

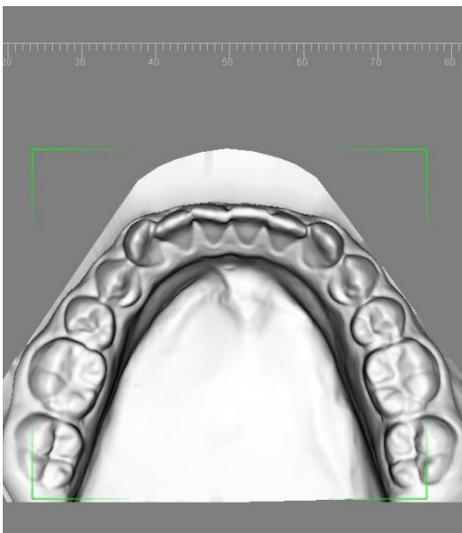
Tiops Cephalometric Analysis: Adding a Digital Occlusogram

Adding Digital Occlusogram Data into the file of a patient can be done effectively and correctly with the Tiops program.

A screen shot of a 3D scan with a known magnification factor or an integrated ruler can be used for digitization (Left).

A digital photo or a copy of the study cast made on a flatbed scanner can be used in a similar way (Right). In that case a ruler should always be placed next to the study model before the picture is made to ensure a correct calculation of the magnification. Remember the model image must be available as a .jpg or .bmp file in a suitable location on the PC.

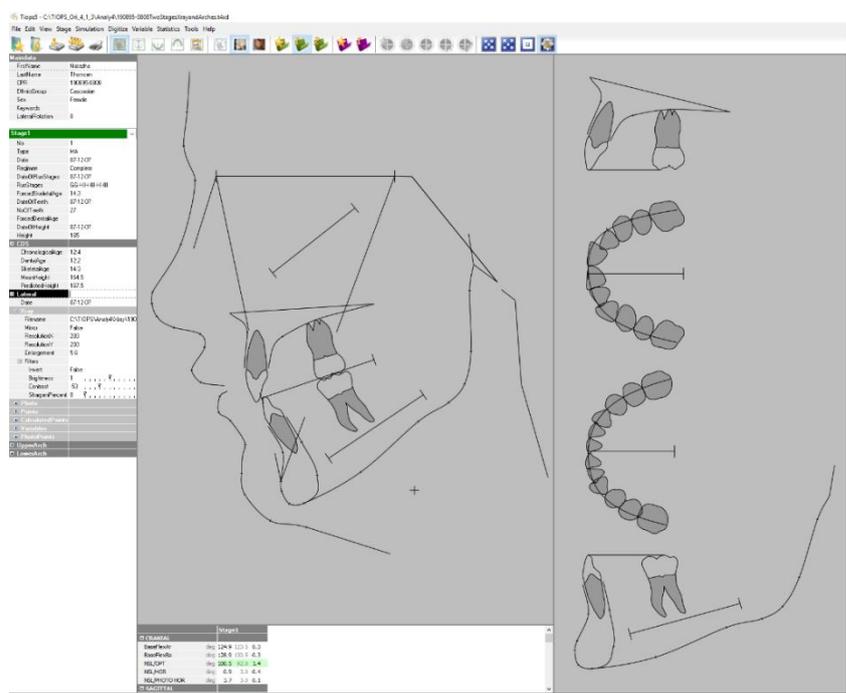
The model image, of both the upper and lower casts, must be rotated to show **the incisors facing upwards**.



Note: A 2Dimensional image of the 3D study cast may not always represent the true dimensions accurately. If a significant 'Curve of Spee' is present the antero/posterior dimensions may be shortened on the scan.

On the Tiops tracings of the upper and lower jaws the occlusograms will be correctly related to the jaws. The same is the case when analyzing growth and treatment changes, or if a simulation is performed. To ensure the correct alignment with the headfilm it is important that the first digitized reference point on the occlusogram, **ref1**, is registered precisely at the tip of the most anterior, or prominent, incisor on the lateral headfilm. This reference point together with the second reference point, **ref2**, will also define the symmetry axis of the dental arch.

Note: The program will automatically adjust the magnification of the occlusograms to match the headfilm on the tracings

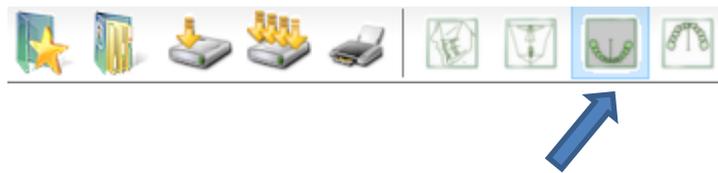


Note: This guide is supplemented by:

Some thoughts on the benefits of including Occlusograms in the Cephalometric analysis of Growth and Treatment.

