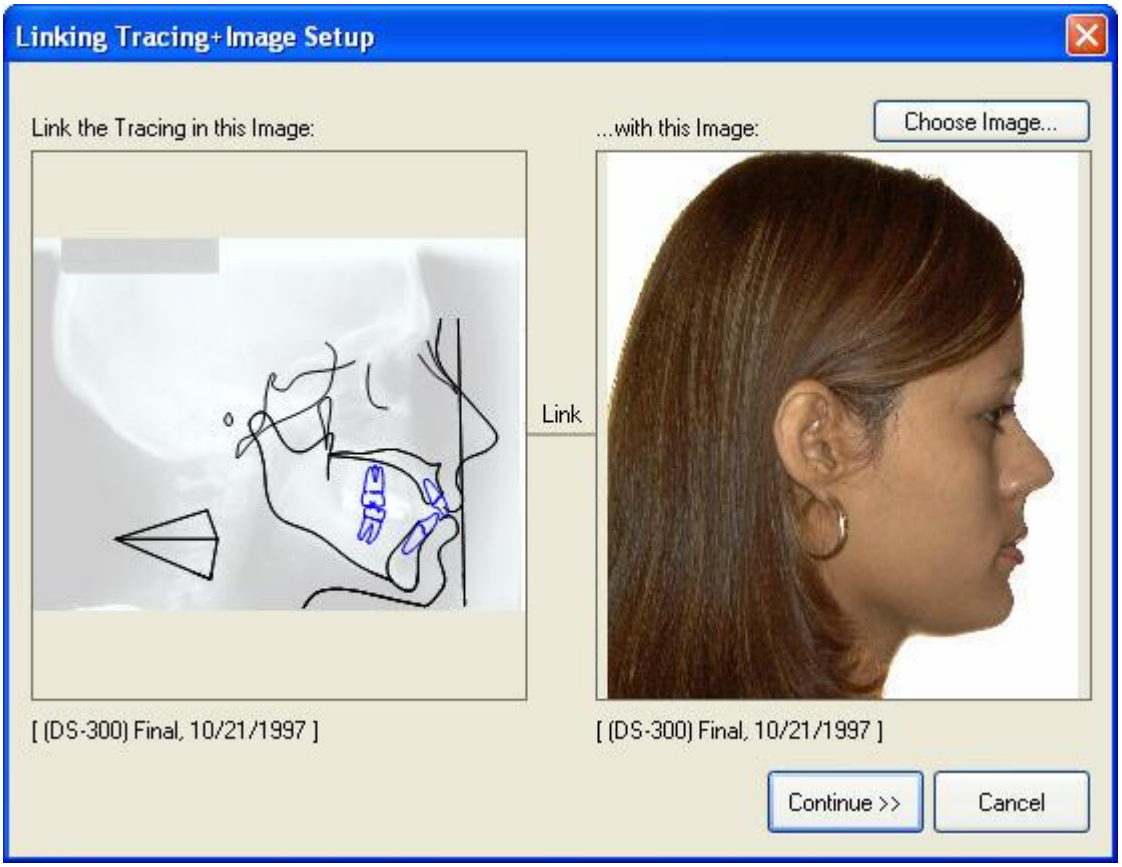
To superimpose a patient's lateral photograph with the patient's tracing:

1. Select a patient for whom you have a lateral cephalometric and a lateral image (see Chapter 5 of the *Dolphin Imaging User's Guide*). Then, click OK.

2. On the Dolphin Imaging main screen, click 

on the vertical tool bar. Then, select Link Tracing+Image for Treatment Simulation from the pop-up menu.

   The Linking Images Option dialog box opens so that you can select the image that you want to superimpose with the patient's tracing. By default, the profile image for the current timepoint is selected.



3. If the Image To Link is the correct image, click Start Linking.

   Or,

   If the Image To Link is not the correct image, click Select Another Image... (see below).

To select another image for this superimposition:

1. Linking Images Option dialog box, click Select Another Image....

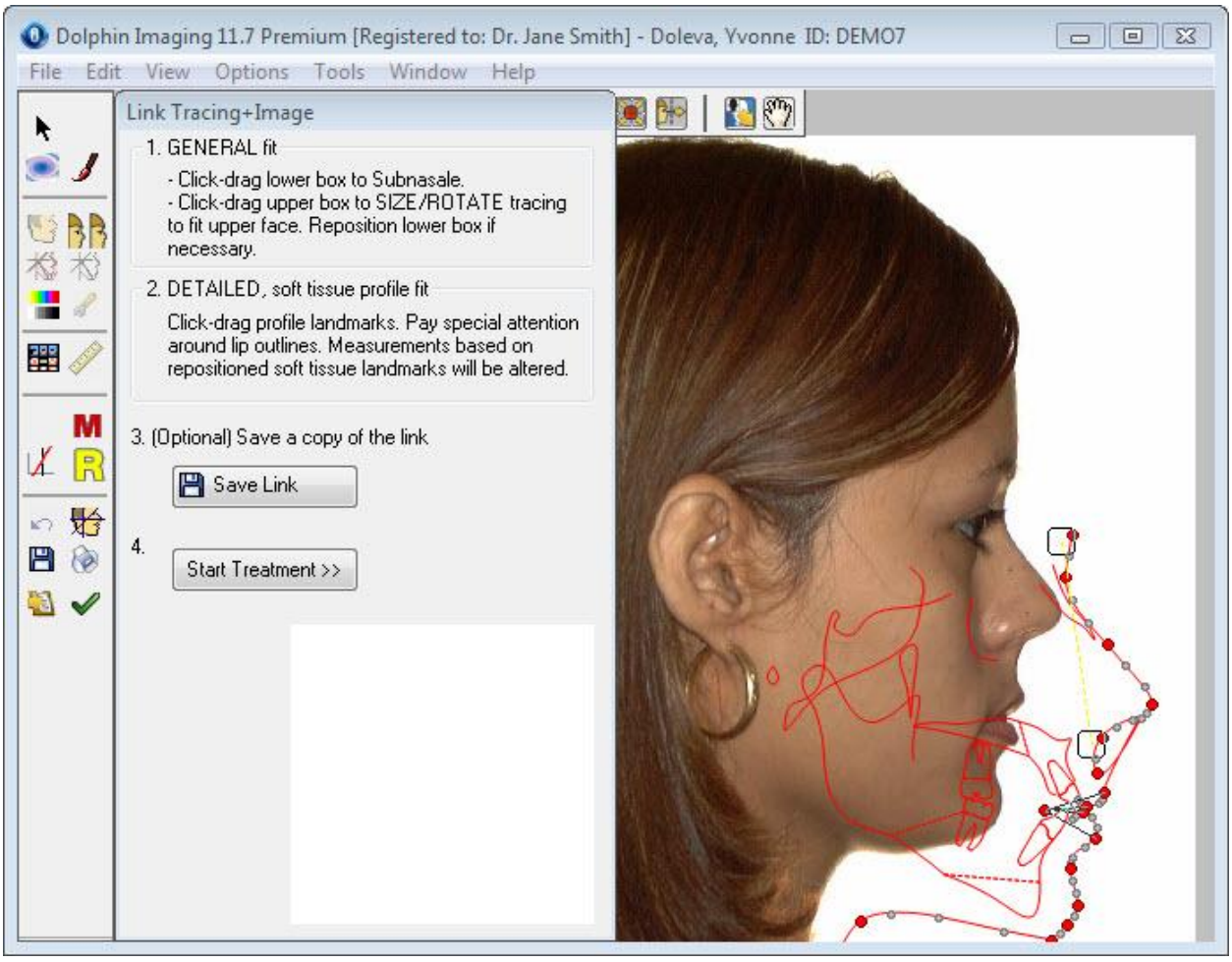
   The Image/Record Chooser dialog box opens, as shown below.

2. Select the image you want to use in your superimposition. Then, click OK.

To link the tracing and image:

1. On the Link Tracing+Image dialog box, click and drag the lower box to the Subnasale.

   Refer to the zoomed window on the palette (shown below) to see a close-up view of the area.



   For more information on the options available on the Link Tracing+Image dialog box, see Chapter 14 of the *Dolphin Imaging User's Guide*.

2. Click and drag the upper box to size and rotate the tracing to fit it as closely as possible over the patient's profile image, paying special attention to the nasal area.

