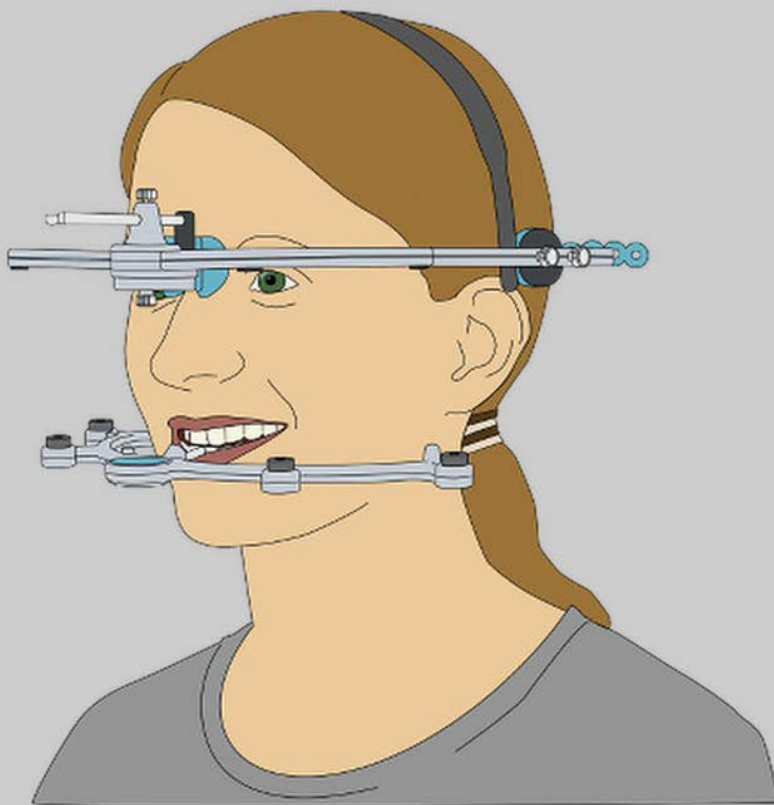


WINJAW+



Software-Manual

Software-Manual WINJAW+

describes included functions until version 1.4.x
Pictures of this manual may differ to your version.

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1 Foreword

Welcome to the User Manual of the WINJAW+ Software.

This User Manual provides you the basic knowledge for operating the Software. It explains the installation and gives suggestions for preparing the measuring procedure and data recording.

Please additionally note the information relating to safety in the Technical Manual and please ensure to keep all the manuals directly next to the measuring system. The Operating Manual is an integral part of the product and will help you to operate the measuring system in accordance with the instructions.

The zebris Medical GmbH does not assume any liability whatsoever for injury to personnel or patients, or damage to the system, caused by non-observance of the information contained in the manuals, or improper use of the Measuring System.

Should you become aware of any errors when using this User Manual, or should you have any suggestions, we would be most grateful to receive your feedback at any time.

Registered trademarks

Different brand names are referred to in this Manual. All these product names are used only for clarity's sake, or for editorial reasons and are trademarks belonging to the respective companies. When using brand names, the trademarks themselves and also the rights of the respective proprietors shall remain unaffected thereby.

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1.1 Conventions and symbols used

In this User Manual the following conventions are used.

Warnings are shown as follows:



Warnings indicate a potential hazard to the health and safety of the users and/or patients. The warnings describe the danger involved and how this can be avoided.

Important information is shown in the following way:



The warnings denote a potential hazard that can cause damage to, or destroy the device. The warnings describe the danger involved and how this can be avoided.



These warnings denote information that is relevant for taking measurements.

This User Manual is to be kept within easy reach so that the information it contains is available to the user at all times.

Note on modifications

In order to guarantee the quality of our products, we continually endeavor to improve our product line. It is possible that by the time this User Manual has been printed, the software and hardware configuration have undergone a further update. Therefore it is possible that some of the figures deviate from the product you have actually been supplied with.



Please note that there is not a new version of this manual for every new software release, as often new software releases have technical modifications invisible to the user. The up-to-date version of the software manual can be obtained from the service area of our homepage.

2 Installation

2.1 System requirements

- Processor: Intel Core i5 or equivalent
- Working memory: min. 4 GB RAM
- Hard drive: min. 750 GB free space on system disc
(needed for database, especially for video recording)
- 3D graphic card: 1 GB usable graphic memory
OpenGL 3.3 or higher
DirectX 9.0c or higher
Support of native display resolution
- Display: Display with minimum resolution of 1024x768 Pixel
- Ports: 2 x USB (1x device, if needed 1x SYNCCam)
- Operating system: Windows 7 with Servicepack 1
Windows 8.1
Windows 10



In case of any questions to necessary system requirements, don't hesitate to contact the support of your dealer.

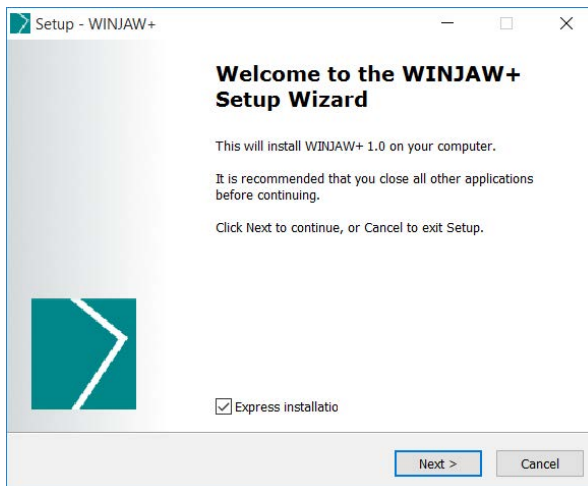
2.2 Installing the WINJAW+ software



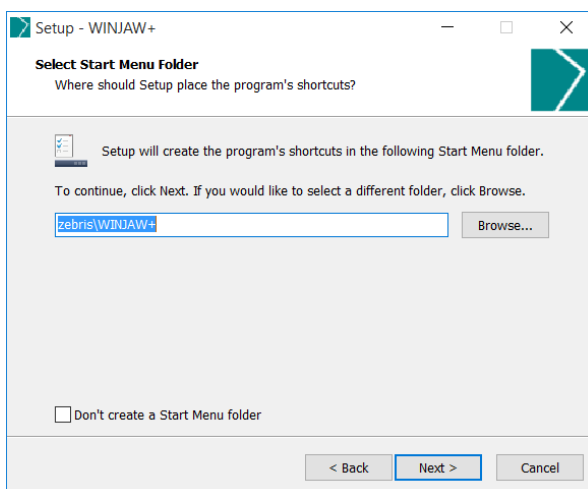
If a note appears during installation that your graphics hardware does not support OpenGL 3.3, you cannot run the software on your computer. If your graphics hardware features two graphics chips, please switch in the corresponding software to the high-performance chip. If your graphics hardware supports OpenGL 3.3 according to its specifications, please try to update the graphics driver.