Procedure

1. Before including an occlusogram you must first digitize the lateral headfilm and save it in the TIOPS program and then consolidate the file as described elsewhere.
2. To add the occlusograms to the patient data click on the lower arch icon to open the lower arch view



3. With this view selected press the keys
Shown at the same time to create
a **LowerArch** analysis to the patient file.



You then proceed through the listing
using the down arrow key.



Open the sub menu **Model** by clicking
on the plus sign [+] next to it or use the
right arrow key.

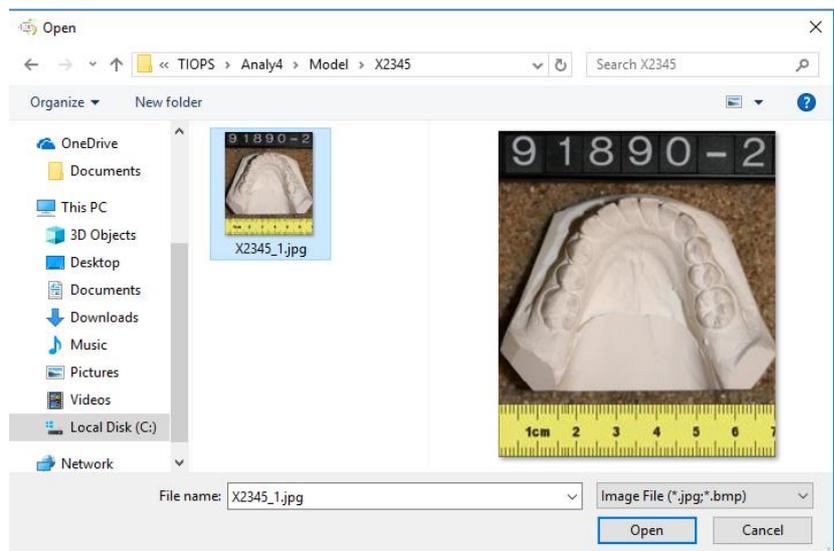


The box sign changes to a [-] and a new list
opens up. Scroll down to **Filename** and click
the radio button or press the
keys shown at the



LowerArch	
Date	13-12-07
[-] Model	
Filename	<input type="radio"/>
Mirror	False
ResolutionX	100
ResolutionY	100
Enlargement	0
+ Filters	

4. A Dialog Window, where you
can browse and locate the
Study Model Image file, will
now open up. When you find
the file, click Open and the
image of the model will
appear in the Tiops program's
Main Window.

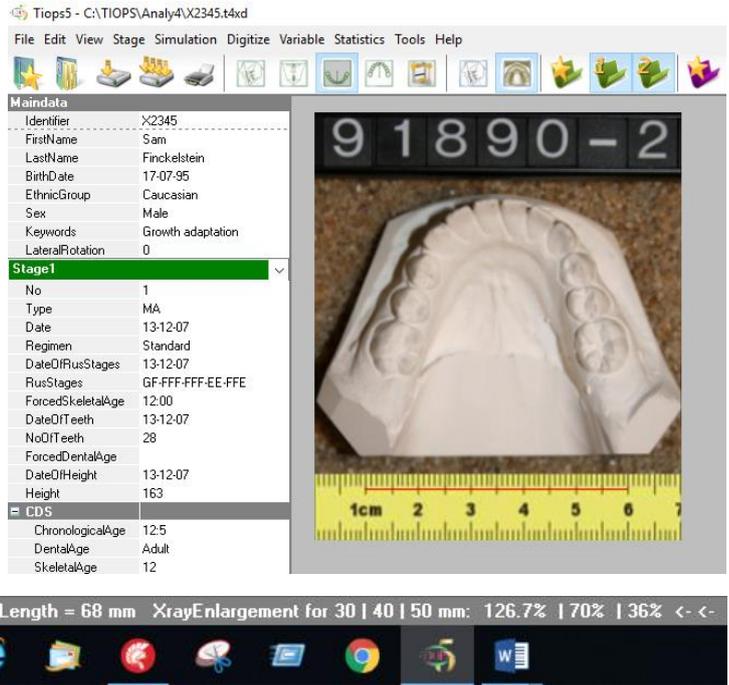


5. Finish the digitizing process by clicking this icon to save and consolidate the image correctly in the Tiops File System.



- In order to ensure accurate measurements of the teeth and the arch, the image of the model must be adjusted to a magnification of zero, using the ruler next to the study cast. This magnification adjustment can be done by using the following procedure: With the model displayed, click and hold the left mouse button on the ruler, and drag a line 50 mm long across the ruler.

While holding the mouse button down read the magnification factor corresponding to 50 mm at the bottom line of the program window (36%).



Now, the Value is entered in the submenu where it says 'Enlargement' and the program automatically corrects the image to match the headfilm. Normally the program will read the Resolution values correctly, otherwise enter the values 100/100.