3. If necessary, click and drag the lower box again to position it at the Subnasale.

4. Click and drag the other landmarks to align the soft tissue profile and lip outlines in the tracing to the image.

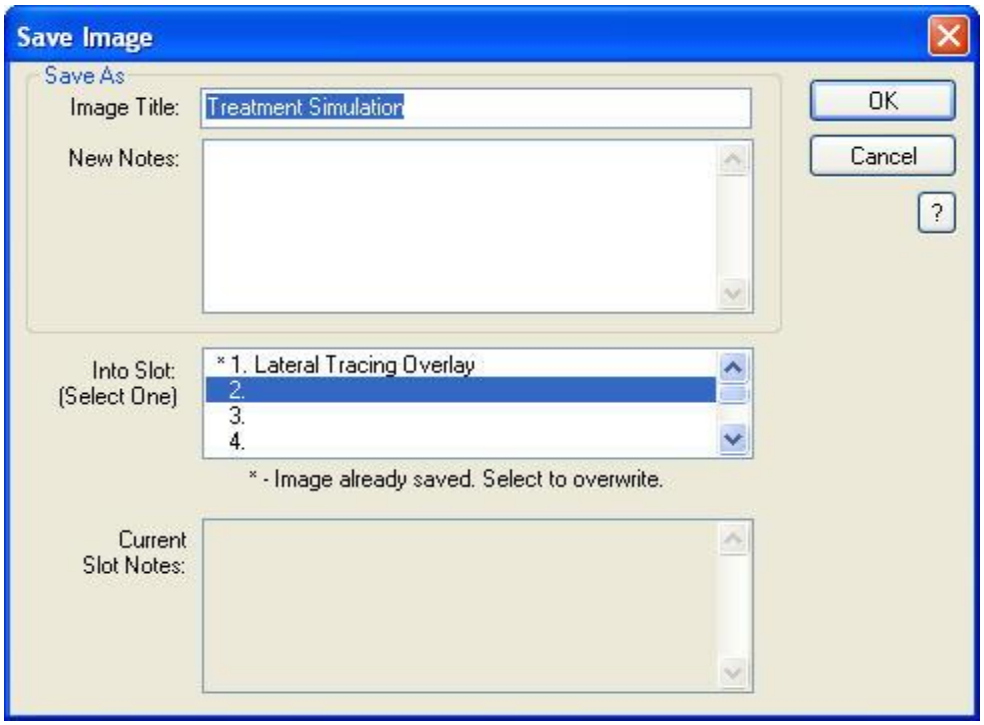
   Again, you can refer to the zoomed window on the palette to see a close-up view of the area when moving the landmarks.

   Before moving on to Treatment Simulation, save the results of this superimposition.

To save the results and close this dialog box:

1. Click  on the tool bar.

   The Save Image dialog box appears as shown below.



2. Enter an image title.
3. Select a slot from the Save As list box in which to save this image and click OK.

   If you attempt to save this image into a slot that already contains an image, a dialog box appears asking for confirmation that you want to replace the existing image with the new image.

To move on and start treatment simulation:

1. Click Start Treatment on the palette to begin treatment simulation for this patient.

   The Image Border Trim dialog box shown below opens so that you can choose options for aligning the patient's image.

2. Select the reference plane to use in aligning the image.

   Depending on the orientation of your image, the alignment procedure may produce jagged edges on the photograph, which may not be visually pleasing when used in a presentation. For this reason, Dolphin Imaging gives you the option to choose the best option for trimming the borders of the newly-oriented image. You may also choose a default border fill that best suits your image.

3. Select either a black or white border to use for the image after trimming.
4. Select an option for fixing the image after rotation. Then, click OK.

   When you click OK, the Treatment Simulation palette appears with the patient's superimposed profile photograph in the Treatment Simulation dialog box.

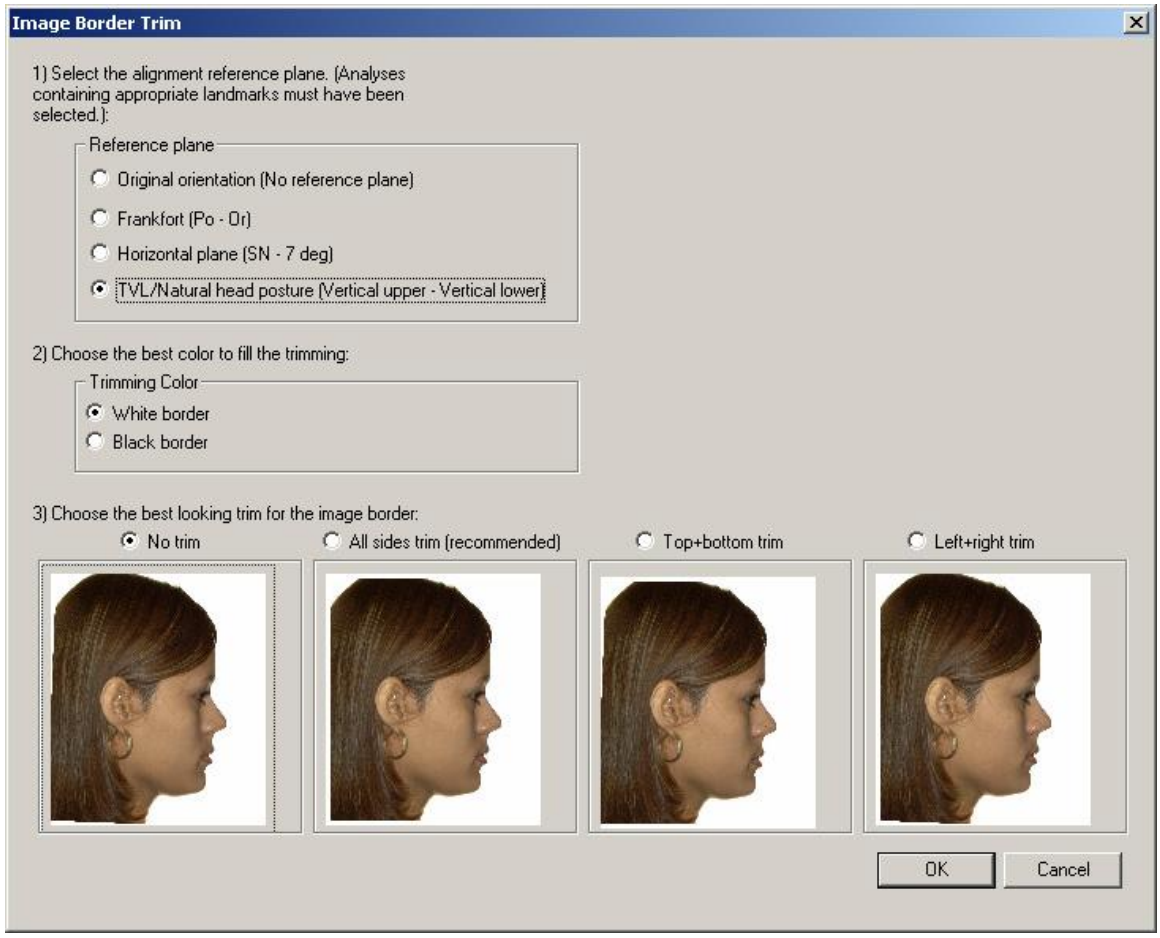


Image Border Trim
1) Select the alignment reference plane. (Analyses containing appropriate landmarks must have been selected.):
Reference plane
Original orientation (No reference plane)
Frankfort (Po - Or)
Horizontal plane (SN - 7 deg)
TVL/Natural head posture (Vertical upper - Vertical lower)
2) Choose the best color to fill the trimming:
Trimming Color
White border
Black border
3) Choose the best looking trim for the image border:
No trim
All sides trim (recommended)
Top+bottom trim
Left+right trim
OK
Cancel

4 Treatment Simulation

Once you have linked the patient's tracing and image as described in the previous chapter, you can begin treatment simulation using the result of the superimposition. This chapter describes the basics of treatment planning using the superimposed tracing and image to simulate treatment results for planning and communication purposes. Using the Treatment Simulation feature, you can simulate:

- tooth and skeletal movement based on the application of orthodontic devices.
- oral maxillo-facial surgical procedures and the resultant skeletal and soft tissue movement.

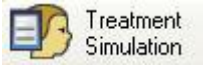
Only the lateral or profile view of treatment simulation is available.

These features are available if you have purchased the Dolphin Treatment Simulation module.

Note: For treatment presentations, we highly recommend that you perform treatment simulation using the patient's image superimposed over the patient's tracing as described in this section. However, you can use treatment simulation with only a digitized lateral X-ray..

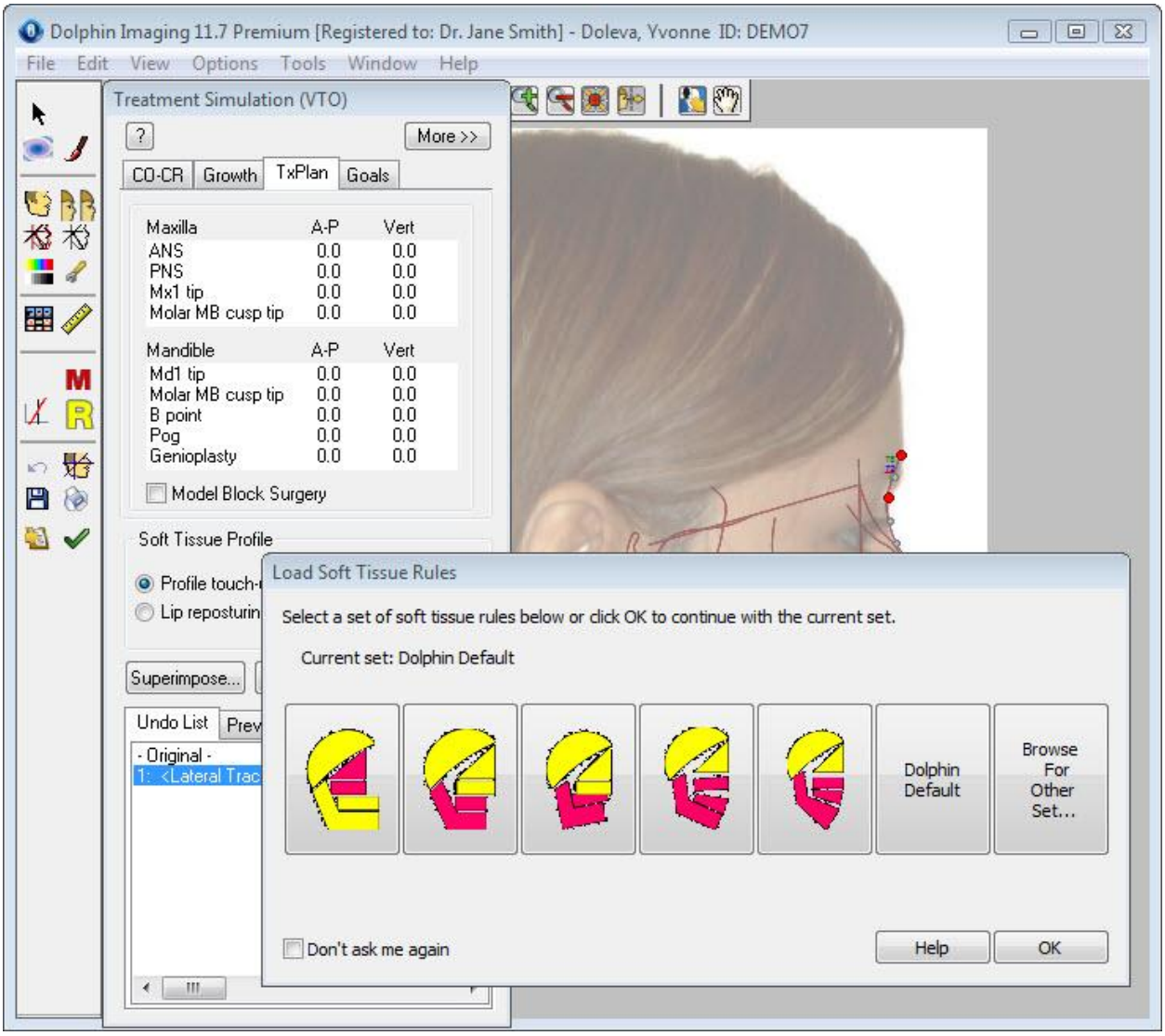
To open the Treatment Simulation dialog box:

1. Using the Patient Charts dialog box, select the patient and timepoint that you want to use for treatment simulation.
2. Select the Treatment forecast layout from the Layout drop-down list box.

   For more information on using the Patient Charts dialog box to select a patient, timepoint, and layout, see Chapter 5 of the *Dolphin Imaging User's Guide*.
3. On the Dolphin Imaging main screen, select the image you want to use for your treatment simulation.
4. You can use either a lateral X-ray digitized with the @Treatment Plan analysis or a profile photograph of the patient superimposed with the patient's tracing.
5. Click 

on the vertical tool bar.

   The digitized lateral X-ray or the superimposed image appears in the Edit dialog box along with the Treatment Simulation palette and the Load Soft Tissue Rules dialog box (see below). For detailed information on the options on this dialog box, see Chapter 17 of the *Dolphin Imaging User's Guide*.
7. Click OK to start your treatment simulation.



The following sections describe the various elements in this dialog box.

Using the Treatment Simulation Tool Bar

The Treatment Simulation Tool Bar contains the following buttons:

 Opens the Treatment Planning module.

 Opens the Morph tool.

 Opens the Brushes tool.

 Sets the display option for the image.

 Displays the modified image side-by-side with the original image.

 Toggles display of the original tracing.

 Toggles the display of the patient's tracing.

 Opens the Enhance tool.

 Sets display preferences.

 Opens the original records window.

 Opens the measurements table.

 Opens the McLaughlin Dental VTO Analysis.

 Aligns the image to a reference plane.

 Opens the Ricketts VTO/Roth-Williams VTO Wizard.

 Undoes the previous operation.

 Opens the Link Tracing+Image window.

 Saves the image.

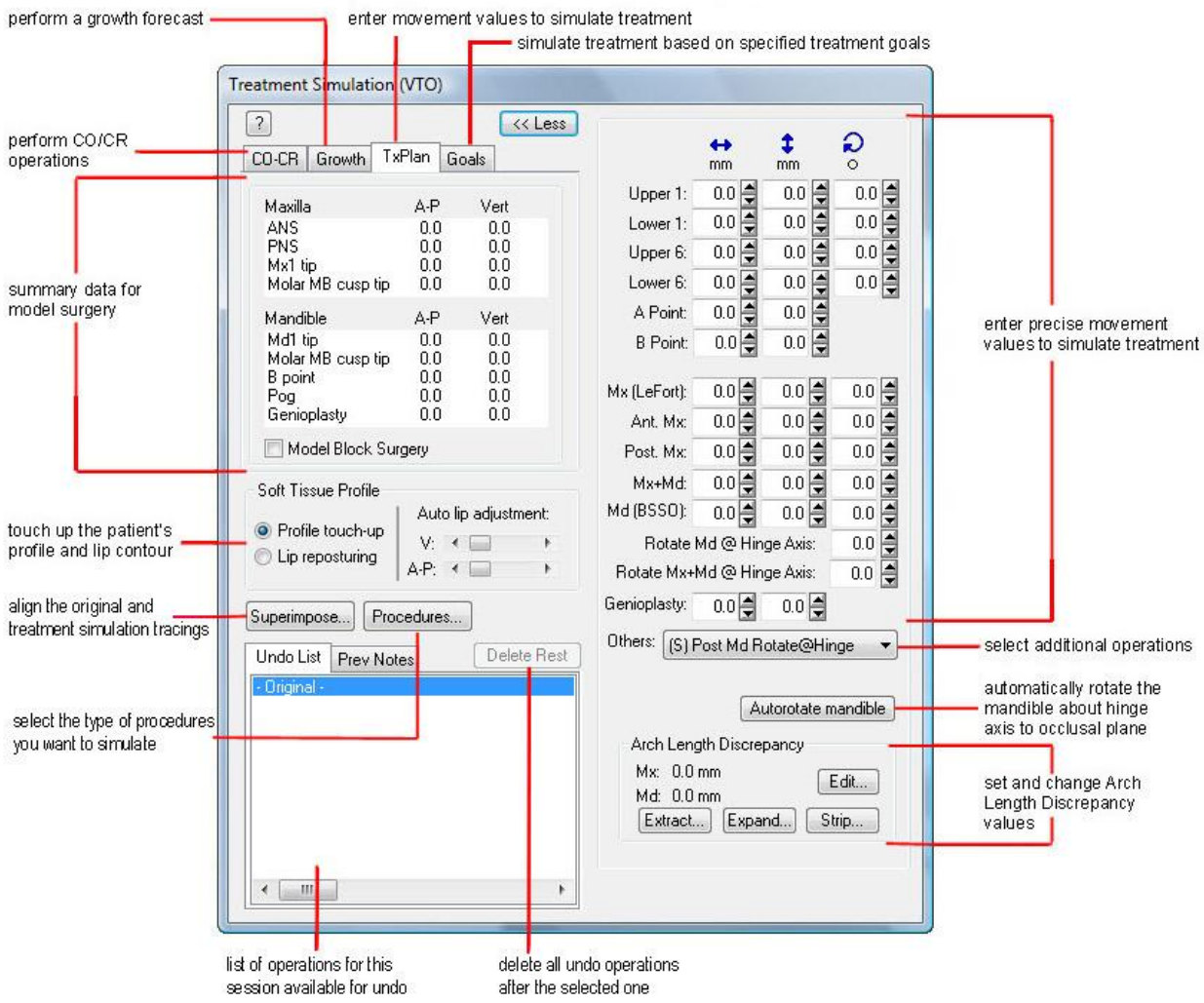
 Prints the image.

 Copies the image and/or its tracings to the clipboard.

 Returns to the Dolphin Imaging main screen.

Using the Treatment Simulation Palette

The following figure illustrates the tools available on the Treatment Simulation palette. In this figure, the palette has been expanded by clicking the More>> button.



More>> or <<Less Click this button to open or close the expanded version of the Treatment Simulation palette, which includes text boxes in which you can enter exact values or increment values of treatment operations. When the palette is expanded, click this button to hide the expanded view.

Treatment Simulation Tabs Select these tabs to use the treatment simulation operations.

CO-CR: Select this tab to reposition a patient's condyle and bite from centric occlusion to centric relation. For some patients, this step is necessary before performing any treatment simulation procedures. For more information, see Chapter 15 of the *Dolphin Imaging User's Guide*.

Growth: Select this tab to forecast the patient's growth. For more information, see Chapter 16 of the *Dolphin Imaging User's Guide*.

TxPlan: Select this tab to perform treatment simulation.

Model Block Surgery: Check this box to perform treatment simulation based on the physical occlusal model of the patient. For more information, see Chapter 17 of the *Dolphin Imaging User's Guide*.

Goals: Select this tab to set the desired orthodontic values to specific common orthodontic cephalometric measurements. Dolphin automatically alters the appropriate skeletal structures and soft tissue profile to get the closest value specified. Please contact Dolphin if you want to see other values listed here. For more information, see Chapter 17 of the *Dolphin Imaging User's Guide*.

Soft Tissue Profile Use these options to fine tune the patient's soft tissue profile after the other treatment simulation processes.

Profile touch-up: Select this option to fine-tune the patient's profile outline and soft tissue.

Lip reposturing: Select this option to quickly reposition the patient's lip area.

Auto Adjust Lips: Use these sliders to make automated, idealized adjustments in both anterior/posterior and vertical directions to the appearance of the patient's lip outline.

For more information, see Chapter 17 of the *Dolphin Imaging User's Guide*.

Superimpose... Click this button and select one of the listed superimpositions to align the original and treatment simulation tracings using the specified landmarks. Click Advanced.. to open the Tracing Superimpositions dialog box with the original and treatment simulation tracings. For more information, see Chapter 14 and Chapter 17 of the *Dolphin Imaging User's Guide*.

Procedures... Click this button and select the type of procedures you want to simulate.

Ortho and Surgical: Enables features for simulating both orthodontic and surgical procedures.