2.2.1 Step-by-step installation

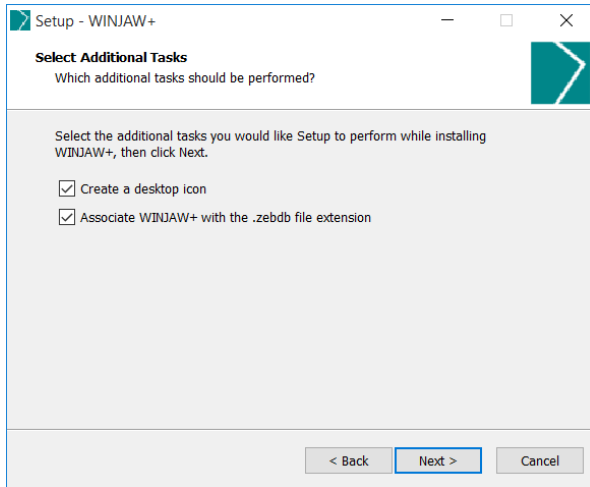
1. Please open the folder “software” on the installation data carrier and start the installation file named WINJAW+



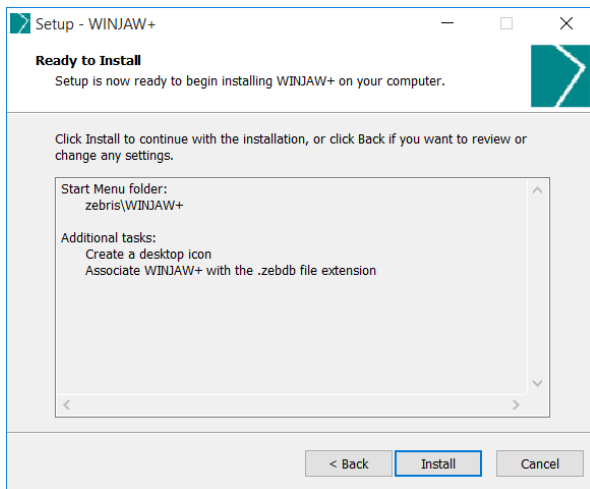
2. Then please click on **Next** to start the installation.



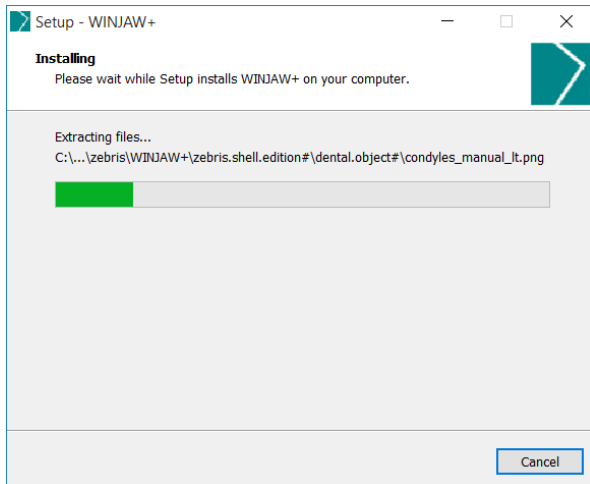
3. Select whether the installation is to run locally or on a network. Click Next to continue with the installation. Select a folder path for the shortcut or use the default path..

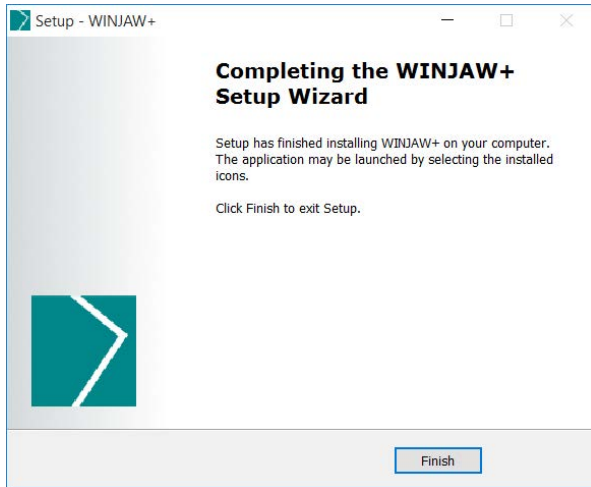


4. Select whether you want to create a desktop icon and if the registration for the file extension should be runned.



5. Click on **Install** to install the software on your computer.



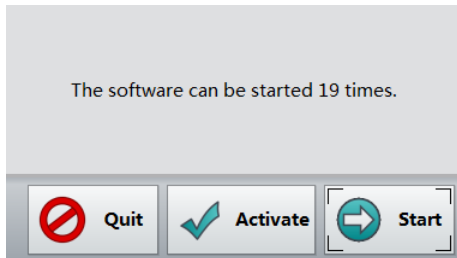


6. After the installation is completed, the following window appears. Click **Finish** to complete the installation.

The software is now installed. A symbol with the designation WINJAW+ has been created on the desktop. To start the software you can either double-click on this symbol, or start using the program group **Start >> Programs >>zebris medical >>WINJAW+**.

