bti
Human Technology

LANGUAGE

English

SOFTWARE

# BTI SCAN 4

## INSTRUCTIONS FOR USE

**Planning** for dental implantology

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# 1 INTRODUCTION

## DESCRIPTION

BTI SCAN 4 is a software tool for the digitisation and visualisation of images, for 3D reconstruction, and for the measurement and calculation of bone densitometry values around and inside the implant, in order to facilitate the diagnosis and implant surgery treatment plan based on axial sections obtained from CT (computed tomography) or CBCT (cone beam computed tomography) scans.

**Main functions:**

• Definition of the arch curve

• Display of axial, panoramic, sectional, sagittal and coronal slices

• Display of 3D models

• Marking of the dental nerve

• Visual inspection of thickness of the corticals, bone trabeculation, bone defects, etc.

• Simulation of implant placement

• Identification of the bone quality

• Measurement of distances, angles, area and volume

• Printing of planning reports and lists of measurements

• Selection of the volume of interest in the DICOM import

• Bone densitometry setting

## INTENDED USE

Medical image processing software system intended as a pre-operative tool for simulation and evaluation of patients' anatomy, dental implant placement and options for surgical treatment.

## INDICATIONS FOR USE

Software tool to help with the diagnosis and treatment planning of implantology patients, intended for dental professionals who are familiar with the clinical terms and concepts used by the program. The

software transfers the information from axial slices of the images obtained from a CT (computed tomography) or CBCT (cone beam computed tomography) scanner to a BTI-patented format.

There are no specific requirements regarding the physical environment, except those applicable to all Windows applications.

**INTENDED USER**

This diagnosis software must be used by person with medical qualifications and knowledge of anatomy, oral surgery and dental implantology.

**INTENDED PATIENT GROUP**

Patients partially or totally edentulous who are going to be subjected to oral implantology techniques and therefore to oral or maxillofacial surgery.

Pregnancy and breastfeeding: Users must observe the precautions corresponding to the use of ionising radiation for obtaining images required for the use of BTI SCAN 4. These conditions must be taken into account by the clinician prior to submitting the patient to a radiological examination (CT) and subsequent use of BTI SCAN 4 for the diagnosis and planning of implant treatment.

# 2 MINIMUM SYSTEM REQUIREMENTS TO INSTALL BTI SCAN 4

## 2.1 MINIMUM SYSTEM REQUIREMENTS FOR BTI SCAN 4

| **Operating system** | |
|---|---|
| **Client** (Network installation)/Single station | Windows 11 Professional x64 (64 bits) |
| **Server** (Network installation) | Minimum: Windows 2019 standard server<br>Recommended: Windows Server 2022 Standard |

⚠ Data processing and pre-surgical dental planning from the server is not recommended. The server must only be used to act as a server as such and for the storage of studies in a networked installation. Data integrity could be compromised.

| **CPU** | |
|---|---|
| **Minimum** | Intel Core i5 |
| **Recommended** | Intel Core i7 or higher |
| **RAM** | |
| **Minimum** | 8 GB |
| **Recommended** | 16 GB |

| | |
|---|---|
| **Storage** | |
| **Minimum** | 5 GB client/single user 5 TB Server |
| **Recommended** | 10 GB SSD client/single user 10 TB SSD Server |
| **Graphics card** | |
| **Minimum** | Dedicated graphics card, not integrated in the motherboard, compatible with OpenGL. |
| **Recommended** | Nvidia or better with support for OpenGL 2.0. |
| **Screen**<br>*The following are requirements for computers on which the study plan is to be made. For hardware that is going to act as Server (and is only going to be used to host studies) any type of monitor is sufficient, since the use of the server is not recommended for planning.* | |
| **Minimum** | 22-inch monitor with a minimum resolution of 1440x900 with 16-bit colour depth. |
| **Recommended** | 24-inch monitor with a 1920x1200 resolution as BTI Scan® 4 is a diagnostic tool, the larger the monitor, the better the visualisation and handling of the application. |
| **Mouse** | Mouse with a central wheel button. |
| **Text** | Text size 100% or 125% if these parameters are exceeded, the texts will become unreadable. |
| **Network connection** | 1GB Ethernet network cable, not Wi-Fi. |

| | |
|---|---|
| **General firewall requirements** | |
| Status inspection | Enabled. Monitors and analyses ongoing connections. |
| Intrusion prevention system | Enabled. An intrusion prevention system helps detect and prevent attacks in real time. |
| Encryption support | Enabled. Supports secure encryption protocols such as IPSec or SSL/TLS. |
| Detailed logs and reports | Enabled. Generating detailed access and activity logs is essential for anomaly detection. |
| Recommended Firewall | Next-generation firewall (NGFW). |
| General recommendations | - You must allow access to the port configured during installation if installed in server mode, by default 5432.<br>- Windows server: file and printer sharing: incoming.<br>- Windows workstation: file and printer sharing: outgoing. |

## 2.2 COMPATIBILITY

BTI SCAN 4, like previous versions BTI SCAN II and 3, is characterised as being an open platform which is compatible with different CT scanning systems; conventional, spiral, volumetric, etc. that carry out analyses of the patient's jaw in DICOM format.

It is also a repository of an extensive library of implants available to the user for pre-surgical planning on the patient's scanner. In addition, it allows for the importation of studies created with previous versions of BTI SCAN, with the exception of BTI SCAN I.

BTI SCAN 4 is not compatible with BTI SCAN I. Files generated with BTI Scan® I cannot be opened with BTI SCAN 4.

Ensure you back up your BTI Scan database before performing an update.

## 3 GENERAL INFORMATION

Throughout this manual the following symbols are used, which have the following meanings:

This symbol accompanies a text to which special attention will have to be paid, as it indicates cautions to consider.

This symbol accompanies a text to which special attention will have to be paid, as it indicates warnings to consider.

This symbol accompanies a text with references to other sections of this manual.

This symbol accompanies important information for the user.

REF — Product reference

Manufacturer

MD — Medical device

UDI — Unique Device Identifier

CE 0123 — CE marking

Manufacturing date

Rx only — For professional use only

The user must follow the guidelines and instructions contained in this manual. In addition, attending training activities on BTI SCAN 4 and surgical techniques in dental implantology is recommended for the correct diagnosis, planning and performance of the treatment. If

you do not respect these precautions, there is a risk of damaging the dental nerve during or after surgery.

In this respect, special note must be taken that the reliability of the data and measurements provided by the BTI SCAN 4 software during the diagnosis and surgical simulation depends on the CT scan being taken properly by the radiologist, and proper reconstruction of the patient's arch curve by the implantologist or specialist user. The positioning of the patient is exceptionally important for both the maxilla and the mandible of the patient, in cases of full and partial edentulism.

The reliability of the data and measurements provided by BTI SCAN 4 also depend on the CT techniques, parameters and equipment used, due to the variability observed in medical images obtained with the different techniques and equipment available in the market, which will then be imported and displayed by BTI SCAN 4.

Some anti-virus software may be configured so they can identify the bootable installation files of BTI SCAN 4 harmful to the system. Please ignore this warning and continue with the installation.

The database management system used by BTI SCAN 4 (Postgre SQL) can cause connection problems if an antivirus and/or firewall blocks communication.

If during the installation of BTI SCAN 4 an antivirus and/or firewall warns that POSTGRE SQL requests access, authorise it and continue the installation.

The program BTI SCAN 4 is protected by a hardware and software SENTINEL/HASP protection system. This means that, to run BTI Scan® 4, the virtual license provided by BTI must be present on the PC (in single-station installations) or in the PC that is acting as a server (in network installations). The program can be used concurrently by as many users on the network as licenses have been acquired.

If during the installation of BTI SCAN 4 an antivirus and/or firewall warns that SENTINEL/HASP requests access, authorise it and continue the installation.

We expressly recommend you make periodical backups of the data contained in the BTI SCAN 4 application and the rest of your systems, to avoid possible losses and comply with the current legislation regarding personal data protection. For further information on backups, see section 0.

If during the use of BTI SCAN 4 the network connection with the server is lost, communication with the database will stop working and it will be necessary to close the application in the following way:

1) Access the Windows task manager (CTRL+ALT+DEL).
2) In the PROCESSES menu right click on the process BTISCAN4.EXE and select END PROCESS.

Otherwise, changes made during the current session could be lost.

All screenshots and instructions regarding Windows® that have been taken throughout the manual correspond to Windows® 10 PRO X64 and Windows® 11 PRO X64, so they may differ slightly if a different operating system is used.

The instructions for use are set out below chronologically from installation to the use of all the functions the Software allows.

# 4 CONTRAINDICATIONS AND ADVERSE EFFECTS

No contraindications or adverse effects have been identified.

# 5 INSTALLING THE PROGRAM – MANAGING USERS

## 5.1 INSTALLING THE PROGRAM

See section 2 before starting the installation.

If the program is updating, consult Section 7.1 for further information.

Manually run the BTI Scan 4 installer by double clicking.

In order to install BTI SCAN 4, you must have administrator permissions. For further information see section 9.3 (

FAQs).

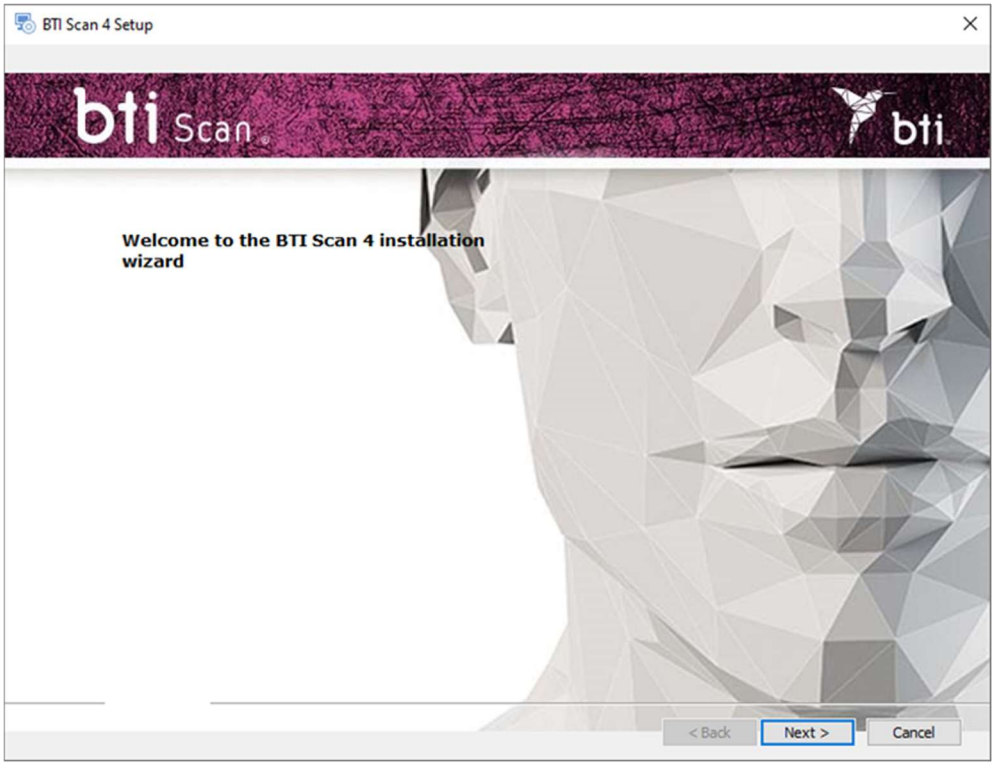
Do not install BTI SCAN 4 on a public network. Otherwise, a security breach may occur, and the program might not work properly.

If you have any problems or cannot install BTI SCAN 4, please contact the BTI Technical Service Team.

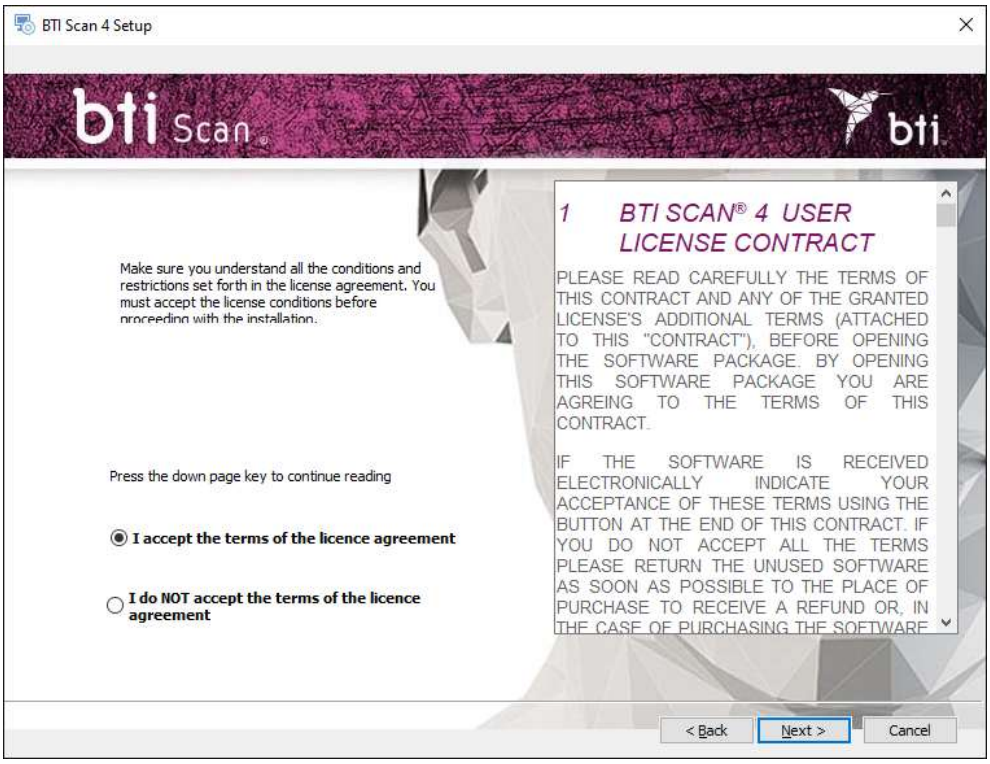
Before starting installation of BTI SCAN 4 we recommend you close any documents or applications open on the system. Otherwise, the installation may not be carried out correctly.

Follow these steps:

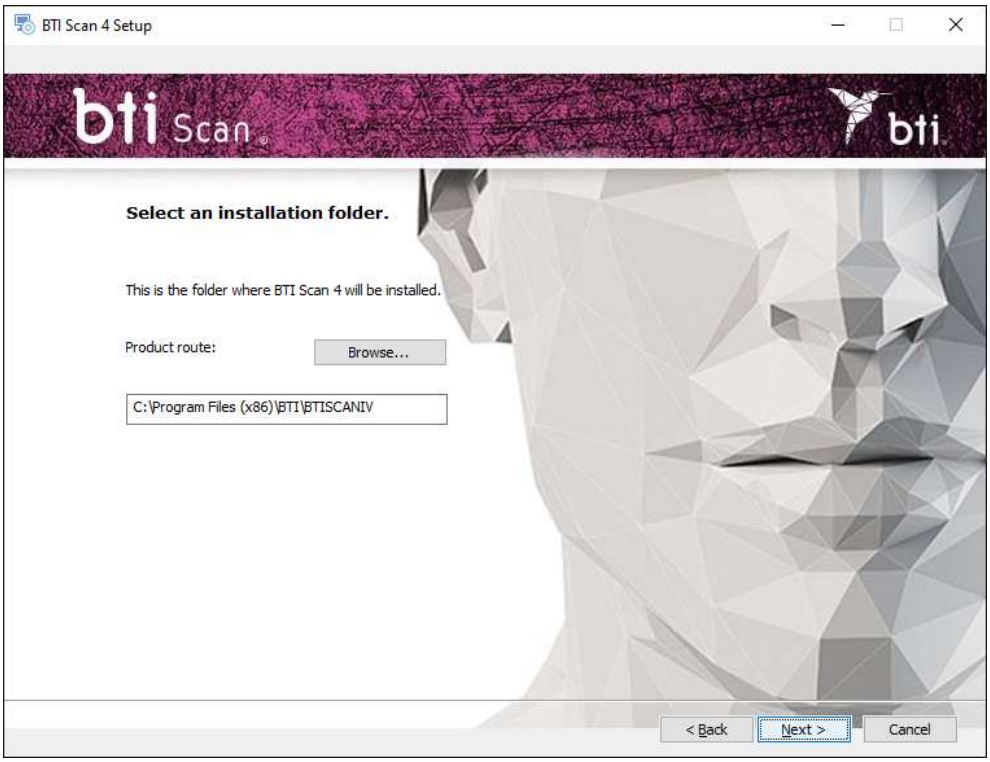
1) Click on Next on the welcome screen.



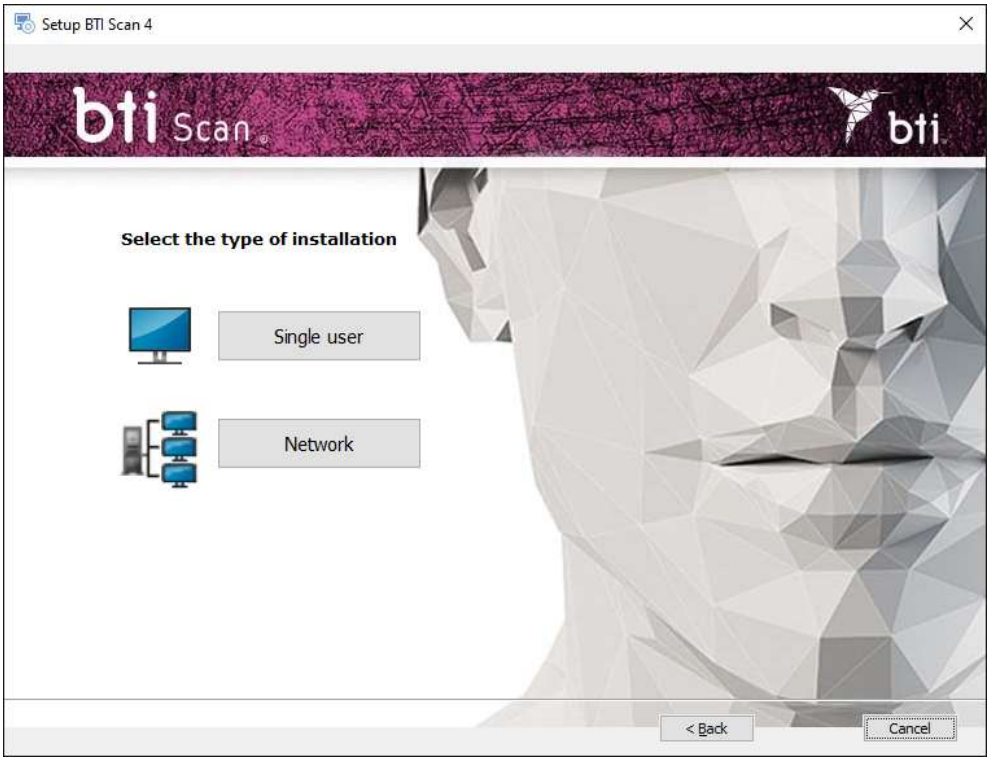
2) Accept the licence agreement terms and click on Next.




3) Select the installation route and click on Next.



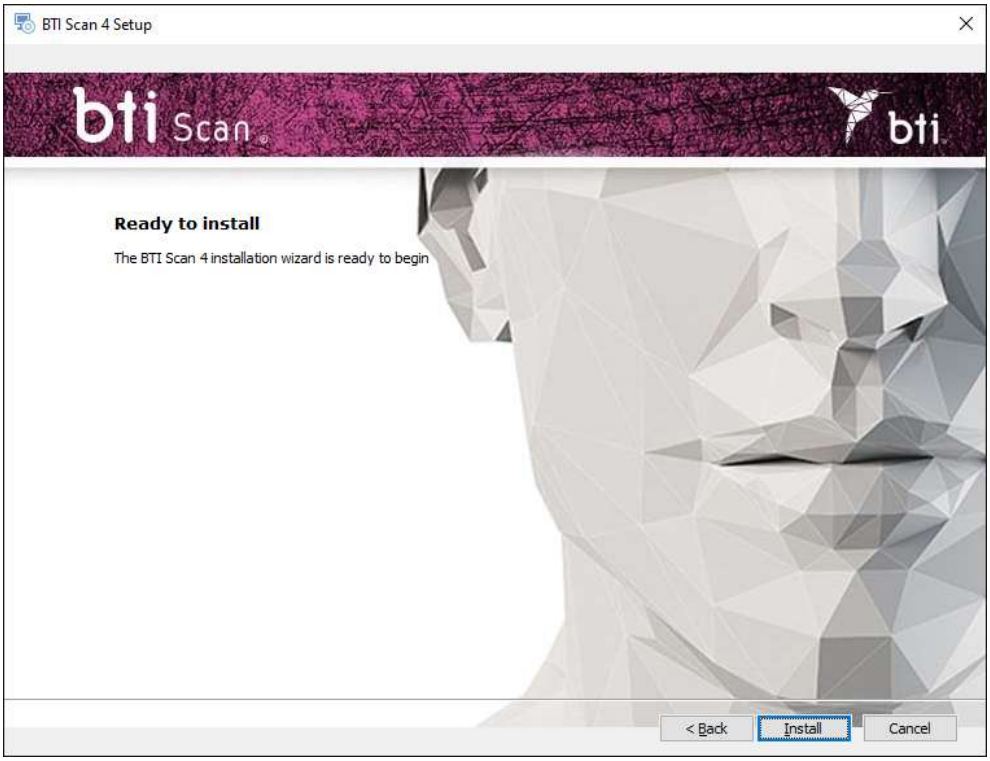
4) Choose between a single user (see Section 5.1.1) or network installation (see Section 5.1.2). After this, it will be necessary to activate the license (Section 5.3).



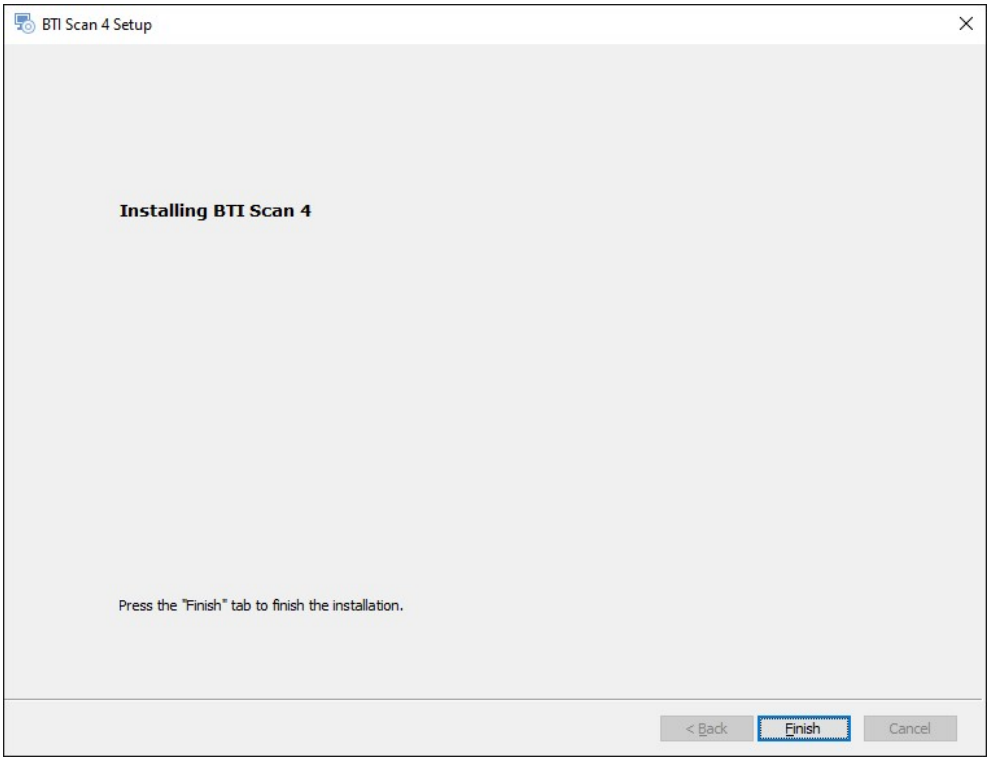

### 5.1.1 SINGLE-STATION INSTALLATION

Select the single-station installation if you are going to install the application on one computer only:

1) Select the single-station option and install.




2) Press Finish to finish the installation.

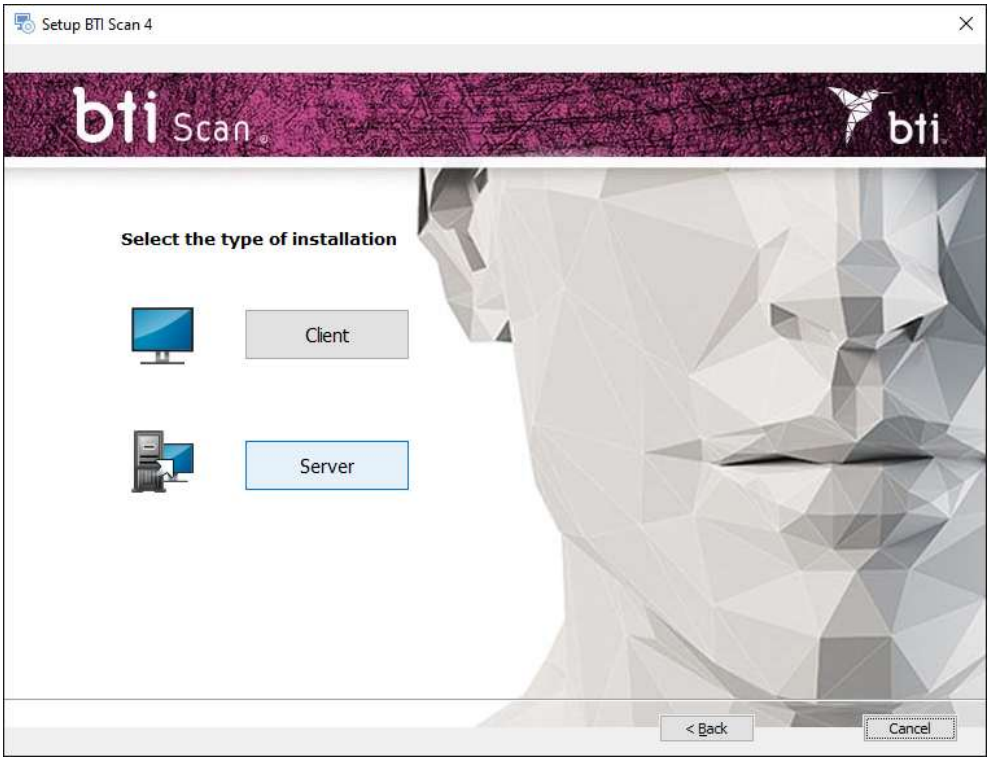


### 5.1.2 NETWORK INSTALLATION

Choose network installation when you are going to install the application on several computers. One of them will act as a server (storing the database) and the other computers are its clients:

1) Select the option Network.


2) Choose between the two types of installation: Client or Server.




Install BTI SCAN 4 in:

First on the computer that will be the Server.

Then on the Client computers.

We recommend always processing data from the client PCs that are equipped for this purpose. Leave the server for storing the studies and the database.

## Server/client installation

Select the option Server to indicate to the application that this is the computer that will store the study and the database:

Select the option Client to install the application in a computer other than the server:

1) Select the option desired and click on Next:


- Server: The installation program automatically detects and assigns the TCP/IP address and the port number of the computer, although this data can be changed if necessary. Check that the information is correct and click on Next.

⚠ Ensure that it is being installed on a Windows 2012 R2 Server x64 or higher. Previous versions have not been verified.

ℹ By default, the port number is 5432. If the program detects that this port is occupied by another application it will select a port that is free.

ℹ Note the TCP/IP address and PORT NUMBER as they will be requested when you install the client.

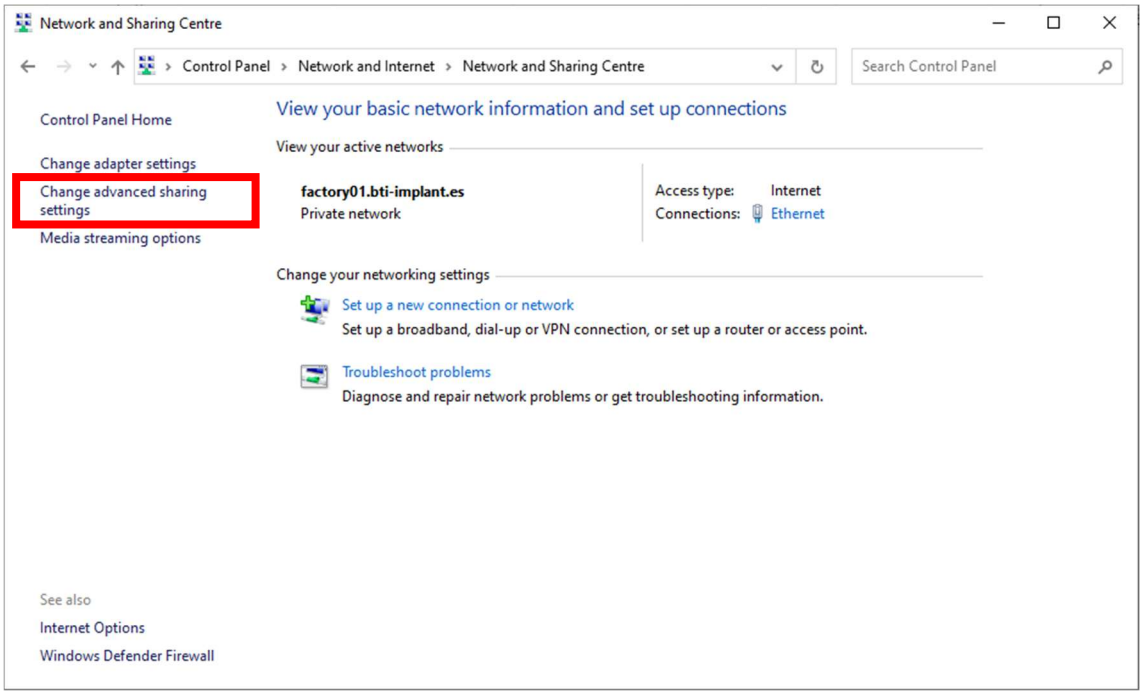
⚠ The TCP/IP address must be fixed, otherwise the program will not work and it will not be possible to connect with the database.

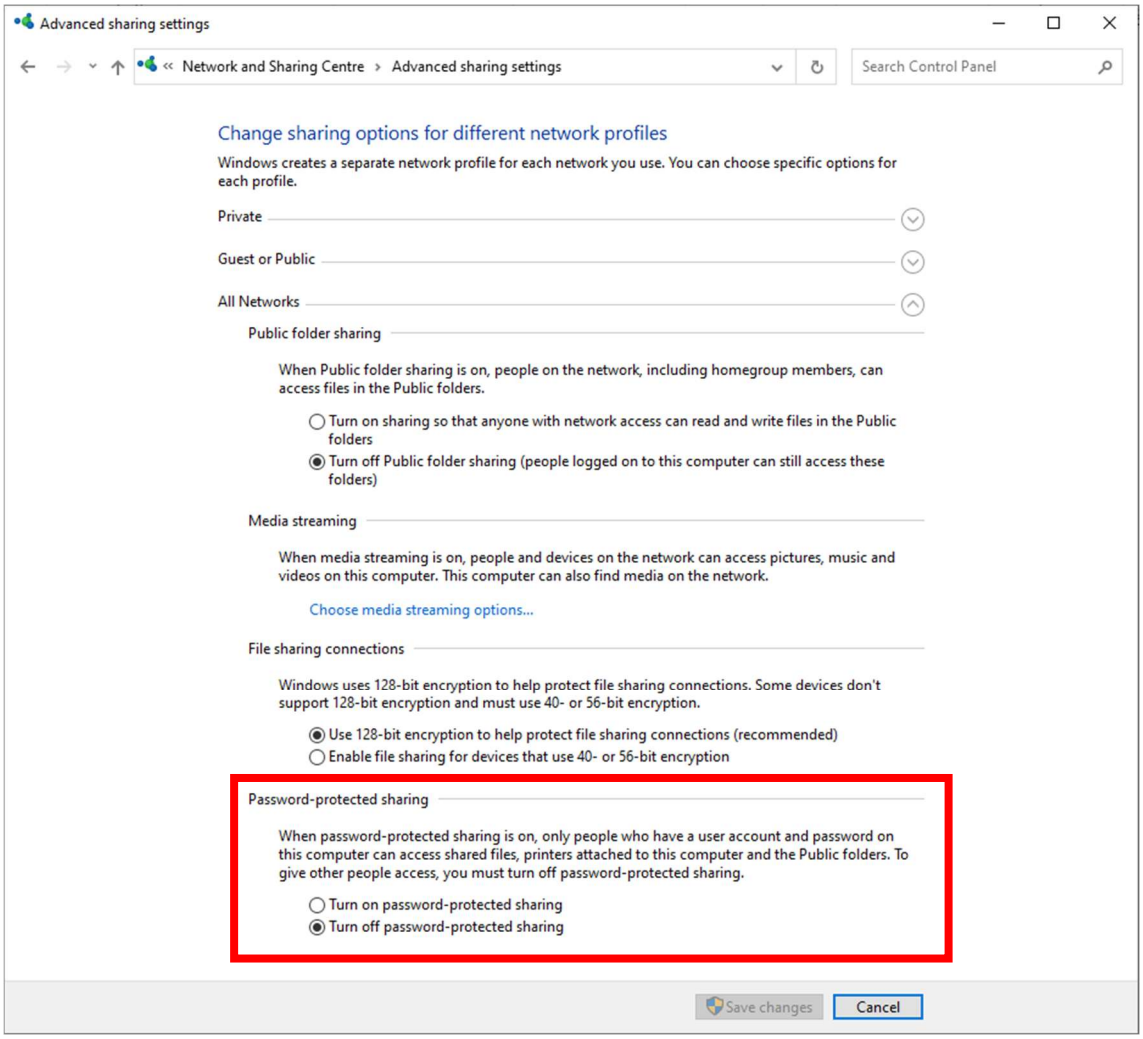
⚠ The firewall and antivirus must be configured to exclude the port number assigned (in the following figure, 5432) from the list of supervised ports. Otherwise, access to the database may be blocked.

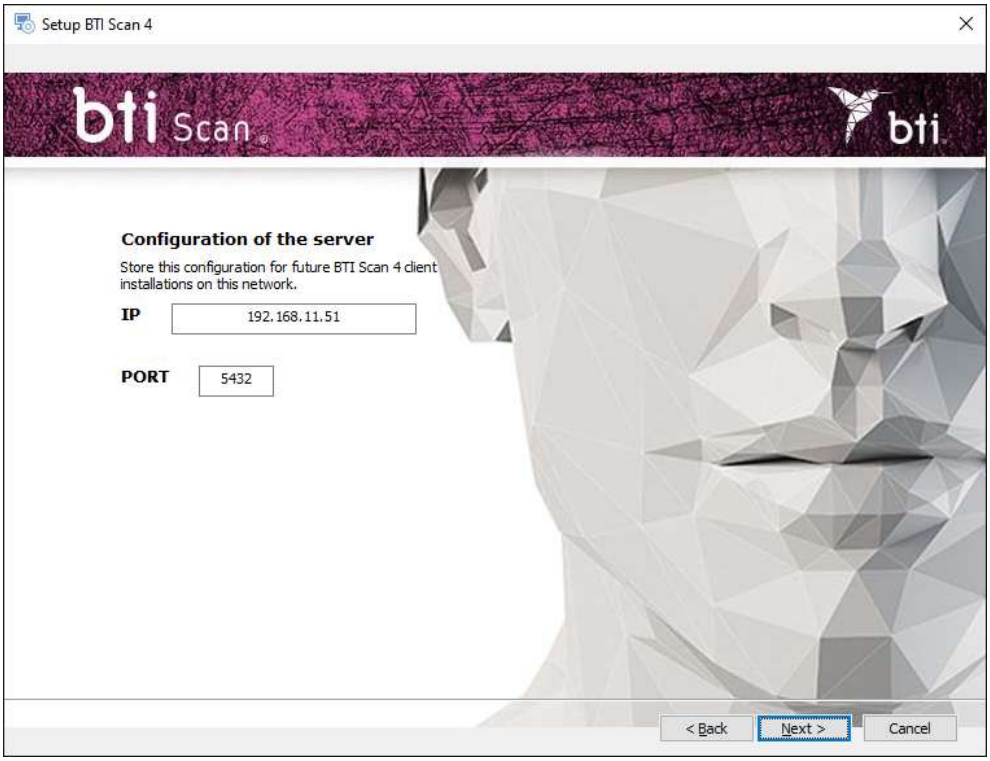
ℹ If you have any doubts as to how to configure the firewall rules, consult the network administrator or the IT support service.

To determine the TCP/IP address see Section 9.2

ℹ To ensure connection with the server, password protected sharing must be switched off. The option is available in the 'Network and Sharing Center' by accessing the 'Advanced Sharing' settings.