Ortho only: Displays structures in orthodontic style and enables features for simulating orthodontic procedures only. Features for simulating surgical procedures are disabled.

Surgical only: Displays structures in surgical style and enables features for simulating surgical procedures only. Features for simulating orthodontic procedures are disabled.

Undo List This view lists treatment simulation operations that you have performed. You can easily return to any point in your treatment simulation session by clicking one of the operations in this list. To return to the beginning of your treatment simulation session, click Original.

Prev Notes Select this tab to view operations and other notes from previously-saved operations. You cannot delete or jump to any of these operations.

Delete Rest Available only when one of the operations on the Undo List tab is selected. Click this button to delete all operations in the Undo List below the selected operation.

Simulating Treatment

This section describes how to simulate treatment using the movement controls or by entering precise movement values on the Treatment Simulation palette.

Note: You can also simulate treatment by specifying treatment goals. For more information, see Chapter 17 of the *Dolphin Imaging User's Guide*.

To use the movement controls:

1. Click and drag one or more of the movement controls.

   The movement controls are the red and blue boxes on the patient's image. When you place the cursor over one of the movement controls, a tool tip appears indicating the movement that you can perform using that control.

   If the movement control is for lateral movement, red triangles appear around the control. If the movement control is for rotation, a circular arrow appears around the control. Some movement controls perform both lateral and rotational movement. Click and drag the mouse for linear movement. To rotate, press the CTRL key while dragging the mouse. When you click a movement control for rotation, a circle appears on the image illustrating the range of the rotation.

   As you make changes, the patient's soft tissue and cephalometric data are updated to simulate the effect of treatment. In addition, the values on the TxPlan tab of the Treatment Simulation palette change to represent movement resulting from treatment. For accuracy, make small changes using the movement controls.

   To further touch up your treatment simulation results, we recommend using the Morph tool or Brushes tools. For more information, see Chapter 9 in the *Dolphin Imaging User's Guide*.

To enter movement values to simulate treatment:

1. On the Treatment Simulation palette, click More>>.

   The Treatment Simulation palette expands to provide more options. You can perform precise treatment simulation by entering movement values.

2. Enter new values in the text boxes to simulate movement of the patient's teeth based on orthodontic or dentofacial surgical treatment.

   For information on the values you can enter, see Chapter 17 of the *Dolphin Imaging User's Guide*.

   To further touch up your treatment simulation results, we recommend using the Morph tool or Brushes tools. For more information, see Chapter 9 in the *Dolphin Imaging User's Guide*

To save the treatment image after you have finished the treatment simulation:

1. Click  .

   The Save Image dialog box is displayed.

2. Enter an image title.

3. Select a slot from the Save As list box in which to save this image and click OK.

5 Adding Braces to a Patient's Image

This chapter describes how to use the Image Library to add braces to a patient's image. You can use the Image Library to illustrate the patient's appearance with a variety of appliances or to show pictures of how the patient's teeth will look after treatment is completed.

This feature is available if you have purchased the Dolphin Consultation and Image Library module.

To open the Edit dialog box:

1. Using the Patient Charts dialog box, select the patient, timepoint, and layout containing the image to which you want to add braces. Then, click OK.

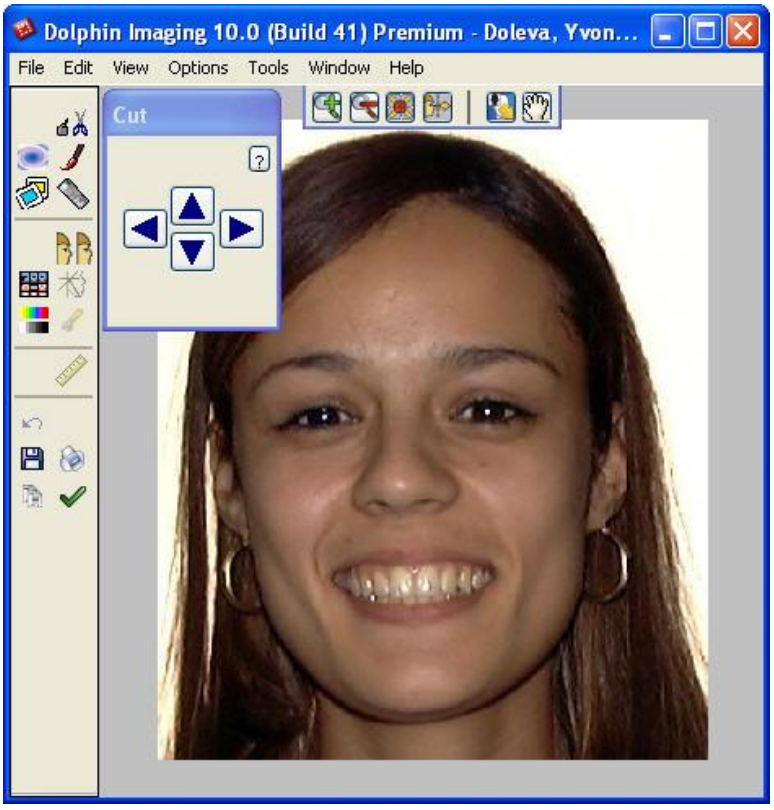
   For more information on selecting a patient, timepoint, and layout, see Chapter 5 in the *Dolphin Imaging User's Guide*.

2. On the Dolphin Imaging main screen, click the image you want to edit to select and maximize it.

3. Click 

on the vertical tool bar.

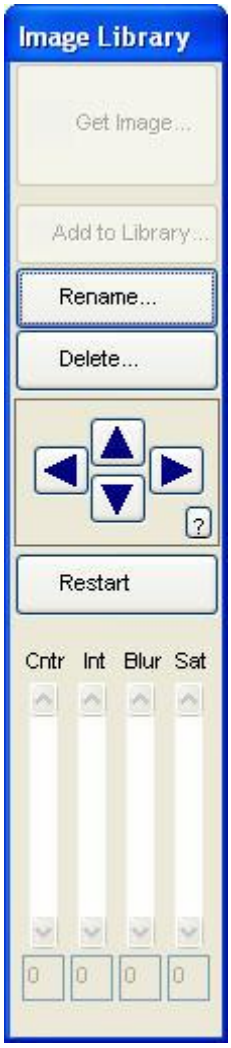
   The image appears in the Edit dialog box as shown below.



To open the Image Library palette:

1. Click  on the Edit tool bar.

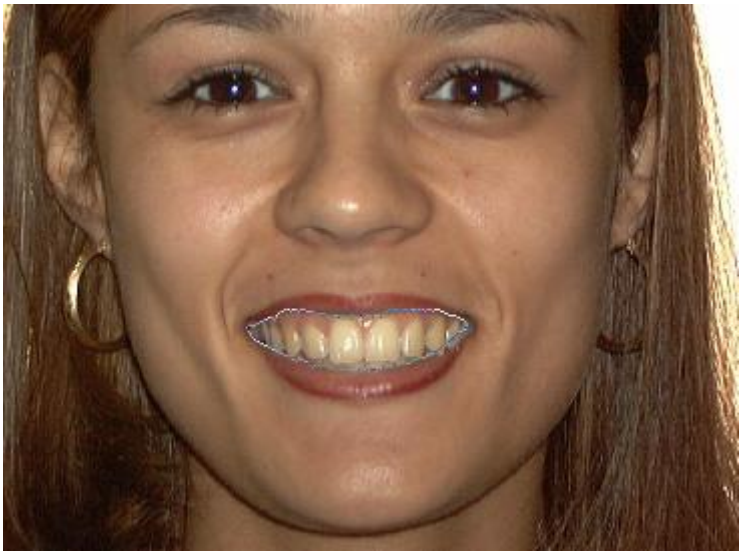
   The Image Library palette opens (see below). For details on the options available on this palette, see Chapter 9 of the *Dolphin Imaging User's Guide*.



To add braces to the patient's image:

1. Outline the patient's smile.

   To outline the patient's smile, click where you want to begin drawing. Move the mouse to begin drawing the outline. Click to place a point every few millimeters, following the outline of the inside border of the patient's lips. To complete the outline, click the first point you clicked again, and the outline will close. The following figure illustrates the outline.

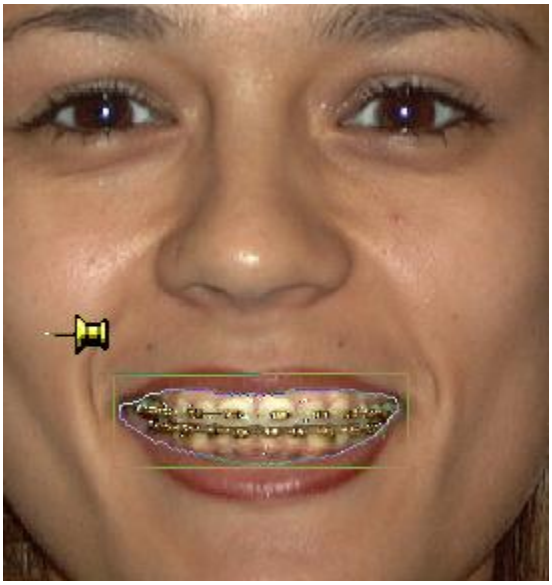


2. Click Get Image on the Image Library palette.

   The Get Image dialog box is displayed.

3. Select Teeth with Appliances from the Category drop-down list box.
4. Select the type of braces you want to use from the Name list box.

   The image you picked automatically appears within the outline, as shown below:



You can select different images in the Name list box to see how different appliances will appear on the patient's image.