2.3 Activating the software

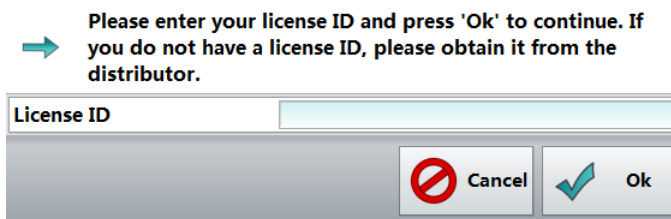
The installation file comprises a module selection for the unlimited use of 30 starts, afterwards the software has to be activated.



The activation of the software can either be done by internet or via phone/fax/email.

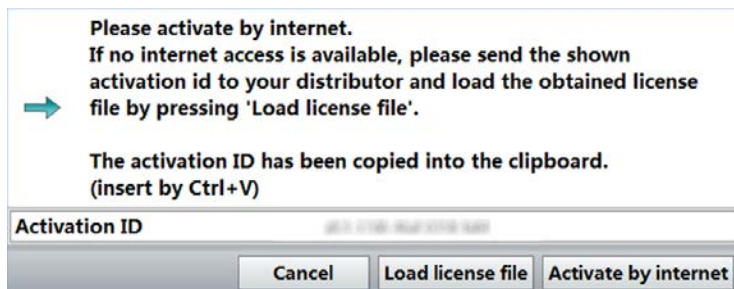
2.3.1 Entering the license code

First the license code (eight-digit, e.g. 1234-5678) must be entered, which you purchased together with the software.



2.3.2 Activation

Afterwards you have two possibilities of activation as described in the following.



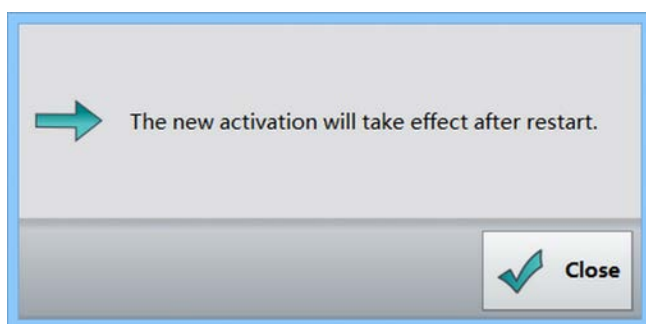
Via internet

The activation is done completely automatically after verification of the activation ID that has been transmitted through the software before and comparison with the registered licenses. In case a negative verification occurs, a corresponding note appears.

Offline

Activation is done offline via transmitting the activation ID that is displayed by the software through phone/fax/email/mail.

1. A 20-digit activation code (see figure above) is displayed. Please transmit this code to your qualified zebris medical dealer.
2. Afterwards you receive a license file, which you make available for example using a USB stick on the computer that shall be activated.
3. Afterwards you click on „load license file“ in the dialog window displayed above, select the received license file and confirm. After an automatic restart of the software, the activation is complete.



Please note that the activation is done per computer (work station) and that the number of activations is restricted to 3 work stations. Further activations can be purchased upon request at your qualified zebris medical dealer.

2.4 Installing the zebris device drivers

Drivers are available on the installation file carrier in the file **Drivers**. When required, please start the installation as described in the following paragraphs.

2.4.1 zebris USB driver

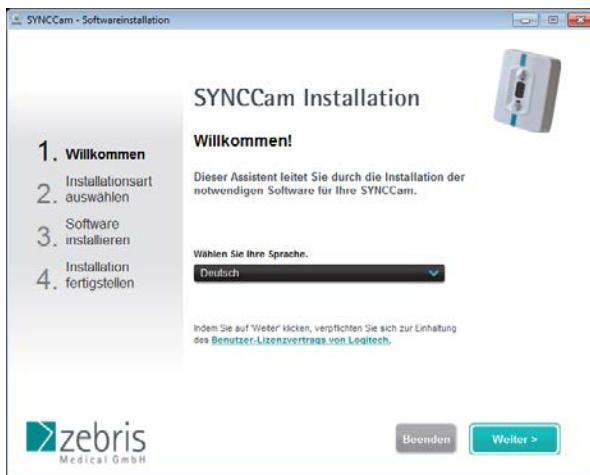
The zebris medical USB driver required for the main unit is installed in the background of the WINJAW+ installation. Please only install the USB driver separately when your PC cannot find the device resp. on demand of our support staff.

2.4.2 SYNCCam driver



The installation of the driver is only recommended in case you have problems with standard Windows drivers (e.g. display failures, speed problems) or when you are using two and more SYNCCams at the same time.

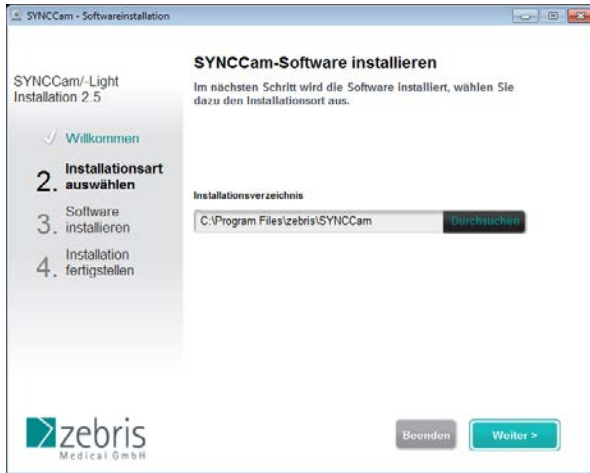
1. The installation files are automatically transferred to your computer. The process can take a few minutes.



2. Select the language and then click on **Next** to continue the installation.



3. Connect your SYNCCam using a free USB port and then click on **Next**.



4. To continue the installation click on **Next**.



5. The installation of the driver software can take a few minutes.



6. After successful installation you will see a live display of the connected camera. If the live display does not appear, please install the driver again.