Network and Sharing Centre
Control Panel › Network and Internet › Network and Sharing Centre
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
Media streaming options
View your basic network information and set up connections
View your active networks
factory01.bti-implant.es
Private network
Access type: Internet
Connections: Ethernet
Change your networking settings
Set up a new connection or network
Set up a broadband, dial-up or VPN connection, or set up a router or access point.
Troubleshoot problems
Diagnose and repair network problems or get troubleshooting information.
See also
Internet Options
Windows Defender Firewall


Advanced sharing settings
« Network and Sharing Centre › Advanced sharing settings
Search Control Panel
Change sharing options for different network profiles
Windows creates a separate network profile for each network you use. You can choose specific options for each profile.
Private
Guest or Public
All Networks
Public folder sharing
When Public folder sharing is on, people on the network, including homegroup members, can access files in the Public folders.
Turn on sharing so that anyone with network access can read and write files in the Public folders
Turn off Public folder sharing (people logged on to this computer can still access these folders)
Media streaming
When media streaming is on, people and devices on the network can access pictures, music and videos on this computer. This computer can also find media on the network.
Choose media streaming options...
File sharing connections
Windows uses 128-bit encryption to help protect file sharing connections. Some devices don't support 128-bit encryption and must use 40- or 56-bit encryption.
Use 128-bit encryption to help protect file sharing connections (recommended)
Enable file sharing for devices that use 40- or 56-bit encryption
Password-protected sharing
When password-protected sharing is on, only people who have a user account and password on this computer can access shared files, printers attached to this computer and the Public folders. To give other people access, you must turn off password-protected sharing.
Turn on password-protected sharing
Turn off password-protected sharing
Save changes
Cancel





- Client: Enter the TCP/IP address and the port number used when installing the server and click on Next.

2) Continue and click on Finish to complete the installation.

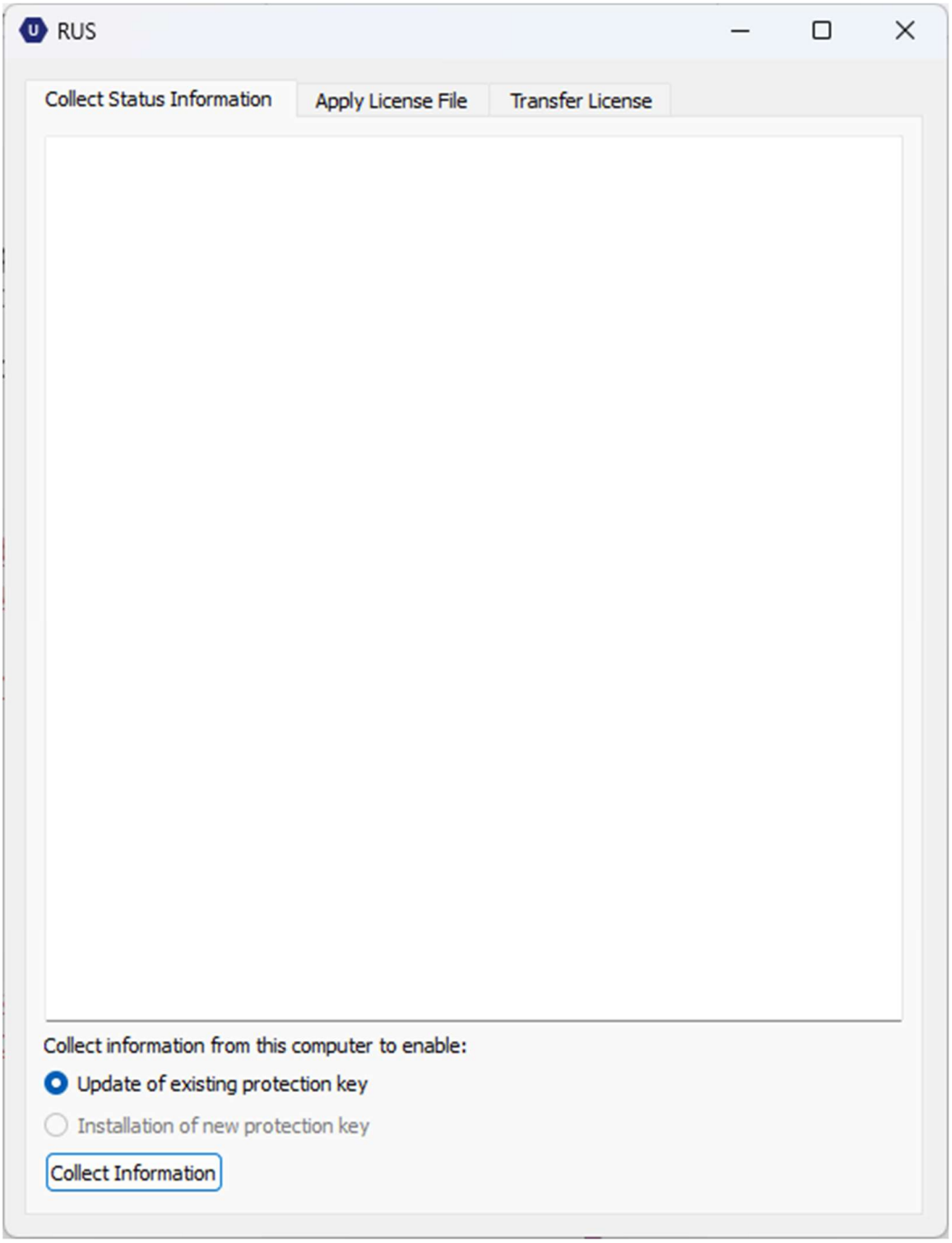
## 5.2 LICENSE ACTIVATION

License activation can be done in two ways, depending on whether the license is to be installed on a computer without internet access or on a computer with internet access where the software has been installed. In any case, if you want to use the software in server/client mode, you must activate the licence on the server only.

### 5.2.1 INSTALLATION ON A COMPUTER WITHOUT INTERNET CONNECTION

Along with the installer, a product key and a RUS executable are included. To activate the license, you must first collect the information from the computer on which the software will be run.

To do this, execute the RUS on the offline computer, select the option for installing a new protection key, and click the "Collect Information" button.

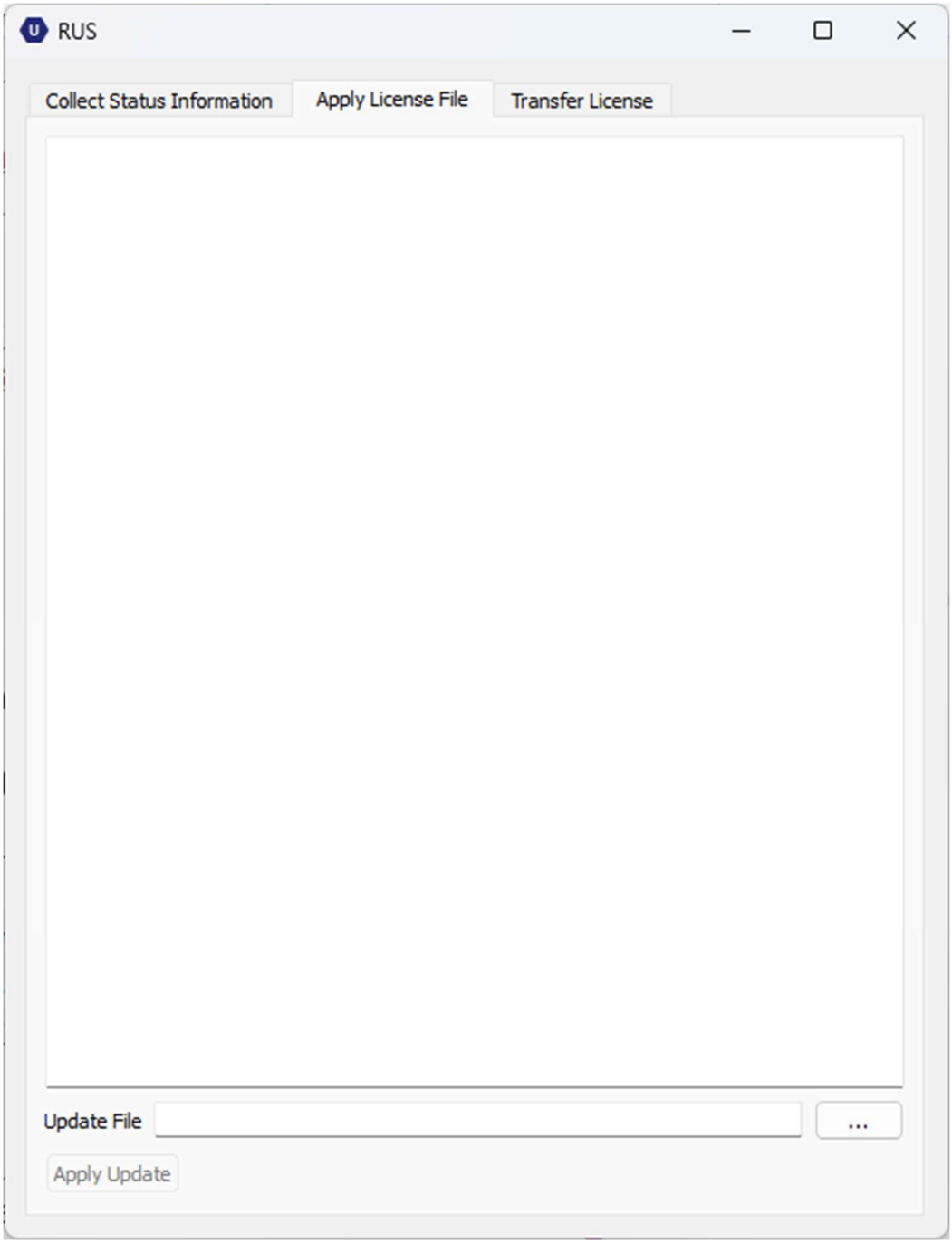



After this, the c2v file should be saved and sent to a computer with an internet connection.

Once the information has been collected, using a computer with internet access, go to the webpage https://ls01.bti-biotechnologyinstitute.com/ems/customerLogin.html and enter the product key.


Once the product key has been entered, select the offline activation option and attach the c2v file generated on the offline computer. This will generate a v2cp file that should be downloaded to an accessible location and then sent to the offline computer.

Finally, to activate the license, run the RUS again on the offline computer and select the Apply License File tab. Attach the recently generated v2cp file, and the software will then be available for use.



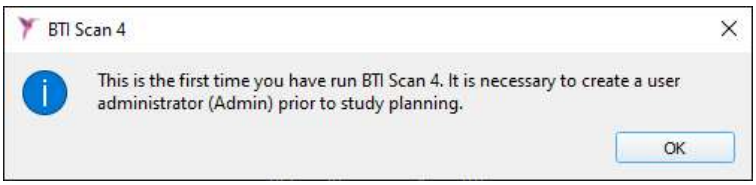

### 5.2.2 INSTALLATION ON A COMPUTER WITH INTERNET CONNECTION

If the computer where the software is installed has internet access, to activate the license, simply go to the webpage https://ls01.bti-biotechnologyinstitute.com/ems/customerLogin.html and enter the product key.


Once the product key has been entered, the Online Activation option will be selected and the licence will be activated.

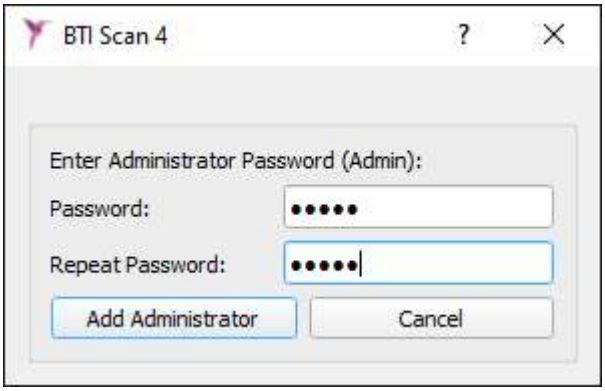
## 5.3 RUNNING THE PROGRAM FOR THE FIRST TIME

When you start the application for the first time you must configure the following parameters:



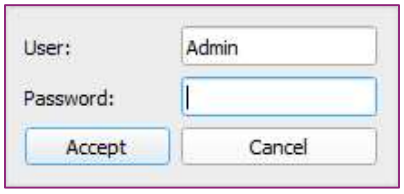

1) Password for the user Admin

> Before planning any studies, the program creates a main user called administrator (admin). This user can create and manage other users and establish permissions.

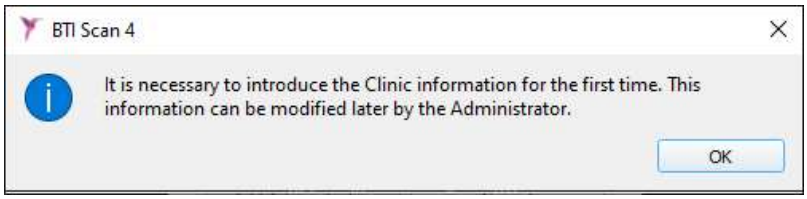


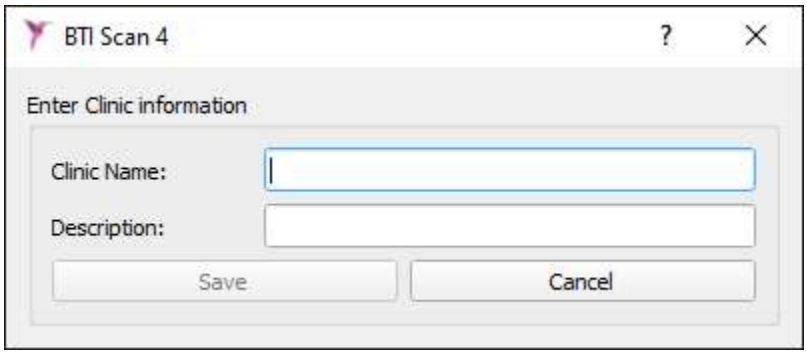
| | |
|---|---|
| i | This user may not be deleted or modified. |
| i | The password must be at least 5 characters . |

Once you have selected the password, access the program with the username Admin and the password selected and continue with the initial configuration process.

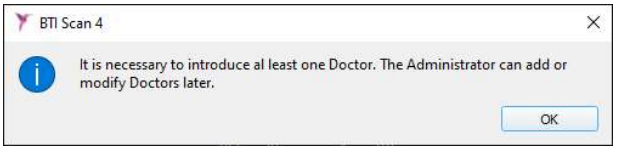


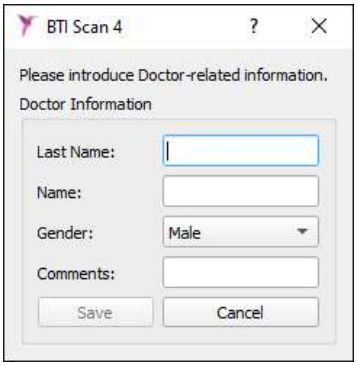

2) Clinic information.



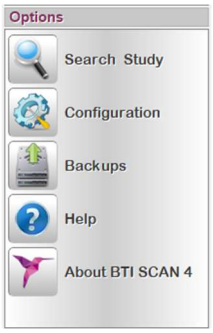

3) Data of at least one doctor.



## 5.4 OPTIONS

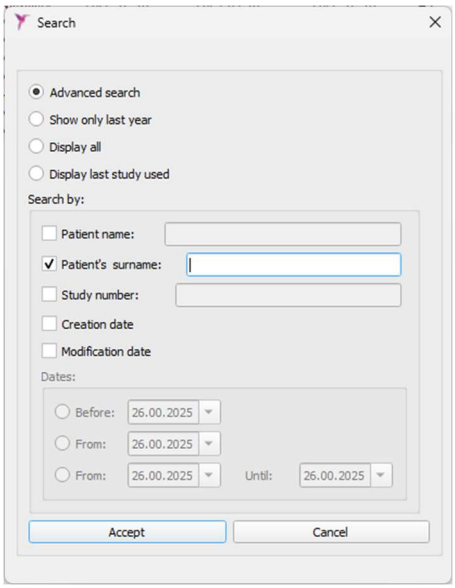
From the menu Options of the main screen you can:




If you click on the ‘About BTI SCAN 4’ option, the programme displays specific data about the installed software version, the reference, the UDI and other product and manufacturer data.

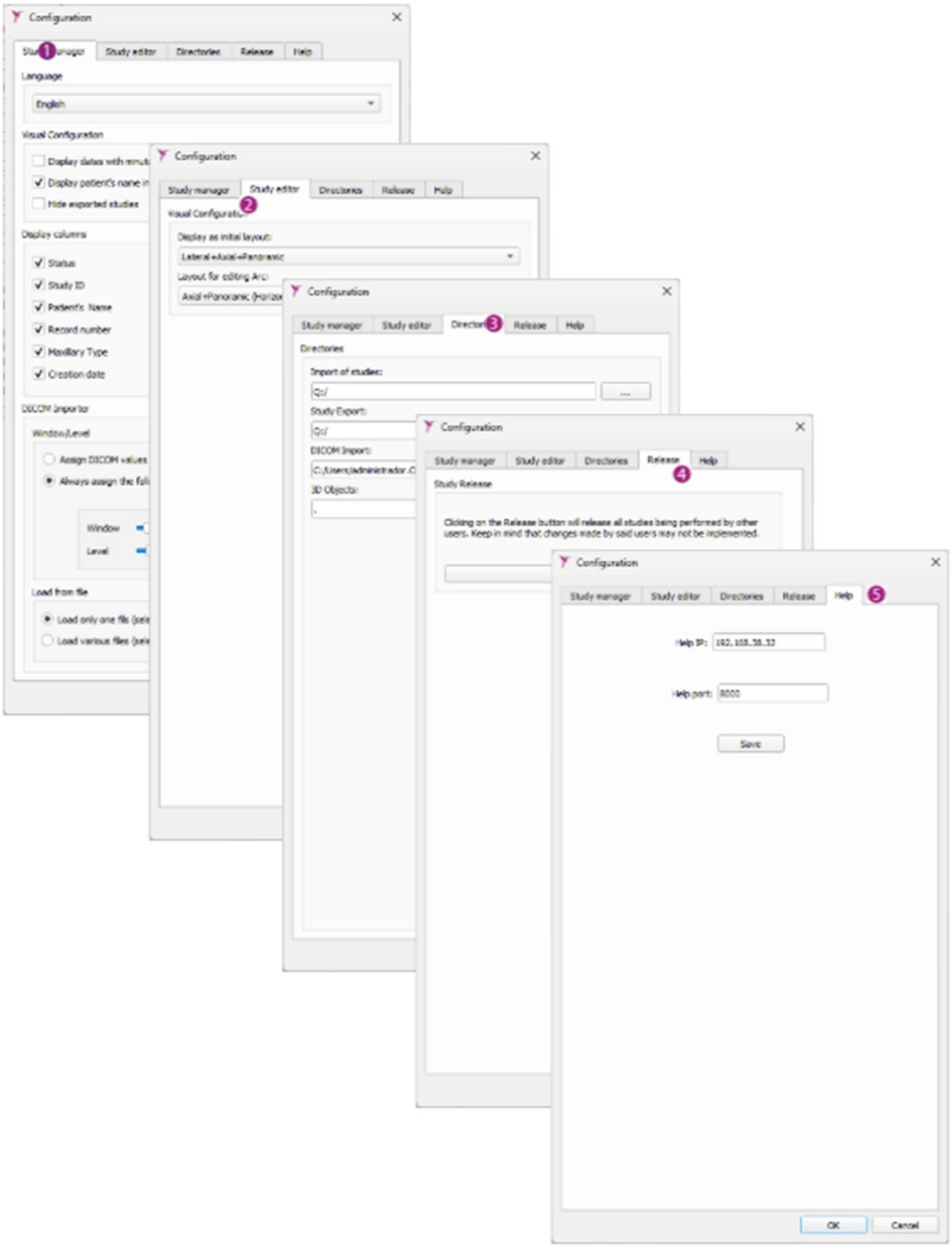
### 5.4.1 SEARCH FOR A STUDY

This makes a search, allowing you to select multiple search fields to filter the results (you can also click on the F8 to access this screen). By default, only cases from the last 6 months are displayed. To find previous cases, select the ‘Show all’ option.




### 5.4.2 ESTABLISHING THE BASIC PROGRAM CONFIGURATION

This enables each user to establish certain parameters of the application:




**Study manager❶:**

Modifies:

- The language of the application interface
- Certain visual parameters
- The columns to display on the main screen

- The thresholds of the DICOM values of the image displayed (Windows/level).
- The selection by folders or by files of these DICOM studies.

**Study editor ❷:**

Modifies:

- The initial visual configuration when loading a project

**Directory ❸:**

Modifies:

- The established directories when importing/exporting studies and importing DICOM , and adding 3D models.

**Unlocking ❹:**

Unlocks all the studies that are locked by other users.

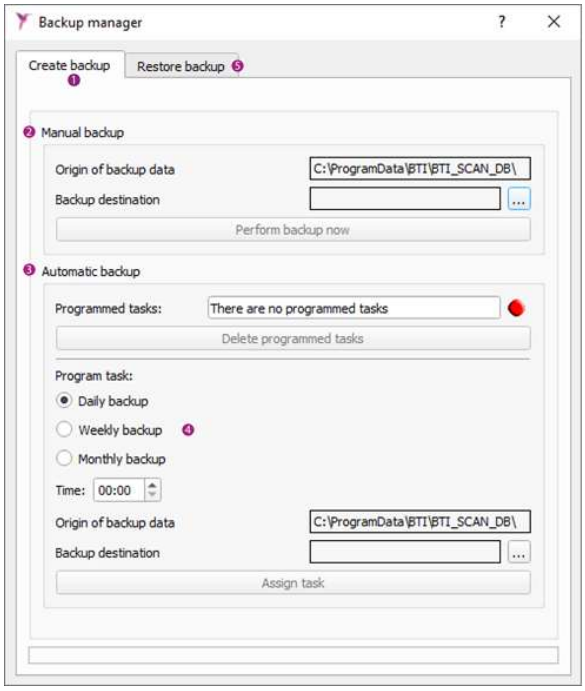
| | |
|---|---|
| ⚠ | When you do this ensure no users are working on the studies, as they will not be able to save the changes they are making. |
| i | This should only be done by the ADMIN user and on the Server in a network installation or on the single station. |

**Help ❺:**

Allows you to modify the help server address.

### 5.4.3 MAKE BACKUPS

| | |
|---|---|
| i | Only the ADMIN user can make and restore backups and this must always be from the server computer (as this is where the database and the patient cases are stored) and the single station. |
| i | The backup does not allow you to define directories in other computers on the network. |
| i | Take into account that when you create or restore a backup this is done for all the program data (cases and database). |




To make a backup select the corresponding tab ❶ and select between:

- Manual backup ❷: This makes a backup. Select where you want to do it and click on the button Run a backup now.
  - This must have an extra file beyond the C:\ProgramData\BT \BTI_SCAN_DB\BTI_IMAGE_DATA folder.
  - The backup is made up of everything in C:\ProgramData\BTI\BTI_SCAN_DB\BTI_IMAGE_DATA. As well as the BTI_SCAN_BACKUP_XXXXXXXXTXXXXXX.BACK file
- Automatic backup ❸: This programs a backup ❹ to be done periodically (daily, weekly, monthly) and at a certain time.
  - This must have an extra file beyond the C:\ProgramData\BT \BTI_SCAN_DB\BTI_IMAGE_DATA folder.
  - The backup is made up of everything in C:\ProgramData\BTI\BTI_SCAN_DB \ BTI_IMAGE_DATA. Plus the BTI_SCAN_BACKUP_XXXXXXXXTXXXXXX.back file

  Select the type of backup and the time and click on the button Assign task.

⚠ If the computer where you are going to make the backup is switched off at the programmed time, it will not be done.

To restore a backup select the tab ❺, search for the file and click on the button Restore backup.

### 5.4.4 SEARCH HELP

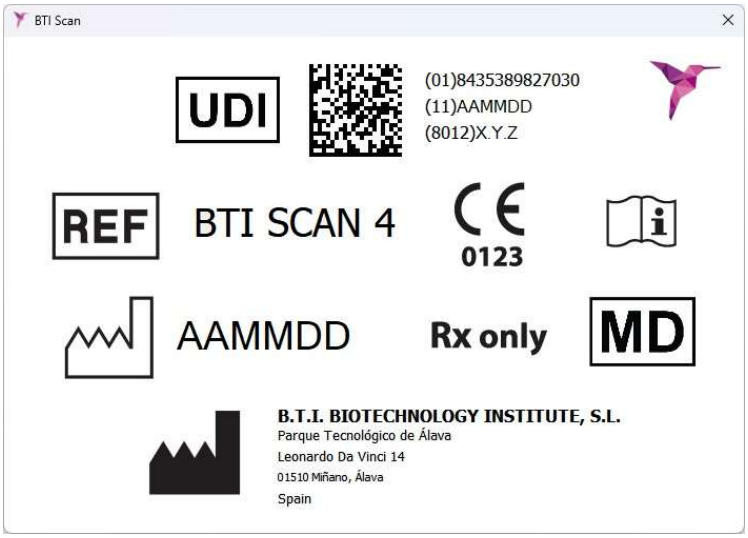
Access the help page, where you can find various user support documents. These include software user manuals, quick guides, information on compatible devices (explant and trans-epithelial), milling sequences, etc. A username and password are required to access the page. The default credentials are:

- Username: user
- Password: user12345

If you lose your account, the system has an administrator account that allows you to recover user passwords.

### 5.4.5 ABOUT BTI SCAN

This button accesses a window with all the information on the BTI SCAN 4 software tool.




## 5.5 USERS/DOCTORS/CLINICS/REFRESH VIEW/DENSITOMETRY SETTING

From the management menu the Admin user can manage the following information:

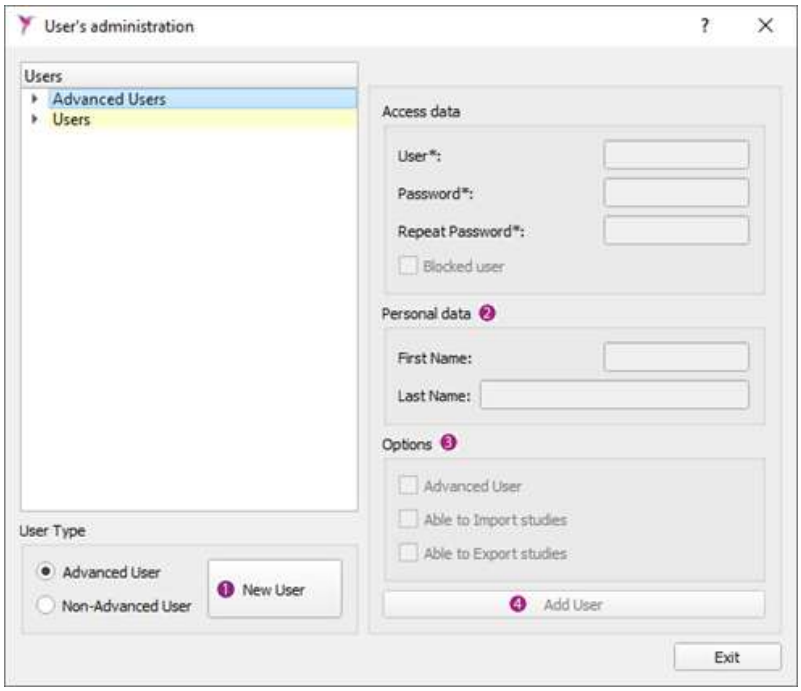
- Users
- Doctors
- Clinics
- Densitometry setting
- Refresh view

### 5.5.1 USERS

You can create two different types of user: *Advanced* and *Non-advanced*.

An Advanced user can import and export studies.

A Non-advanced user cannot import and export studies.




#### 5.5.1.1 Creating users

1) Select between Advanced or Non-advanced user and press the New User button ❶.

2) Assign a username and a password. You have the option of filling in your personal data ❷.

The username must contain at least 3 characters.

The password must contain at least 8 characters and include uppercase letters, lowercase letters, numbers, and symbols.

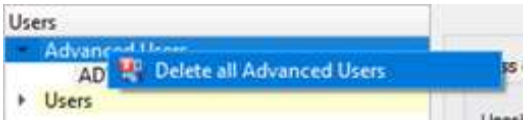
3) The Options section ❸ lets you assign permissions for importing and/or exporting studies.

These options are only accessible if the user is Advanced.

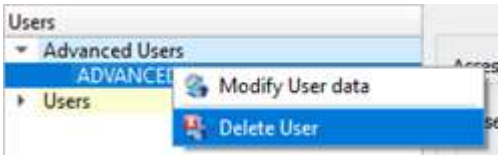
4) Finish creating the user by clicking on the button Add user ❹.

#### 5.5.1.2 Deleting or modifying a user

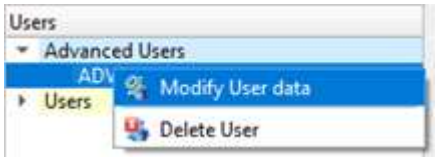
To delete all the users, right click on one of the two lists (Advanced users or Users) and select the option *Delete all advanced users*.



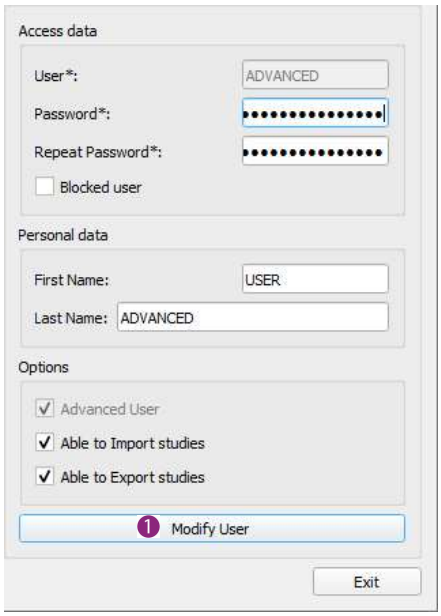

To delete a particular user, right click on the user you wish to delete and select the option *Delete user*.




To modify data of a user, right click on the user you wish to edit and select the option *Modify user data*.

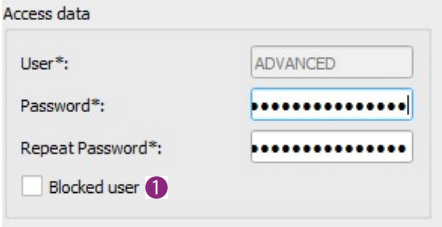



Modify the data (password, personal data, options, etc.) and click on the button *Modify user* ❶ to save the changes.



#### 5.5.1.3 Blocking a user

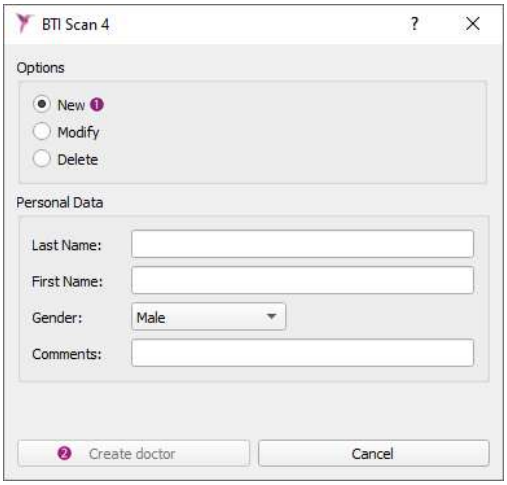
You can block a user's access to the application at any time by activating the following option ❶ .



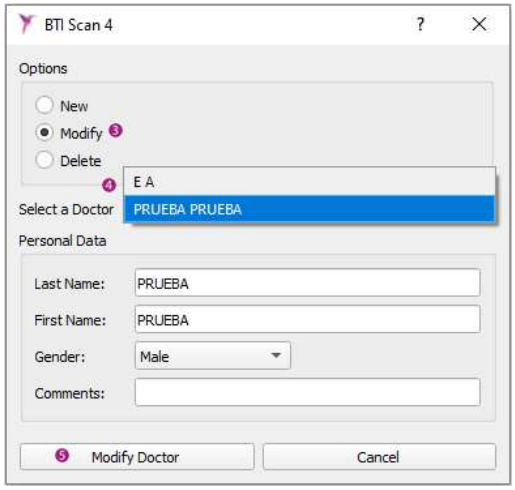

### 5.5.2 DOCTORS

You can create, delete and modify the data of the different doctors in the clinic:

- To create a new doctor, select the option New ❶, fill in the fields and click on the button Create doctor ❷.

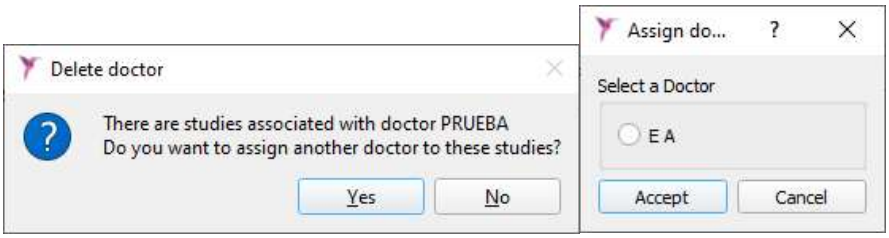



- To modify the data of a doctor or delete a doctor select the corresponding option ❸, select a doctor from the dropdown list❹, modify the necessary data and click on the button ❺ to carry out the action.




The program requires the name at least of one doctors and one clinic.

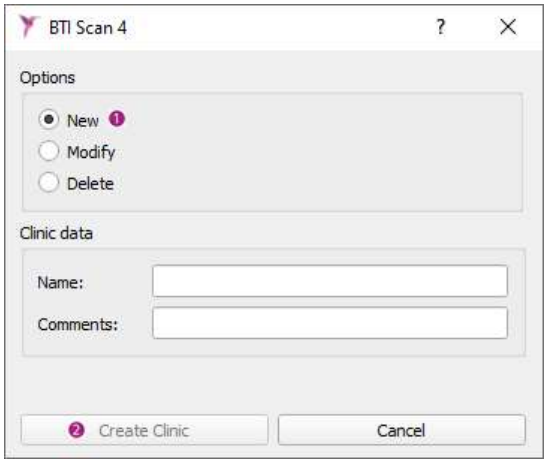
When removing a doctor, you will be asked to relocate their assigned cases to another doctor.



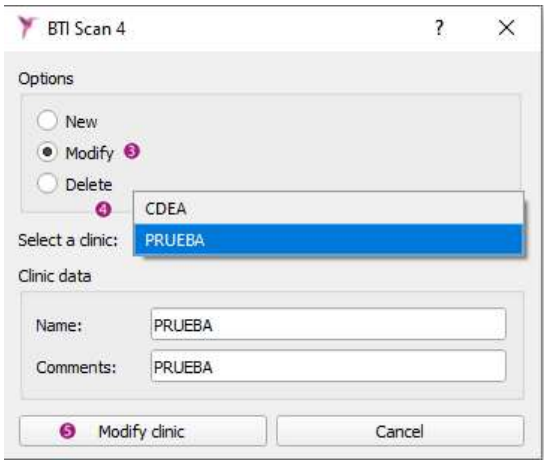

### 5.5.3 CLINICS

You can create, delete and modify the data of the clinic:

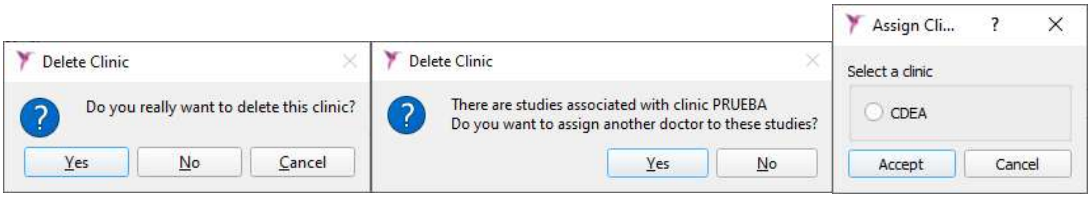
- To create a new clinic select the option New ❶, fill in the fields and click on the button Create clinic ❷.



- To modify the data of a clinic or delete a clinic select the corresponding option ❸, select the clinic from the dropdown list❹, modify the necessary data and click on the button ❺ to carry out the action.




When you delete a clinic, it will request the cases to be reassigned from this clinic to another.




### 5.5.4 REFRESH VIEW

Refresh the list of existing studies.

This button only shows when working network mode.

This is useful when carrying out a multi-user installation, since several users can work on as many other studies and the list can be modified while being worked on.