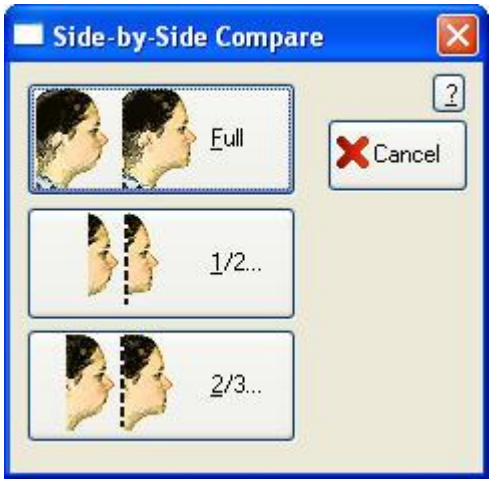
5. When you are satisfied with your selection, click OK to close the Get Image dialog box.
6. Use the image editing features, if necessary, to further fine-tune this image.

   For more information, see Chapter 9 in the *Dolphin Imaging User's Guide*.

To view the modified image side-by-side with the original image:

1. Click  on the tool bar.

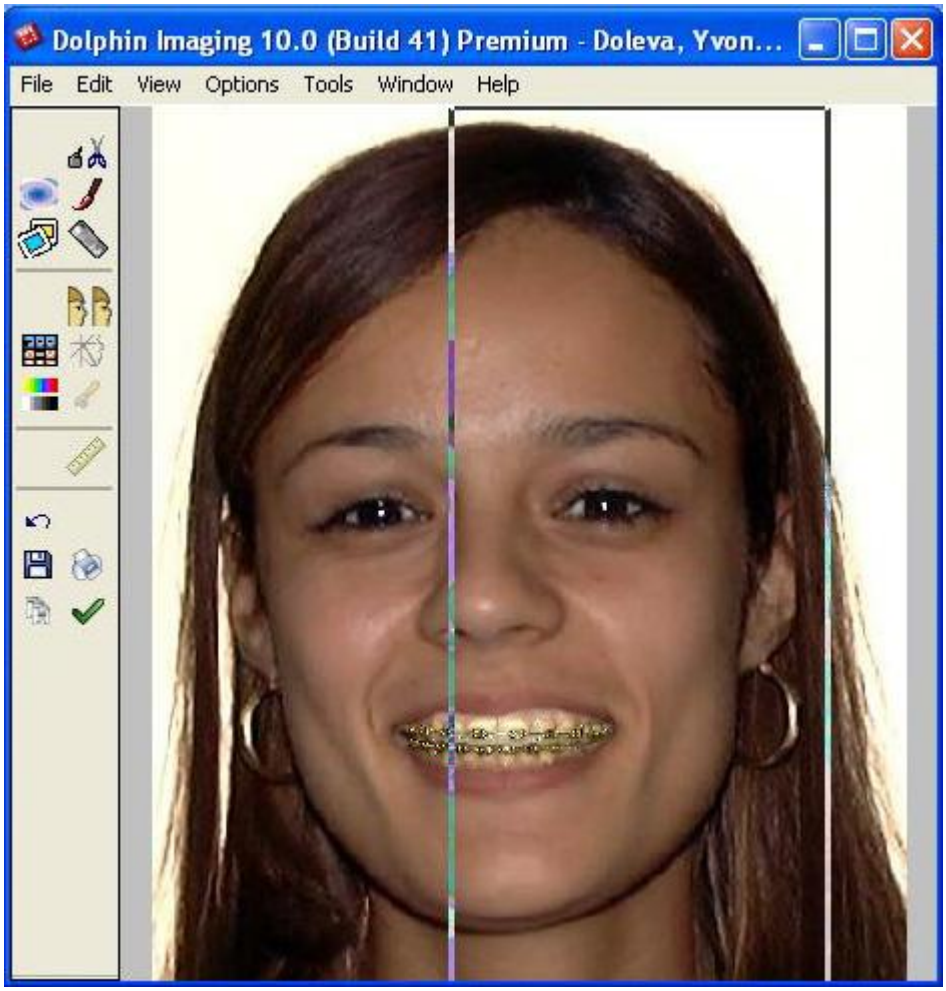
   The Side-by-Side dialog box is displayed:



2. Select the amount of the images you want to show.

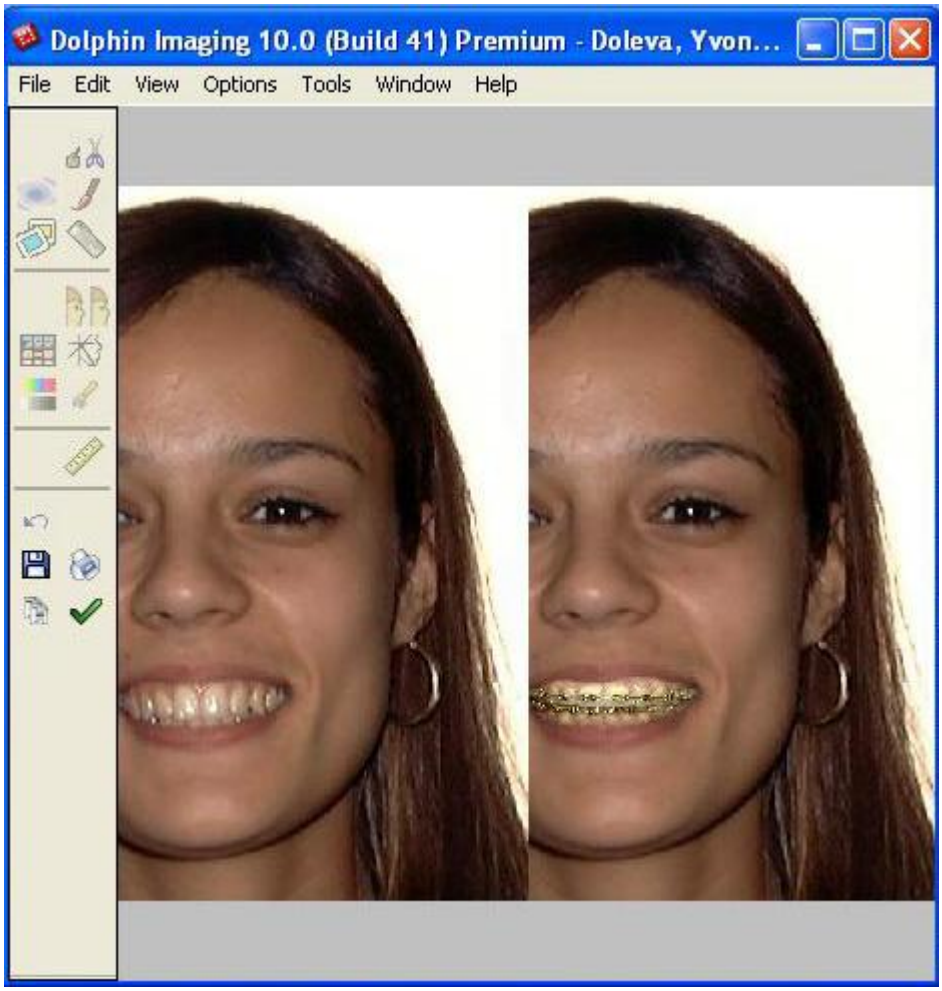
   If you picked Full, the two images are displayed side-by-side in the Edit dialog box.

   If you picked 1/2 or 2/3, a rectangle appears on the Edit dialog box so that you can select the half or two-thirds of the images you want to view, as shown below.



3. If you picked 1/2 images or 2/3 images, click and drag the rectangle to select the part of the images you want to view. Click the left mouse button again to view the two images side-by-side.

   The images appear side by side as shown below. If you click Save at this point, the side-by-side images are saved.



4. When you finish viewing the images side-by-side, click the image again.

   The original image disappears, and only the image you are editing is displayed.

To save a modified image:

1. Click  on the tool bar.

   The Save Image dialog box is displayed.

2. Enter an image title.
3. Select a slot from the Save As list box in which to save this image and click OK.

6 Dolphin 3D Basics

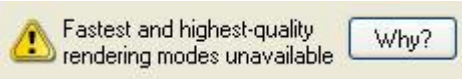
This chapter describes some of the basics for using Dolphin 3D. Before you can get started using Dolphin 3D, you must create a patient and timepoint or select an existing patient and timepoint. If Dolphin Imaging prompts you to capture 2D images for the newly-created timepoint, you may do so, or you can click Cancel on the Capture Setup dialog box. For more information about creating patients, creating timepoints, and capturing 2D images, see Chapter 1.

Once you have identified the patient and timepoint, you can use Dolphin 3D to:

- import 3D volume data for the selected Dolphin Imaging patient
- import 3D photographs for the selected Dolphin Imaging patient
- select the part of the patient's 3D image (hard tissue, soft tissue, or both) that you want to view and the type of view (such as solid, translucent, or 3D photo)
- view the patient's 3D image from any angle
- view the volume using different layouts and slices
- save the volume

Dolphin 3D provides many more features than those described in this chapter. For more detailed information on Dolphin 3D, see Part IX of the *Dolphin Imaging User's Guide*. Press F1 for help at any time to view context-sensitive help.

The Dolphin web site (www.dolphinimaging.com) provides documentation on the hardware requirements for Dolphin 3D. Actual memory requirements depend on the data size of volumes you are viewing and editing. The advanced 3D rendering modes ("translucent" modes) are only enabled if your computer is equipped with a video graphics card that supports them. If you see the following message on the Dolphin 3D window, click Why? for a detailed description of why your computer is not fully compatible.