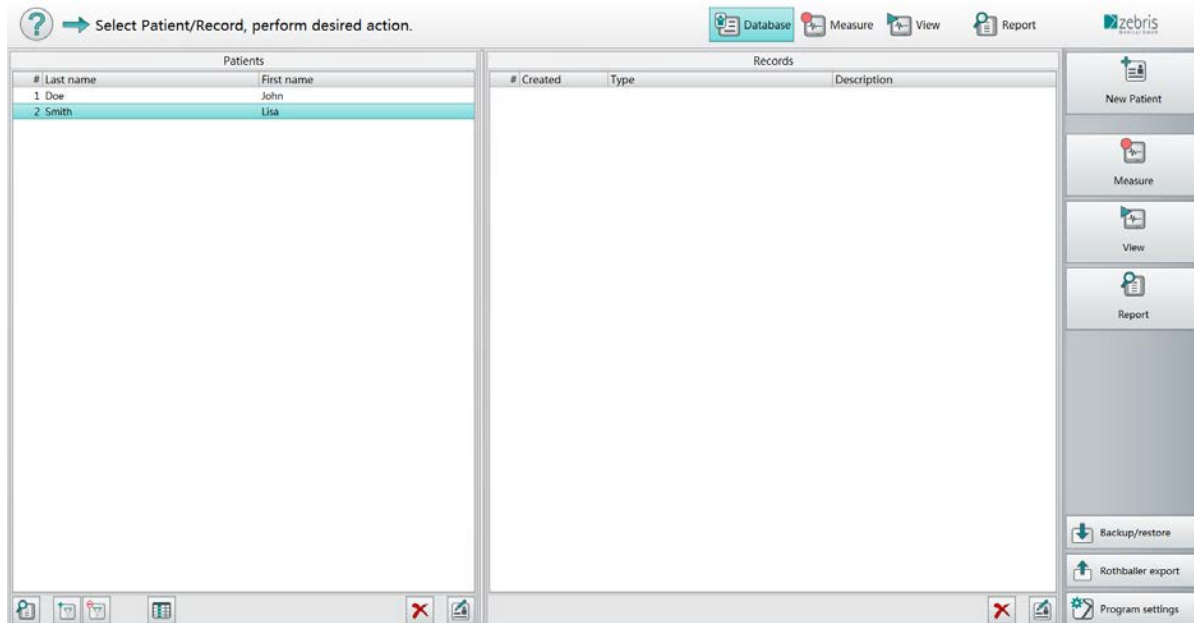
7. Once the installation has been set up, the following display appears. Click on **Finish** to complete the installation. If you are asked to restart your computer, please do so accordingly.



When using several cameras, the driver installation does not, as a rule, have to be carried out again. If problems arise for displaying the cameras in the program, please then carry out this driver installation once again to ensure the correct function of the cameras.

3 The Patient Database

After starting the program, you are in the Patient Database.



Here you can manage the patients as well as previous measurements and have access to import and export functions. In the following, you will also find a detailed description on the user interface.

3.1 Data Backup



The manufacturer zebris Medical GmbH explicitly states, that the user is responsible for backing up his/her data and furthermore recommends to create a regular backup of the patient data base. The WINJAW+ database can be found in the user data folder

- Windows 7,8
C:\ProgramData\zebris medical\WINJAW+

3.2 Information and Navigation



Information

Help and instructions for using the software.

Navigation

Here you can see the section of the program you are actually in. The active section is marked in color, respectively.

3.3 Patients

Patient list

Here, the names of the patients are listed. The patient currently selected is marked in color.

Deleting a patient

After a separate confirmation, the patient is irretrievably deleted together with all the measurements assigned to him.

Searching after a patient in the database

Using the function search, the patient database can be searched for a specific patient through the input line. The search window can be faded out through pressing **Esc** or clicking again on **Search**.

Processing the patient file

With a single click on properties the patient file opens.

Selecting the filter function

By using the filter function, you determine which patients are shown in the list. Click on **Set filter** to call up the filter settings. Click on **Cancel filter** to display all patients (standard setting).



Search parameters

The search parameters include the possibility to filter patients according to specific criteria.

Patienten			
Nr.	Nachname	Vorname	Gebur...
1	Mustermann	Max	16.06.1976

Patienten		Gefiltert - 1/2
Nr.	Nachname	Vorname

Active filter

A filter is active when all visible patients above the patient list on the upper right are displayed (patients displayed/all).

3.4 About WINJAW+



View „About WINJAW+“

A click on the **question mark** opens the window.

Functional description

The functioning and the application of the software are briefly described.

Software related data

The software's name, version and the date of installation resp. the last update as well as information on the used operating system, the graphic hardware and the active license are displayed.





Manufacturer's information

This field contains all relevant data on the software manufacturer.

3.5 Recordings

Aufnahmen			
Nr.	Erstellt	▲ Typ	Beschreibung

List of recordings

Here all recordings of the patient are listed who has just been selected. The selected recording is marked in color.

Deleting a record

After a separate confirmation, the selected measurement is irretrievably deleted.

Details of the recording

Here you can edit the description and comments on the recording.

3.6 Functions



New Patient

Click here to create an entry for a new patient.

Begin new measurement

With a single click you can select the measurement application.