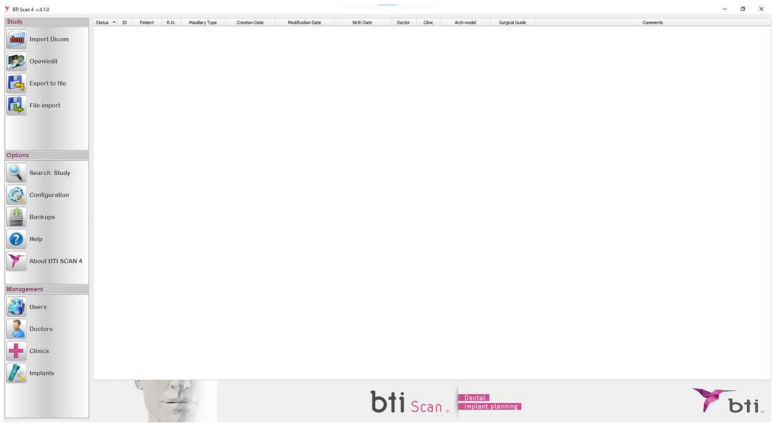
# 6 TUTORIAL FOR BTI SCAN 4

## 6.1 STUDY MANAGEMENT WINDOW

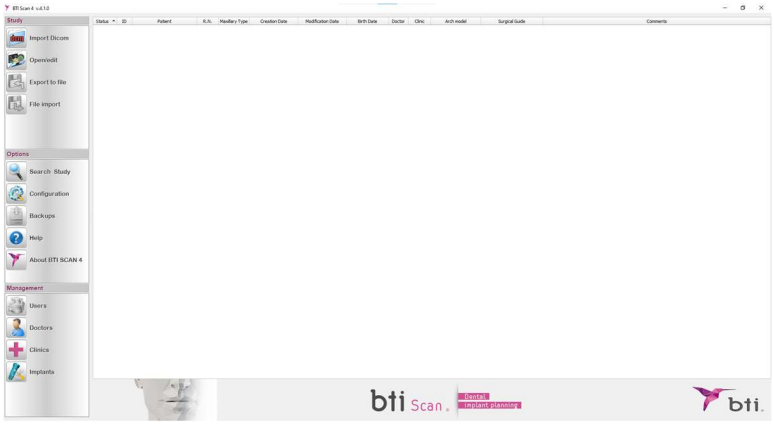
The study management window appears in the foreground every time BTI SCAN 4 is run.

This is composed of a complete list of the studies and the options toolbar. Depending on the user that accesses, you may or may not access the different screens (the buttons appear deactivated).

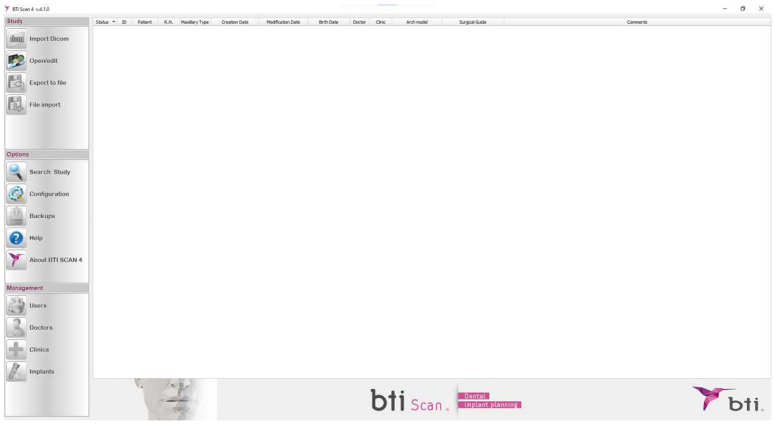
## Administrator user




## Advanced user



**Non-advanced user**




### 6.1.1 NEW DICOM STUDY

BTI SCAN 4 enables you to convert the CT scan of a patient in DICOM format to an internal format (.xml) that allows the user to edit a study. To carry out this function, the CT scan must be compatible with the DICOM format which is standard in medical imaging.

The DICOM images to import must be compatible with the DICOM 3 standard, and be available without compressing, in separate folders and series.

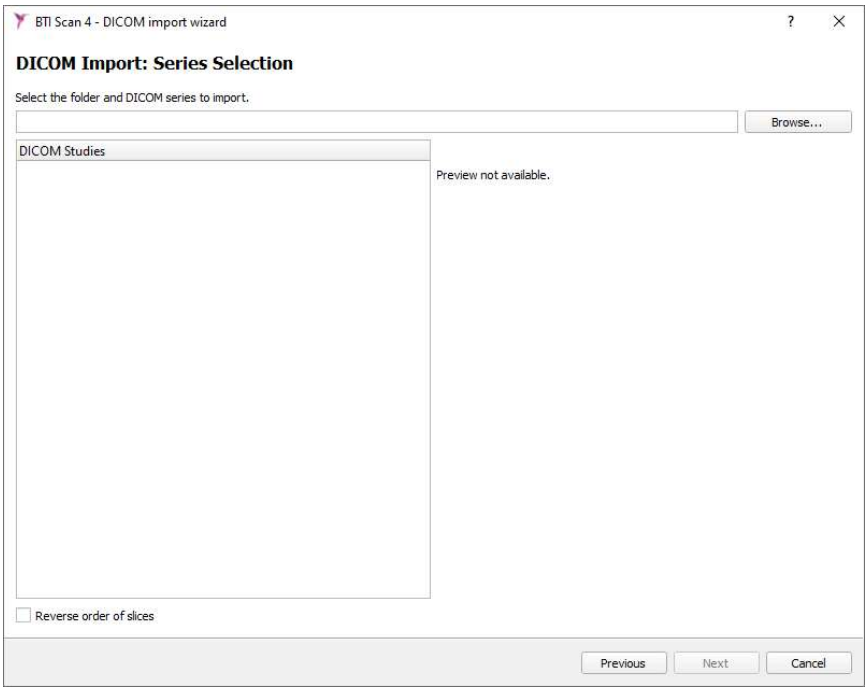
DICOM single frame file collection: SUPPORTED

DICOM single file Multi Frame: Not SUPPORTED

The import process for a study is as follows:

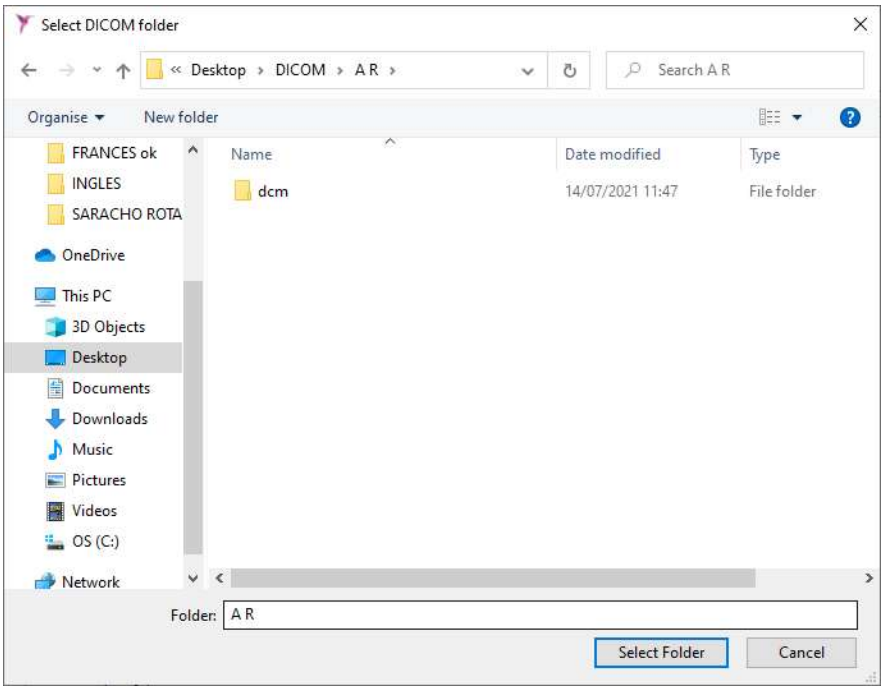
1) Click on the following icon.

2) Click on the button Browse to search for a series.




3) Locate the folder where the DICOM slices are and click on Select folder.

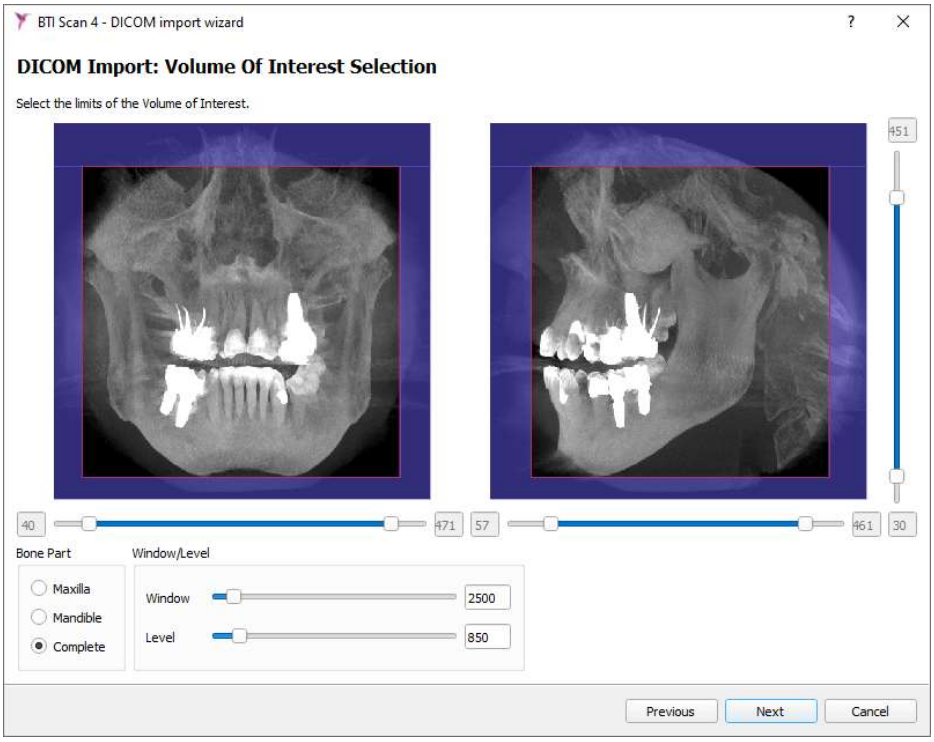
Select the folder my highlighting it and clicking once on “select folder”. Double click on the desired folder will not select it.



4) If the route selected contains studies stored in DICOM format, the different series contained in the study will be listed, in conjunction with a preview of images belonging to each series. Click Next.

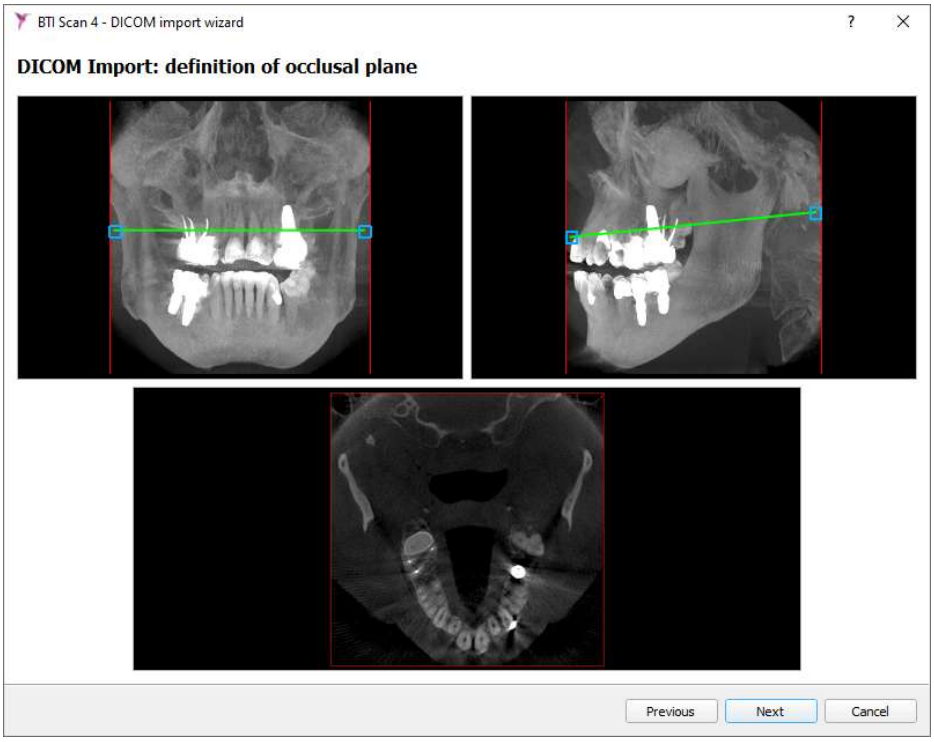
5) Then the projection generated can be seen. To the right of the image there are two vertical sliders ❶ and below each image there are another two horizontal sliders. These controls allow you to select or vertically and horizontally trim a certain region within the volume of images.

   You must also select whether the study refers to a full, upper or lower jaw ❷.




   There is the option of modifying the greyscale of the image ❸. (Window/Level) or (Brightness and contrast)

6) Using the controls ❹ define the occlusal plane and the volume that you wish to trim, then click on Next. With this you can select the volume of interest and redirect and tilt it as you wish, for example to compensate for deviations in the position of the patient when the scan was taken.




⚠ It is advisable to repeat the TAC or CBCT scan with inclinations greater than 30º. If images with inclinations greater than 30º are used, the views and slices obtained may be imprecise.

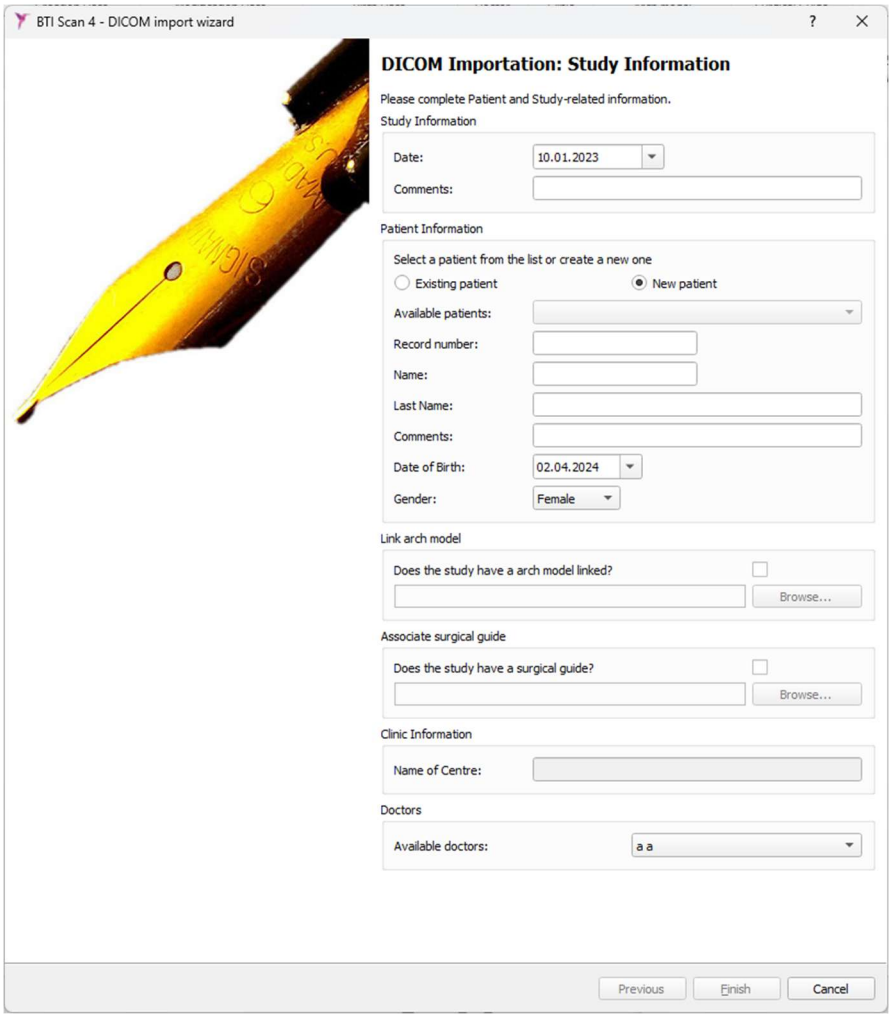
ℹ If the program recognises that some of the images are not valid the CT scan will not be loaded. It will notify that the scanner is not valid.

If the proportion of valid and invalid slices exceeds 20%, BTI SCAN 4 will not load the CT scan and it will deem it invalid.

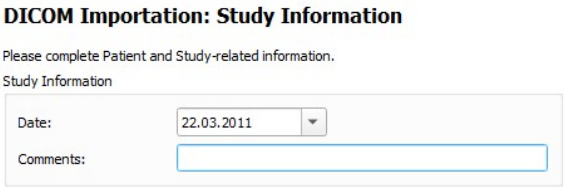
7) Fill in the study data:

- Date of creation and description of the study.
- Patient's personal data.
- Assigned doctor.

ℹ If you cannot import the study, delete the content of the comments field and enter the FIRST NAME and SURNAME with normal characters ❶ (standardised in English).




The DATE field ❶ corresponds to the scan creation date. We advise against changing it. It may be useful to the specialist as it provides the possibility of comparing the scan date and the study start date.




The application does not detect characters such as diereses, exclamation marks or punctuation (¨), (;), (¡). We recommend you use standard English characters when is entering data during the import.

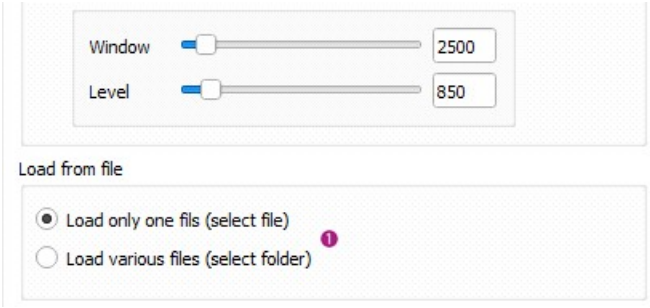
8) Finish the DICOM import by clicking on Finish.

### 6.1.2 IMPORTING STUDIES

To upload a DICOM format study which has been exported or received from a diagnostic centre, follow these steps:

1) Click on the button Import file in the study management window.


This button works differently depending on how the Load files option ❶ is configured (see Section 5.4.2 for further information.

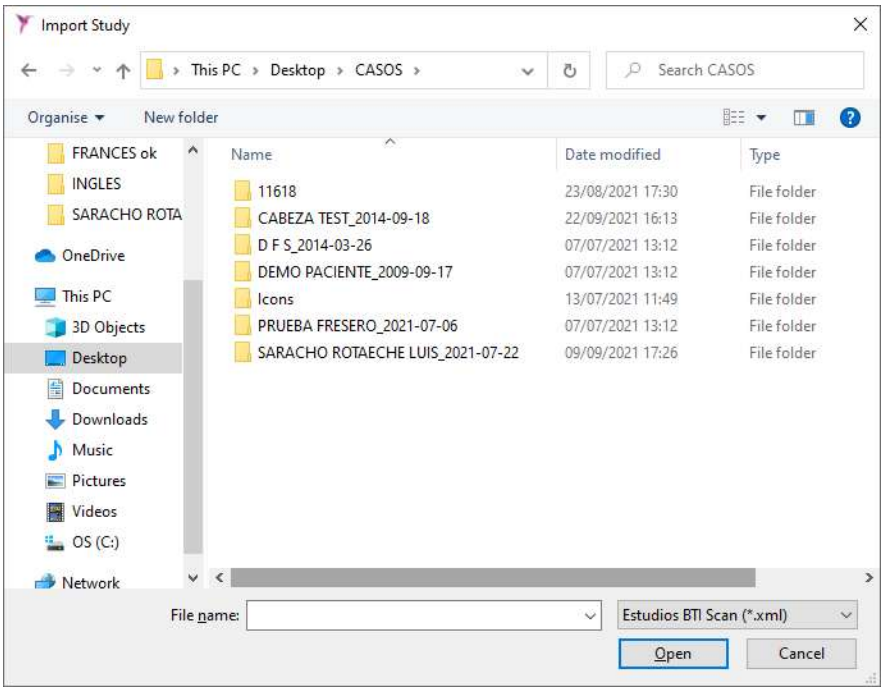



Loading a single study: Search for the study within its corresponding folder.

Loading several studies: Select a folder and all the studies it contain will be loaded (you can also press F12 from the study management screen to carry out the same action)

We recommend copying the studies to the PC memory, although they can also be opened from any external memory or CD reader.

2) Search for the route of where the study to import is located.




BTI SCAN 4 allows you to import studies created in both BTI SCAN II, BTI SCAN 3 (*.xml) and BTI SCAN 4.

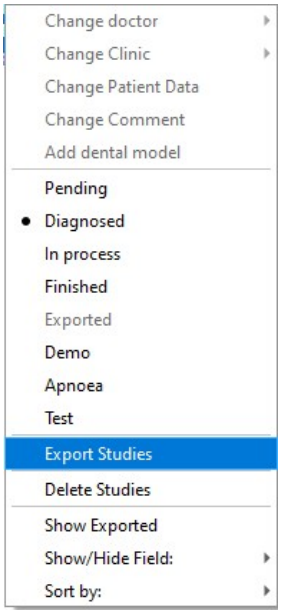
3) Click on "Open". BTI SCAN 4 reads the patient's scanner and adds it to the study list with the status in which it was exported.

### 6.1.3 EXPORTING SELECTED STUDIES

Exporting a study can be useful when you wish to send it to a colleague or referring physician with whom you are collaborating in a diagnosis or treatment plan or simply to free up space on your hard disc.

To export one or more studies, select them and:

1) Click on the button Export a file or right click on the study or studies selected and select Export studies.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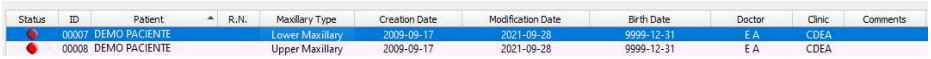
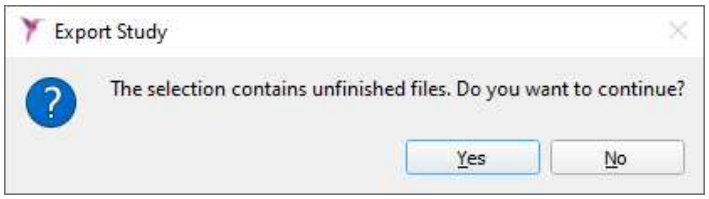
To select more than one study, press Control and left click on the different studies. They will be selected in blue.



| Status | ID | Patient | R.N. | Maxillary Type | Creation Date | Modification Date | Birth Date | Doctor | Clinic | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | 00007 | DEMO PACIENTE | | Lower Maxillary | 2009-09-17 | 2021-09-28 | 9999-12-31 | E A | CDEA | |
| | 00008 | DEMO PACIENTE | | Upper Maxillary | 2009-09-17 | 2021-09-28 | 9999-12-31 | E A | CDEA | |

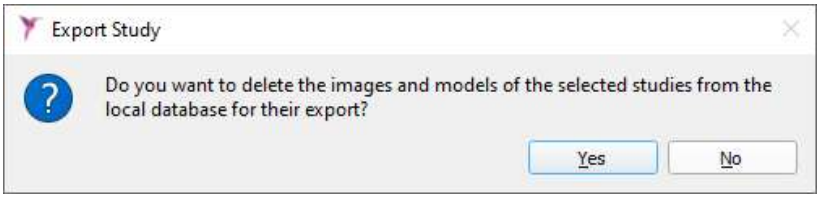
---

If the study to export is not finished confirmation will be requested to continue with the process.




---

2) Select between deleting the images disc (freeing up the available space) or keeping them.

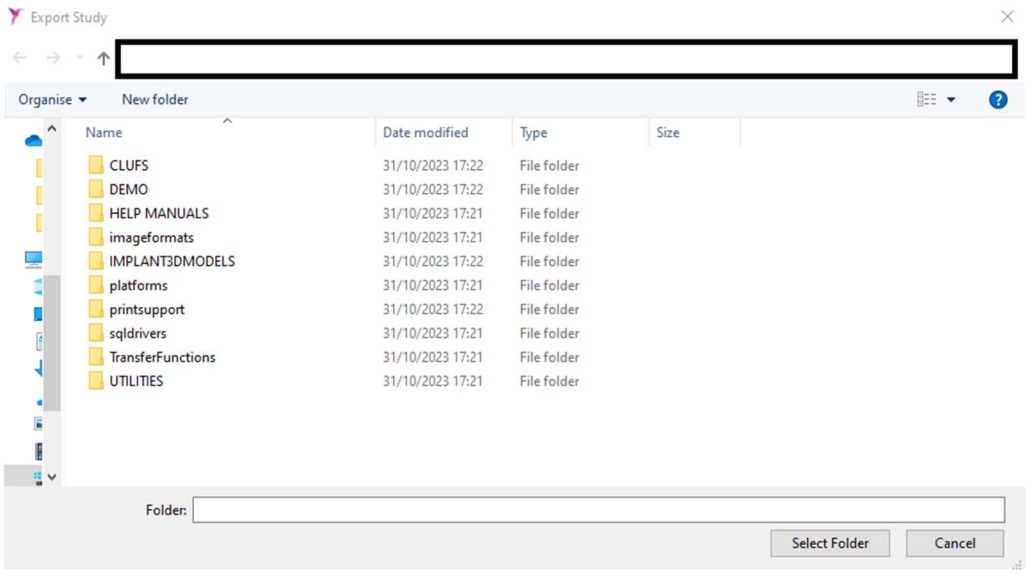


If you delete the images: The study will become an exported study (see section 6.1.4). It will not occupy space in the database.

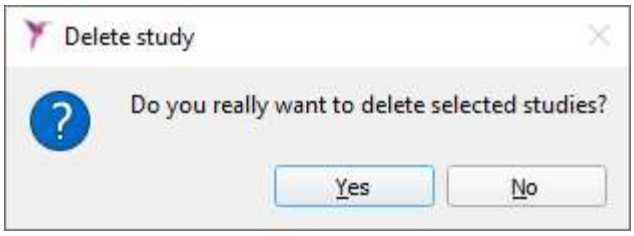
If you do not delete the images: The study will not change status.

These studies can be hidden in the list of studies by right clicking and selecting Hide exported studies.

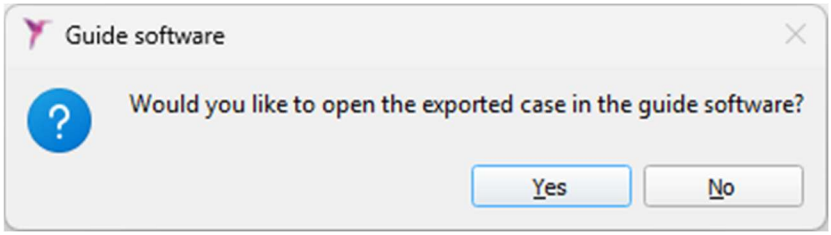

3) Select the path and the folder where you are going to save the study and click on Select folder.




4) Click on OK to finish the export.



5) After exporting a study, it is possible to open the exported case with the BTI guide software, provided that it is also installed on the computer.




⚠ *When exporting a case, the user confirms that the CBCT scanner data and surface scanner data are up-to-date and have sufficient visualization quality for accurate planning. The user agrees to and takes responsibility for marking the dental nerve. They also agree to and take responsibility for the planning performed based on clinical aspects. The user confirms that the selected implant was chosen with consideration of the safety zone with adjacent teeth and the final prosthetic solution. It is acknowledged that the planning performed will not be reviewed by BTI or any of its distributors.*

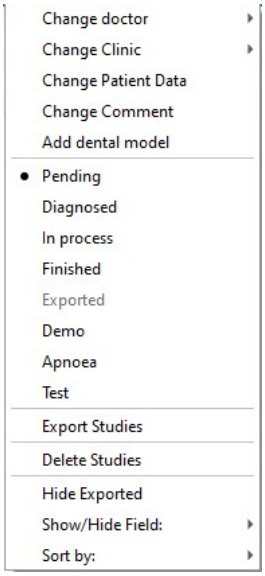
### 6.1.4 DESIGN GUIDE

By clicking on the design guide button, the user will access the guide module where they can design guides for their operations. It is necessary to export a case in order to open it from the guide design module.


For more information on how the guide design module works, please refer to the user manual.

### 6.1.5 STUDY STATUS

A study can go through different statuses. When you right click on a study a context menu appears that allows you to change its status ❶.




The statuses a study can have are the following.

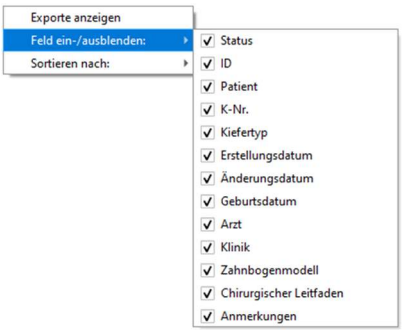
- Pending
- Diagnosed
- Underway
- Finished
- Exported
- Demo
- Apnea
- Test

### 6.1.6 CHANGING THE STUDY DATA

To modify the study data (densitometry settings, doctor name, clinic name, patient's personal data or observations), right click on a study and select the corresponding option in the context menu.

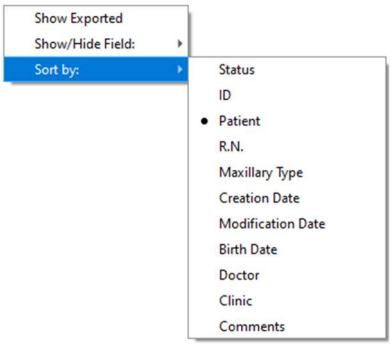
### 6.1.7 SHOW/HIDE FIELDS

Show or hides fields in the list of studies. Right click on the list and select the fields to show/hide.




### 6.1.8 SORT PROJECTS LIST BY…

Sorts the list of studies by the desired field. Right click and select the field to sort.

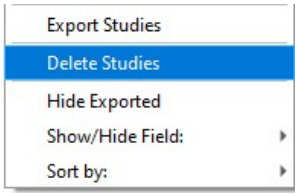



You can sort the list of studies in ascending or descending order by clicking on the column header ❶ (except the Patient column, which will always be in alphabetical order (A → Z)).

| Status | ID | Patient | R.N. | Maxillary Type ❶ | Creation Date | Modification Date | Birth Date |
|---|---|---|---|---|---|---|---|
| | 00005 | 17315 | | Upper Maxillary | 2022-09-21 | 2022-10-03 | 2022-09-21 |
| | 00004 | 17315 | | Lower Maxillary | 2022-09-21 | 2022-10-03 | 2022-09-21 |
| | 00006 | 17342 | | Lower Maxillary | 2022-10-03 | 2022-11-21 | 2022-10-03 |

### 6.1.9 DELETING STUDIES

Select one or more projects from the list of studies, right click on it and select Delete studies. This will delete the images and the study from the hard disc.




Then another window appears to ensure you wish to delete the study selected.

## 6.2 PLANNING STUDIES

A dental CT study is a conventional CT study in that special slices are generated that are useful for the dentist in general and for the implantologist in particular.

To work with a study, double click with the mouse on the line of study you wish to open or select and click on this button.


Studies must be planned on the SLICES or 2D VIEWS. The 3D module is only for visualisation.

Be sure to SAVE the changes made to a study (curve arch, implants, dental nerve) as the program does not perform periodical autosaves. Otherwise, all work carried out will be lost.

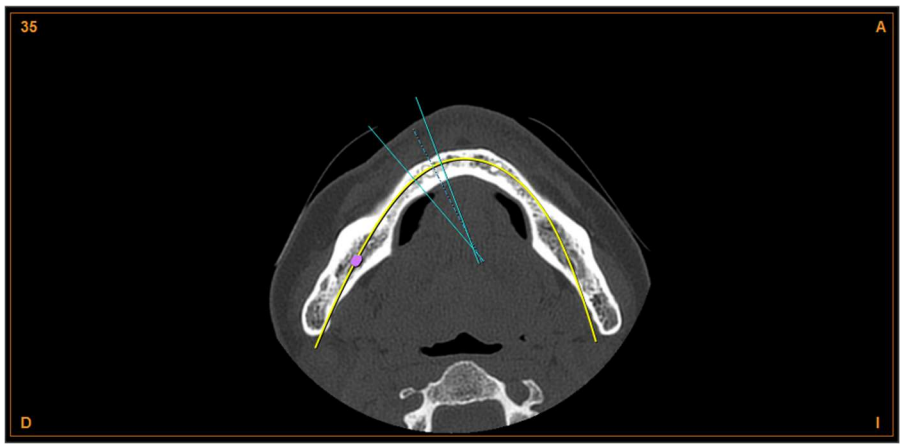
### 6.2.1 TYPES OF SLICES OR SECTIONS USED IN *BTI SCAN 4*

BTI SCAN 4 uses three types of slices: Axial, panoramic, lateral, coronal and sagittal slices:

**Axial slices**

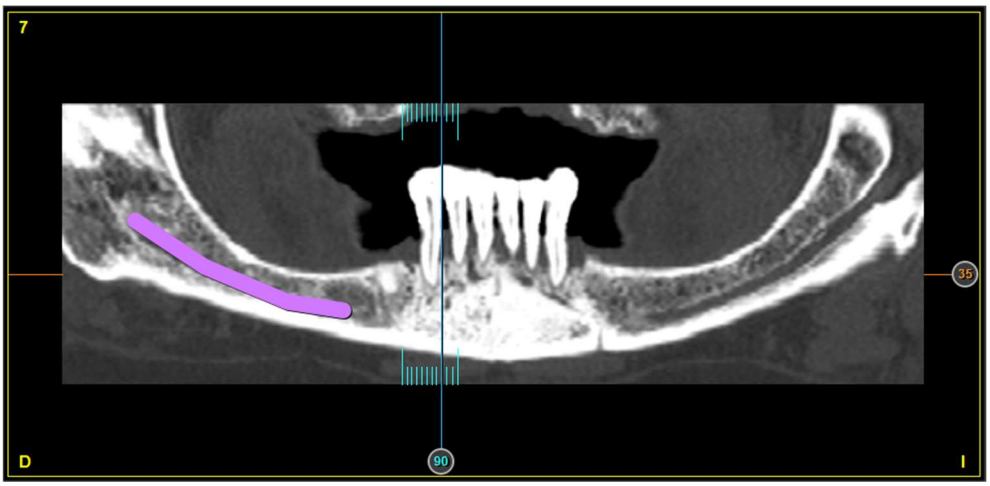
These are slices perpendicular to the axis of the head. These are the slices that that the scanner provides by default. All the other slices are generated from these ones.

The axial slices are numbered starting from the first slice. These slices are equally spaced at a set amount (the distance can vary. In the modern scanners this distance is less than one millimetre, 0.6 or 0.5 mm). The thickness of each slice is also a fixed for all of them.



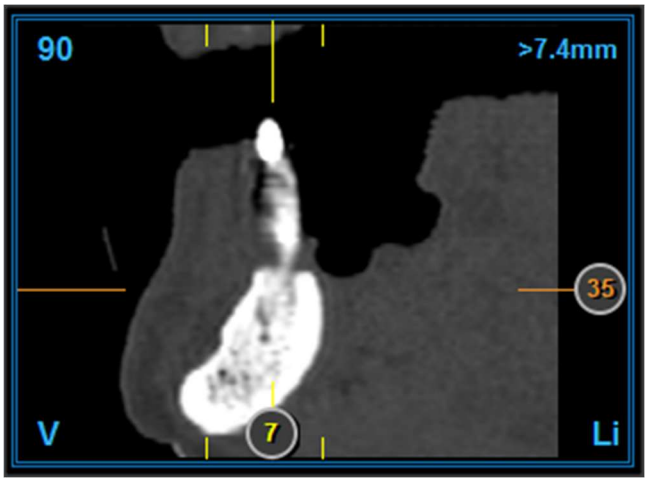
## Panoramic slices

These are slices generated using the axial slices. They are generated using a parabolic curve that extends over the axial slices along all of them. The intersection surface generated is developed as a panorama. The number of slices of this type that are generated are enough to cover the whole bone region of interest. The slices are numbered starting from 1, corresponding to the innermost slice the (most lingual or palatine). These slices are generated by the program and the user has the opportunity to change the number of slices and the distance between them (see section 6.4).



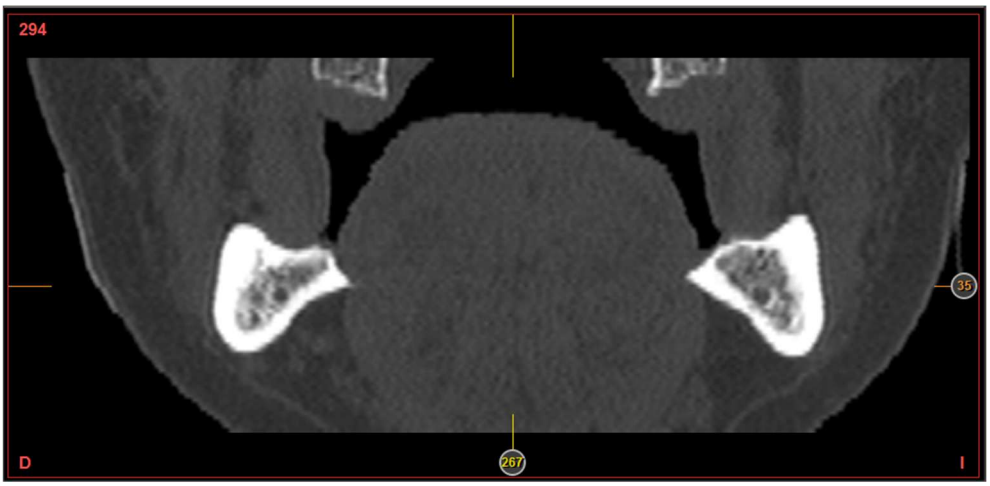

## Lateral slices

These are also slices generated using the axial slices. They are generated using planes perpendicular to the panoramic slices. The number of slices of this type that are generated is determined by the length of the panoramic curve specified in the innermost region (lingual or palatine) and by the desired spacing between the slices. This value, the spacing between lateral slices, can be changed or defined by the user the configuration section (see Section 6.4).