Adding a New 3D Image

To add a new 3D image for the selected patient and timepoint, you import a DICOM data set. The data set can be:

- A single DICOM file containing all images that comprise the 3D volume.
- A set of DICOM image files, each containing one image that is part of the 3D volume. In this case, all image files that comprise the data set must be in the same directory. In addition, the directory cannot contain any DICOM image files unrelated to the current data set.
- A set of DICOM image files, each containing one image that is part of the 3D volume, along with a DICOM directory file (usually named DICOMDIR) that identifies the DICOM image files for the data set. In this case, all the image files and the DICOM directory file must be in the same directory.

To add a 3D image for a patient:

1. On the Dolphin Imaging main screen, select the timepoint.
2. Optionally, select the layout to which you want to add the 3D image.

   You can only select a different layout if other images already exist for this patient.
3. Click 

on the Dolphin Imaging main screen.
4. Select Import New DICOM... from the pop-up menu.

   The Open dialog box appears so that you can select the directory containing a valid 3D DICOM volume data set.
5. Navigate to the folder containing the 3D DICOM volume data set.
6. If the data set is comprised of a single file, select that file.

   Or,

   If the data set is comprised of several files but has no DICOM directory file, select any file in the data set.

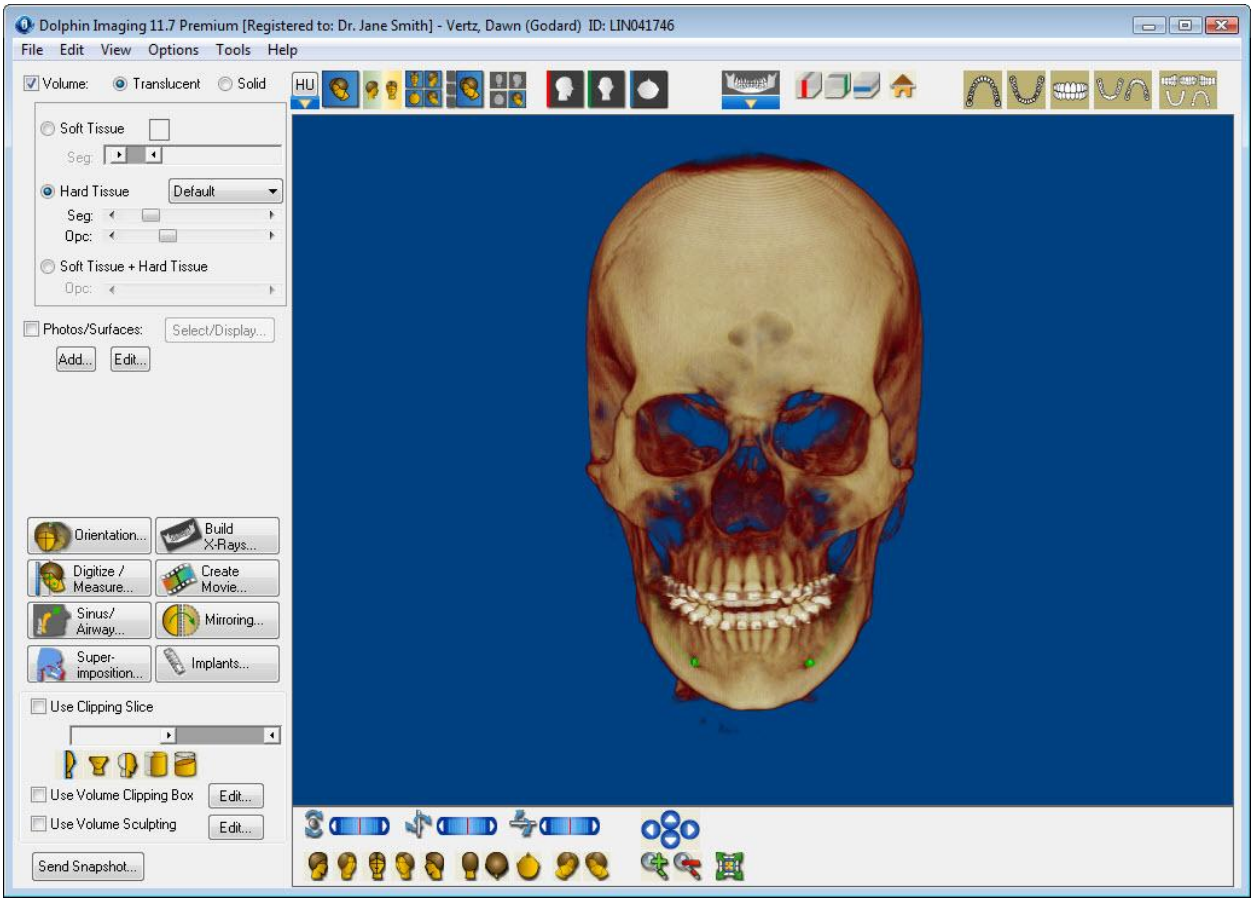
   Or,

   If the data set is comprised of several files and has a DICOM directory file, select the DICOM directory file.
7. Click Open to load the data set.

   The 3D image appears in the Dolphin 3D window. Depending on the source of the image, it may not appear recognizable initially, or it may not be properly oriented in the window. If this happens, you may need to:

   - Segment the image: You may need to identify or fine-tune the segments of the 3D image to use for the soft tissue and hard tissue views.
   - Orient the image: You may need to change the image orientation so that it properly correlates to the requirements for your analysis.

   These two activities are fundamental to your proper use of the 3D volume. For more information, see Chapter 27 of the *Dolphin Imaging User's Guide*.



Adding a 3D Photograph

To add a new 3D photograph for a patient, you import it from an image file and superimpose it over the 3D volume.

To import a 3D photograph:

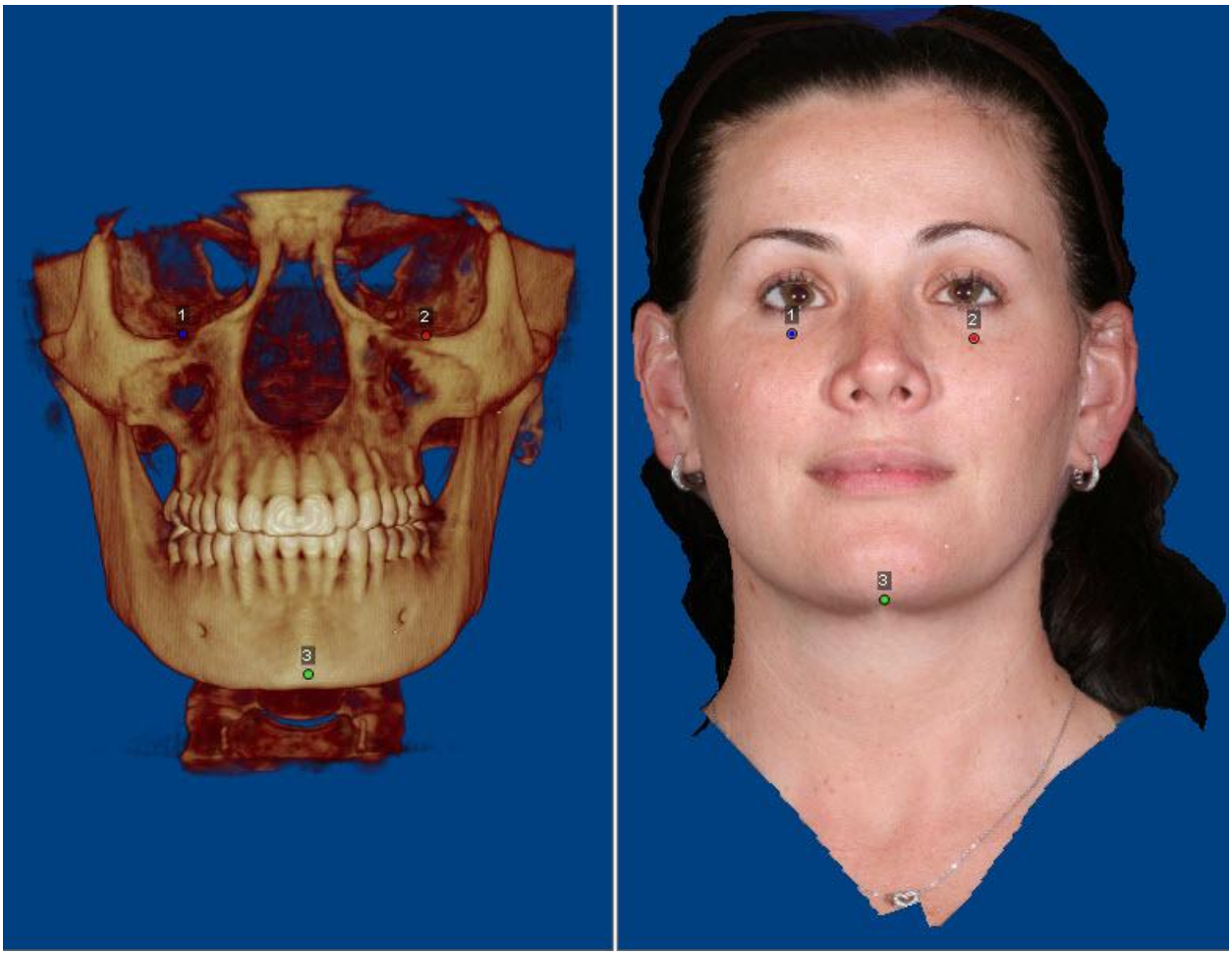
1. In the Soft Tissue group box, select Photo: 2D/3D.
2. Click Add....
3. Select Import 3D Photo (OBJ + Bitmap) from the pop-up menu that appears.