Displaying the measurement & editing

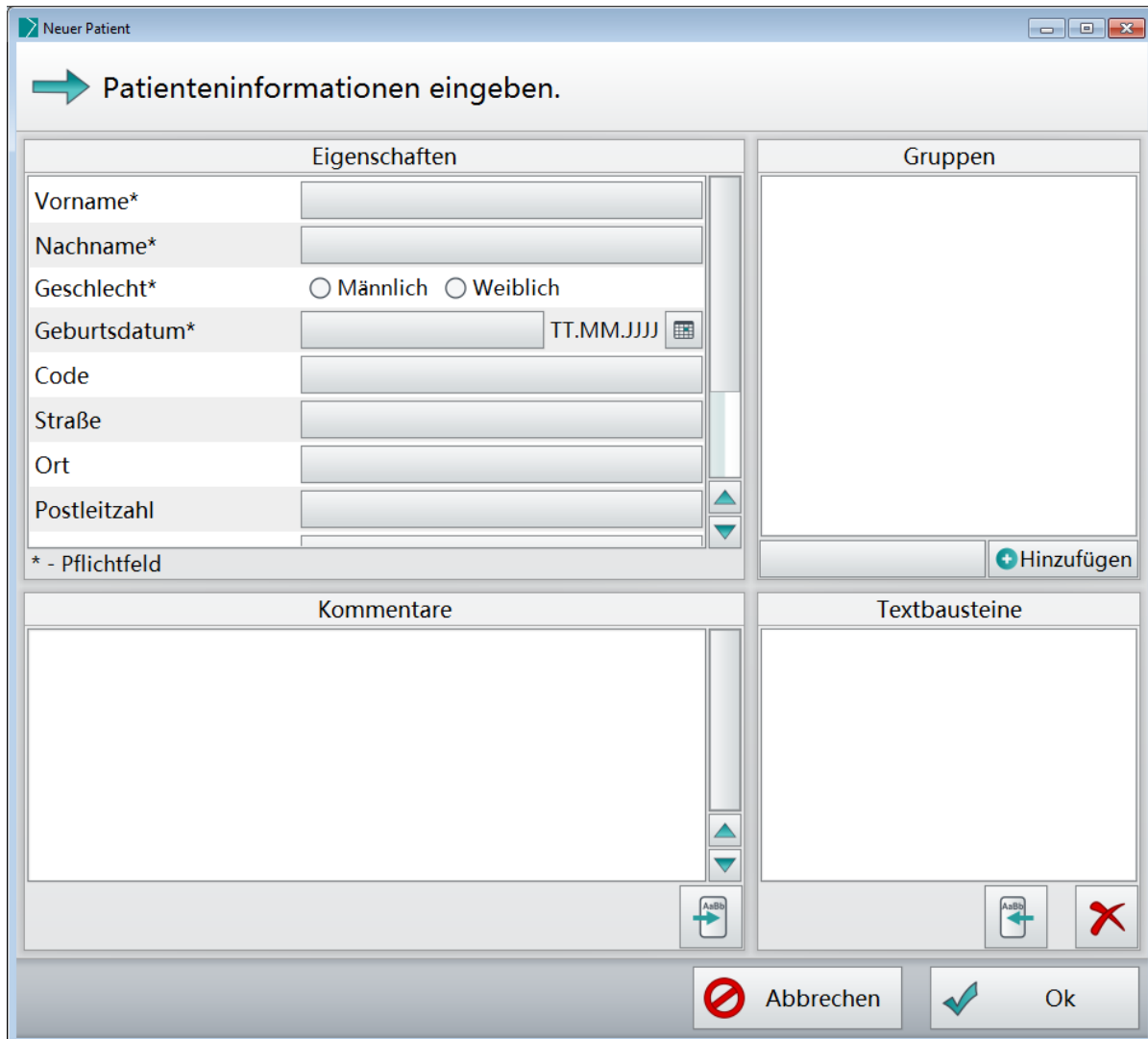
The currently selected measurement is opened for viewing and editing.

Showing the measurement results

The measuring results of the measurement selected now are shown clearly. The report provides a print function and PDF export.


3.7 Patient file / New patient

When you create a new patient or edit the file of an existing patient (button **New Patient** or **Properties**), the following dialog appears:



In the following the individual fields and their function are briefly explained.

3.7.1 Properties

Properties	
First name*	<input type="text"/>
Last name*	<input type="text"/>
Gender*	<input type="radio"/> Male <input type="radio"/> Female
Date of birth*	<input type="text"/> mm.dd.yyyy 
Code	<input type="text"/>
Street	<input type="text"/>
City	<input type="text"/>
Postal code	<input type="text"/>
State	<input type="text"/>
Country	<input type="text"/>
Work phone	<input type="text"/>
Home phone	<input type="text"/>

* - mandatory field

Patient data

Please enter the patient data here:


Obligatory fields are the first name and the surname as well as gender and date of birth.

The box “**Code**” gives you the possibility of allocating the patient entry a unique identifying designation.

3.7.2 Labels

With this field you can allocate the patient to a group.

You will then have the possibility of showing only the patients of a certain group in the database. Therefore, please select this/these group(s) in the filter settings.

Gruppen	
<input checked="" type="checkbox"/>	Patientengruppe 1
<input type="checkbox"/>	Patientengruppe 2
 Hinzufügen	

Creating a new label

Enter the name for the new group to be created here and click on **Add**.

Gruppen

<input checked="" type="checkbox"/> Patientengruppe 1

Gruppen

<input checked="" type="checkbox"/> Patientengruppe 1
<input checked="" type="checkbox"/> Patientengruppe 2

+ Hinzufügen

The newly created group appears in the list. The tick to the left of it shows that the patient is allocated to this group.

Allocating a patient to several labels

By clicking on the tick you can carry out or cancel the allocation.

Groups to which no patients are allocated any longer disappear automatically after closing the dialog.

3.7.3 Comments & Clips

Kommentare	Textbausteine
<div style="border: 1px solid gray; width: 100%; height: 100%;"></div>	<div style="border: 1px solid gray; width: 100%; height: 100%;"></div>
<div style="border: 1px solid gray; padding: 2px; display: inline-block;">→</div>	<div style="border: 1px solid gray; padding: 2px; display: inline-block;">←</div> <div style="border: 1px solid gray; padding: 2px; display: inline-block; margin-left: 10px;">✖</div>

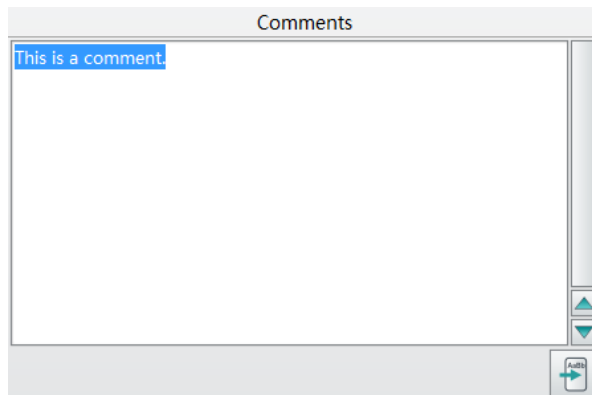
Comments

Write any free text here as a comment on this patient.

Clips

This list contains all the text clips you have defined.