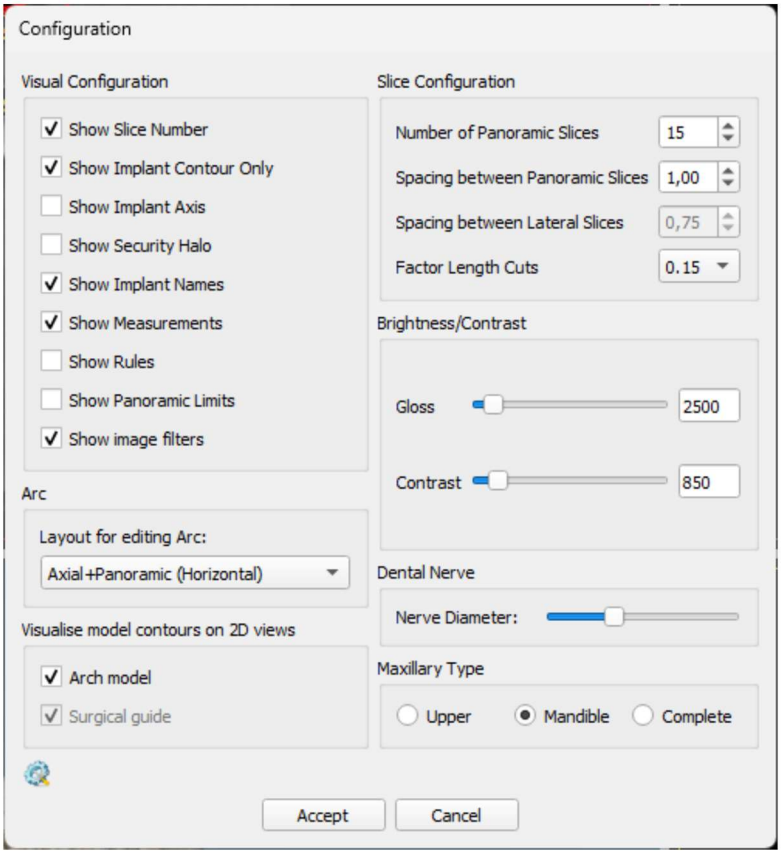


## Coronal slices

These are slices generated from a frontal plane. They are perpendicular to the sagittal plane. The number of slices of this type that are generated are enough to cover the whole region of interest of the bone, to measure the volumes. The slices are numbered starting from 1, corresponding to the most anterior slice (at the front of the image). These slices are generated by the program. The user cannot change the number of slices or the distance between them. It divides the head into the front and rear.

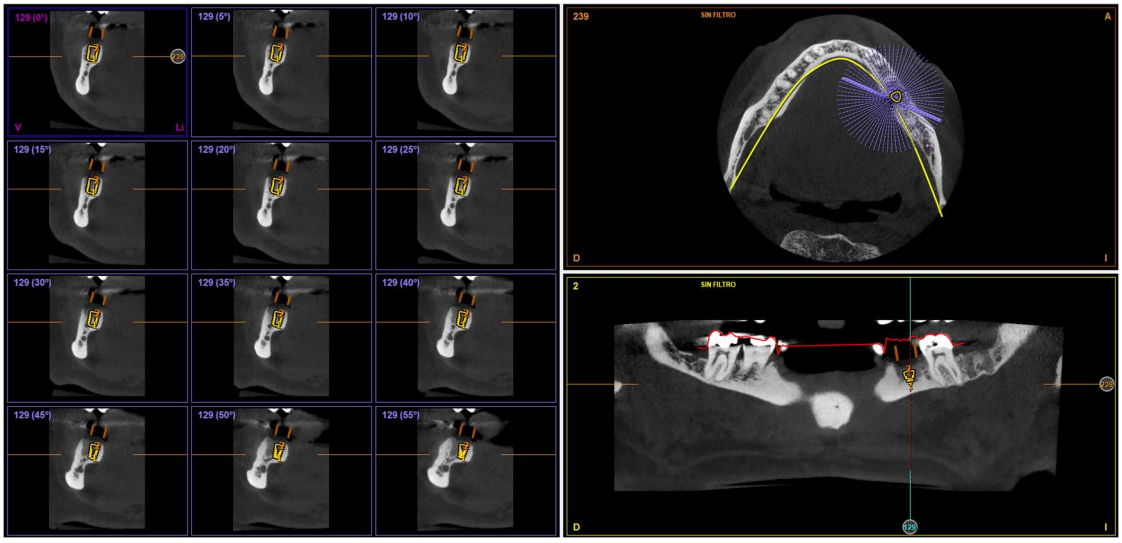



This parameter can only be changed ❶ when the arch curve is being adjusted (see section 6.7)




## Radial slices

These are cross-sections generated from lateral and panoramic cross-sections, their representation is in the Axial. You can modify the interval of degrees that you would like these cross-sections to be carried out in as well as their visualisation, which provides a 360-degree view from a single point.

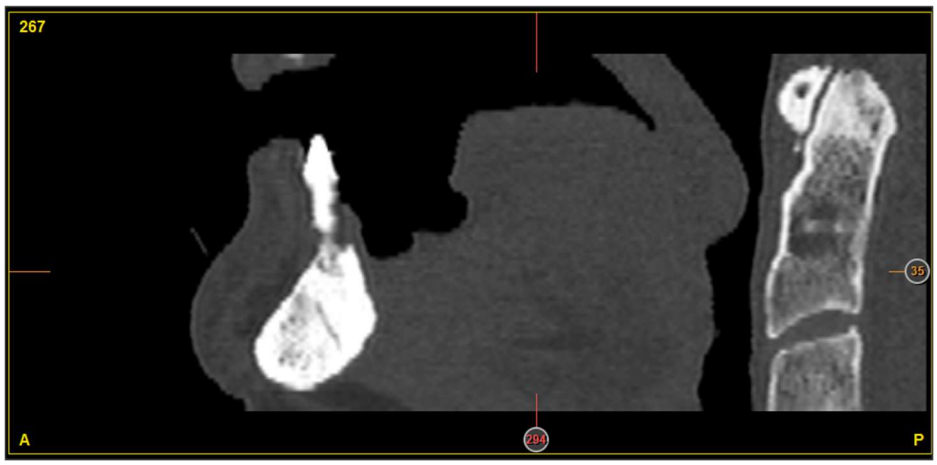


You can move across them (depending on the Angle and of the cross-sections) with the mouse scroller, moving forward and backward.

You can go from the Radial layout to the MultiRadial layout by double clicking on the desired radial cross-section and going back to the previous one.

**Sagittal slices**

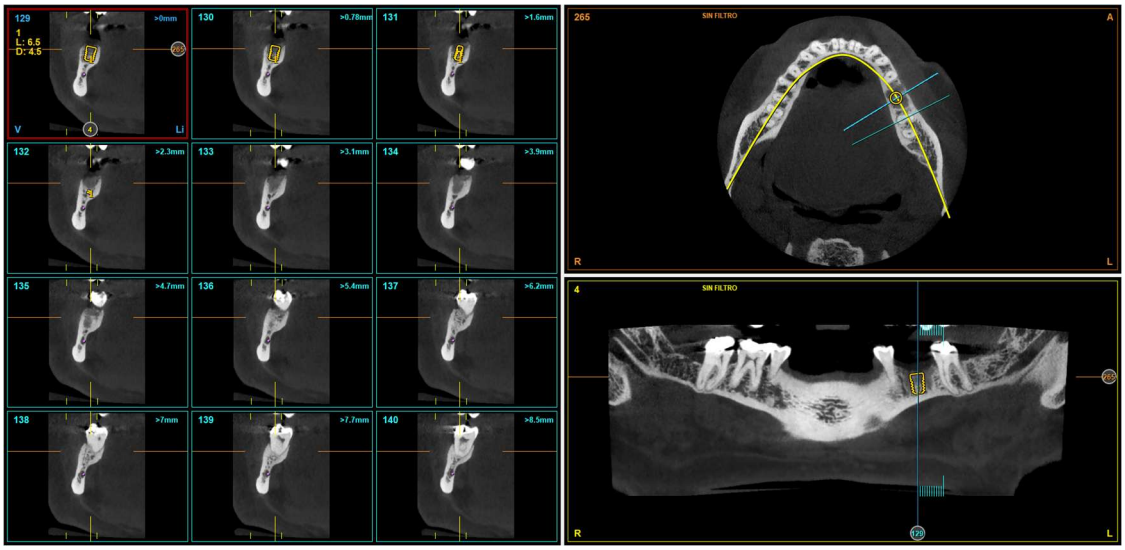
These are slices perpendicular to the ground and the coronal plane. The number of slices of this type that are generated are sufficient to cover the whole region of interest of the bone, to measure the volumes. The slices are numbered starting from 1, corresponding to the slice furthest to the right. These slices are generated by the program. The user cannot change the number of slices or the distance between them. It divides the head into the right and left.




### 6.2.2 ACTIVE LATERAL SLICES

Without doubt, the lateral slices are the most important for planning implant placement. This why more operations can be carried out on these than on any others.

Of all these slices one of them can be active (selected). If you left click on any of the lateral slices you will see that a double framework is created over it. Similarly, a vertical line is drawn on the panoramic slice and another on the axial indicating that this sectional slice is selected and its position is marked.



### 6.2.3 IDENTIFYING THE REGION DISPLAYED. REFERENCES BETWEEN THE DIFFERENT TYPES OF SLICE

In each type of slice the program BTI SCAN 4 displays marks to indicate which slices of the other types are displayed. Several possible cases are explained below.

In the following axial slice, three straight lines appear in sky blue that indicate which region of lateral slices is being displayed:

- The first solid line corresponds to the first sectional slice viewed in the upper left or lower right (depending on which way around it is).
- The second solid line corresponds to the last sectional slice viewed in the lower right or first (depending on which way around it is).
- The third line, between the first two and dotted, corresponds to the sectional slice active at that moment.
- The upper left corner shows the number of axial slice displayed.
- The following panoramic slice shows a vertical sky blue line that indicates the region of lateral slices that is being displayed. Similarly, orange horizontal lines (with the slice number) appear that indicate the axial slice that is being displayed.

The coronal and sagittal slices show a line along the edges of each image referring to the slice that is displayed in the axial, sagittal and coronal slices respectively.

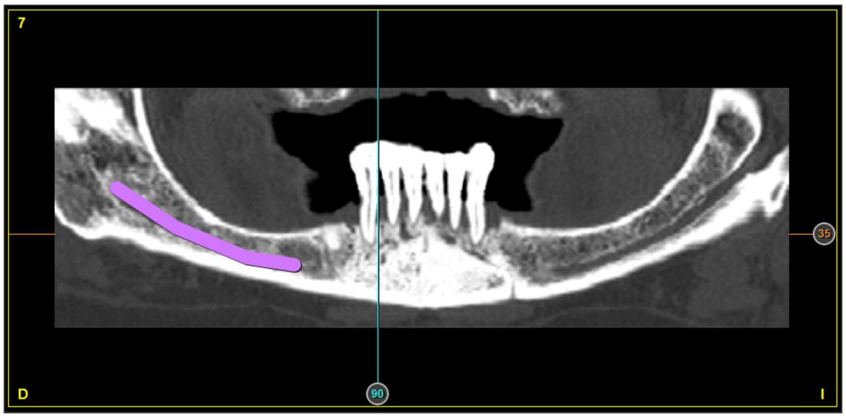
### 6.2.4 NAVIGATING THROUGH A VOLUME

BTI SCAN 4 allows you to change the slices viewed, in other words, move to other regions, which is called Navigating through the volume. There are two ways of navigating or browsing the region displayed: Quick mode and precise mode:

**Quick navigation mode**

This consists of moving the cursor over the marks of the slices that you wish to move or change. Once the cursor is on top of these marks, the cursor changes shape (it changes from a cross to a hand). Now click and move the mouse to the area to be viewed. Once there you can release the mouse button.

It is also possible to quickly navigate between slices moving the mouse through the view while the SHIFT key is pressed, this make the other views to be centred in the point selected with the mouse.




**Precise navigation mode**

There are two ways to use the precise navigation mode: With the keyboard and with the mouse:

- With the keyboard (except views F3, F4, F5 and F6)

  Left arrow and right arrow keys: Move in the lateral slices one slice to the right or one slice to the left, respectively. (When you hold down the shift key it moves in groups of 12 slices).

  In the case of radial slices, the slice is shifted by 5º in the indicated direction.

  Up arrow and down arrow keys: Move in the panoramic slice one slice towards the vestibular or one slice towards the lingual or palatine respectively (when you press the keys up arrow and down arrow + shift the axial slices are moved).

- With the mouse:

  If the mouse has a wheel, you can change the slice displayed quickly and accurately. It is the easiest way to do it, so we recommend you purchase a mouse of this type, if you do not have one, to work more comfortably with BTI SCAN 4.

  Changing the slice is very simple. Place the cursor on the slice (axial, panoramic, coronal, sagittal, radial or any of the lateral slices displayed) and move the mouse wheel.

## 6.3 FUNCTIONS OF THE TASK BAR

When you access a study a toolbar appears, from which the majority of the program options are accessed.


g

## Study

Exit: You can return to the study management window with the option of saving or not saving the changes made up to then.

Save: Saves the changes made.

Print study: See section 6.11.

Configuration: Accesses the configuration options. See section 0.

## Views

All the views you can use in BTI SCAN 4 are the following:


1 lateral, 1 axial and 1 panoramic view (hotkey F1).

1 lateral, 1 axial 1 3D, and panoramic view (hotkey F2).

1 3D view (hotkey F3)

1 axial, 1 coronal and 1 sagittal view (hotkey F4)

1 axial, 1 coronal, 1 sagittal and 1 3D view (hotkey F5)

1 axial view and 1 sagittal view (hotkey F6)

1 lateral view and 1 3D view (hotkey F7).

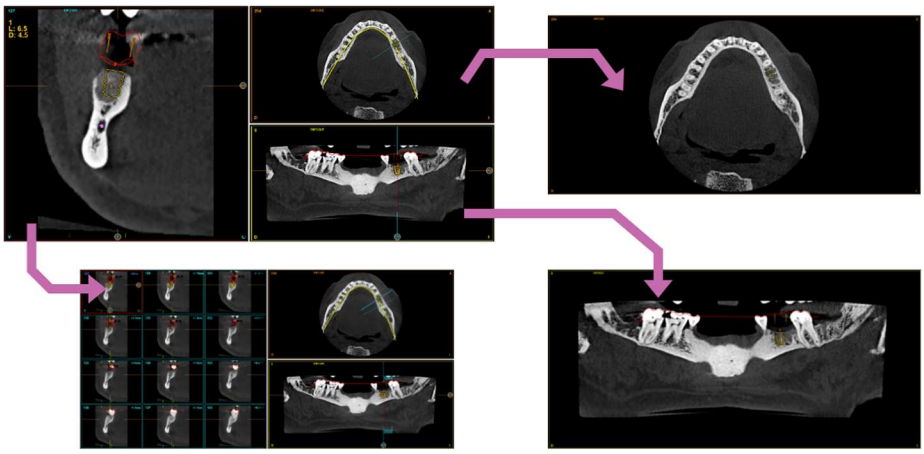
1 lateral, 1 3D and the demonstration table (hotkey F8).

1 3D, 1 panoramic, 1 axial and 2 radial views (hotkey F9).

1 3D, 1 panoramic, 1 axial and 2 radial views (hotkey F9).

1 radial, 1 axial and 1 panoramic view.

Double click with the left button on any slice maximise the image and generate a new view.



Double click again to return to the original view.

## Tools

False colour: Changes the view of the slices from black and white to colour to view the bone structures, soft tissues, etc. better.

Adjust arch: Erases the current arch curve and assigns a new one. See section 6.7.

Implant density data: Access the list of implants and view the density data. See section 6.9.8.

Matrix of favourite implants: Shows the complete list of implants (see Section 6.9.12).

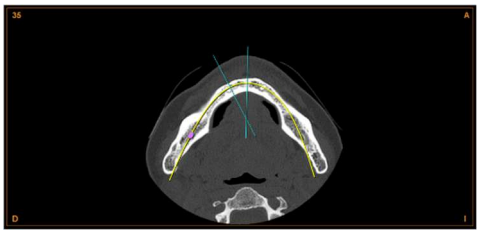
Dimensions: Shows the measurement options offered by BTI SCAN 4.

Align model: Allows you to modify the alignment of the linked 3D models.

This means that you can add or remove 3D models.

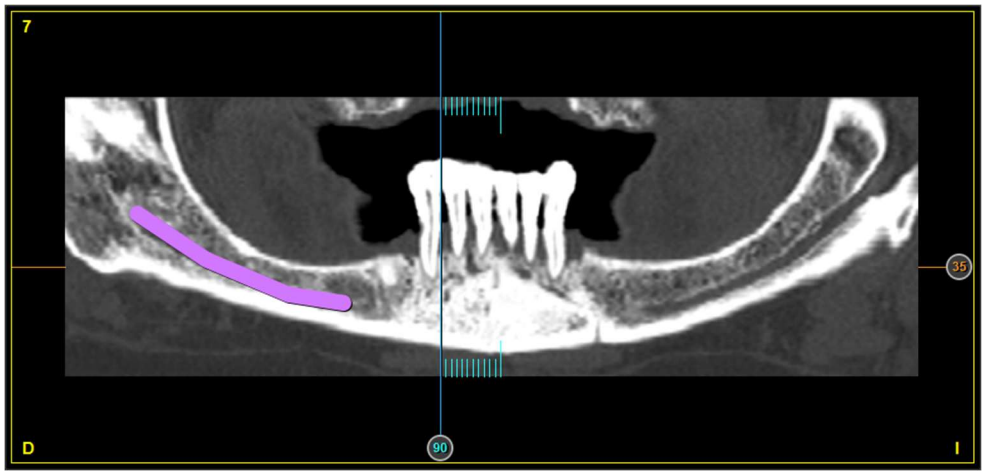
The zoom is deactivated if the user changes the view.

## Example views

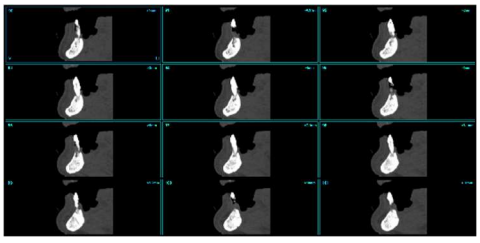


Axial view

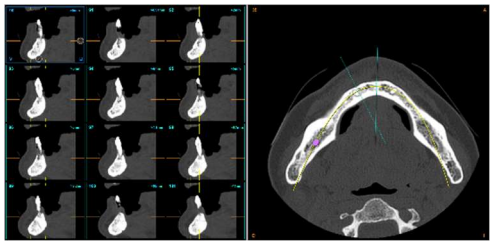

Lateral view



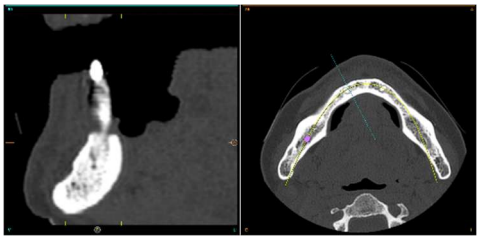

Panoramic view



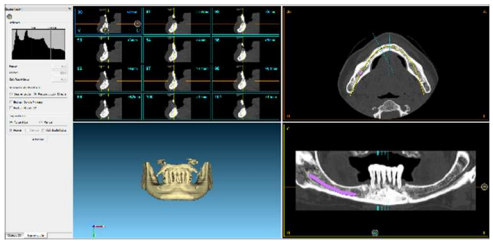
Multilateral view



Multilateral + axial view



Lateral + axial view



Multilateral + 3D + axial + panoramic view

### 3D model

An arch model or a surgical guide can be added in STL or PLY format and subsequently aligned within BTI SCAN.

At least 3 pairs of points are required for registration between the model and the CBCT, 3 points in the CBCT, and others in the model.

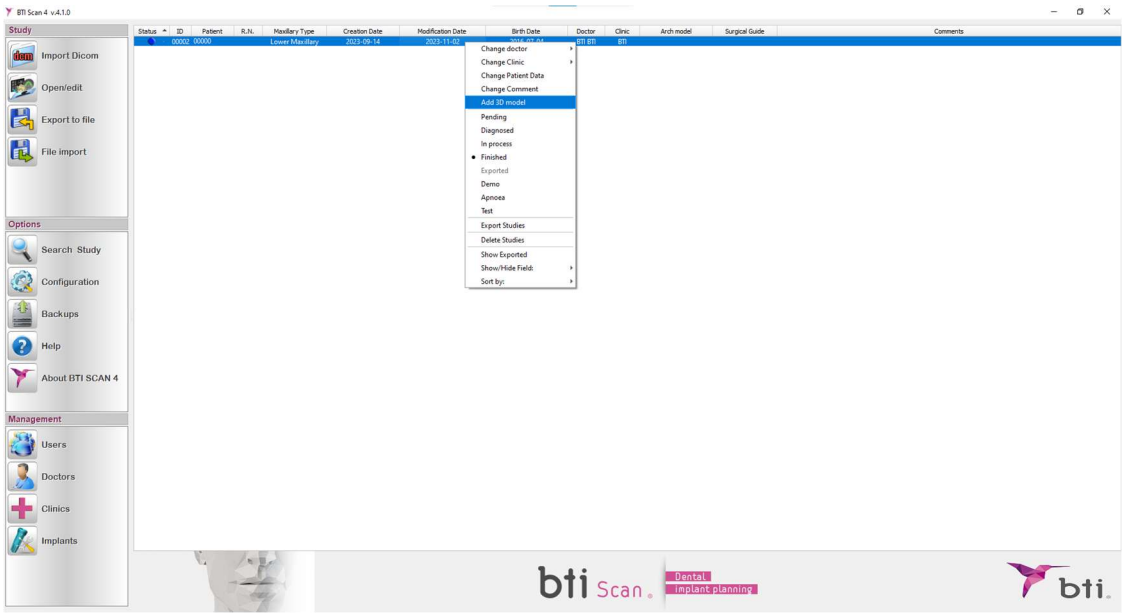
## Add 3D model

This option will only appear if the study has no linked 3D model.

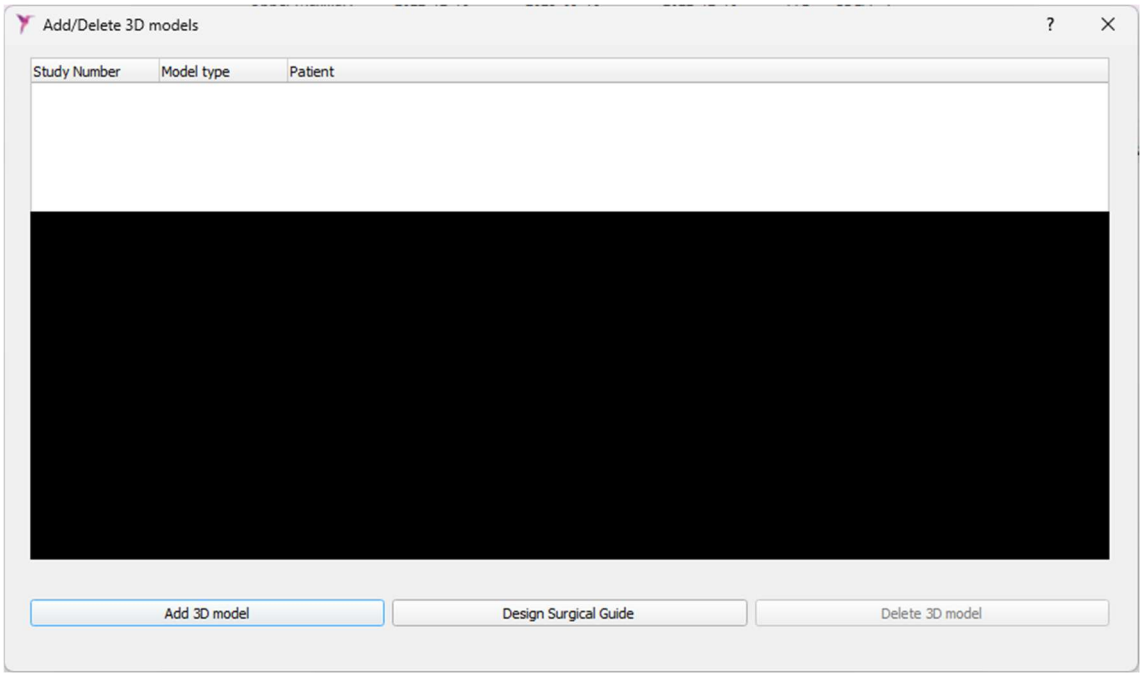
The option to associate a dental model to a case in STL or PLY format will appear on the main screen.

Choose the case and click on it with the right mouse button.

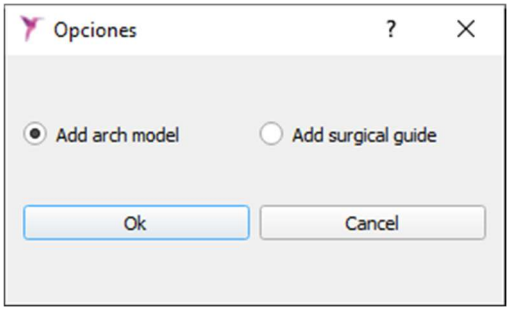
Select the *Add 3D model* option:



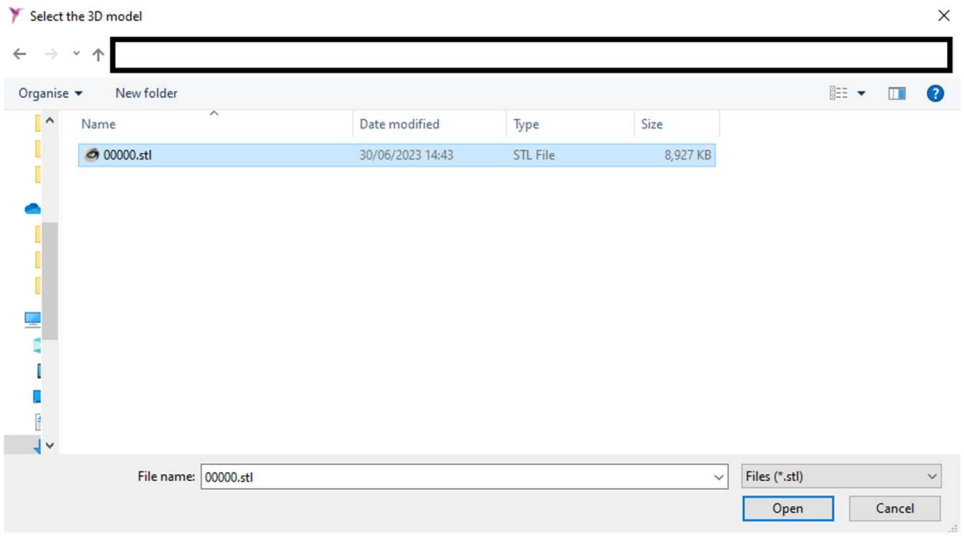
Once selected, the following option appears:




Here, the following window will open by using the 'Add 3D model' button:

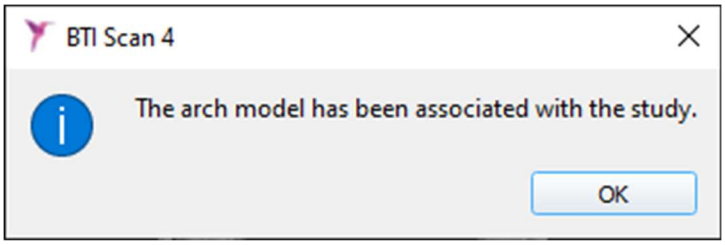


Use this window to choose whether to add an arch model or a surgical guide by selecting either of the two options and then the OK button.

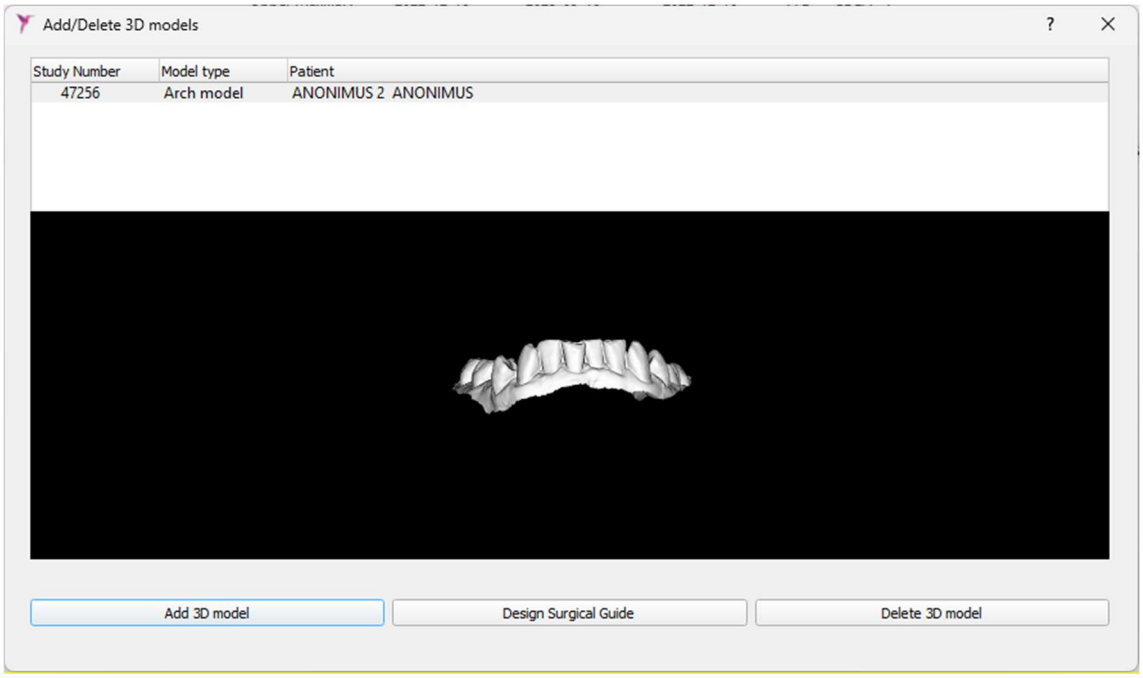



Select the path where the model to associate is located.

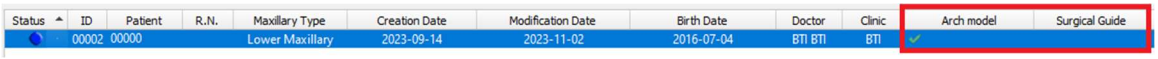
Click on OK.



Finally, confirmation will then be displayed in the 3D model window that it has already been linked to the patient.




The surgical guides are automatically aligned when linked to the study. Arch models must be manually aligned.



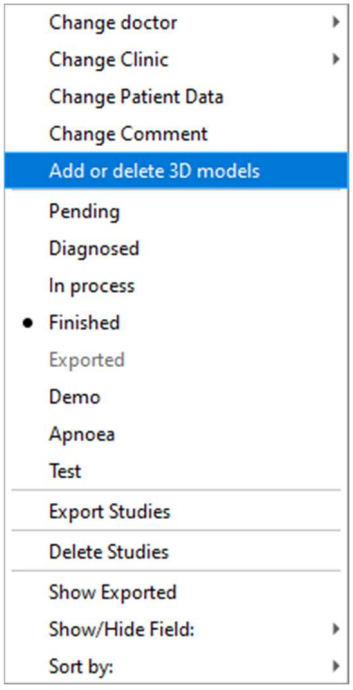

A tick in the corresponding column will show that the study has a linked arch model and a surgical guide.

Only one model and one surgical guide can be linked to a study. Two studies (one for each type) must be created in order to work on both the upper and lower arches in the same CBCT.

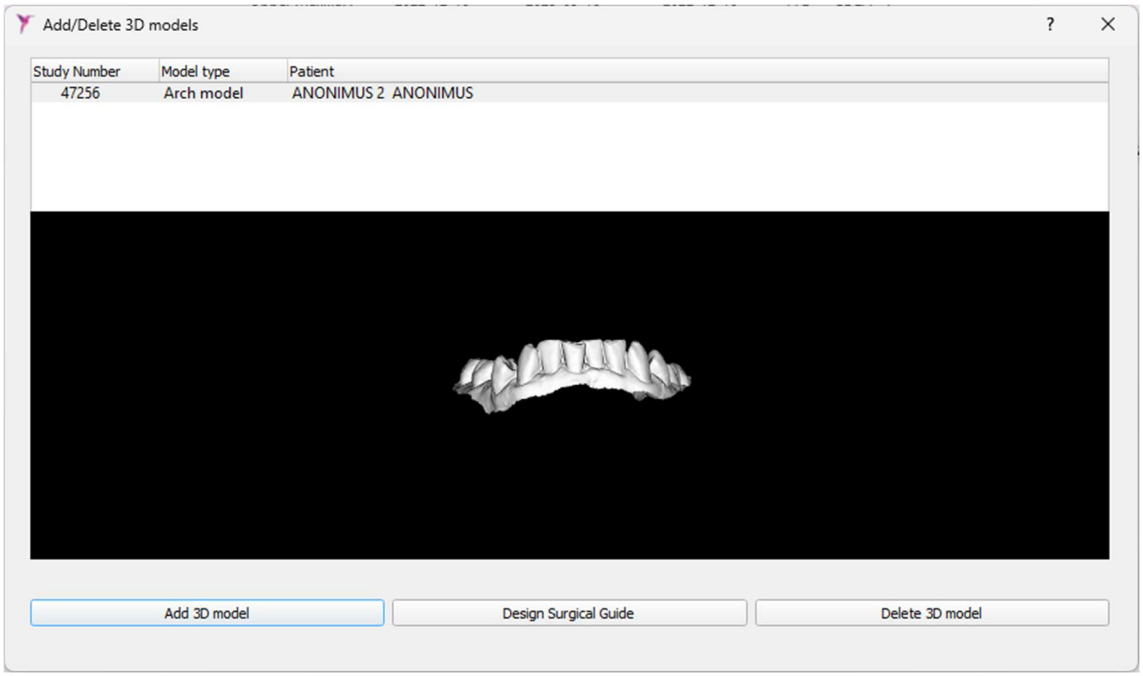
## Change or delete 3D model

This option will only appear if the model already has a linked 3D model.

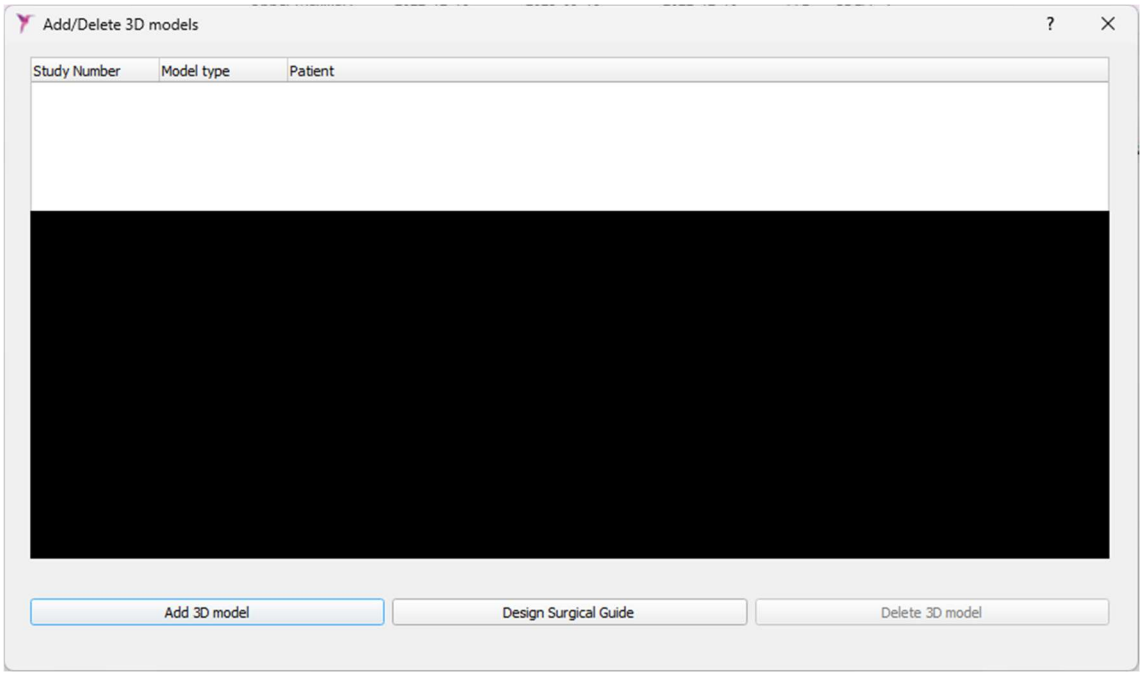
Allows to delete and/or change the 3D model via the same window used to add a new one.