LowerArch	
Date	13-12-07
Model	
Filename	C:\TIOPS\Analy4\Model\X2
Mirror	False
ResolutionX	100
ResolutionY	100
Enlargement	36
+ Filters	

- Repeat the drawing of the line and check for accuracy, redo if necessary.



- To make it easier to digitize the model you can zoom out or in using the icon/shortcuts as displayed. This does not affect the magnification adjustment but will enlarge the picture, making it easier to locate the landmarks.



Or F10



Or F11



- Start the digitizing process by pressing



at the same time or click



10. A millimeter grid will now appear, and you can start digitizing by first placing the edge of the grid where **ref1** should be located. This first reference point registered on the occlusogram must correspond with the landmark defining the tip of the incisor on the lateral analysis (do not click yet).

Once you have oriented the grid to ref1 you continue by aligning the grid to match the symmetry axis of the dental arch.

The grid will rotate when the mouse is moved.

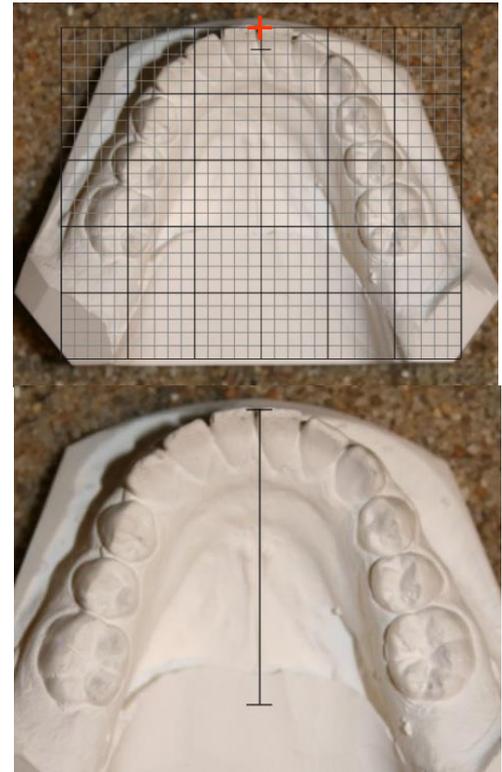
The grid can be translated by simultaneously holding down



and move the mouse until the correct position is achieved. Now position the grid midline cursor to define **ref2** at the level of the molars and click. This will register ref1 and ref2 at the same time.

Both landmarks will when placed define the symmetry axis of the dental arch and should be placed accordingly.

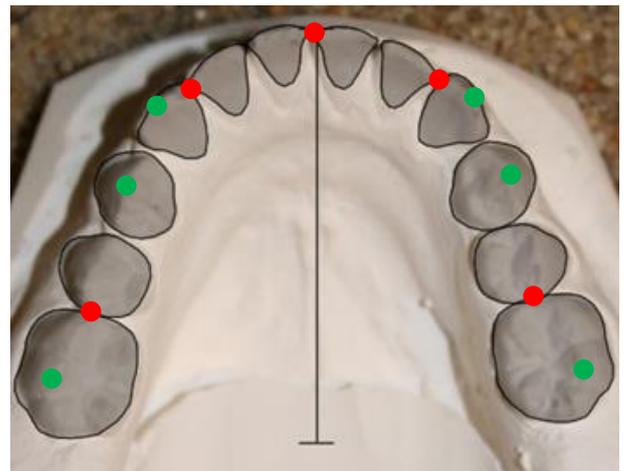
These two landmarks cannot be changed at this time, but any corrections, including that of the midline location, can be done after the digitization process is fully completed.



11. Now follows a series of landmarks as shown in the point list in the line below the program panels (the Status Line).

-> -> I6distal [I6d] in LeftFirstMolar (I6d-I6b-I6m-I6l-L6C) <- <-

12. Unique to the program is a series of arch perimeter points, included to allow defining the desired future arch perimeter used to determine the space conditions. These points are located at the desired approximal contact points between the first molar and second bicuspid, the cuspid and the lateral incisor and in the midline between the incisors. They are marked in the illustration with **red** Dots. These points are listed in the point list with capital letters when you reach any of them. (**LMM, LCM, LIM, RCM, RMM**). Four occlusal contact points between the upper and lower teeth and the canine cuspids are marked with green dots. They are also indicated with a capital letters as you reach them in the digitizing process. (**L6C, LPC, L3C, R3C, RPC, R6C**). The four green points are mandatory, L3C and R3C only when the cuspids are present. When the bicuspid are preceded by the primary teeth, LPC and RPC should also be registered.