Creating text clips



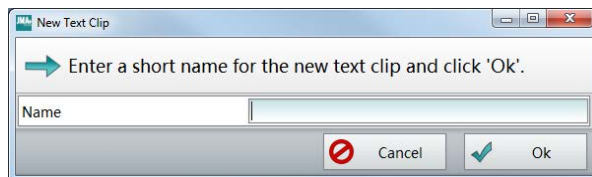
1. Mark the text

Mark the text section in the box "Comments" that you wish to create as a text clip.

2. Save

To save the marked text section as a text clip, click on **Save Clip**.

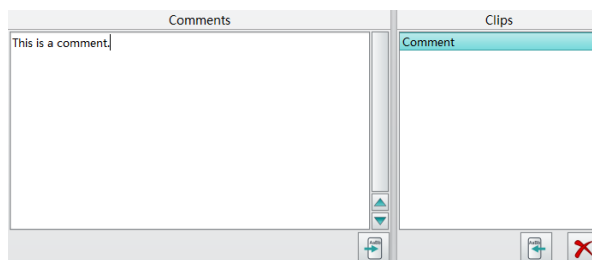
3. Enter designation



In this dialog you can select a designation for the text clip your chosen designation is then automatically stored as a suggestion.

By clicking on **OK** the text clip is created and appears in the list with the chosen designation.

Inserting a text clip



1. Determining the cursor position

Set the cursor by left-clicking at the position where your text clip is to be inserted.

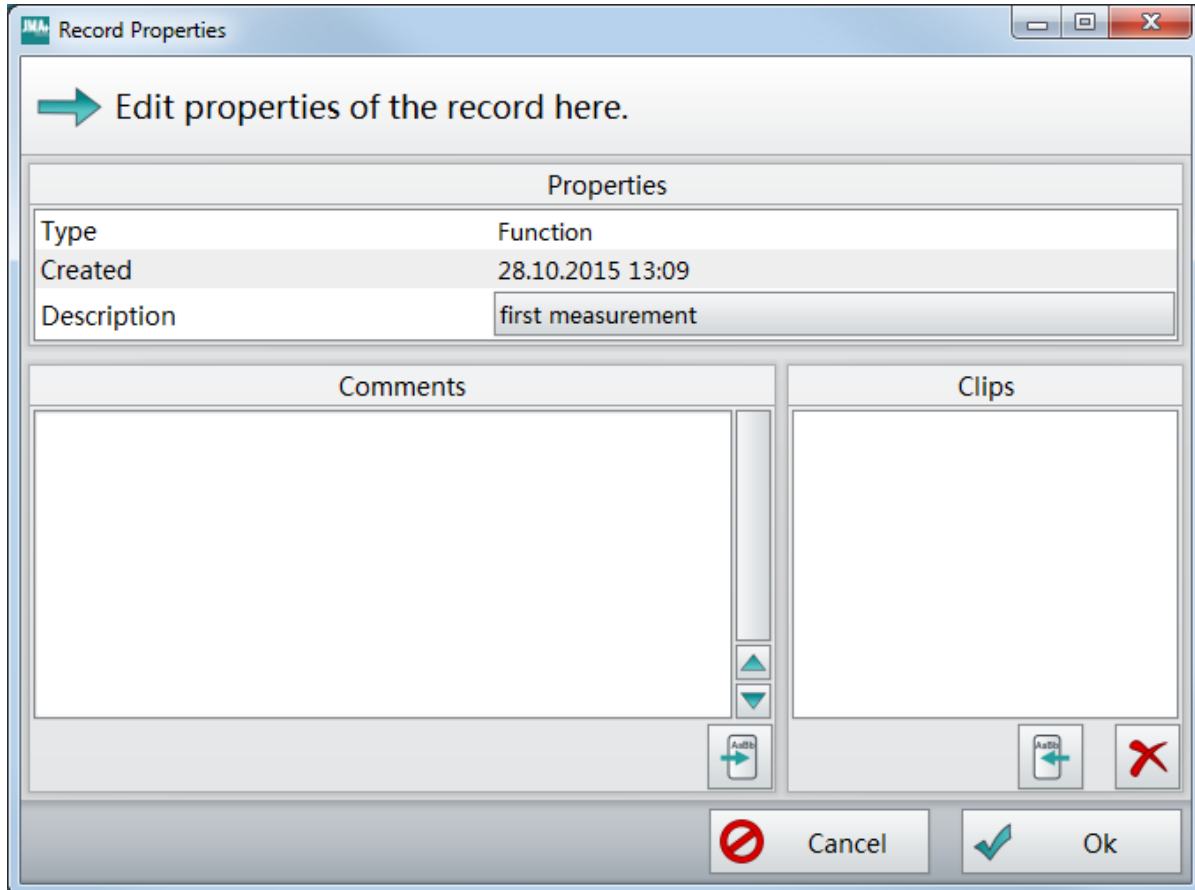
2. Inserting the selected text clip

Select a clip from the list with a left click. This clip is then taken over to its new position in the Comment box by clicking on Paste Clip.

3.8 Details of the recordings

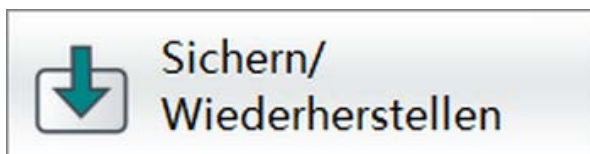
Call up this dialog by clicking on Properties on the right under the list of recordings.

You can change the description of the recording and also add a recording comment. Text modules are stored separately from those in the Patient File.



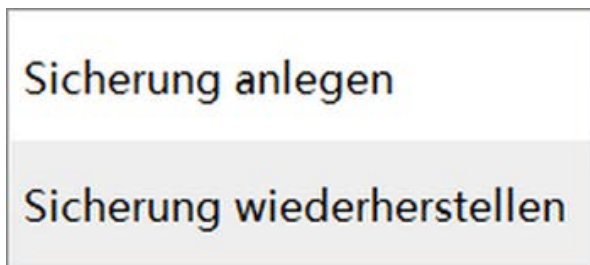
3.9 Import of data sets

You can import existing patient and measuring data of different formats into the database. The exact procedure in doing so is explained below:



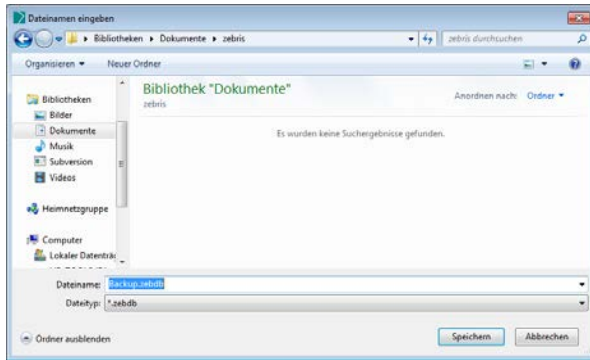
1. Import...