To delete the added 3D model, select the one you want to delete and then the 'Delete 3D model' button.




The 3D model will be deleted.

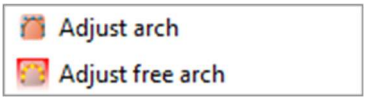



The window to add, delete and modify 3D models can be accessed using the  button within a study.

## Align 3D model

Open a case and click the button.

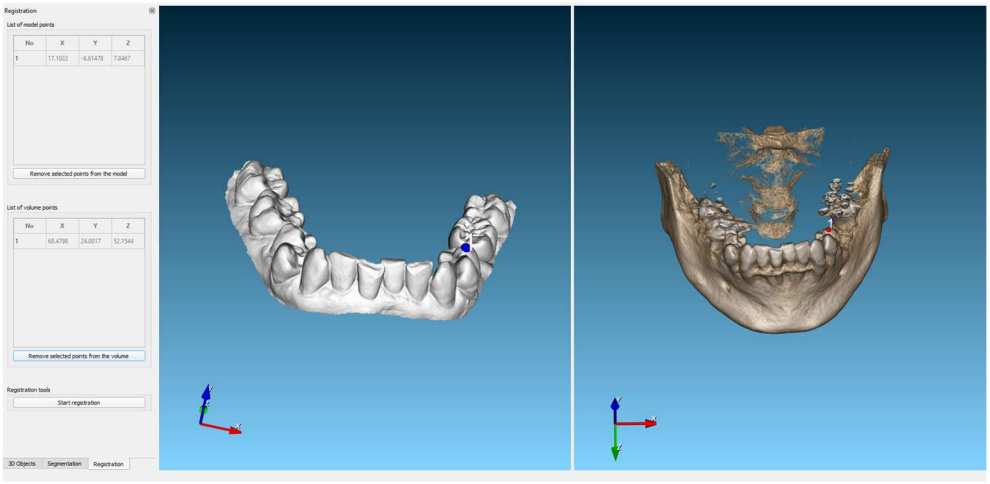
Select to align an arch model or a surgical guide. The surgical guides are automatically aligned when linked to a study, but the possibility of manual alignment is offered.



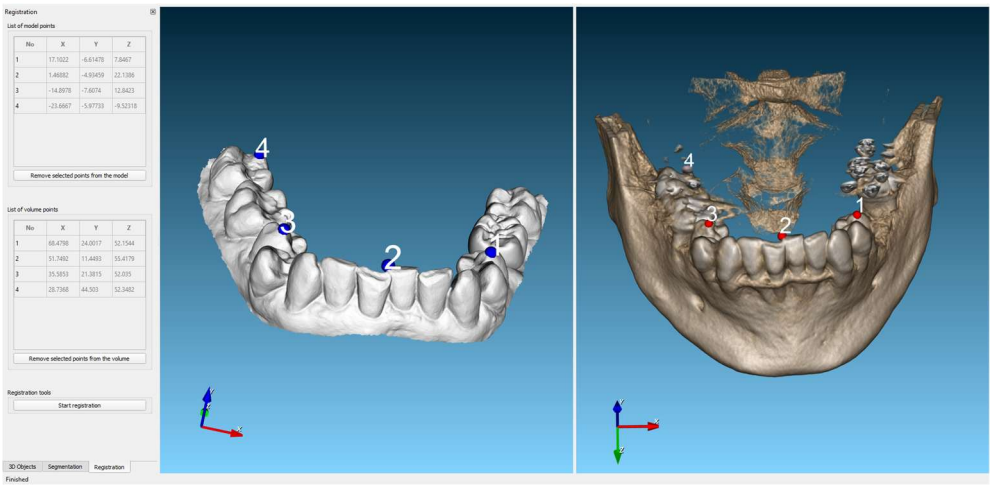

Once in the case, register the model that is in front of the scanner. To do this, proceed to generate junction points in both.

## Add points

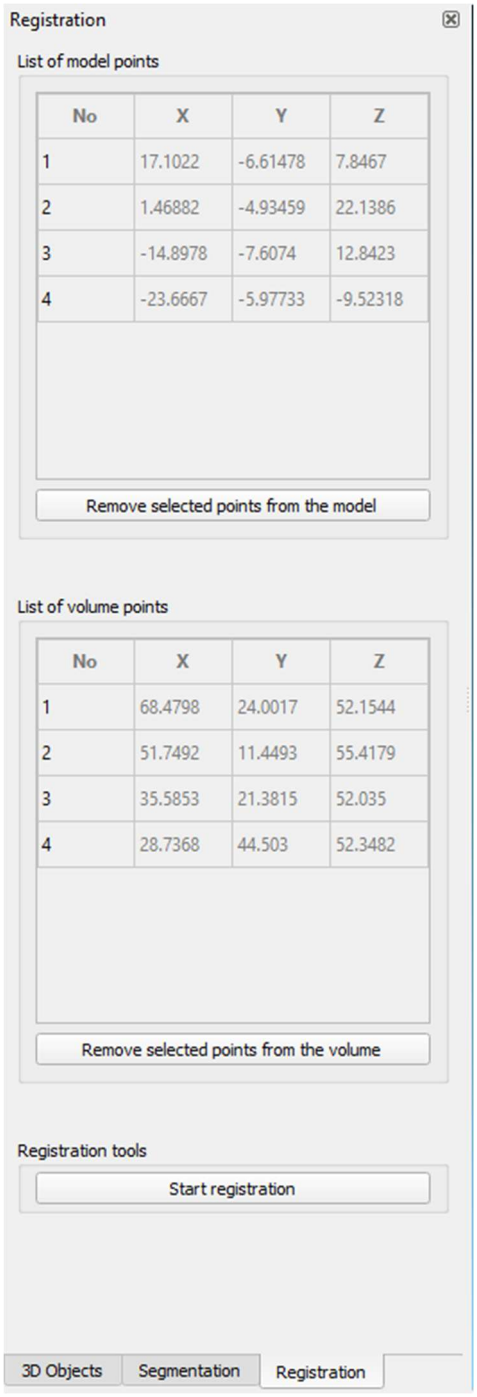
To add a point, click with the middle mouse button on the 3D model and on the volume of the CBCT. The program will use the points to overlay the two images, so make sure that they are correctly aligned.



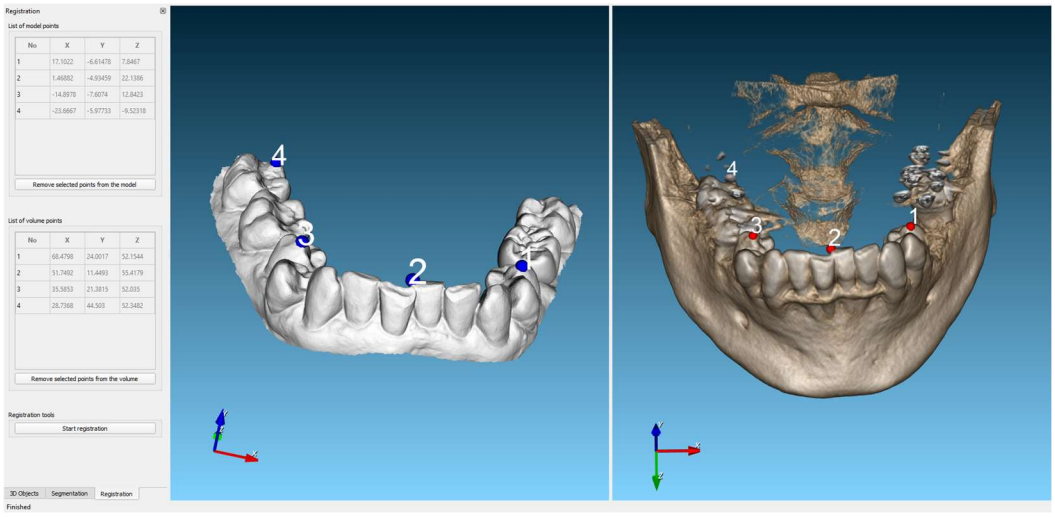
The process should be repeated until there are at least 3 points in each image. The points are automatically placed on the surface of the volumes and can be moved by holding the left mouse button and dragging to the desired position. There should be the same number of points in both images.



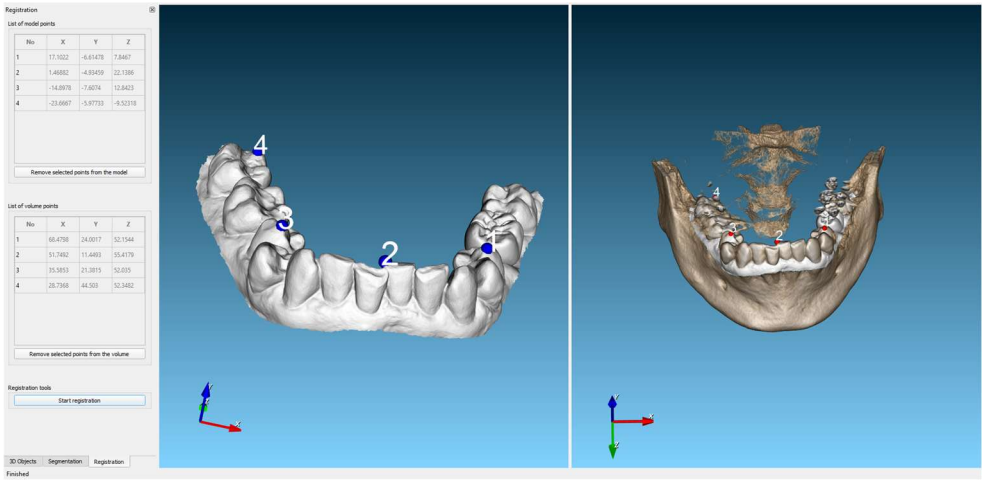
The added points are displayed in the tables on the left-hand side of the screen. It is possible to delete any of them. To do so, select one or more points in the table and press the 'Remove selected points from the model' button at the bottom of the table (in the case of the arch model or the surgical guide) or the 'Remove selected points from the volume' button (in the case of the CBCT volume). It is possible to modify the position of the points by dragging them with the left mouse button from any of the 3D views.



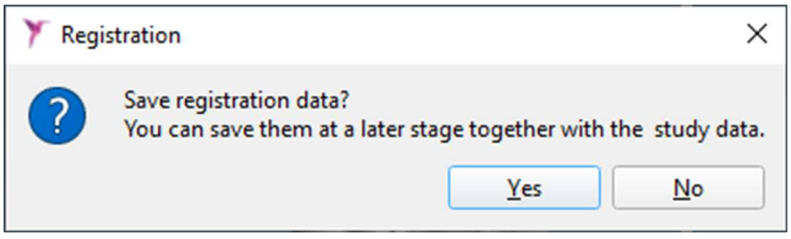

Once the same points have been selected in the CBCT and in the model, the points are registered and aligned by clicking on the 'Start alignment' button.



Once finished, the 3D model will be overlaid on the volume of the CBCT, displaying the result.



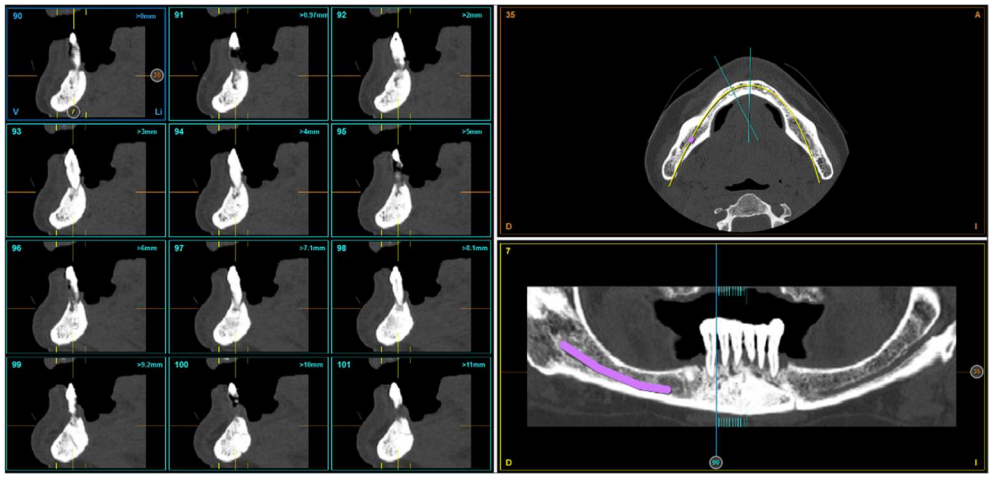
To exit, click on the alignment button again and a message will appear asking if you want to save the changes.




### 6.3.1 FUNCTIONS OF THE RIGHT-HAND MOUSE BUTTON ON THE VIEWS

Right click to drop down a context menu for various actions. This menu varies depending on the view you are clicking on:

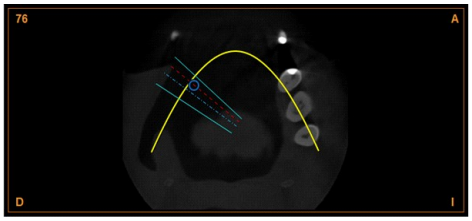
## Context menu for lateral/multilateral view



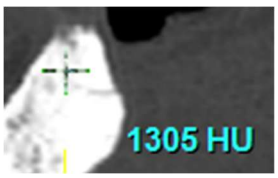
| | | |
|---|---|---|
| | *Add implant by default* | Adds an implant measuring 13 mm long and 3.75 mm in diameter (If the matrix *All* or *BTI favourites* is selected. See section 6.9.12). |
| | *Add implant from database* | Adds an implant of the desired length and family (see Section 6.9.1). |
| | *Mark dental nerve* | Activates the mark dental nerve function (see Section 6.8). |
| | *Measure distance* | Activates the distance measurement function (see Section 6.6.1). |
| | *Measure angle* | Activates the angle measurement function (see Section 6.6.1). |
| | *Measure area* | Activates the area measurement function (see Section 6.6.1). |
| | *Modify brightness/contrast* | Modifies these parameters. To do this, hold down the left mouse button and:<br>• Mover from left to right to increase or decrease the contrast.<br>• Mover from top to bottom to increase or decrease the brightness. |
| | *Select/deselect sectional slice* | Selects or deselects the desired sectional slice. (also called lateral) |
| | *Move to the first slice* | Places the desired slice as the first slice in the view. |
| | *Invert slice direction* | Inverts the direction of the slices. |
| | *Previous page (SHIFT + LEFT)* | (Function activated in multilateral view only). Lets you see the previous 12 sections of the current view. |
| | *Previous section (LEFT)* | Moves to the previous section. |

| | | |
|---|---|---|
| | *Next page (SHIFT + RIGHT)* | (Function activated in multilateral view only). Lets you see the next 12 sections of the current view. |
| | *Next section (RIGHT)* | Moves to the next section. |
|  | *Show/hide density value* | Shows or hides the density value in all the views. |
| | *Screenshots* | Makes a screenshot of what you are viewing on the display and saves it to the hard disc. |

**Context menu on axial view**

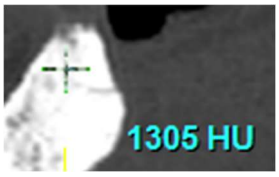



| | | |
|---|---|---|
| | *Measure distance* | Activates the distance measurement function (see Section 6.6.1). |
| | *Measure angle* | Activates the angle measurement function (see Section 6.6.1). |
| | *Measure area* | Activates the area measurement function (see Section 6.6.1). |
| | *Measure volume* | Activates the volume measurement function (see Section 6.6.1). (Only in F4) |
| | *Modify brightness/contrast* | Modifies these parameters. To do this, hold down the left mouse button and:<br>• Mover from left to right to increase or decrease the contrast.<br>• Mover from top to bottom to increase or decrease the brightness. |
| | *Previous axial slice (SHIFT + DOWN)* | Moves to the previous slice. |
| | *Next axial slice (SHIFT + DOWN)* | Moves to the following slice. |
| | *Show/hide density value* | Shows or hides the density value in all the views. |
| | *Hide arch curve* | Shows or hides the arch curve in the axial view. |

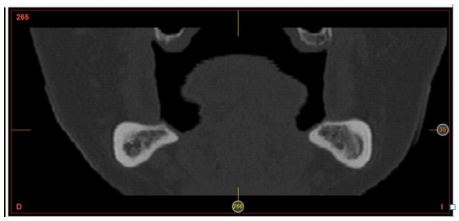


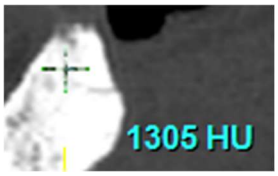
| | | |
|---|---|---|
| | *Screenshots* | Makes a screenshot of what you are viewing on the display and saves it to the hard disc. |

**Context menu on panoramic view**


| | | |
|---|---|---|
| | *Add Implant* | Adds an implant measuring 13 mm long and 3.75 mm in diameter (if the matrix *All* or *BTI favourites* is selected. See section 6.9.12). |
| | *Add implant from database* | Adds an implant of the desired length and family. |
| | *Mark dental nerve* | Activates the mark dental nerve function. |
| | *Measure distance* | Activates the distance measurement function. |
| | *Measure angle* | Activates the angle measurement function (see Section 6.6.1). |
| | *Measure area* | Activates the area measurement function (see Section 6.6.1). |
| | *Modify brightness/contrast* | Modifies these parameters. To do this, hold down the left mouse button and:<br>• Mover from left to right to increase or decrease the contrast.<br>• Mover from top to bottom to increase or decrease the brightness. |
| | *Previous arch curve (DOWN)* | Moves to the previous arch curve. |
| | *Next arch curve (UP)* | Moves to the next arch curve. |
| | *Show/hide density value* | Shows or hides the density value in all the views.<br>  |
| | *Screenshots* | Makes a screenshot of what you are viewing on the display and saves it to the hard disc. |

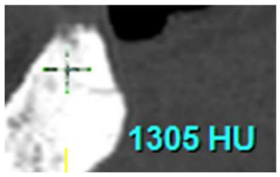
## Context menu on coronal view



| | | |
|---|---|---|
| | *Measure distance* | Activates the distance measurement function (see Section 6.6.1). |
| | *Measure angle* | Activates the angle measurement function (see Section 6.6.1). |
| | *Measure area* | Activates the area measurement function (see Section 6.6.1). |
| | *Measure volume* | Activates the volume measurement function (see Section 6.6.1). (Only in F4) |
| | *Modify brightness/contrast* | Modifies these parameters. To do this, hold down the left mouse button and:<br>• Mover from left to right to increase or decrease the contrast.<br>• Mover from top to bottom to increase or decrease the brightness. |
| | *Previous axial slice (SHIFT + DOWN)* | Moves to the previous slice. |
| | *Show/hide density value* | Shows or hides the density value in all the views.<br>  |
| | *Screenshots* | Makes a screenshot of what you are viewing on the display and saves it to the hard disc. |

## Context menu on sagittal view

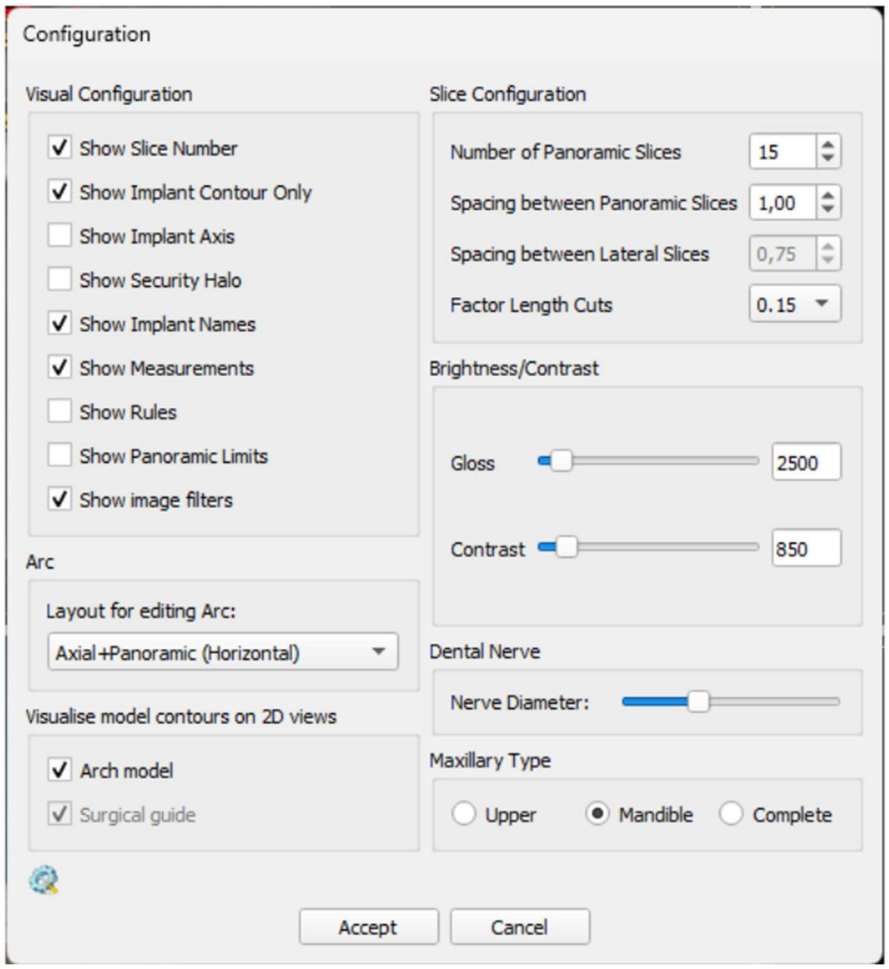
| | | |
|---|---|---|
| | *Measure distance* | Activates the distance measurement function (see Section 6.6.1). |

| | | |
|---|---|---|
| | *Measure angle* | Activates the angle measurement function (see Section 6.6.1). |
| | *Measure area* | Activates the area measurement function (see Section 6.6.1). |
| | *Measure volume* | Activates the volume measurement function (see Section 6.6.1). (Only in F4) |
| | *Modify brightness/contrast* | Modifies these parameters. To do this, hold down the left mouse button and:<br>• Mover from left to right to increase or decrease the contrast.<br>• Mover from top to bottom to increase or decrease the brightness. |
| | *Previous axial slice (SHIFT + DOWN)* | Moves to the previous slice. |
| | *Show/hide density value* | Shows or hides the density value in all the views.<br>  |
| | *Screenshots* | Makes a screenshot of what you are viewing on the display and saves it to the hard disc. |

## 6.4 CONFIGURATION OPTIONS (CONFIGURATION WITHIN A STUDY)

In a study, click on the Configuration button on the task bar.


This window is structured in several sections:




**Visual configuration**: Modify parameters related to visual issues of the application. Shows or hides:

- The numbering of the axial, lateral and panoramic slices
- The contours of the different implants
- The axis of the implants
- The safety halo of the implants
- The name of the implants
- The measurements taken in the program
- The rules in the different slices In millimetres (mm)
- The limits of the panoramic slice

**Arch**: Selects the predetermined view when the arch curve is edited. These are:

- Axial
- Axial + Panoramic (Horizontal)
- Axial + Panoramic (Vertical)

**View model outlines in 2D**: Select which 3D models you want to display over the 2D views. These options are only available if the models have been previously assigned and aligned:

- Arch model: Draws the outline of the model in red.
- Surgical guide: Draws the outline of the guide in blue.

**Configuration of slices**: Modifies parameters related to the number and distance of the different slices:

- Number of panoramic slices: By default 15. The more slices, the higher the quality of the composition.
- Spacing of panoramic slices: This separation is, by default 1 mm and may vary between 0.10 and 3 mm.
- Spacing of lateral slices: Establishes the distance between the lateral slices.

- Side cut length factor: Changes the length of the side cuts. Depending on the value selected, they become longer or shorter, the default value is 0.15. The value should never exceed the specified limits. Otherwise, a warning is issued and the original status is restored

Some Slice configuration options can be disabled depending on whether you are adjusting the arch curve and if the change might affect the dental nerve.

**Brightness/Contrast:** Adjusts the greyscale of the image.

**Dental nerve**: Modifies the diameter of the dental nerve. By default it is 1 mm.

**Type of maxilla**: Determines the type of maxilla with which you are working (upper, lower, complete).

In the complete maxilla, no adaptation of the arch curve or implants can be planned, since it is designed to see anatomical structures that cannot be seen separately in a lower and upper jaw, such as airways, occlusion, etc.

## 6.5 ZOOM

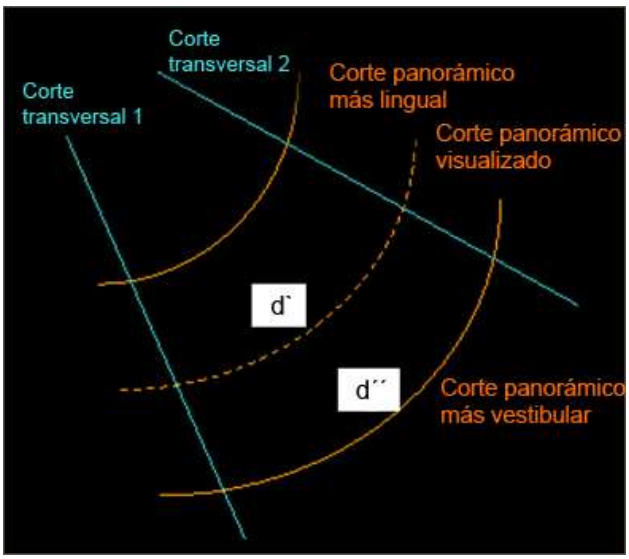
It is possible to zoom in on any of the views. To zoom in on a view, simply place the cursor over it and roll the mouse wheel while holding down the CTRL key.

It is possible to reset the view to the initial form by double left-clicking on the zoomed view.

## 6.6 MEASUREMENTS

All the distances and measurements viewed are expressed in millimetres.

The lateral slices are generated using the most lingual or palatine parabola, perpendicular to it and equally spaced at a distance predefined at the radiology centre that sent the CT scan but that can be configured by the odontologist. This distance is usually 0.75 mm although can even be 0.1 mm. The following drawing shows the geometry of these slices.

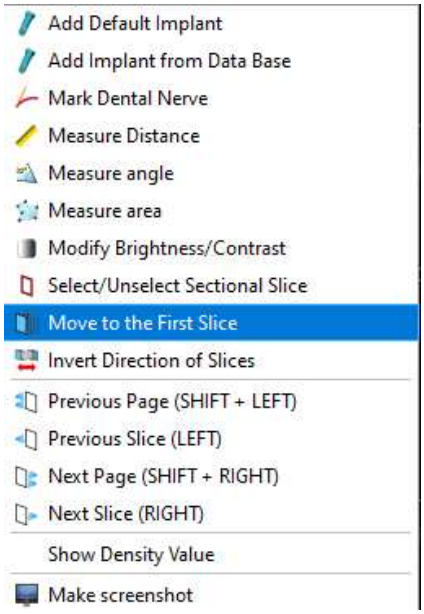



The distance between lateral slices varies according to the panoramic curve that follows, in other words, according to the panoramic slice it is in. For this reason, and to provide the odontologist with greater accuracy, BTI SCAN 4 indicates the distance between the lateral slices in the panoramic slice that is displayed at all times.

To take a measurement:

- Navigate to the Multilateral view (see Section 6.3) by double-clicking on a lateral view. Twelve lateral slices will be displayed.. In the upper part right of each sectional slice, in green, some numbers are shown. In the first slice >0 mm ❶ is shown, in other words, this slice is marked as the origin of the coordinates. In the other slices the distance will be indicated between the initial slice and the current one.

- If this slice is not the one you wish to have the reference to, right click on in the desired slice and select the option Move to the first slice.




This data is very valuable because in implantology the implants are placed at a distance certain with respect to references (teeth, other implants, guides, etc.).

### 6.6.1 ADDING A MEASUREMENT

The degree of accuracy of the measurements provided by BTI SCAN 4 is determined by the resolution of the imported image and by the resolution of the user's screen. Taking into account the variability in the cursor positioning by the user,

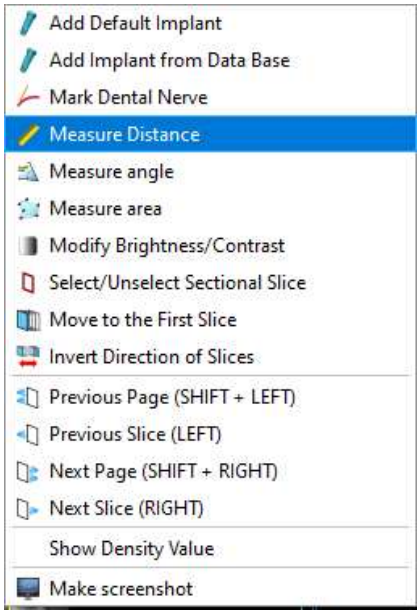
BTI SCAN 4 provides measurements with an accuracy greater than 95% (the relative error for the distance, area and angle is less than 5%) The better the image quality, the greater the accuracy of measure obtained by BTI Scan 3.

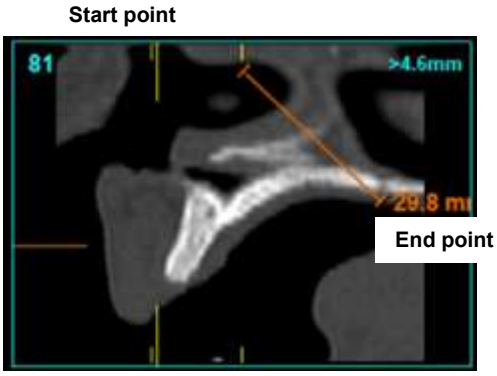
BTI SCAN 4 lets you take distance measurements in any of the five types of slices (axial, panoramic and sectional). Nevertheless, you must indicate in which slice you wish to measure. Therefore, the first step is to place the cursor on the slice on the slice you wish to measure.

To measure a distance:

1) Select the option Measure distance from the right-click menu in any view or from the button 'Measurements' located in the upper left corner of the study editor.

2) Select the origin of the distance by clicking on the image. Move the cursor to the destination point of the image and click again. We can see how the distance is marked by a segment in orange and its numerical value in mm.

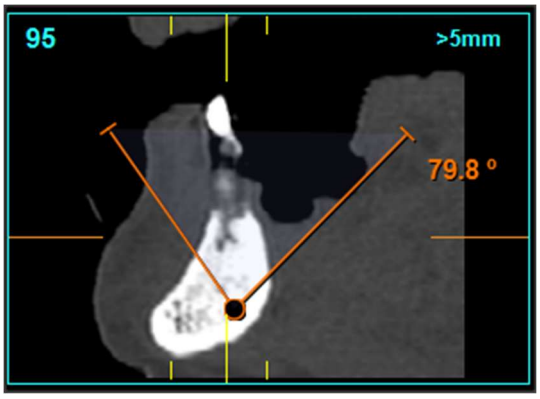



To create an angle:

1) Select the option *Measure angle* from the right-click menu in any view or from the button 'Measurements' located in the upper left corner of the study editor.

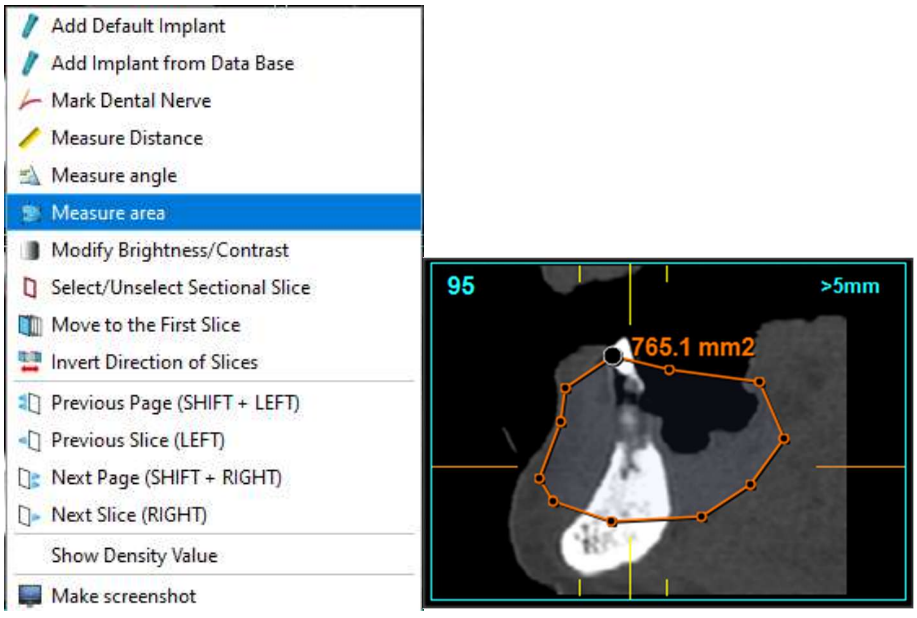
2) Select the first of the three points that will form the angle clicking on the image. Move the cursor to the second point that will be the vertex of the angle and click again. Move the cursor to the third point of the angle and click again. You can see how the angle is delimited by two sectors in orange that join at the vertex of the angle and its numerical value in degrees (°).




To create an area:

1) Select the option *Measure area* from the right-click menu in any view or from the button 'Measurements' located in the upper left corner of the study editor.

2) Select the first point that will delimit the area by clicking on the image. Move the cursor to the next point and do so successively until the area is delimited, clicking again on the first point selected. This point can be recognised as it is bigger than the others. You can see how the area is delimited by sectors in orange that come together and with the numerical value of this in $mm^2$.



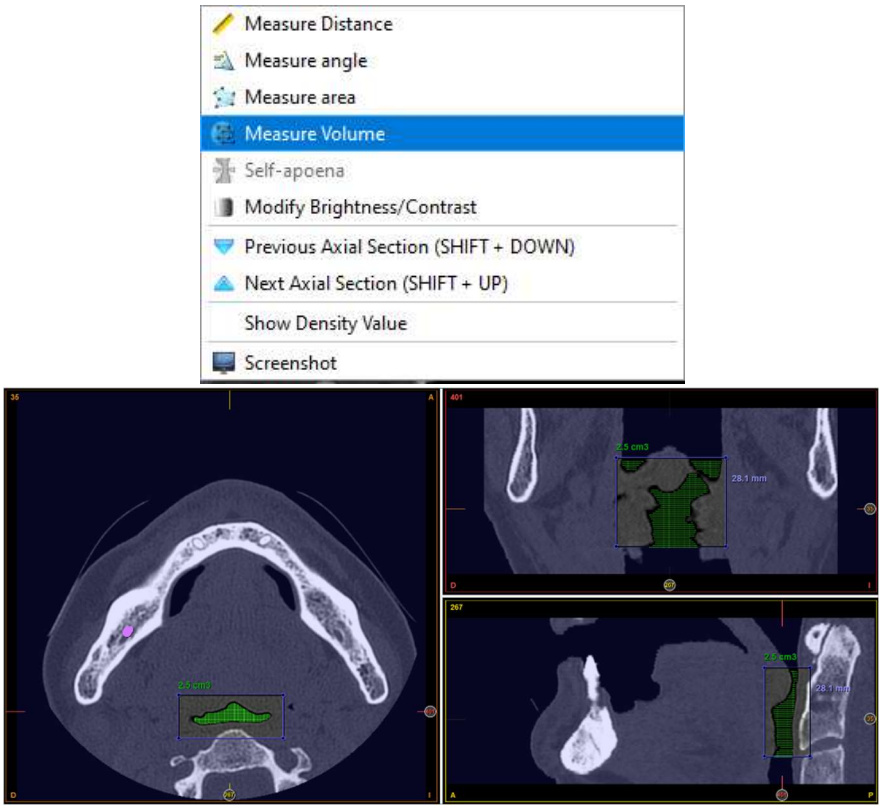

To measure a volume:

1) After select the view F4 (Axial + coronal + sagittal), choose the option Measure volume from the right-click menu in any view or from the button 'Measurements' located in the upper left corner of the study editor.

2) Select the first point that will delimit the volume by clicking on any of the three images, axial, coronal or sagittal. Thus mark the top left point of the polygon that delimits the area in that view Move the cursor and you will see how the one area is deployed. Now you will have to click to determine the bottom right of this area.

3) At the same time, areas have been created in the other two views. These area by default will have a height of 30 mm. These areas can be modified until the area for which you want to calculate the volume is covered.

4) Finally, click inside the area selected in a point of the area of the volume to calculate. The volume measured will appear marked in green, with its numerical value in $cm^3$.