   The Open dialog box appears so that you can select the folder containing the image file.
4. Navigate to the folder containing the image file for the photo.
5. Select the appropriate file. Then, click Open to load the photo.

   The photo and the volume appear in the Photo and Volume Alignment/Superimposition dialog box. The Method: Side-by-Side Superimpositions tab is selected by default. On this tab, you align the photograph and the volume by identifying corresponding points on them.

To superimpose the photograph over the volume:

1. Click and drag the points on the volume and photograph so that they identify corresponding locations (see below).
2. Click Superimpose Now!
3. Click OK to save the superimposition and close this dialog box.



Viewing the Soft Tissue, Hard Tissue, or Both

On the Dolphin 3D window, you can view the patient's soft tissue, hard tissue, or both. You can also select the type of view (such as solid, translucent, or 3D photo).

To view the patient's soft tissue:

1. Select the Soft Tissue radio button.
2. Select the Solid radio button for a solid view of the patient's soft tissue.

Or,

Select the 3D Photo radio button to view the patient's 3D photo (if available).

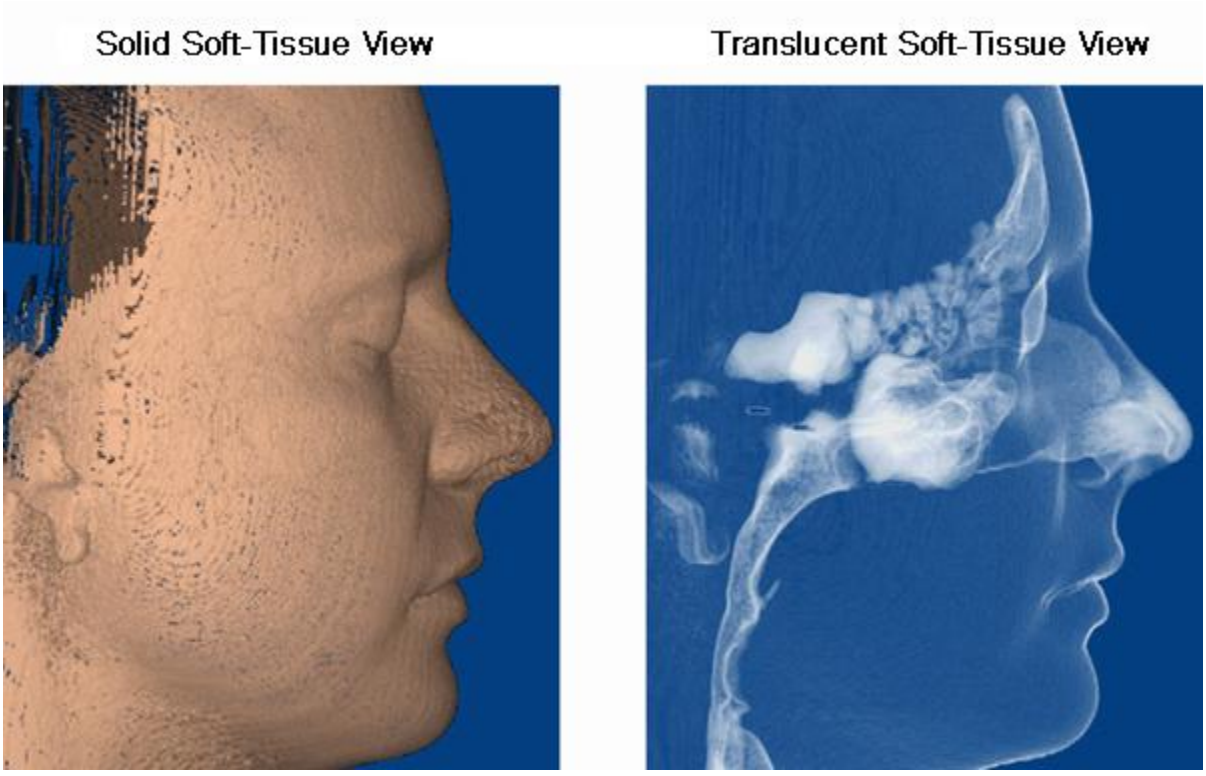
Or,

Select the Translucent radio button to view a translucent representation of the soft tissue.

To use the patient's 3D photo for the soft tissue view, you must have already imported a 3D photograph and superimposed it over the volume. For more information, see "Adding a 3D Photograph" on page 47.

The translucent view can enable you to see structures that might otherwise be difficult to see. The following figure illustrates the same patient image in the solid soft-tissue view and in the translucent soft-tissue view.

Note: The translucent view is available only on computers that support advanced 3D rendering.



To view the patient's hard tissue:

1. Select the Hard Tissue radio button.
2. Select the Solid radio button for a solid view of the patient's hard tissue.

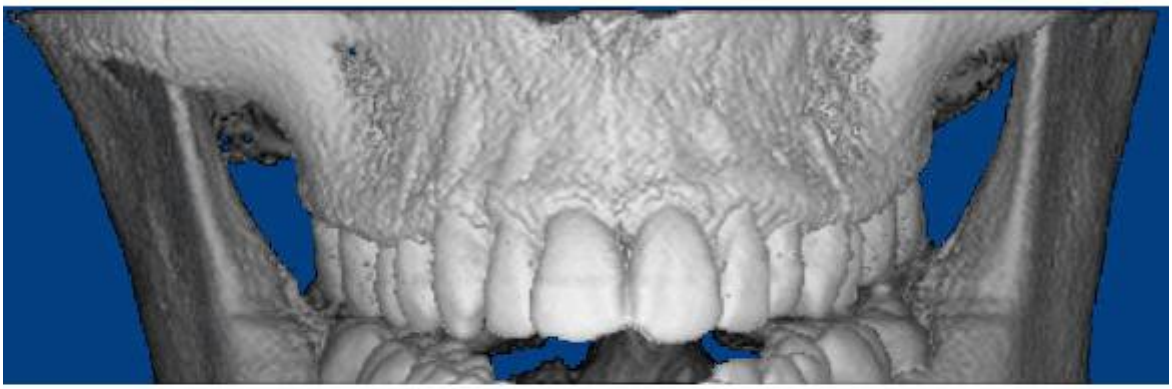
   Or,

   Select the Translucent radio button for a translucent view of the patient's hard tissue.
3. If you selected the Translucent radio button, optionally adjust the Trans slider to adjust the transparency of the image.

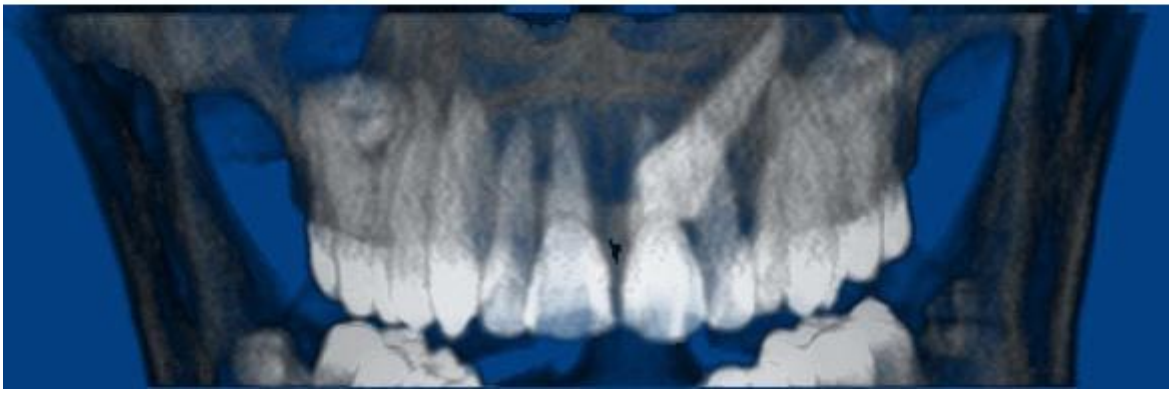
   The translucent view can enable you to see structures that might otherwise be difficult to see, such as impacted teeth or implants. The following figure illustrates the same patient image in the solid hard-tissue view and in the translucent hard-tissue view.

Note: The translucent view is available only on computers that support advanced 3D rendering.

Solid Hard-Tissue View



Translucent Hard-Tissue View



To view both the soft and hard tissue:

1. Select the Combined Soft Tissue + Hard Tissue radio button.
2. Optionally, adjust the Trans slider to adjust the overall transparency of the image.
3. Optionally, set options for the hard tissue view in the Hard-Tissue group box.
4. Optionally, set options for the soft tissue view in the Soft-Tissue group box.

Viewing the 3D Image from Different Angles

The Dolphin 3D window provides the following options that you can use to change the viewing angle for the image.

Rotation Sliders

Use these sliders to rotate the image around the indicated axis:

 : Use this slider to rotate the 3D image horizontally.

 : Use this slider to rotate the 3D image circularly.

 : Use this slider to rotate the 3D image vertically.

Predefined Views

Click one of these buttons to orient the 3D image in one of the predefined views.

 : Click this button to orient the 3D image for a right view.

 : Click this button to orient the 3D image for a right oblique view.

 : Click this button to orient the 3D image for a front view.

 : Click this button to orient the 3D image for a left oblique view.

 : Click this button to orient the 3D image for a left view.

 : Click this button to orient the 3D image for a back view.

 : Click this button to orient the 3D image for a top view.

 : Click this button to orient the 3D image for a bottom view.