Click on the button **Backup / Restore** at the bottom right in the toolbar.



2. Backup / Restore

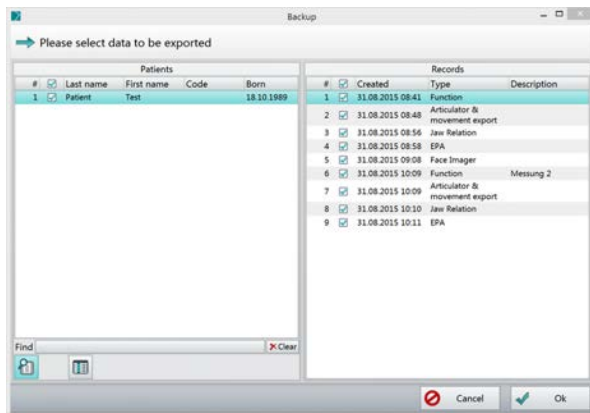
Select Backup / Restore backup in order to import the desired data to your database.



3. Browsing for & selecting data

Search for data records, that you would like to import, on your hard disk respectively other storage media connected to your computer. It depends on the format which files you have to select. More information see Chapter [Data formats](#) [30].

4. Select data records



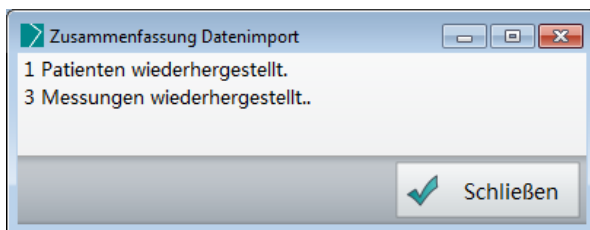
Place ticks in front of all data records, that you would like to import.

In order to import all patients of a group or a project, place the tick in the first column. If you would like to import all measurements of a patient, simply click on the tick in front of the patient's name.

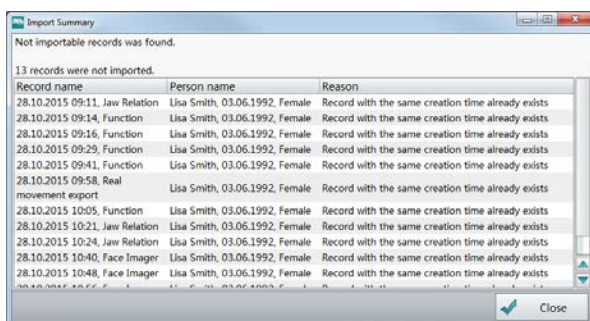
When clicking in a line with the patient name, all measurements of the patient are displayed on the right. You can then select them individually.

5. Results

After a successful data import the dialog shows you a summary of how many patients and measurements have been imported. Incorrect data records are shown in the list, as well as patients and measurements that have already been created and were therefore not imported.



Project names from the old software are allocated to the patients as a group with the prefix "Project".



Errors/Duplicates

If any errors occur while importing or if you would like to import data records, which already exist in your data base, a summary will be displayed informing you on the corresponding information.

3.9.1 Data formats

zebris medical own data formats (.zebdb/.data)

If you would like to import data from older or new software packages, simply select the corresponding file with the ending `.zebdb` resp. `data`.

Old data sets WinJaw

You can import old measuring data from the software packages from WinJaw into this patient database.

Please search directly for `database.db`.

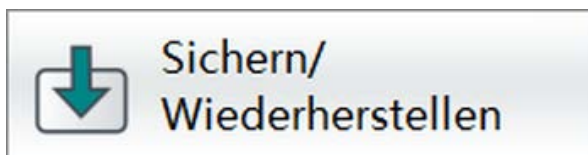
The default paths to the database are:

„C:\Programs\zebris medical\WinJaw\Data\Database.db“

Alternatively you can also copy the whole folder "Data" from the old software, e.g. onto a USB memory stick, and then import the data from this stick.

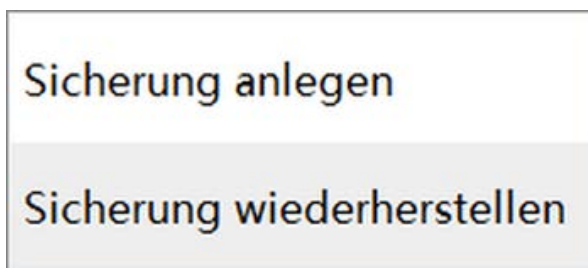
3.10 Data Export (Backup)

You can export patient and measuring data from the database into the zebris medical' own format „zebdb“. This offers you the opportunity to exchange single data records with colleagues also working with the WINJAW+-Software. Exported data can be imported again by using the Restore function. Furthermore, you can create backups of the database by doing so.



1. Export...

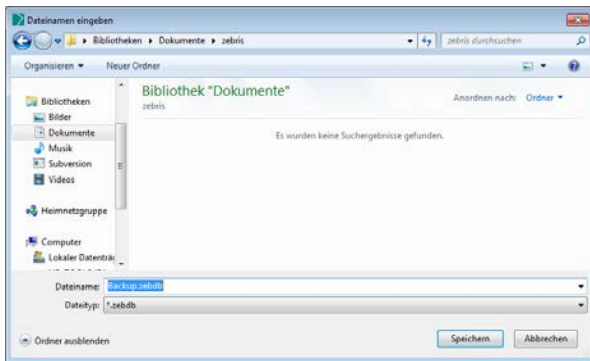
Click on the button at the bottom **Store / Restore** right in the toolbar. If several export formats are available, select one from the appearing list.