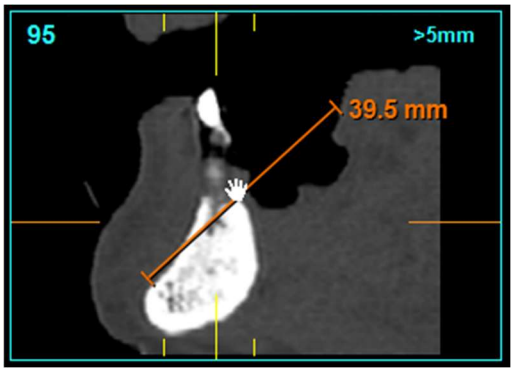



The accuracy of the value of the volume is above 80% provided the images taken with the scanner are of an acceptable quality. The better the image quality, the greater the accuracy of volume obtained by BTI SCAN 4.

If in the configuration menu the option Show measurements is not active, measurements can be made but they will not be shown on the screen.

### 6.6.2 MOVING A MEASUREMENT

Pass the cursor over a measurement (distance, angle, area and volume). The cursor changes shape (hand). Left click. Hold it down while dragging.




Passing the cursor over the measurement can also change the cursor to the hand with the index finger extended, a signal that instead of moving will modify the measurement.

### 6.6.3 DELETE A MEASUREMENT

Pass the cursor over a segment (distance, angle, area or volume), right click and select delete.

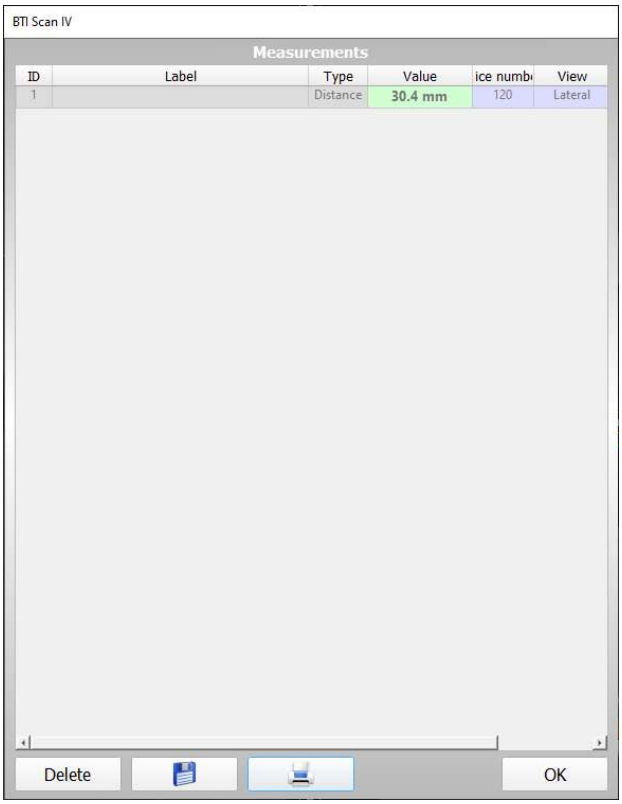

### 6.6.4 LIST OF MEASUREMENTS

Select the option *List of Measurements* from the menu that drops down when you right click when passing the cursor over the measurement or from the button 'Tools' located in the upper left corner of the study editor.

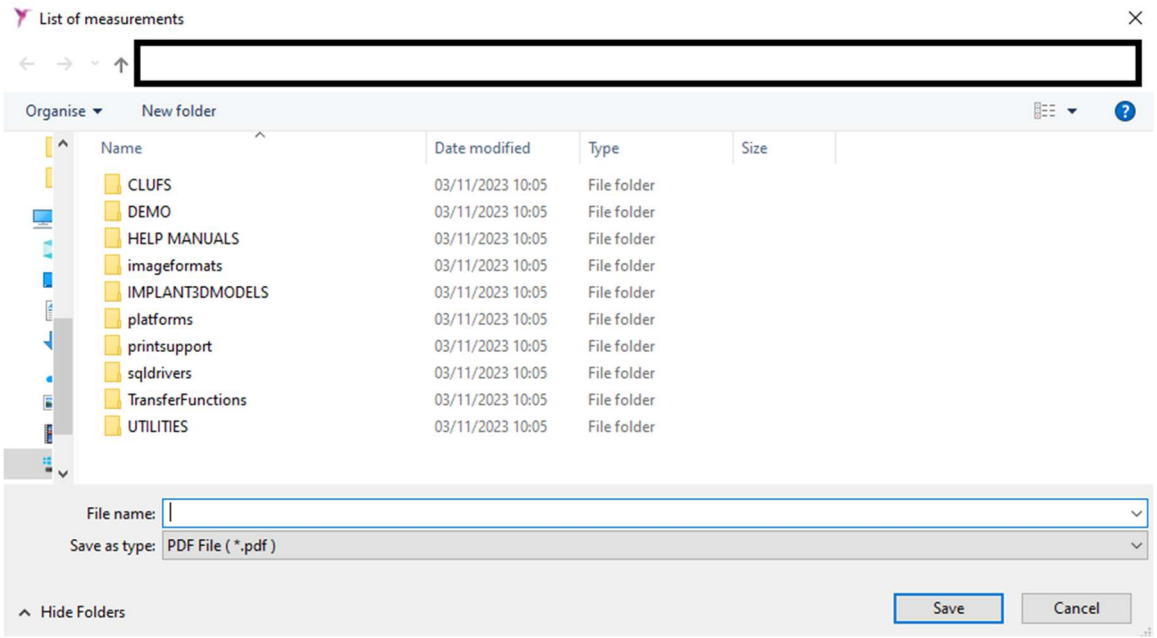
A new window appears with the following data of the measurements made in any of the views:

- ID
- Label (editable field)
- Type of measurement

- Value
- Slice no.
- View




In the list of measurements is possible delete any measurement by selecting the line and pressing the delete button. This measurement will also be deleted from the study. In addition, the complete list can be printed and saved in pdf format. Click on OK to close the measurements list.




⚠ The study measurements are lost if they are deleted from the list of measurements

**i** By double clicking on “Label” for each measurement the program will direct you to the slice in which the measurement appears, provided that at that time that view was on the screen from which you entered the list of measurements. In the multilateral slices in addition to being selected they will be the first view.

## 6.7 ADJUSTING AUTOMATIC ARCH CURVE

The reasons for modifying the arch curve of a study may be very varied, for example, to view the dental nerve in the lower jaw or the pterygoids in the upper jaw better, or simply to correct an arch curve created previously or create a new one.

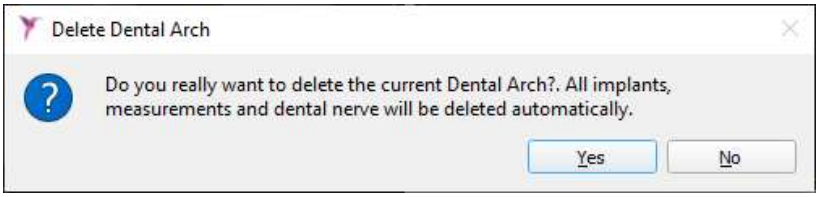
The modification of the arch curve creates a new layout of the lateral and panoramic slices, giving rise to a new study.

The process to adapt the automatic arch curve is the following:

1) Open a study and click on the Adapt Automatic Arch button in the toolbar.

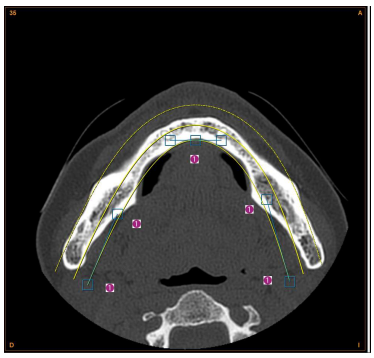
Adapt automatic arch

If you modify the arch curve, all the objects, implants, measurements, etc. in the study will be deleted.




2) Accept the message.

3) It now shows a presentation with axial and panoramic slices (or the layout selected to edit the arch). Take note of the axial slice because it has a yellow curve with some blue control points.



4) Locate the axial slice that best represents the cortical area of the maxillar. Use the mouse wheel on the axial slice to change the slice, or use the drag points of the axial slice in the lateral or panoramic slices. By default 15 panoramic slices are considered.

5) Position the central control point at the centre of the cortical in the inner part (lingual or palatine) of the patient's maxilla.

6) Locate the end points at the ends of the cortical of the right and left branches of the maxillar. In the case the lower maxilla, if you wish to set the range of the dental nerve, finely set the end points until you can see the dental part of the mandibular branch.

7) Finish adjusting the parabola with the checkpoints on the right and left ramus, until you can see the dental nerve or the parabola follows an acceptable path on the maxilla cortical.

Click on the button Configure to change the default spacing between the lateral and panoramic slices (see Section 6.4).

The distance between lateral slices may be up to 0.1 mm.

When the arch is adjusted 3 curves are shown. The lateral slices are made with reference to the internal curve, while the panoramic view is generated with the average.

The closer the average is to the internal, the less you will have to increase the measurements between the lateral slices, and this will increase the closer you get to the external.

We recommend that the relationship between the internal curve and the average be 1/3 or 1/4 of the distance between the internal and external.

Use the Configure button to modify the distance between the lateral slices to 0.75 mm (see Section 6.4).

8) Click on the button Adjust free arch to save the changes and reconstruct the lateral and panoramic slices.

## 6.8 MARKING THE DENTAL NERVE

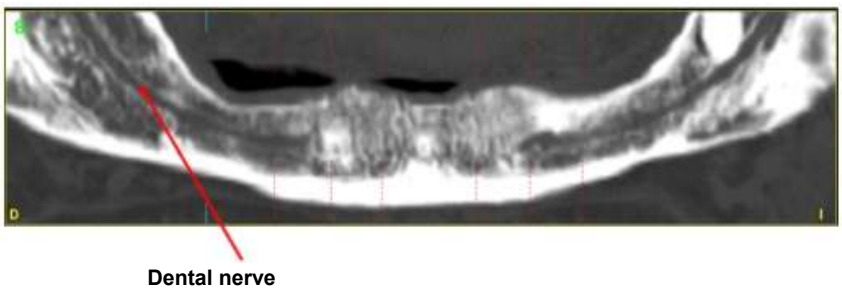
In the case of lower maxillas it is useful to mark the dental nerve when you are planning to fit implants in regions that can be affected by this anatomical structure. BTI SCAN 4 allows you to mark the dental nerve on the panoramic slice or on the lateral slices.

Affecting the integrity of the dental nerve can cause permanent harm to the patient.

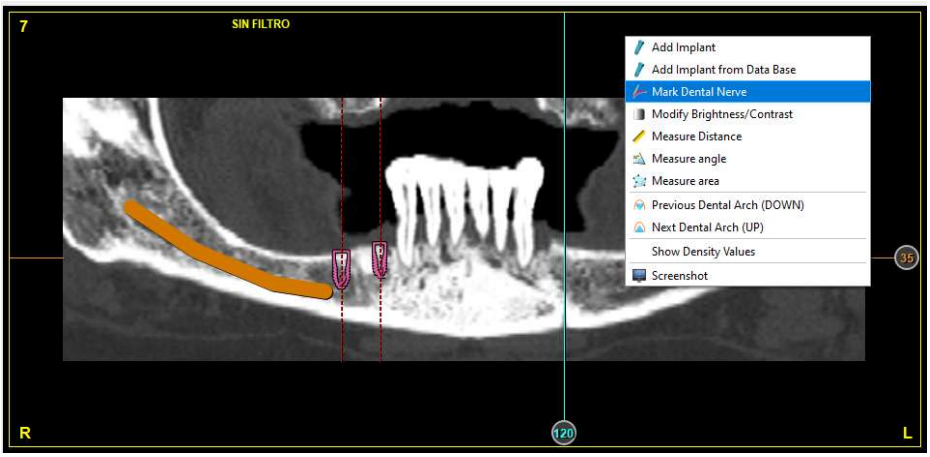
### 6.8.1 SELECT THE TOOL MARK DENTAL NERVE IN THE PANORAMIC SLICE

1) Move the cursor to the region of panoramic slice.

2) Select the panoramic slice in you can see this structure best (there are usually one or two slices where the whole of each mandibular ramus can be seen).



3) Right click and select Mark dental nerve or press N on the keyboard.




### 6.8.2 MARKING THE POINTS THAT DETERMINE THE PATH OF THE DENTAL NERVE IN THE PANORAMIC SLICE

It must be noted that the dental nerve follows a curved shape throughout one or more panoramic slices. BTI SCAN 4 approximates this structure with a geometry of multiple sectors (a curve can always be approximated with a multiline or set of segments).

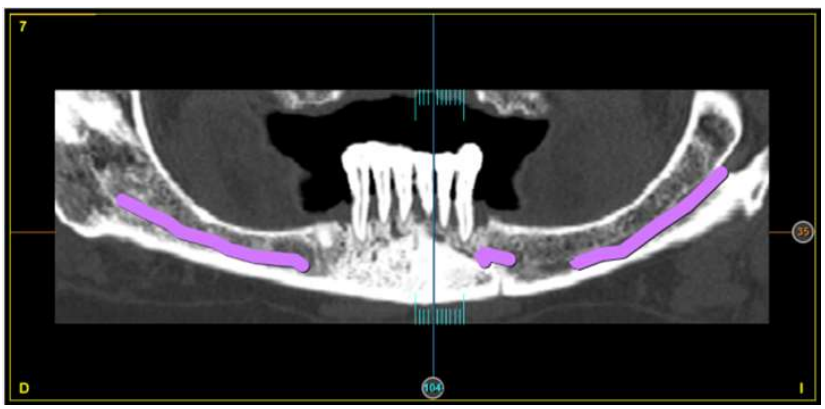
To mark a dental nerve follow these steps:

1) Left click on the first point of the path of the dental nerve.

2) Move the cursor to the next point on the path and left click again.

3) Keep marking points until you reach the end of the path displayed.

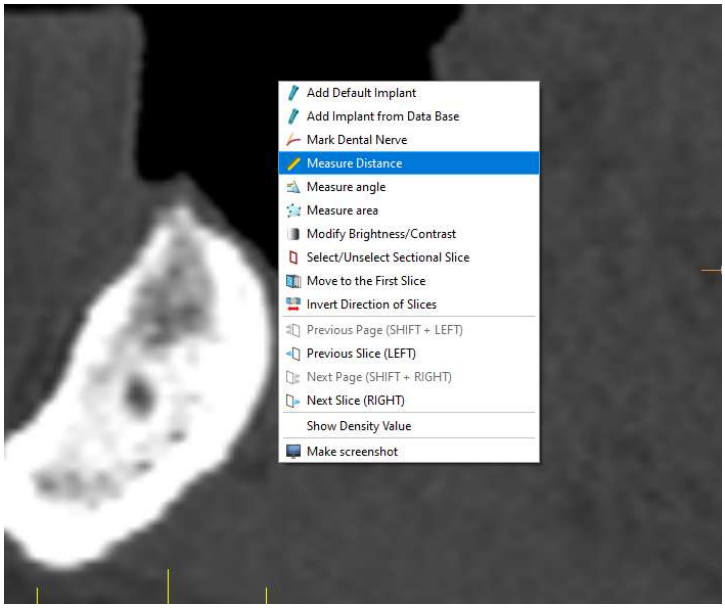
4) Mark the last point by right clicking. At this moment BTI SCAN 4 knows that you have finished marking all the points and the marking tool is deselected.



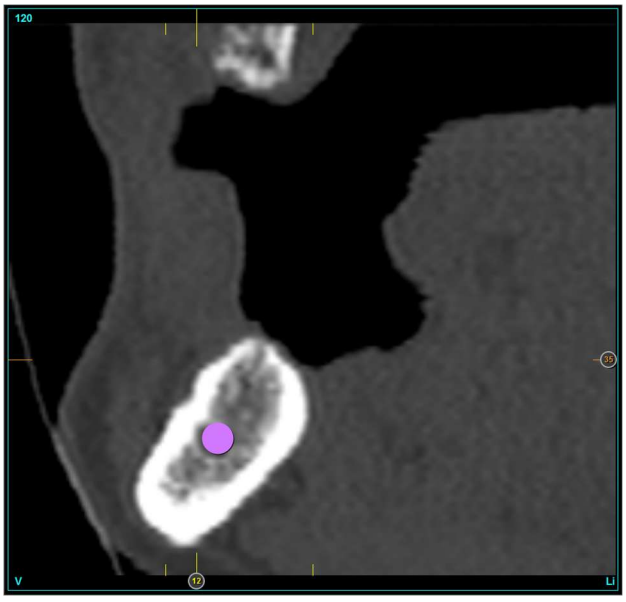
5) With the mouse wheel or keyboard, you can continue moving through the successive slices to continue marking the dental nerve, as shown in the following sequence of images.

### 6.8.3 MARK THE POINT THAT DETERMINES THE POSITION OF THE DENTAL NERVE IN THE LATERAL SLICE

There are occasions on which the dental nerve only affects a small region of edentulism. In these cases, to mark the nerve, move the cursor to the region of the sectional slice where you wish to mark the teeth and right click (and select *Mark dental nerve*) or press *N* on the keyboard.




Being a lateral slice, you only need to indicate one point. To indicate it, left-click on the point where the intersection of the dental nerve is visible in the sectional cross-section.



Take into account that the nerve will be sliced by the lateral plane and this intersection is a point.

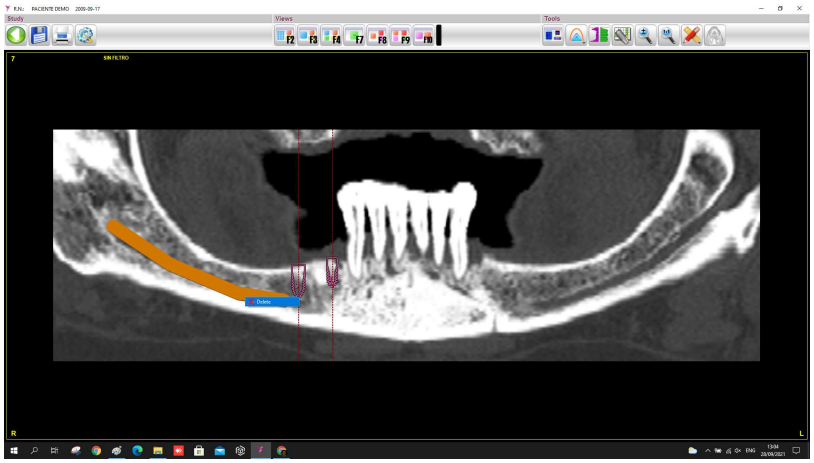
The thickness of this point can be modified (see Section 6.4).

### 6.8.4 CHANGING THE POSITION OF THE DENTAL NERVE

To move a dental nerve place the cursor on the nerve (it will change from pink to red), left click, move it and release the button when it is in its new position.

### 6.8.5 DELETING A DENTAL NERVE

To delete a dental nerve, right-click on it and select Delete, both in sectional and panoramic views.



## 6.9 SIMULATION OF IMPLANT PLACEMENT

BTI SCAN 4 allows you to simulate implant placement in any of the panoramic or lateral slices.

The colour of the implants will vary depending on the family selected. The range of implant families/colours are the following.

| Family | Colour | |
|---|---|---|
| Internal Universal<br>External Universal | Blue |  |
| Tiny<br>Narrow internal/CORE<br>COREX | Pink |  |

| Family | Colour | |
|---|---|---|
| Internal Universal Plus<br>External Universal Plus | Yellow |  |
| Internal Ancha Wide<br>External Ancha Wide | Green |  |
| Generic | Light blue |  |

### 6.9.1 ADD AN IMPLANT

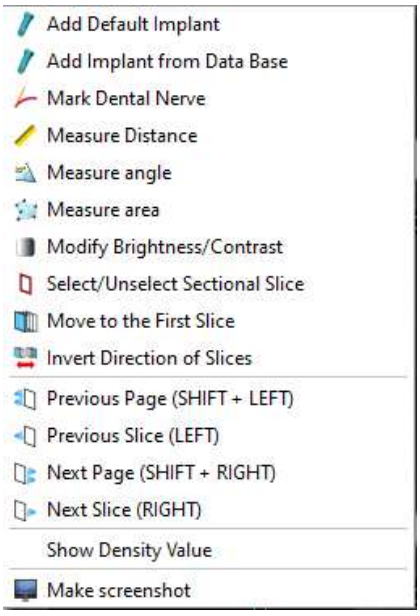
There are two ways to add an implant:

**Add implant by default**

Right click and select Add implant by default. This adds an implant with the dimensions 3. 5x6.5 mm of the Narrow/CORE platform where the cursor is located.

The implant shall be of these dimensions provided that in the Section Matrix of favourite implants (see Section 6.9.12) the option All implants or BTI Favourites is selected.

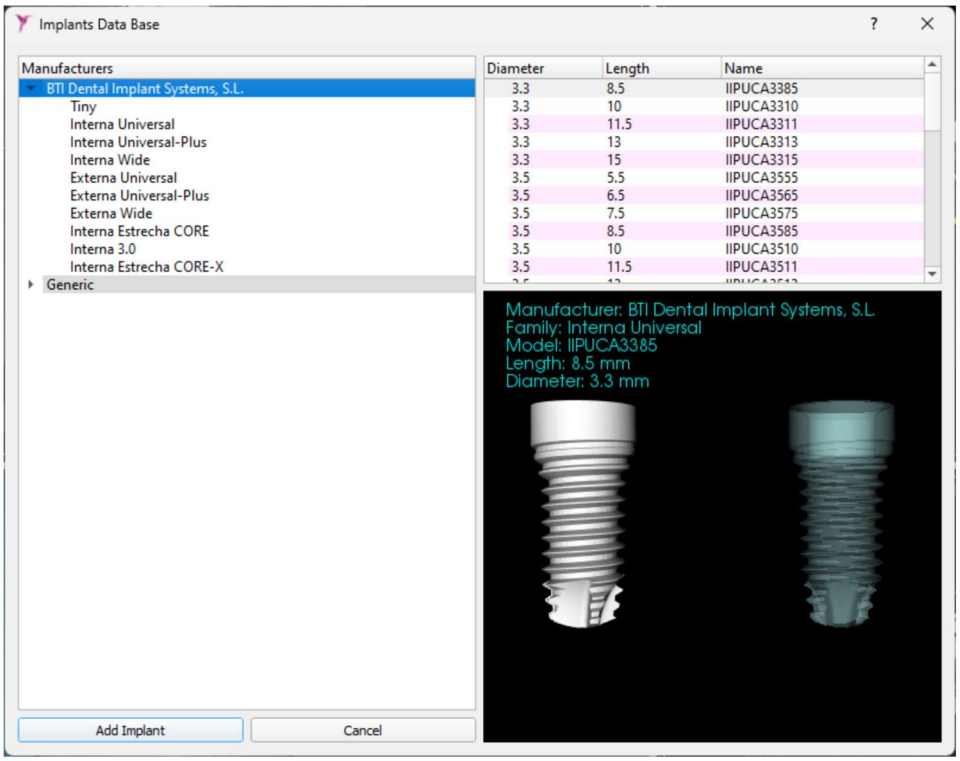
If the option *my favourites* is selected, the diameter of the implant that has been selected as a favourite will be added.



**Add implant from database**

Right click and select Add implant from database. This shows a screen where you can select the manufacturer, the diameter, the length of the implant and name. A pre-display of this will be shown (of the implants of the BTI Family). In addition, there is three different folders with:

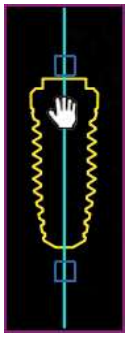
- All implants in the database
- Favourite BTI implants
- My favourite implants




## 6.9.2 MOVING AN IMPLANT

1) Place the cursor on the figure that forms the implant transforming into a hand (a line that passes through the implant appears in blue with a square at each end).

2) Left click and move it to the desired position

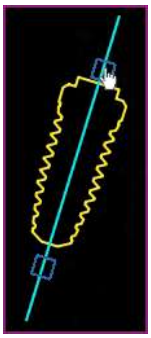
. 

3) When moving the implant from a view other than the lateral view, the other views in the layout will center on the implant.

### 6.9.3 ROTATE AN IMPLANT

When you place the cursor on an implant, two squares appear (one above and the other below).

Place the cursor on any of these two drag boxes, left click and rotate it (the implant rotates around its centre point).



### 6.9.4 CHANGING THE FAMILY, LENGTH AND DIAMETER OF AN EXISTING IMPLANT

The family, length and diameter of an added implant can be changed in two ways:

**Changing the family, length and diameter using the mouse wheel**

Place the cursor on an implant and turn the mouse wheel. The standard measurements will increase or decrease.

These families and lengths will be those defined by the user in the Matrix of favourite implants (see Section 6.9.12).

If the following option is marked:

- All: All the implants will be shown.
- BTI favourites: The BTI favourite implants will be shown.
- My favourites: The favourite implants defined by the user will be shown.

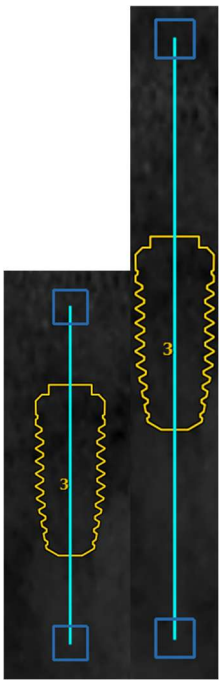
It will only move through the matrix of implants selected in the Matrix of favourite implants (see Section 6.9.12).

**Change the diameter through the implant Matrix**

Once an implant has been selected it will be shown in the Implant Matrix. In this matrix you can jump from one to the other.

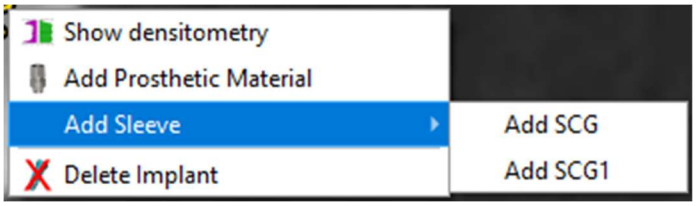
### 6.9.5 MODIFY LENGTH OF AN IMPLANT AXIS

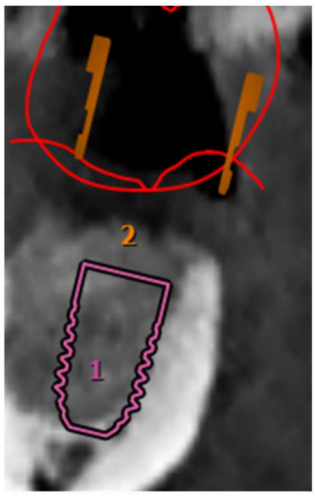
Once an implant has been added, it is possible to modify the length of its axis and also show it in the 3D view. To modify the length of the axis, hold down the CTRL key (CTRL + click) and click on any of the rectangles located at the ends of the implant axis.



### 6.9.6 ADD SLEEVE

By clicking in the right button of the mouse on an implant, it will appear the option *Add Sleeve.* With this option it is possible to add a sleeve compatible with the selected implant.



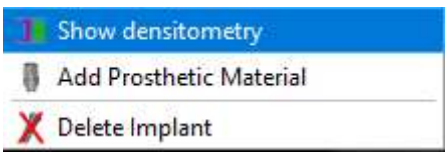




The sleeves are added automatically, aligning their narrower profile with the arch. This rotation can be modified from the 3D views.

It is possible to delete a sleeve by clicking with the right button of the mouse on it and selecting the option Delete Sleeve.


### 6.9.7 DELETING AN IMPLANT

Right click and select Delete implant from the context menu.



### 6.9.8 BONE DENSITY CALCULATION

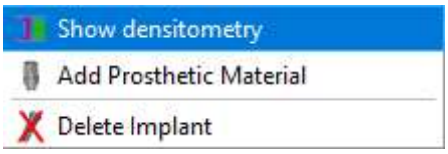
This provides an idea of the bone quality inside and outside the implant (at a distance of 0.5 mm) expressed in Hounsfield units, the unit of density used universally in tomography in memory of Godfrey Hounsfield.

BTI SCAN 4 provides bone density values calculated using the gray scale of the patient's initial CT scan, to facilitate the evaluation of the bone quality in the desired area.

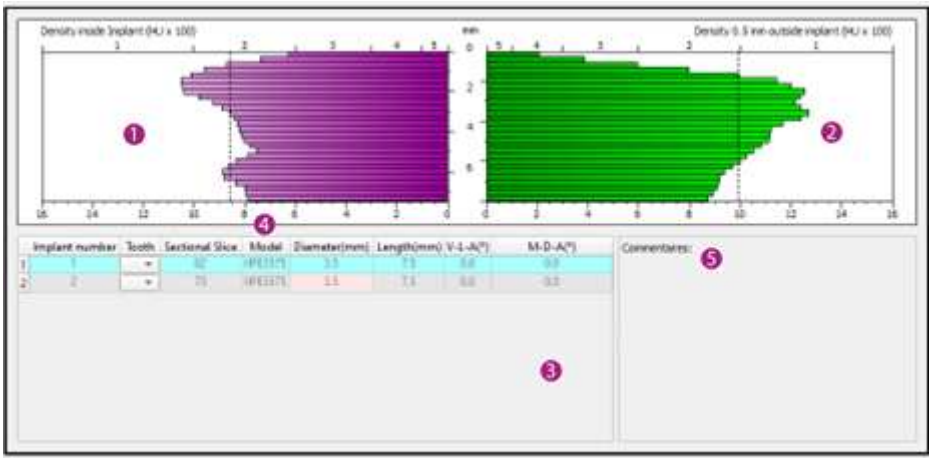
This dependence on the initial CT image means the density value calculated by BTI SCAN 4 depends on the tomography technique, parameters and CT equipment used by the radiology centre.

To access the bone density screen you must:

- Select an implant, right click on it and select show bone density.




- Select an implant and click on this menu button on the toolbar:



The graph is divided into two, the left half ❶ shows the density in a 0.5 mm ring inside the implant, the right half ❷ shows the density of a 0.5 mm ring outside the implant. The whole length of the implant is drawn vertically.

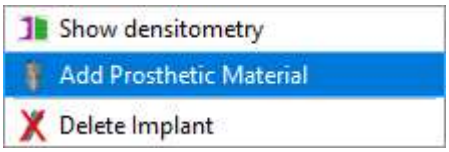
The chart shows the average density achieved (outside and inside) around the implant at a certain height. This density window can remain open while you move the implant, so you can see how the graph will be re-calculated in real time.

In this window there is a space where the list of implants added to the study are shown ❸. If you double click on any implant on this list the BTI Scan® 4 program will position itself on the sectional slice where the implant was placed and show its density. It is a quick way to go to the position of a certain implant. It also allows you to select the tooth number according to international nomenclature assigned to each implant in the column Name ❹.

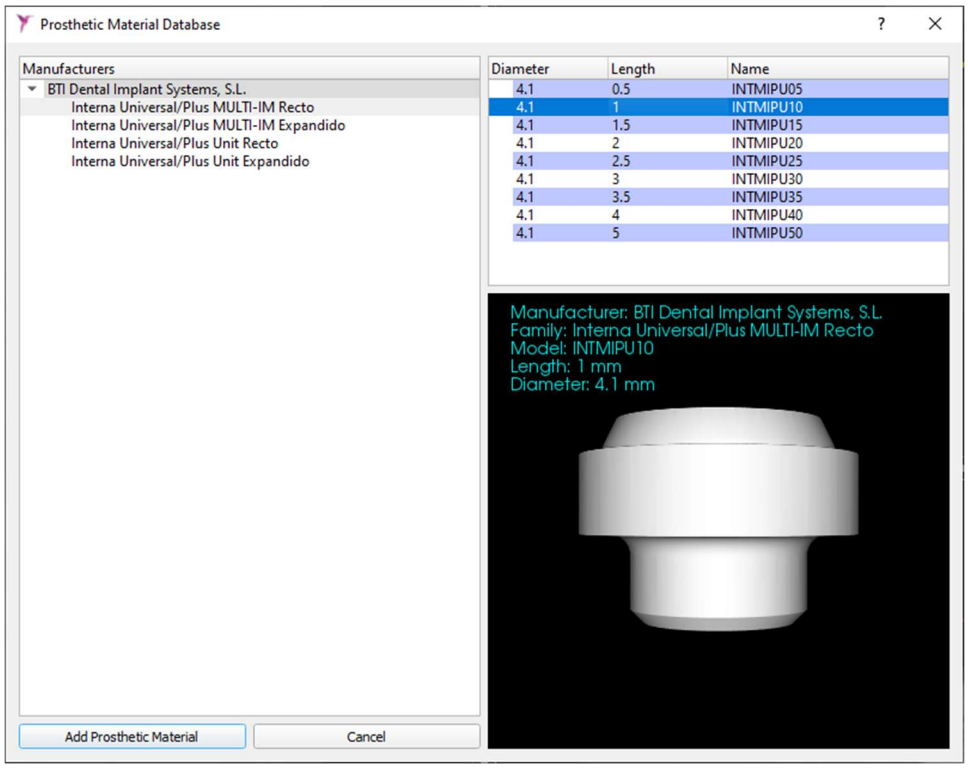
In the box ❺ you can record the surgical procedure or any other note you wish to make about the implant.

### 6.9.9 ADD PROSTHETIC COMPONENT

Once the implant has been selected, when you click on the implant and select it with the right button, the option to add prosthetic material on top of the implant will appear.




You can only position the transepithelial which corresponds to the selected implant.



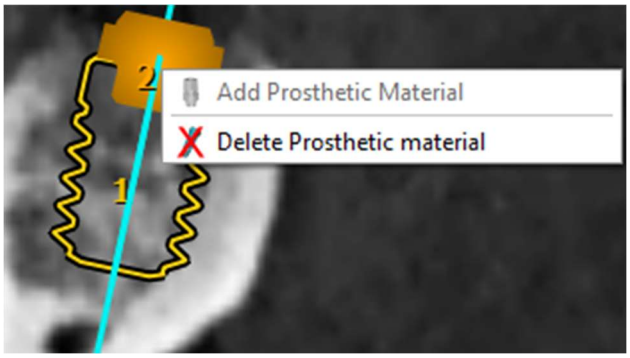

A drop-down menu will appear with all the available lengths and diameters compatible with the selected implant.

If the implant is changed, the prosthetic component will remain the same as long as the implant family remains unchanged. In this case, a delete warning will appear.

It is possible to modify the prosthetic material length by using the mouse wheel.

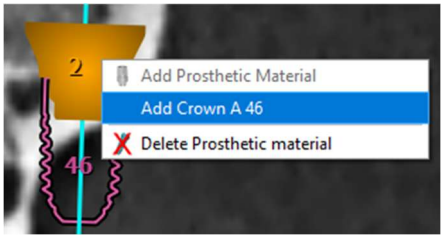
Once the prosthetic component has been assigned, it will be attached to the implant and will behave as a single object.

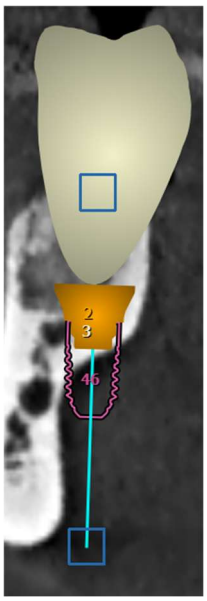

If you want to remove the prosthetic component, you only need to place yourself on top of the set and select the option to Delete Prosthetic Material.



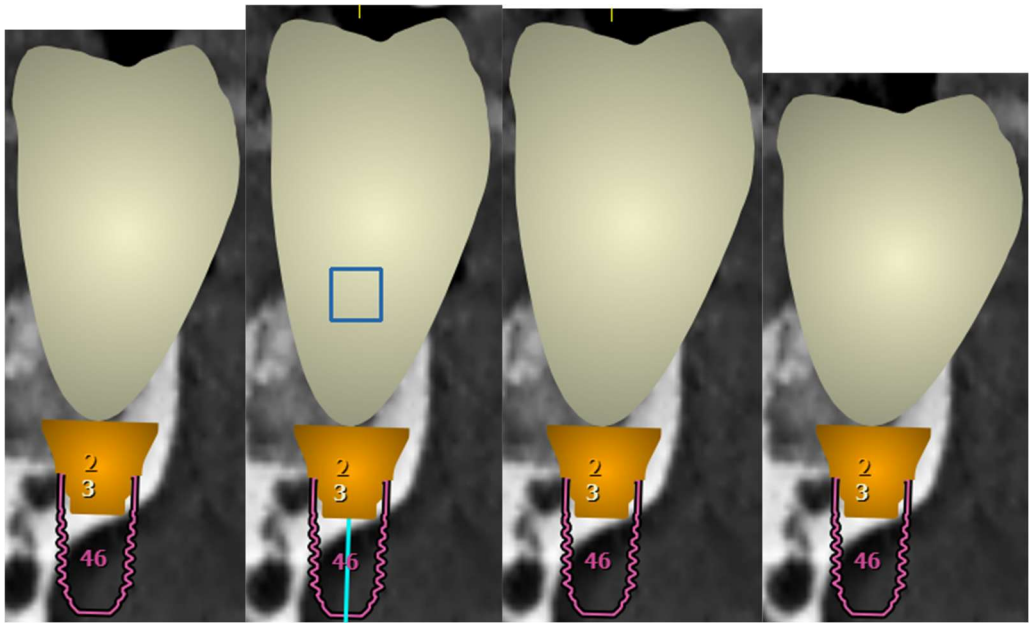
### 6.9.10 ADD A CROWN

By right-clicking on an implant that has an associated prosthetic component, it will be possible to assign a crown to it, provided that it has a position assigned to it. These crowns, which are generic for each position, are editable and transferable.