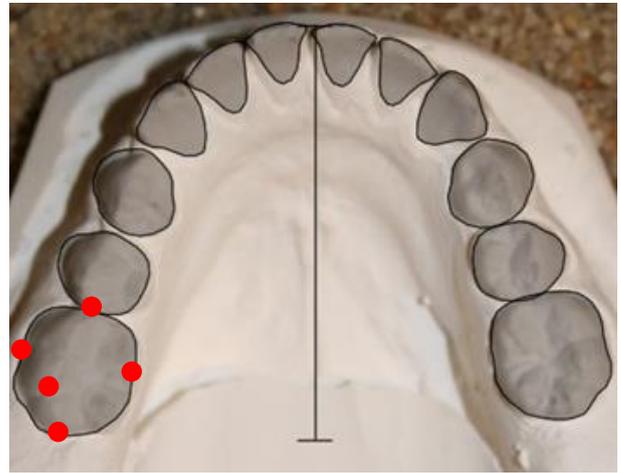


Note: For Definitions see LANDMARK DEF, Page 3 in http://tiops.com/Index_docu_cg.html

13. The digitization of the dental landmarks starts with the distal of the lower left molar. This is followed by the labial, mesial and so on. (I6d, I6b, I6m, I6l, L6C). When both the mesial and the distal landmark are registered the contour of the tooth is automatically drawn.

The bicuspid and the cuspid can be skipped individually when not erupted. You will hear a special sound and the landmark is marked with a (Skip) when you reach these teeth in the procedure.

-> I5distal [I5d] in LeftSecondBicuspid [I5d-I5m] {skip} <- <-

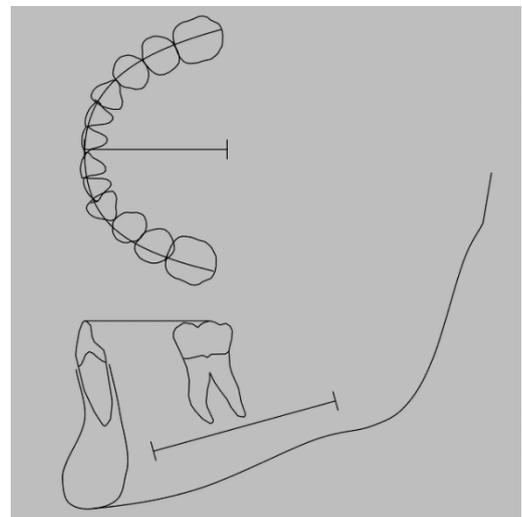


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Note: The dental landmarks are mixed in with the arch perimeter landmarks and the occlusion contact landmarks in the digitization sequence.

14. The process is complete when the distal landmark on the first molar on the right side has been entered. At this point the program shows the occlusogram on the right side of the screen. **Remember to save the file before proceeding further.**

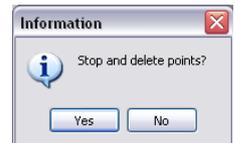
When the first reference point registered on the occlusogram is correctly placed, in relation to the landmark defining the tip of the incisor on the lateral analysis, the occlusogram is also correctly positioned in relation to the view of the respective jaw.



15. Should you have made a mistake during the entry of a specific point you can now correct it by clicking on this icon, which will take you back one step at a time for each click.



16. Clicking on this icon lets you start the digitizing process all over again.



17. If you have made a mistake, that does not appear until the final data is saved, you can open the Lower Arch point list by clicking on the plus next to Point [+]. Scroll down to the specific landmark and re-enter it, pressing the left mouse button on the correct position. The midline can also be corrected at this time, if necessary, by scrolling to ref1 or ref2. The grid will then re-appear, and the correct position can be selected as explained under item 10. When all points are correct you should close the Point entry box and remember to save the file again.

LowerArch	
Date	07-12-07
Model	
Filename	C:\TIOPS\Analy4\Mode
Mirror	False
ResolutionX	100
ResolutionY	100
Enlargement	36
Points	
re1	[-3052,3134]
re2	[-3206,-4068]
ref1	[0,0]
ref2	[0,-2895]
I6d	[-2552,-2622]
I6b	[-2665,-1986]
I6m	[-2147,-1685]
I6l	[-1881,-2355]

Note: Note that you cannot change re1 and re2 as they are automatically registered by the system.



18. After entering the LowerArch analysis data you are now ready to perform the **UpperArch analysis**.

The process is similar to the lower model with digitization of the reference points first, followed by the landmarks in the same order as previously. Make sure that the Enlargement is correct before entering data. Once again save the data before proceeding any further.

The four occlusal contact points between the upper and lower teeth, and the cusps of the canines are shown on the picture. They are also indicated with capital letters as you reach each one. (L6C, LPF, L3C, R3C, RPC, R6F). The four green points are mandatory, L3C and R3C only when the cuspids are present.

LPC and RPC should be registered too, on the primary teeth.



Note: Some items common to the lateral analysis are described in detail in:
http://www.tiops.com/downloads/T4UG/T4UGLateralAnalysis_LateralHeadfilm.pdf