 : Click this button to orient the 3D image for an isometric view.

 : Click this button to orient the 3D image for an isometric view.

Click these arrow buttons to move the 3D image in the window in the indicated direction.

 Click this button to zoom in on the 3D image.

 Click this button to zoom out on the 3D image.

 Click this button to fit the 3D image in the window.

Moving or Reorienting the Image

To move the image in the window:

1. Click one of the arrow buttons to move the image in the indicated direction.

   Or,

   Hold down the SHIFT key while clicking and dragging the image within the window.

To change the orientation of the image:

1. Click the button for one of the predefined views to orient the image for that view.

   Or,

   Click and drag one of the sliders to rotate the image around the indicated axis.

   Or,

   Click and drag the image to rotate it.

If you have changed the orientation on one or more of the slice views, you can set the volume's orientation to match it.

To set the volume orientation to match the slice orientation:

1. Right-click the image, and select Set Volume Orientation to Current Slice Orientations from the pop-up menu.

Changing the Magnification

To change the magnification:

1. Click  or press F2 to zoom in.

   Or,

   Click  or press F3 to zoom out.

   Or,

   Click  or press F4 to fit the image to the window.

   Or,

   Select Zoom Volume to Fit in Window from the View menu to fit the image to the window.

   Or,

   Right-click the image, and select Zoom volume to fit window from the pop-up menu.

   Or,

   Hold down the CTRL key while clicking and dragging the mouse to change the magnification.

To maximize the image so that it takes up your entire computer screen:

1. Right-click the image, and select Full Window from the pop-up menu.

   Select this option again to return the image to its initial size.

Viewing Different Layouts and Slices

The Dolphin 3D main window offers the following options for viewing the full volume and slices:

 Single Volume View	Only the 3D volume or photograph appears in the window.
 Side-by-Side Volume View	The window has two panes containing two views of the same volume.
 4-Equal Volumes Layout	The window has four equal panes containing four views of the same volume.
 3+1 Slices-Volume Layout	The window has four panes: three small panes on the left containing the sagittal, coronal, and axial slices, and one large pane on the right containing the 3D volume or photograph.
 4-Equal Slices-Volume Layout	The window has four equal panes containing the sagittal slice, the coronal slice, the axial slice, and the 3D volume or photograph.
 Sagittal Slice Layout	Click this button to view a radiograph representation of the sagittal slice. You can customize this slice to change the cross-section of the volume that it displays.
 Coronal Slice Layout	Click this button to view a radiograph representation of the coronal slice. You can customize this slice to change the cross-section of the volume that it displays.
 Axial Slice Layout	Click this button to view a radiograph representation of the axial slice. You can customize this slice to change the cross-section of the volume that it displays.

If you have imported model arch surfaces for this patient, the Dolphin 3D main window also offers layouts for viewing these surfaces. For more information, refer to "Working With Model Arch Surfaces" in Chapter 21 of the *Dolphin Imaging User's Guide*.

To use a different layout:

1. Click  to use the Single Volume View.

   Or,

   Click  to use the Side-by-Side Volume View.

   Or,

   Click  to use the 4-Equal Volumes Layout.

   Or,

   Click  to use the 3+1 Slices-Volume Layout.

   Or,

   Click  to use the 4-Equal Slices-Volume Layout.

To view one of the standard slices:

1. Click  to view the sagittal slice.

   Or,

   Click  to view the coronal slice.

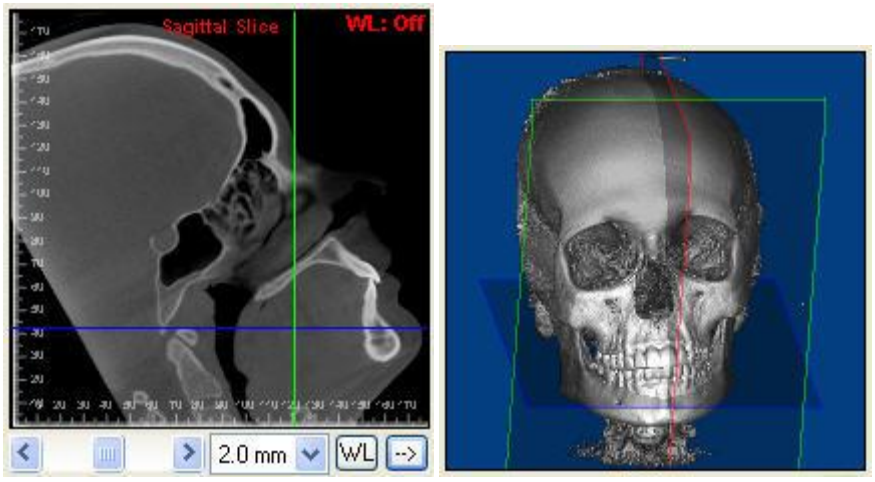
   Or,

   Click  to view the axial slice.

To change the slice angle and thickness:

1. Click the Show/Hide Slice buttons () to show the three planes for the slices on the 3D volume or photograph.

   The sagittal slice view is shown below, and all three planes are shown on the 3D volume on the right.



2. Move the mouse into the upper-right corner of the view you selected.

   A small white circular arrow appears.

3. Click and move the mouse, and the image moves, thus enabling you to select the angle of the slice.

4. Use the drop-down list box to the right of the slider to change the slice thickness.

To change the location of the slice you are viewing:

1. Move the slider under the slice image.

   The image for that slice changes to reflect new location of the slice. In addition, the color-coded lines indicating the location of that slice on the other two-slice images change to reflect its new location.

   For example, if you move the slider under the sagittal slice image, that image changes to show a different cross-section of the volume. In the Coronal and Axial Slice images, the red line also changes to indicate the new location of the sagittal slice.

To reset the slices to the defaults:

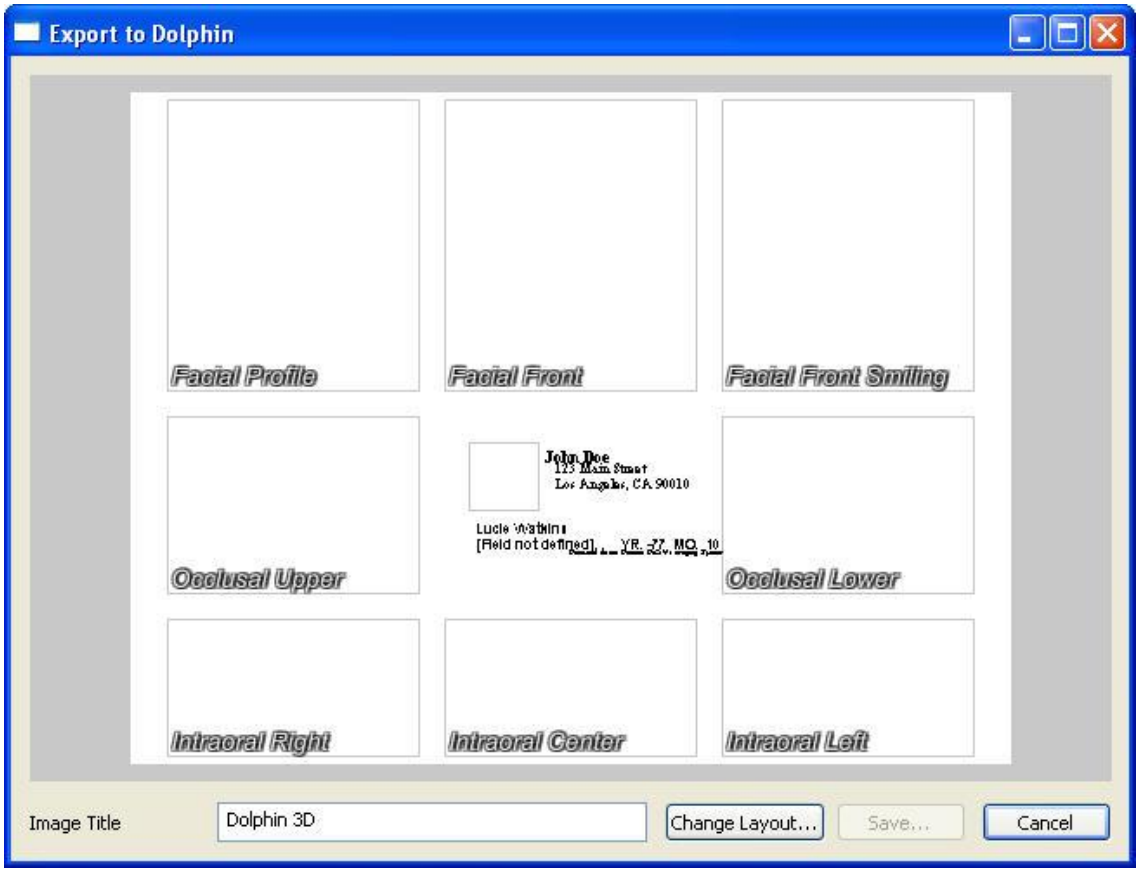
1. Click  .

Saving the Volume

When you finish working with an image, you should save the 3D volume data. You may also want to save the 3D volume data periodically when working with it to make sure your changes are not lost in case of a system failure.

To save an image to the database:

1. Click  .
2. Optionally, change to a different image layout as described below.
3. Click a slot in the image layout to save the image in that slot.
4. Optionally, enter a new image slot title to use for the 3D image in the Image Title text box.
5. Click Save...



To choose a different image layout:

1. Click Change Layout....
2. Select the image layout in which you want to save this 3D image from the drop-down list box. Then, click OK.

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