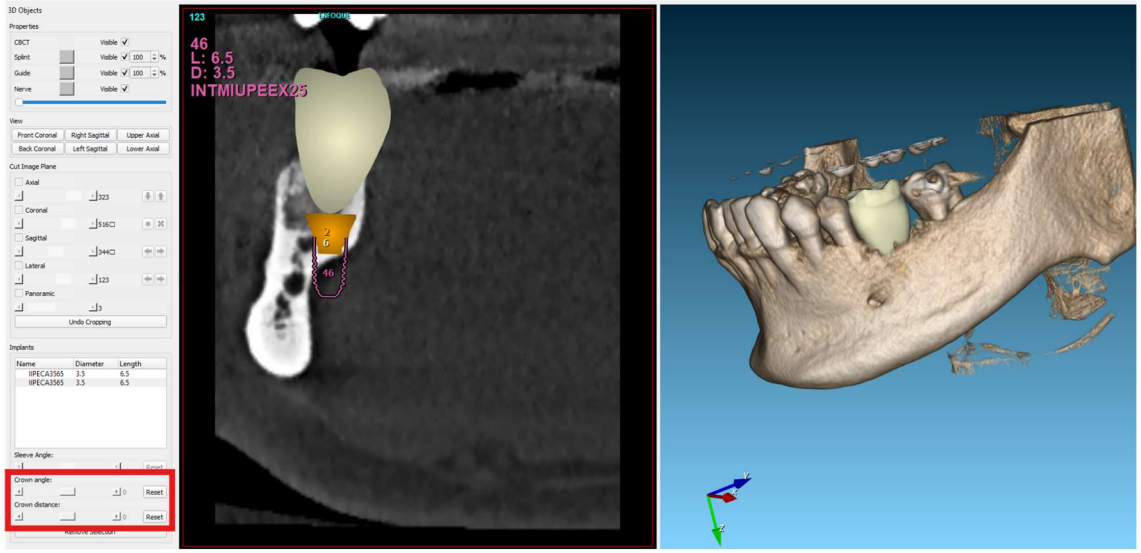



It is possible to lengthen and shorten the crowns in the direction of the implant by turning the mouse wheel over the crown. It is also possible to widen or narrow them if, in addition to the mouse wheel, the user presses the CTRL key.

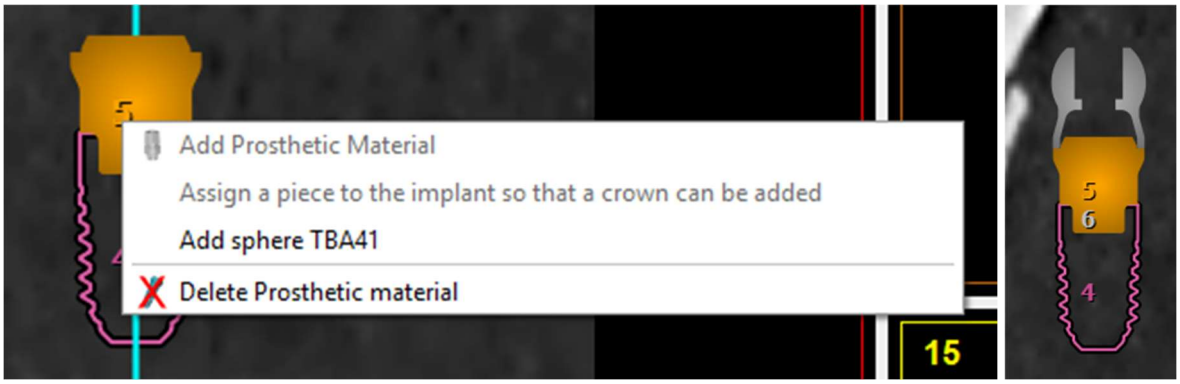


Finally, from the 3D view, it is possible to move the crown along the implant axis or rotate it on the axis to ensure that it fits the patient's mouth as well as possible.




### 6.9.11 ADD A SPHERE

In the case of MULTI-IM prosthetic components with a diameter of 4.1, it is also possible to add a retaining ball for surgical guides.




### 6.9.12 FAVOURITE IMPLANT LIBRARY

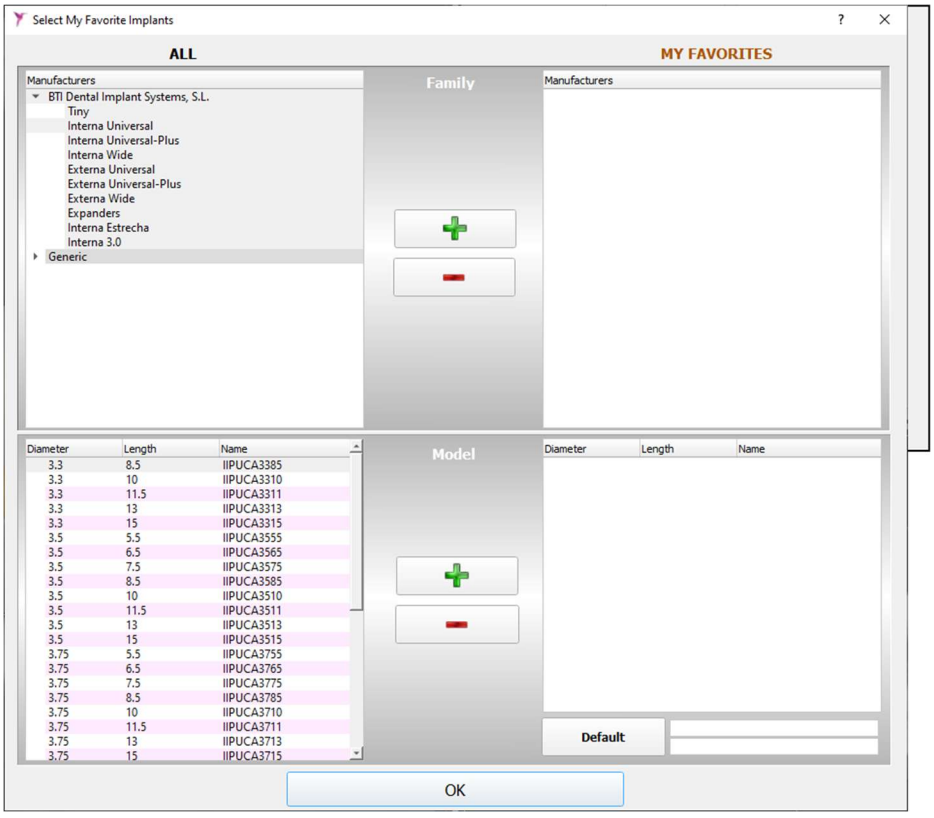
Click on the following icon to access the screen.

This enables you to see the implants available and browse through them. You can select an added implant and access this screen to replace it quickly and visually.


There are three display options:

1. View all the implants in the database.
2. View the BTI favourite implants (recommended).
3. View the favourite implants defined by the user.

   You can edit this list of favourites by clicking on the button 4 and adding the desired families and models.

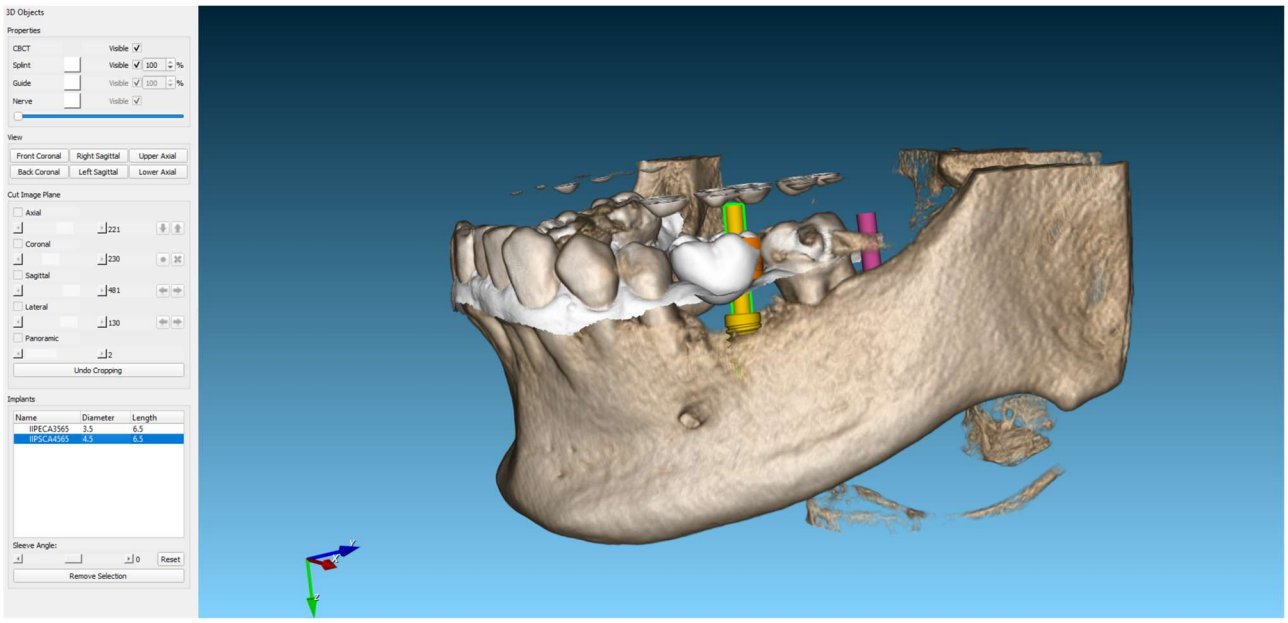


## 6.10 BROWSING IN 3D

BTI Scan® 4 includes a 3D module for viewing the studies in three dimensions.

To access the 3D-view module, press F3 or this menu button on the task bar.


The main screen is composed of two areas.




| | | |
|---|---|---|
| ❶ | Control area: | Here you can modify different options related to the 3D study display. |
| ❷ | Display area: | Shows the 3D model. |

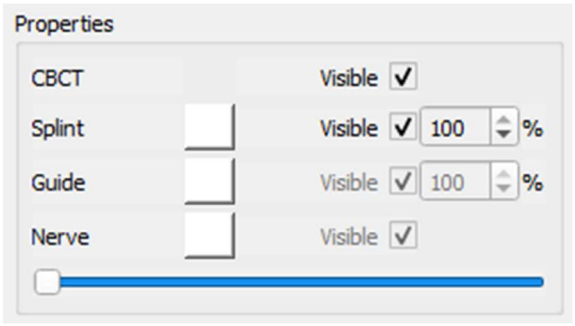
### 6.10.1 MAIN VIEW OF THE 3D PART

In excessively reabsorbed mandibles, the program may not differentiate the mandible correctly with respect to the object to remove, extracting the mandible itself. In these cases, this function should not be used.

Details about the different options in this menu can be found below:

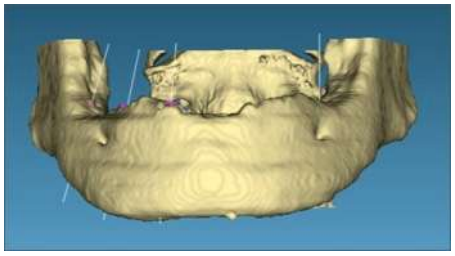
**Properties**

It allows to display, hide and modify the opacity and colour of the different objects in the model (CBCT, splint, guide and dental nerve).

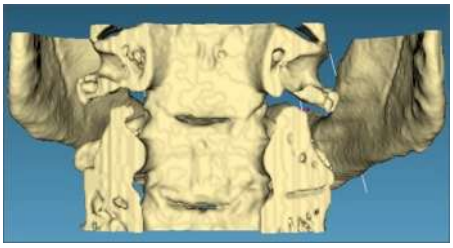



## View

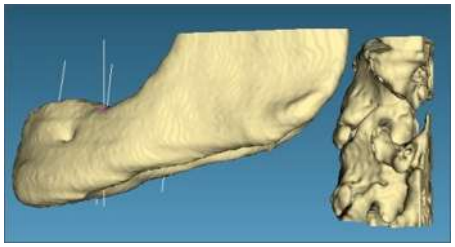
This lets you select between the following predetermined views.

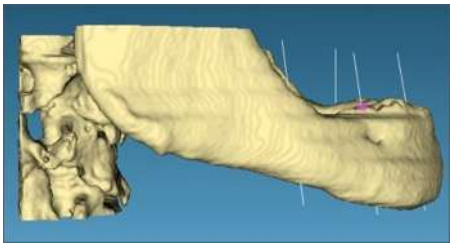
Front coronal view



Rear coronal view



Right sagittal view



Left sagittal view

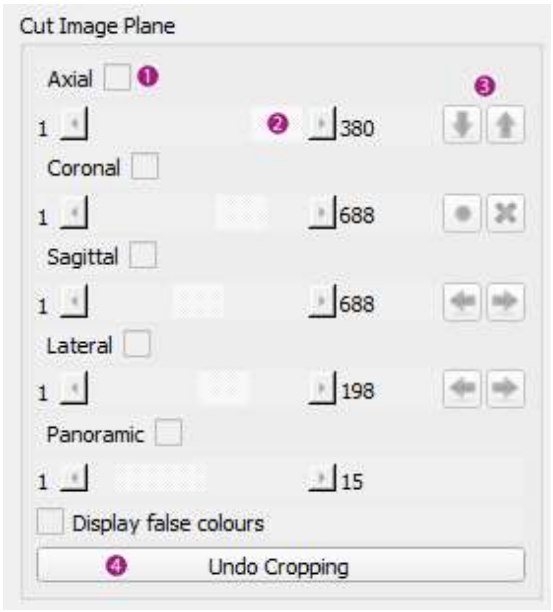
Upper axial view

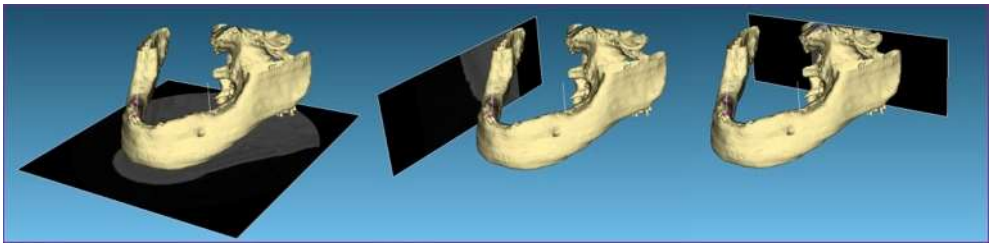
Lower axial view

## Slice image plane

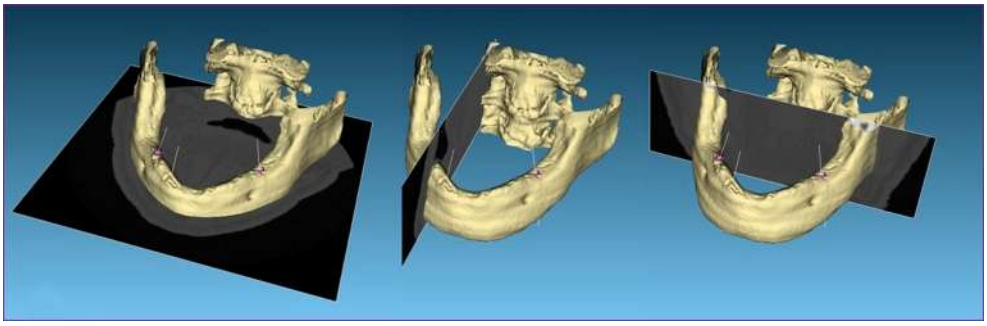
When you check the boxes ❶ the corresponding planes are shown. You can select between axial, coronal and sagittal planes.

The slice of the plane can be moved to the desired place using the scrollbar❷, by rotating the mouse wheel when it is located on the bar, or by pressing the buttons located at the ends of the bar. The buttons allow you to move the slices one at a time for greater precision.





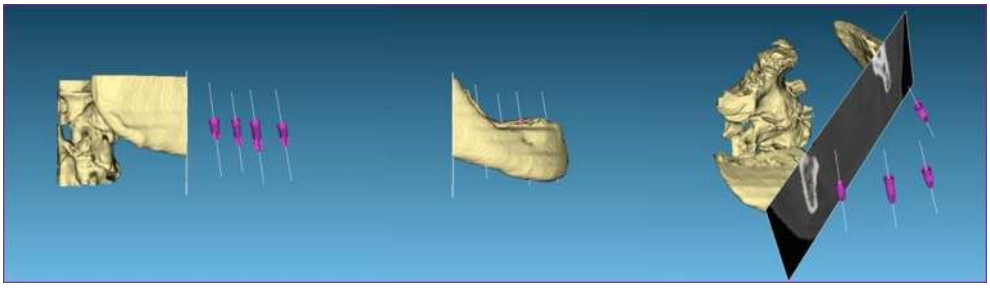
Axial plane Sagittal plane Coronal plane



Axial plane slice 21/57 Sagittal plane slice 185/512 Coronal plane slice 292/512

The buttons ❸ let you create sections of the model on the planes in the image.

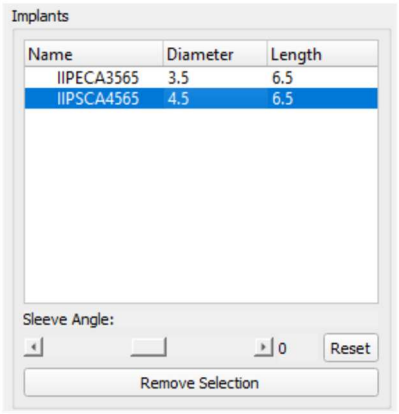
The following images show an example.



Left sagittal plane with slice Left sagittal plane with inverted slice 3D plane with slice

Click on the button Undo slice ❹ to restore the planes of the image.

## Implants



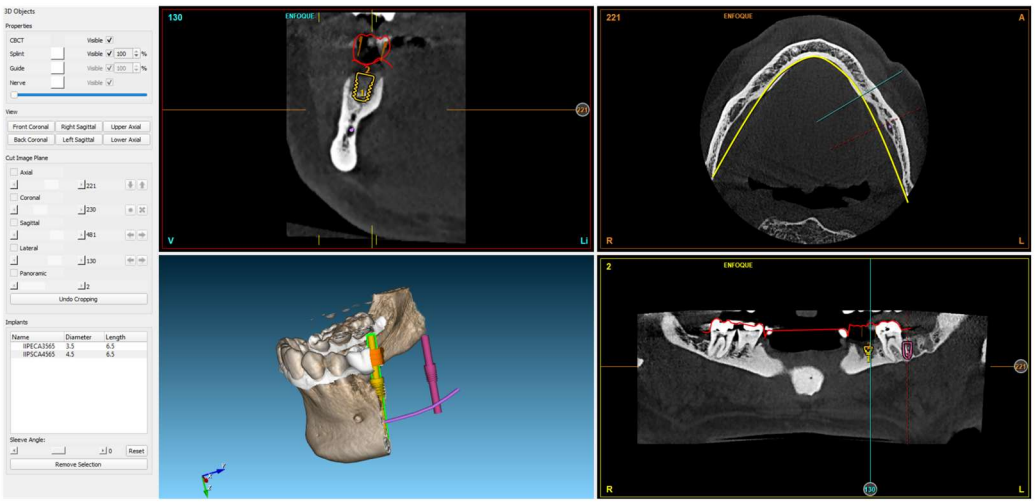

This section shows the implants added to the case, and their characteristics.

It is possible to highlight the axis of any added implant in the 3D view by clicking on its name.

Once an implant is selected, if a sleeve is assigned to it, the option to rotate the sleeve using the bottom bar will be enabled.

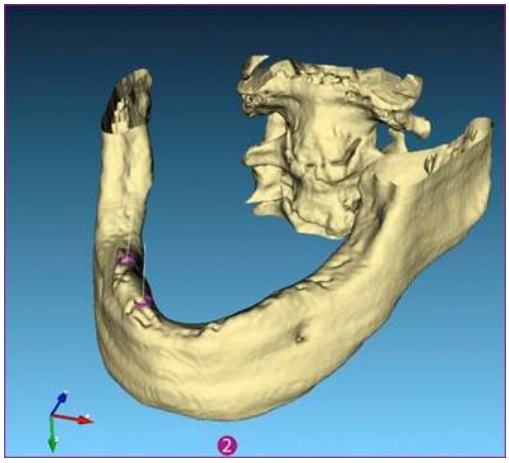

If the Reset button is pressed, the sleeve will reorient, aligning its narrower part with the arch.

Deselecting will remove the highlight from the implant's axis.



### 6.10.2 3D VIEW

In this screen you can view the model in 3D.



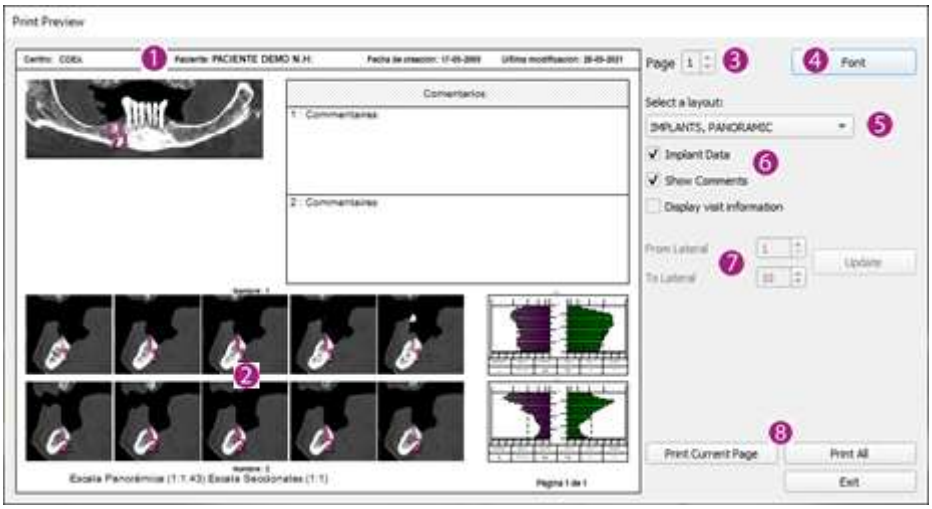
The following controls allow you to move the model in the following ways:

| | |
|---|---|
| Button **A** on the keyboard: | Orients the model, parallel to the X and Y plane. |
| Button **O** on the keyboard: | Orients the model, showing the front view. |
| Button **R** on the keyboard | Orients the model, showing the right sagittal view. |
| Button **L** on the keyboard | Orients the model, showing the left sagittal view. |
| Button **B** on the keyboard | Orients the model, showing the inferior axial view. |
| Button **T** on the keyboard | Orients the model, showing the superior axial view. |
| Right-hand mouse button: | Moves the 3D model. |
| Left-hand mouse button: | Rotates the 3D model. |
| Double left-click | Change layout to 3D view (F3)/return to the previous layout. |
| Central mouse button: | Moves the 3D model and adds alignment points. |
| Mouse wheel: | Zooms out and in as you move the wheel. |
|  | The keyboard arrow keys have the same function as the left mouse button, in that they rotate the 3D model. |

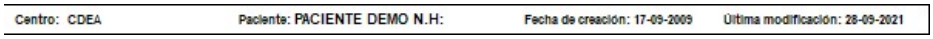
## 6.11 PRINTING A STUDY

BTI SCAN 4 designs a print report that sets out all of the information contained in the study of the implants such as bone density, placement in the different planes and characteristics. To print this report click on the Print button on the tool bar.

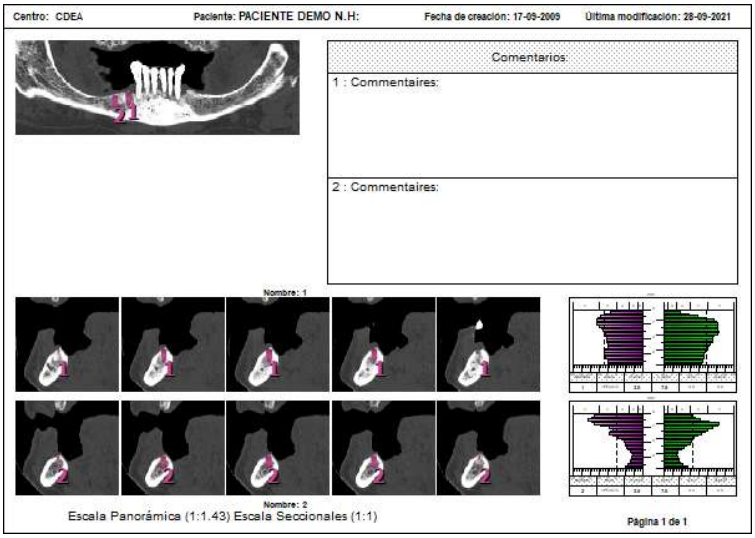
When you click on the button a report and a preliminary window displaying it are generated. This window is structured in different sections:



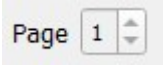

❶ Report data: Shows the name of centre, full name of patient, report creation date and date of last modification.



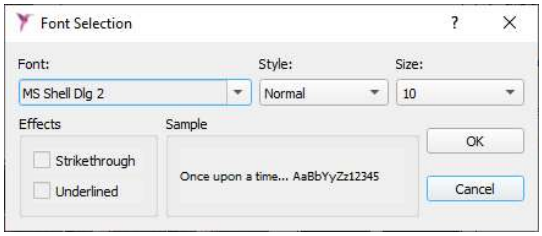

❷ Report area: Area the report content is previewed.



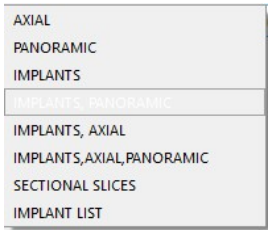

3. Page: Moves between the different pages a report may have.




4. Font: Changes the font used in the report.




5. Diagram: Enables you to choose between the different views.

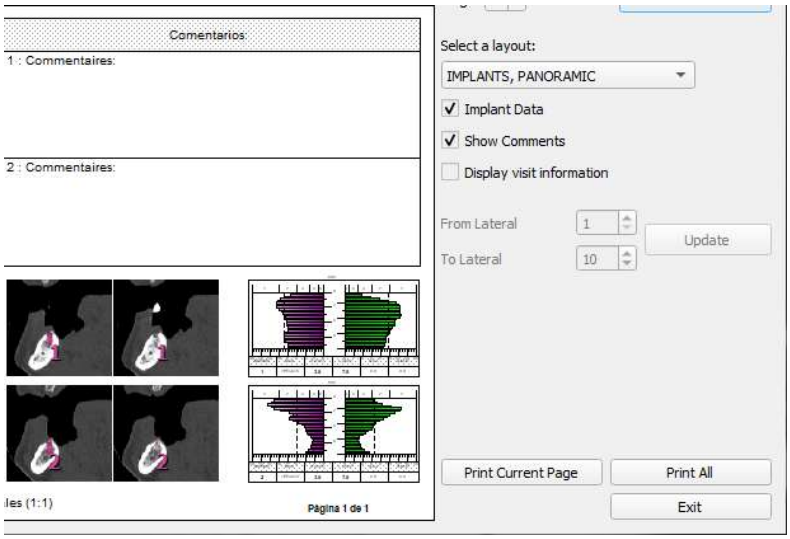



6. Implant data/Show comments: When you select one of these diagrams:

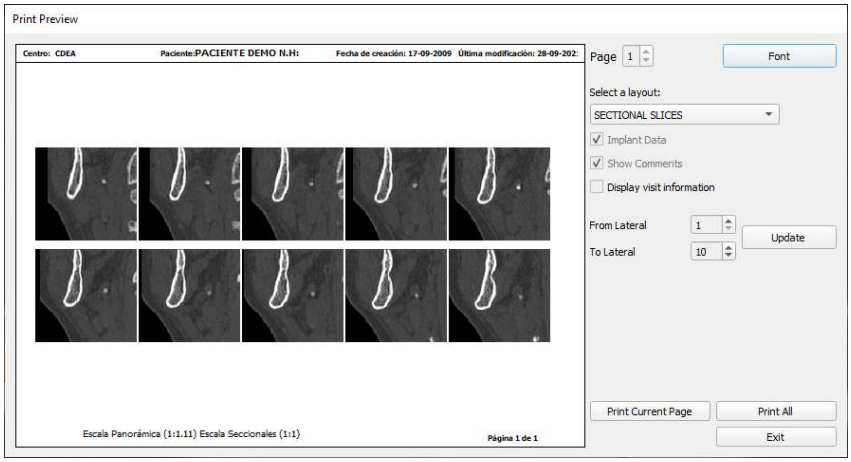
- Implants
- Implants, panoramic
- Implants, axial

- Implants, axial, panoramic

These two boxes are activated, which show the data for the implants applied and comments made about them.




7 From lateral/to lateral: When you select the diagram Sectional this pair of controls that allow you to select the first and last slice to view (maximum 10 slices).




8 Print current page/Print all: Sends the current page or all pages of the report to the printer.

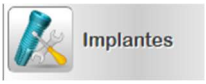
## 6.12 UPDATE THE IMPLANT GEOMETRY IN THE DATABASE TO A NEW VERSION

BTI Scan® 4 offers the possibility to update the geometry of the BTI implants to a new version. This option only exists for implants already included in BTI SCAN 4, new implant references cannot be added.

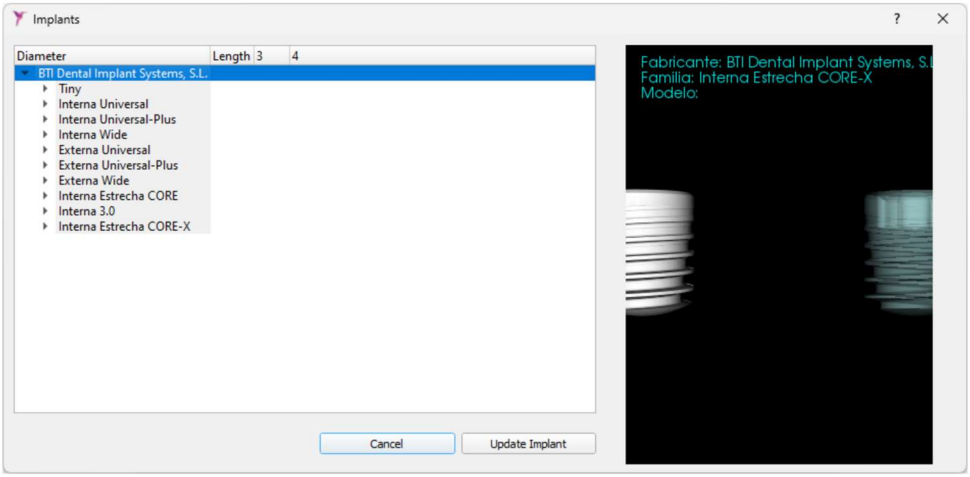
The program must be run as administrator (right-click, run as administrator).

Updates should only be made with BTI supplied files by following the steps below:

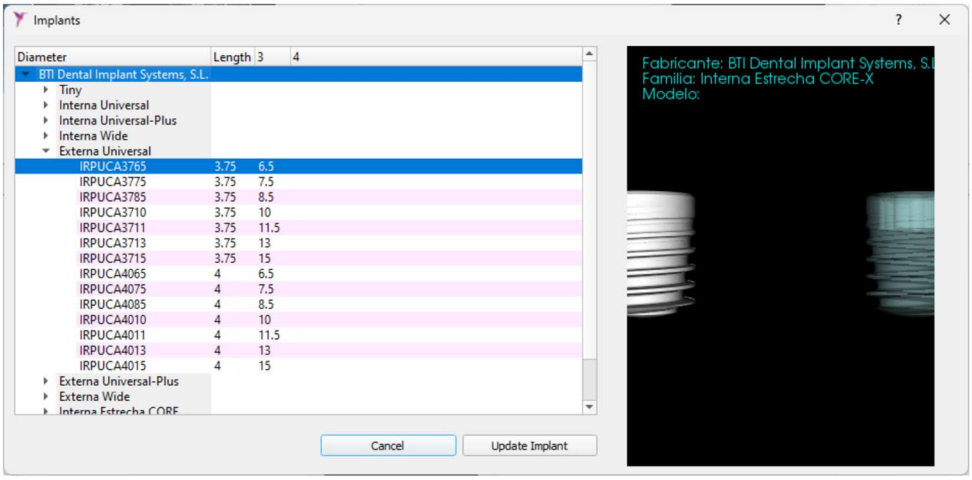
1) Click on the implants button.



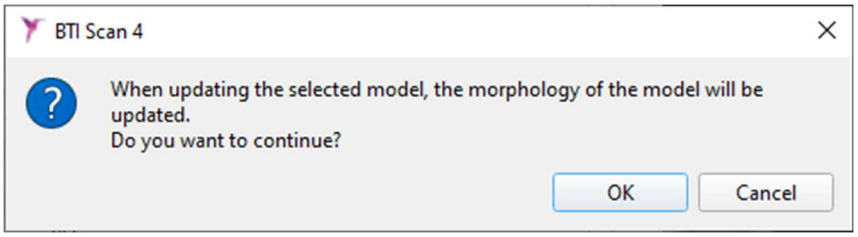

2) Select the implant family to update.



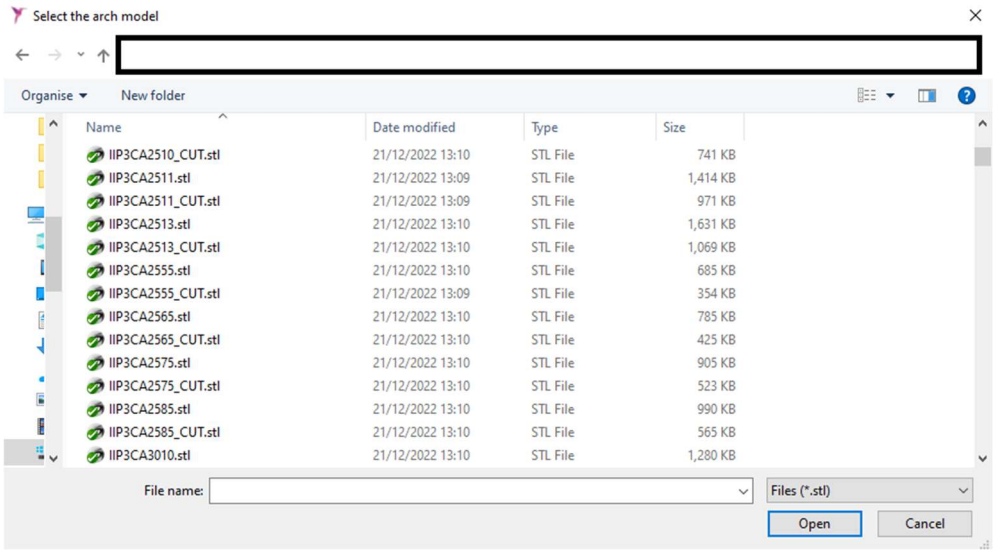

3) Select the reference of the implant to update.




4) An implant model change notice will appear. Accept it.




5) Select the path where the implant files to update are located. You can only update implants with the same reference and name as the implant being updated. If not, an error message will appear.



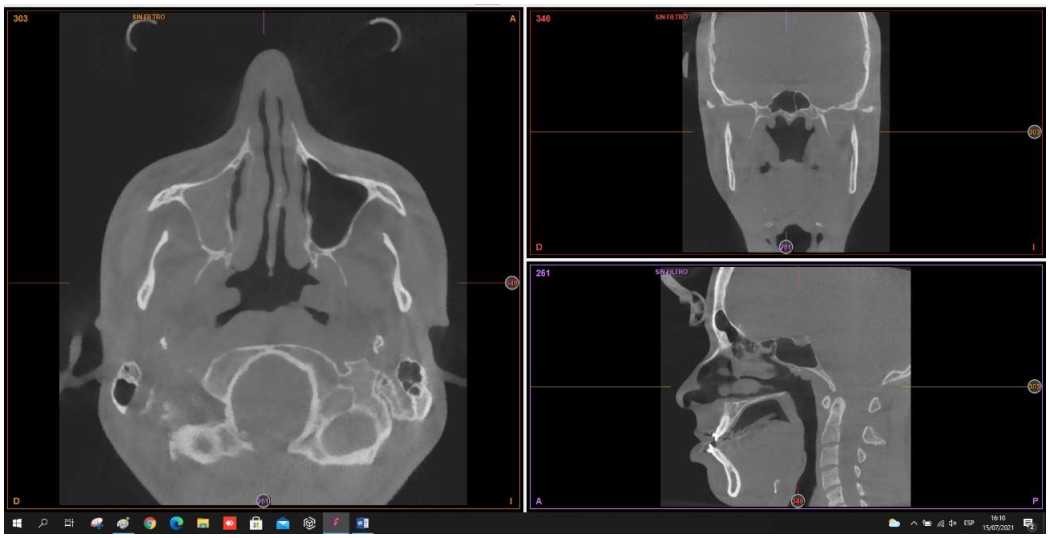
6) Click on open. If you followed the process correctly, a message indicating that the model was successfully updated will appear.

## 6.13 MINIMUM APNEA AREA

You can only measure the minimum apnea area in cases classified as being of a complete maxillary type.

| Status | ID | Patient | R.N. | Maxillary Type | Creation Date | Modification Date | Birth Date | Doctor | Clinic |
|---|---|---|---|---|---|---|---|---|---|
| | 00010 | ANONYMI... | | Complete | 2007-03-09 | 2023-11-02 | 2023-11-02 | BTI BTI | BTI |

Furthermore, to carry out this measurement you will need to be in layout F8 (see point 6.3 of Taskbar functions).

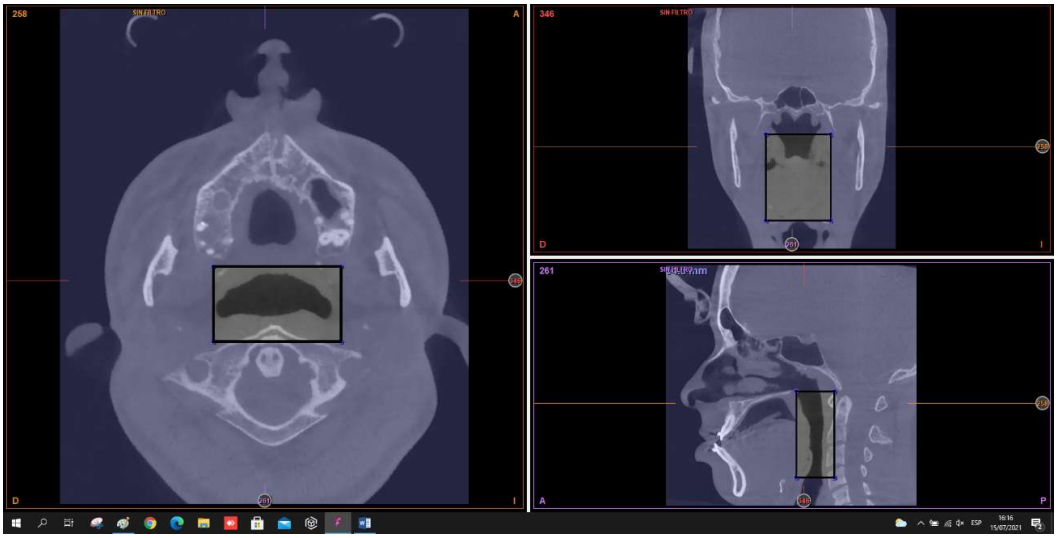


You will also need to take into account that the intersection lines of the planes have to be centred on the volume needed to calculate auto apnea.

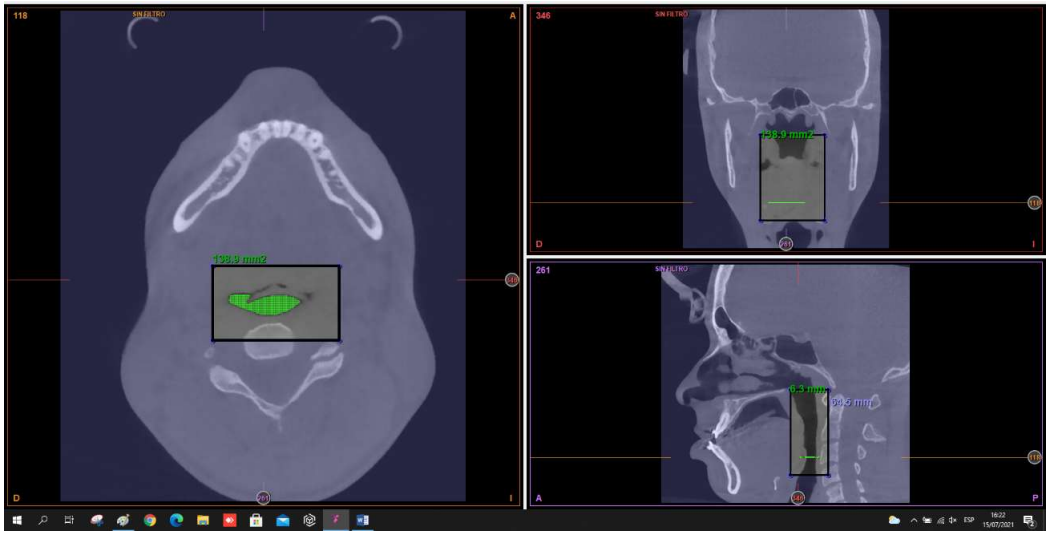
To do this, in the axial cross-section, select it by right-clicking the Auto Apnea or the Measurements button, both will select the same option.

Next, a rectangle will be generated in the axial view, automatically creating its projection in the other 2. After, you will be able modify their size and position in their respective cross-sections.

Next, you will be able to position the volume in the 3 planes to measure the Auto apnea.



Once you have carried out the previous step, left click inside the airway to calculate the position of its minimum area.



The axial slice will be positioned in the Auto Apnea or Minimum area, displaying values in Millimetres and the area in $mm^2$.

# 7 MAINTENANCE AND ELIMINATION OF THE USED PRODUCT

## 7.1 UPGRADING BTI SCAN 4

The new versions and/or upgrades of the program BTI SCAN 4 will be available to BTI customers. If you wish to upgrade your version, contact your BTI distributor for the correct management of your virtual license and program upgrade.

| | |
|---|---|
| i | The installation of new versions of the program do NOT mean you will lose the studies stored as the database will remain intact. The time taken to upgrade the program (in the server) will depend on the cases you have in the database. |
| i | Upgrading BTI SCAN 4 in an operating system with the version BTI SCAN will not happen as the operating systems that they can be used with are not the same. |

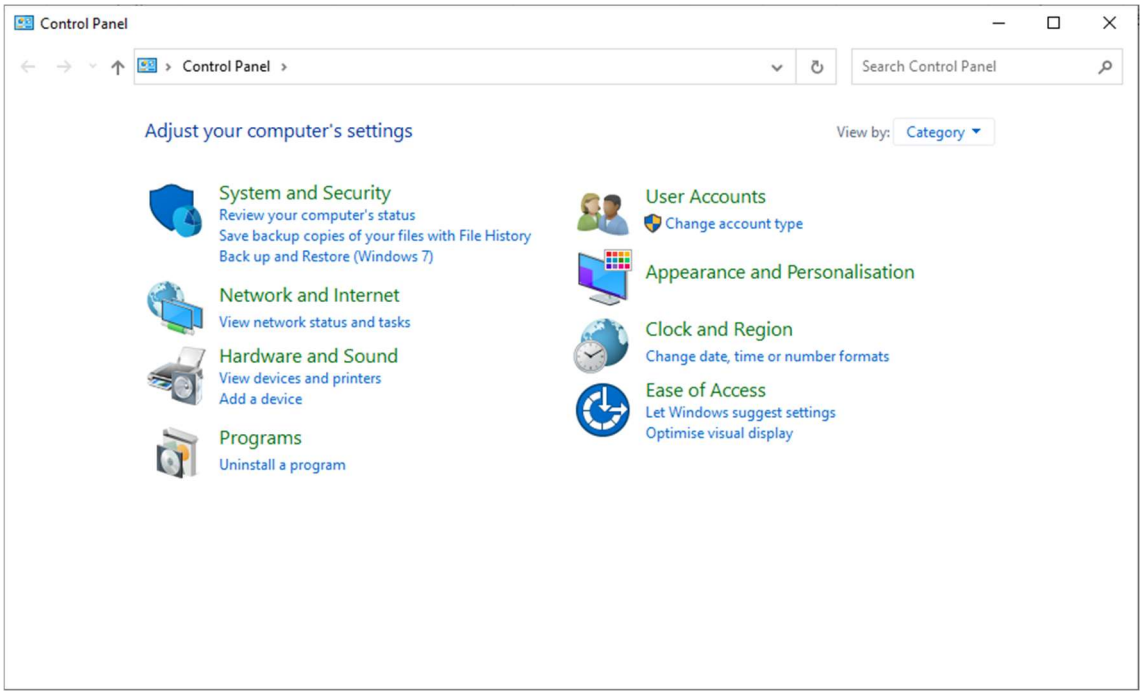
### 7.1.1 UPGRADING BTI SCAN® II OR BTI SCAN® 3 TO BTI SCAN 4

The upgrade process is exactly the same as a normal installation (see section **¡Error! No se encuentra el origen de la referencia.**), with the difference that a screen appears that tells you that the program is going to be upgraded from the version you have installed at that time and that this will be done respecting the current database.

| | |
|---|---|
| i | BTI Scan® II, BTI SCAN 3 and BTI SCAN 4 are all supported on the Windows 10 operating system. The new version has not been tested on older operating systems. |
| i | For further information on the matter or if you detect any problems, contact the BTI distributor. |

## 7.2 HOW TO UNINSTALL BTI SCAN 4

To uninstall BTI SCAN 4, the user needs to access the Windows control panel.




From the control panel, select the 'Uninstall a program' option and access a window that displays all the programs installed on the computer. Once in this window, search for 'BTI SCAN 4'.

# 8 GUIDE TO POSITIONING THE PATIENT AND SETTING THE SCANNER PARAMETERS FOR DENTAL CAT SCANS

This section consists of a number of exclusive recommendations for the radiologist, so that the scan performed on the patient can be displayed perfectly by BTI SCAN 4.

BTI SCAN 4 is the radiology display and implant surgery planning software from BTI for dentists and radiologists. Quality of the image obtained with the BTI software depends on the capacity of the scanner for fine slices and high resolution in axial images. For the quality of the images it is also essential that you follow the instructions in this protocol properly.

## 8.1 PREPARING THE PATIENT

1) Remove (if possible) all metal prostheses, removable prostheses and/or jewellery (earrings, necklaces, piercings, etc.) that may affect the area to be scanned. Non-metallic removable dentures need not be removed for the scan.

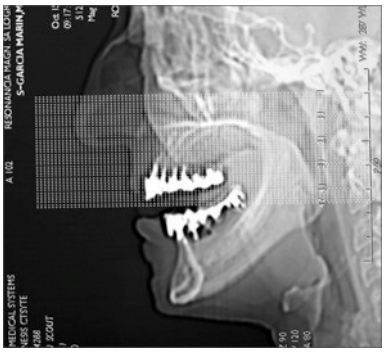
2) Place the patient in the supine position on the scanner table and slide him or her head-first into the scanner.

3) Tell the patient to get comfortable and not to move during the procedure. A normal breathing rate will not cause problems during the scan, but other movements such as leaning or moving the head can cause axial slices in undesired positions that compromise the reformatting of the images, and the need to repeat the sessions.

## 8.2 ALIGNING THE PATIENT

### 8.2.1 SUPERIOR MAXILLA

To align the superior maxilla correctly, the plane of the axial CT slice must be parallel with the occlusal plane (see Figure). The slice must be perpendicular to the root of the premolars, if it is in the correct position. In the lateral X-ray you can check the patient's position. This must be parallel to the hard palate (maxilla bone). The scanner trestle must be tilted 0º.



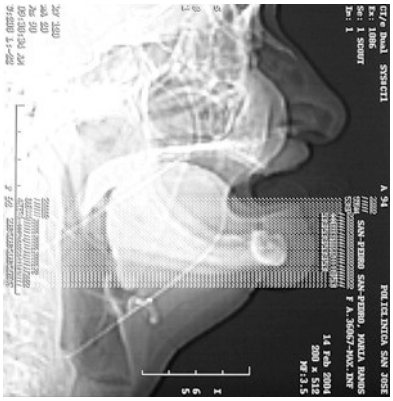
### 8.2.2 INFERIOR MAXILLA

To align the inferior maxilla of a partially edentulate patient, the slice must be perpendicular to the roots of second and third premolar (provided these are in the correct position. See figure).

Secure the head firmly with velcro to avoid movement.

In case of complete edentulism without references in the X-ray guide the slice shall be parallel to the horizontal ramus. Use head supports with sponges to stabilise the position.

Always secure the head firmly with velcro to avoid movement.



A lateral slice (called Scoutview, Topogram or Scanograma depending of scanner manufacturer) to verify the patient is positioned correctly.

Stabilise the occlusion during the scan. In some cases it works well if the patient bites on a gauze pad (especially if he or she has metal restorations in the maxilla not being studied). This minimises the risk of artefacts. Similarly this will allow you to isolate the occlusal plane of the images.

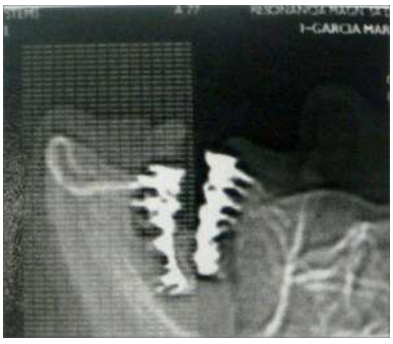
## 8.3 INSTRUCTIONS FOR SCANNING

### 8.3.1 POSITIONING OF THE INFERIOR MAXILLA

Position the first slice just under of lower edge of the mandible.

Position the last slice just above the lower teeth or, in their absence, position the last slice just above the top of the mandibular crest (there must be no bone in the last two slices). A typical mandibular study contains between 40 and 50 axial images at intervals of 1.0 mm, although there are units that allow sub-millimetric slices.

Check the first slice before continuing with the scan, or use a lower guide slice.



The first and last slice should not contain any bones of the jaw. If you need to scan lower down, start again; do not go back and scan slices after having started above the mandibular crest. Otherwise, information about the end slices could be lost.

### 8.3.2 POSITIONING OF THE SUPERIOR MAXILLA

Position the first slice just below the upper teeth or, in their absence, position it just below the bottom of the maxilla crest (there must be no bone in the first slice).

Position the last slice at 7 or 8 mm over the base of the nasal cavity, unless the doctor requires otherwise. For zygomatic implants, the last slice must be positioned in the middle of the orbit.

A typical maxilla study contains between 30 and 40 axial images at intervals of 1.0 mm, although there are units that allow sub-millimetric slices:

Check the first slice before continuing the scan or use a lower guide slice.

The first and last slice must not contain any bone or prosthesis or, in the case of an edentulate patient, it must not contain any bone of the mandibular crest. If you need to scan lower down, start again; do not go back and scan slices after having scanned the nasal cavity. Otherwise, information about the end slices could be lost.

## 8.4 GENERAL RULES FOR SCANNING

Set the height of the table so that the mandible or the maxilla is PERFECTLY centred in the field of the scanner.

All the slices must have the same field of vision, the same centre of reconstruction and the same table height (the patient must not move).

Scan all the study slices in the same direction.

Scan with the same space between slices; the distance between the slices must be less than or equal to the thickness of the slice; the slice thickness should not be greater than 1 mm.

All remaining teeth must be clearly visible in the images up to the occlusal plane.

## 8.5 RECONSTRUCTION OF THE IMAGES

Use a suitable image reconstruction algorithm to achieve sharp reformatted images, where you can locate internal structures such as the alveolar nerve.

Use the most precise algorithm you have, generally defined as the bone or high resolution algorithm.

Only the axial images are necessary; it is not necessary to carry out a dental reformat of the images.

Once the images have been imported, draw the parabola or arch curve that will be the reference for the reconstruction work:

- In the inferior maxilla, the layout of the parabola must allow visualisation of the dental nerve; modify the parabola until you are satisfied with the images.

- In the superior maxilla, the layout of the parabola must be in an axial slice that allows the roots of the front teeth to be displayed and passes through the centre of the crest up to the pterygoid process (pterygoid apophysis).

The images must be saved in the most suitable format, which in the case of BTI SCAN 4 is a USB.

## 8.6 PARAMETERS FOR HELICAL CT SCANS WITH BTI SCAN® 4 SEQUENCE OF AXIAL SLICES

The slices must be equal and homogenous (if they are not, the BTI SCAN 4 program will show them as errors and mark them in black for diagnosis and simulation); If the proportion of valid and invalid slices exceeds 20%, BTI SCAN 4 will not load the CT scan and it will deem it invalid.

The thickness of sections must be 1 mm maximum; the lower the distance between sections, the higher the quality when viewing them. BTI SCAN 4 supports submillimetric distances of up to 0.6 mm.

Important warning regarding CONE BEAM or VOLUMETRIC scanners.

The reliability of the data and measurements provided by DICOM images obtained with CONE BEAM or VOLUMETRIC scanners can vary depending on the technique, Energy parameters and the equipment used.

# 9 FAQ

## 9.1 DON'T I HAVE ANY CASES TO PRACTICE WITH BEFOREHAND?

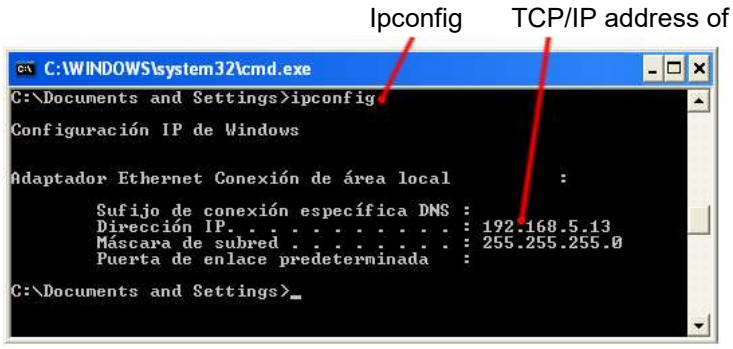
Once BTI SCAN 4 (C:\Installation path\BTI\BTISCANIV) a Demo folder within the installation path is created, where the example studies can be found.

## 9.2 HOW CAN I CHECK THE TCP/IP ADDRESS OF MY COMPUTER?

To find out the TCP/IP address of your computer, follow these steps:

1) Click on Start/Run and write in cmd. Click on OK.

2) In this window write the word ipconfig and press Enter.




## 9.3 HOW DO I KNOW IF THE USER OF THE COMPUTER IS THE ADMINISTRATOR?

1. Click on Start on your computer and then on Control panel.
2. Choose the option User Accounts.
3. This screen will show the existing users of the computer and which group they belong to.
4. Ensure the user that is going to install and access the application is the computer's administrator. Of not, select and apply permissions.

## 9.4 WHY DOES THE ERROR *UNABLE TO CONNECT TO THE DATABASE* APPEAR?

This message can appear for different reasons (service Bti server IV o BtiScan inactive, incorrect TCP/IP address, the application is blocked by a Firewall, etc.). Make the following checks:

**If it is a single-station or network installation (server)**

1) Check that the Service Bti server IV is functioning correctly. To do this go to:

*Start/Control panel/Administrative tools/Services or*

*Start/ Run/ services.msc*

2) Look for the service called Btiserver IV.

3) If it is not running, right click on it and select start.

4) If it does not start, delete the file postmarter.pid (if there is one) that is located in the folder C:\ Programdata\BTI\BTI_SCAN_DB\BTI_DB_DATA. and repeat step 1.

5) Check that the folder bti_image_data is shared and with total control permission, as explained in section 9.5.

6) Check that both the Server and Client computers are within the same domain.

If you do not know how to check the domain where the computer is located, consult the Network Administrator or the IT technical service.

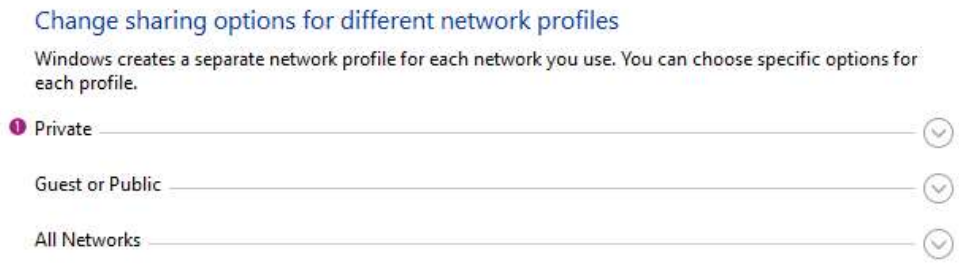
7) Check the configuration options for shared use (only users of Windows® 10 PRO x64). To do this:

   – Access the Windows® control panel.

   – Enter the Network and shared resources centre.

   – Click on the option Change configuration for advanced shared use.

   – Drop down the options of the menu Private ❶.




   – Enable the option Shared use of the folder public.

   – Disable the option Shared use with password protection.

**For a network installation (Client)**

Check the following steps:

1) Follow the instructions of the previous point (Network installations – Server or single-station mode).

2) If it works correctly, verify that the server has the same TCP/IP address as it had when the program was installed:

   To do this:

   - Check the server's TCP/IP address (see Section 9.2).
   - Check the Windows registry in the Server or a Client computer as follows:

     Go to Start/Run and write in regedit. Confirm in the following path that the TCP/IP address coincides with the TCP/IP address of the server and, if it does not, change it to the one that appears in the registry:

     For 64-bit Windows systems: KEY_LOCALMACHINE/SOFTWARE/WOW6432NODE/BTI/BTISCAN4/SYSTEMCONFIGURATION/SERVER IP.

3) If it works in the Server but not in the Client, deactivate the Firewall you are using (the one that comes with Windows or included in the antivirus). If it works now, add the necessary rules to the Firewall.

If you have any doubts as to how to configure the firewall rules, consult the *network administrator* or the *IT support service*.

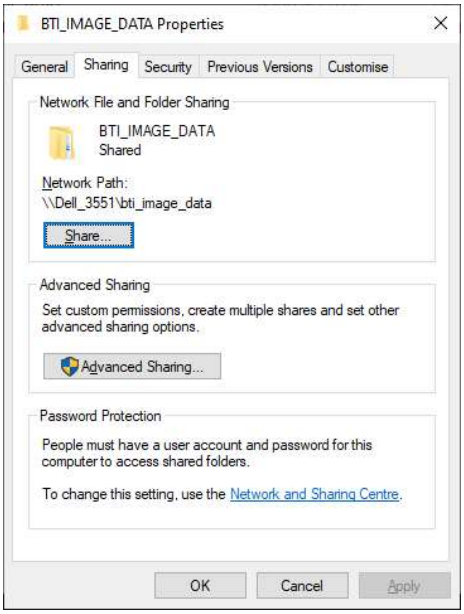
## 9.5 HOW CAN I SHARE THE BTI_IMAGE_DATA FOLDER?

When installing the program on the server check that the folder bti_image_data is shared and with permissions. To do this, follow these steps:

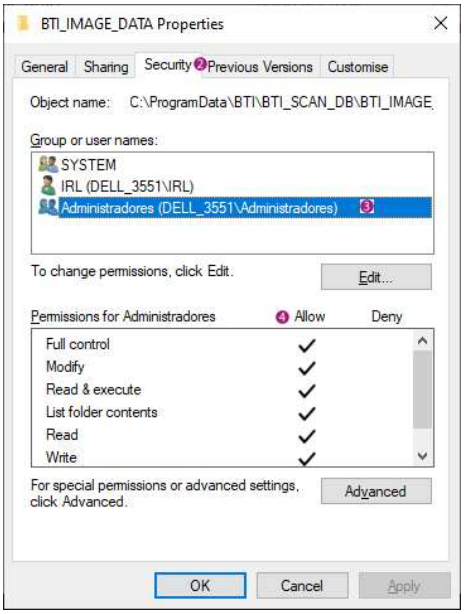
1) Locate the folder in the computer (c:\Archivos de Programa\ bti\bti_scan_db\bti_image_data).

2) Right click on the folder and select the option Properties.

3) In the tab Share, mark the option .




4) In the tab Security ❷ select the users that are going to use the application ❸and assign permission for complete control ❹.




## 9.6 THE CLIENT CANNOT IMPORT A STUDY AND SAVE TO THE SERVER: *ERROR SAVING IN THE DATABASE*

This message may be shown when there is no connection or permission. Check the following steps:

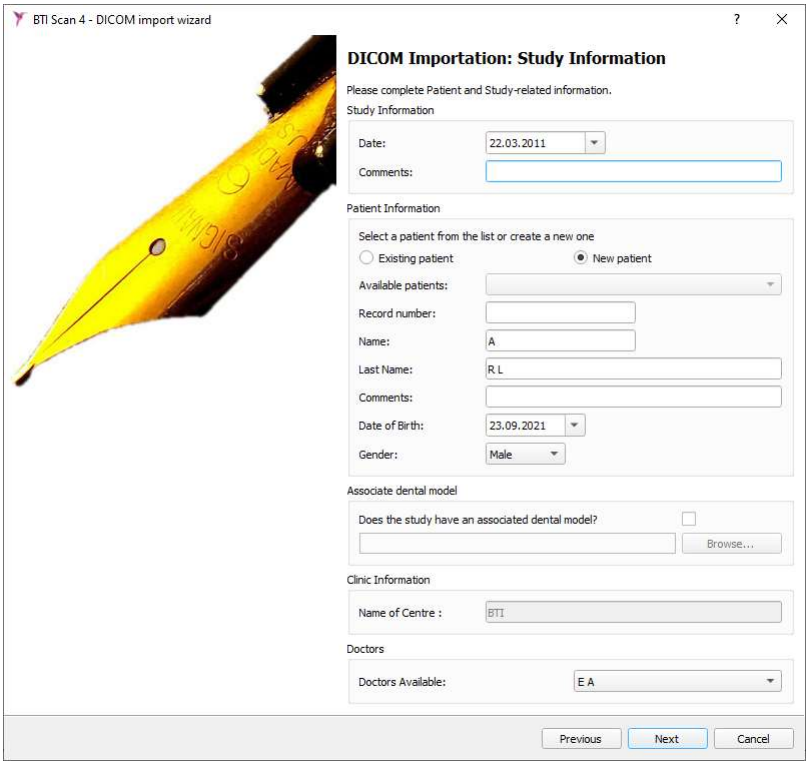
1) Check the status of the network connection and/or access to the server.

2) If it is correct, it is possible that during the installation on the server the BTI_IMAGE_DATA folder has not been correctly shared. (See section 9.4)

3) If all the above is correct, it is possible that read and/or write administrative privileges are missing in your system. (see Section 9.5 or consult your IT service (network administrator)).

## 9.7 WHY CAN'T I ENTER THE INFORMATION ON THE STUDY DURING THE DICOM IMPORT?

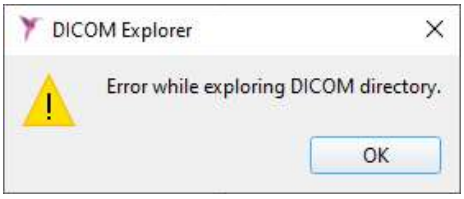
When importing DICOM images, the import wizard stops at the introduction screen of the study information because the Next button is disabled.




This is because:

- New patient ❶ has been selected and no Name or Surname(s) have been written in. Complete these fields without leaving any spaces in front of the first character.
- This is because there is a blank space in the first character of the Name and/or Surname(s) fields. Delete any blank spaces in front of these fields.

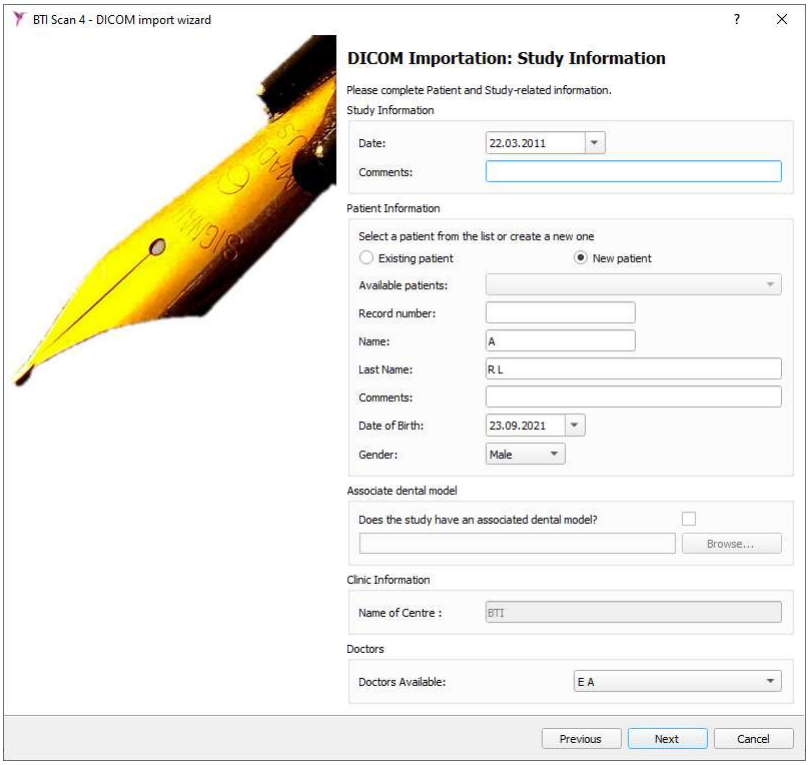
## 9.8 THE MESSAGE *ERROR WHILE EXPLORING DICOM DIRECTORY* APPEARS DURING IMPORT.




This may be because:

- The DICOM file you wish to import is not in DICOM 3 format.
- The views you wish to add do not have any correlation between them.
- In its description, the study contains a typographical character that is not permitted, such as diereses, exclamation marks or punctuation (e.g. Greek names, Ä, Ü, etc.).

When this occurs, delete the contents of the field Comments and enter the First Name and Surname(s) with normal characters ❶ without leaving any blank spaces in front of the first character.




We recommend you use standard English characters when is entering data during the import.

## 9.9 WHEN IMPORTING A CASE (FROM A *CLIENT* COMPUTER) IT WILL NOT LET YOU SAVE IT IN THE DATABASE.

These may be because it is a network installation, and the Server computer has not shared or given permissions for the folder:

*C:\ProgramData\BTI\BTI_SCAN_DB\BTI_IMAGE_DATA*

Check that the Client computer has access to this folder. To do this:

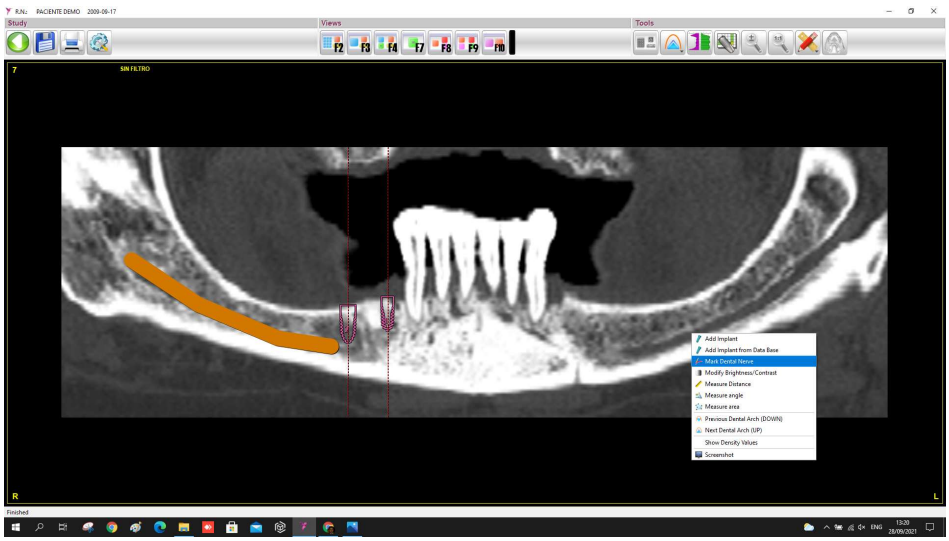
- Click on Start/Run and write in:

  *\\ipservidor\BTI_IMAGE_DATA*

- Check that you can create a file. If it requests a username and password it means that the connection with the server is correct.

If the connection is correct you must share the folder from the server giving full access permission to all the users (see Section 9.5).

## 9.10 WHEN YOU GO TO PANORAMIC AND TRY TO SELECT *MARK DENTAL NERVE* IT IS DEACTIVATED




This occurs when you are working on a case which is marked as Superior. The Maxilla Type should be marked as Lower. For this purpose go the menu Configuration (see 6.4, Item 6) and select the correct option.

## 9.11 WHY ARE THE IMPLANTS UPSIDE DOWN?

This happens when the Maxilla Type is not properly configured in the study (see 0, Item 6).

This parameter must be modified to make it coincide with the maxilla you are working with.

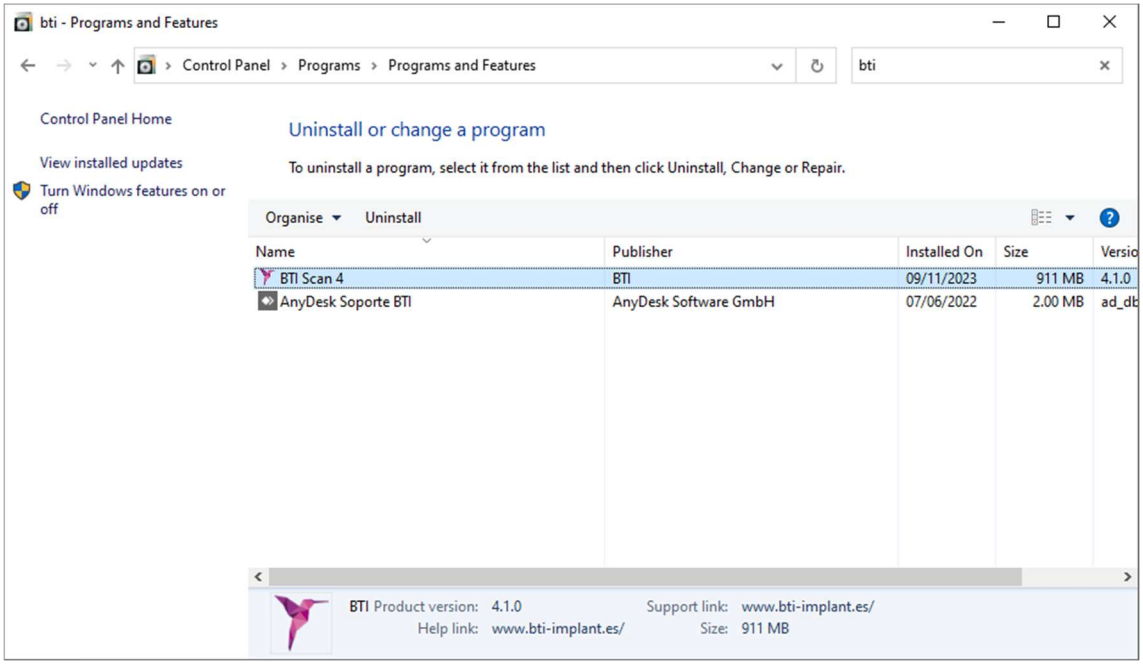
If the type of maxilla is:

| Lower or Complete | Upper |
|---|---|
| By default the implant will be added pointing down. | By default the implant will be added pointing up. |
|  |  |

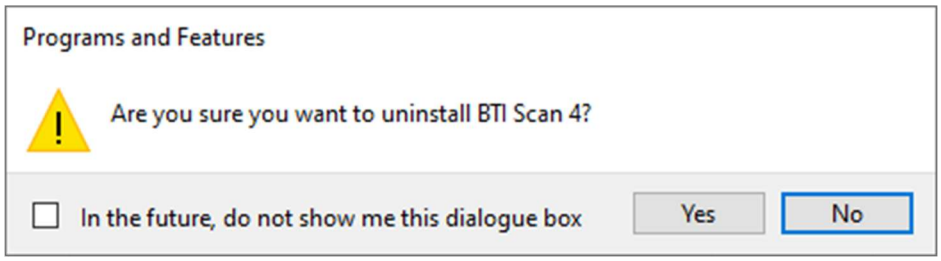
## 9.12 HOW CAN I BE SURE NOT TO LOSE THE STUDIES MADE?

Point 5.4.3. Making backups provides details of how to make backups manually or automatically using a command that may be daily, weekly or monthly and the route this copy must be directed to.

| | |
|---|---|
| i | It is advisable to program the backups as the software does not run them if they are not scheduled. |
| i | Only the ADMIN user can make and restore backups and this must always be from the server computer (as this is where the database and the patient cases are stored) in a network installation or from the PC itself if it is a single-station installation. |
| i | The backup does not allow you to define directories in other computers on the network. |
| i | Take into account that when you create or restore a backup this is done for all the program data (cases and database). |
| ⚠ | If the computer where you are going to make the backup is switched off at the programmed time, it will not be done. |




Double-clicking on ‘BTI SCAN 4’will bring up the following dialogue.




If the user selects 'Yes', ‘BTI SCAN 4’ will be deleted from the system.

## 10 NOTICE REGARDING SERIOUS INCIDENTS

If, during the use of this device or as a result of its use, a serious incident has occurred, please report it to the manufacturer and to your national authority. The contact information for the manufacturer is as follows: qualifiedperson@bti-implant.es.

## 11 FURTHER INFORMATION

The UDI code corresponds to a series of numeric or alphanumeric characters that allow the traceability of the medical device and is displayed on the label in ICAD format and in HRI (human readable interpretation) format.

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