2. Save

Select **Create backup** in order to export the desired data out of your database.

3. Select data records

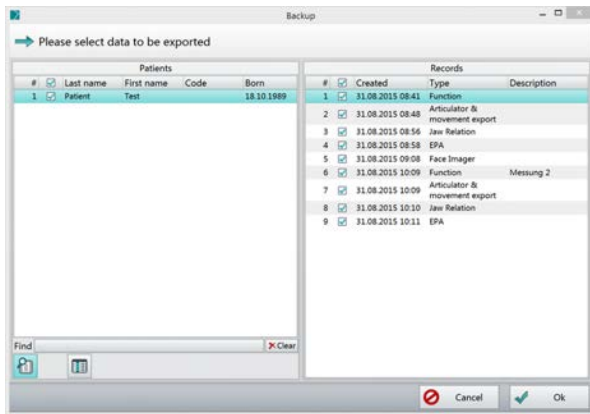


Place ticks in front of all data records that are to be exported.

If you would like to export all measurements of a patient, simply click on the tick in front of the patient's name.

When clicking in a line with patient name, all measurements of the patient are displayed on the right. You can then also select them individually.

4. Select data records



Place ticks in front of all data records, that you would like to import.

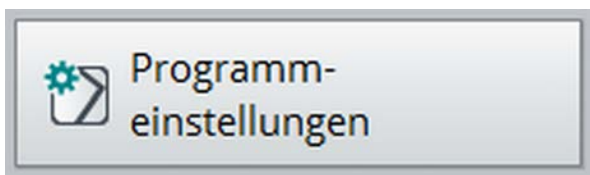
In order to import all patients of a group or a project, place the tick in the first column. If you would like to import all measurements of a patient, simply click on the tick in front of the patient's name.

When clicking in a line with the patient name, all measurements of the patient are displayed on the right. You can then select them individually.

3.11 Program settings

Here you can change among other things the speech and carry out adjustments to the insurance card reader.

3.11.1 Allgemeines



You can reach the program settings by clicking the button **program settings** at the bottom right of the toolbar.

Select General Settings by clicking Common on the left side.

Language

Choose from the list the desired translation of the program interface.

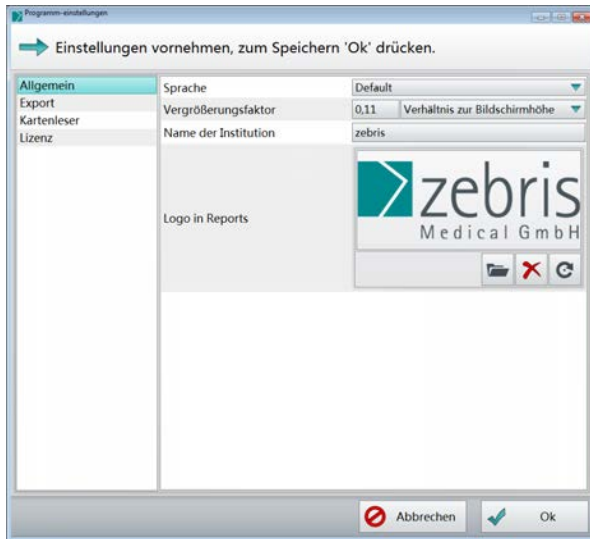
Screen font size

This factor determines the size of all display elements in the software. Select **fixed** to enter your own value in the unit dpi in the box. Relation to the height of the screen can be used as an alternative to the dpi setting therefor set **from screen**. System input **from system** sets the value back to the Windows default.

Logo in reports

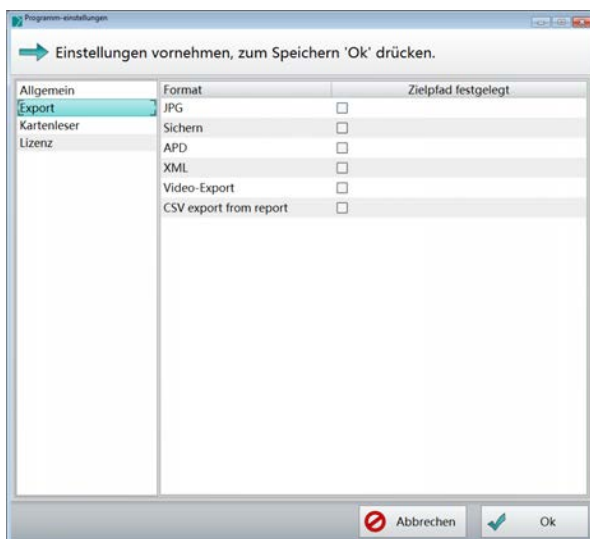
Select a logo graphic, which appears in all reports in the header, by clicking on the **load new picture** Button.

Click on **clear picture** to no logo graphic display, or **restore** to default to the original graphics.



3.11.2 Export settings with default path

You can specify in the program settings (database) for each available export function to a target folder. If this setting is, active no longer a save dialog ("Enter file name") appears and the files are stored directly in the default folder.



1. Program settings

Click the bottom right of the tool bar this button.

2. Select export settings

Click on the left to export.

Save - Select the check box and select the desired folder for backup.

If you want to change the selected directory, press the button and then create a new directory path in the default data to be exported.

zebris medical Dental Export - Select the check box and select the desired directory for export to CAD CAM interface.

If you do not have a fixed folder, a dialog where you can specify the location and name of the export file appears. Enter a different file name, or simply click Save to the displayed proposal to take over.

3.11.3 Smartcard (Card reader)

Here you can set up your card reader for the use of KVK resp. eGK. This requires a Smartcard-Reader with the eGK resp. special reading devices for the KVK, like e.g. chip card keyboards of the German manufacturer Cherry.

The electronic health card (eGK) works in combination with the card reader that is integrated in the zebris medical HP notebooks (right-hand side) without any further installation (Standard setting).

The old insurance card (KVK) only works with installed CT-API drivers.

1. Card reader

Select the entry cardreader on the left hand side.

2. Select interface

Select the interface resp. the device with which you read in the KVK resp. EGK on the right-hand side:

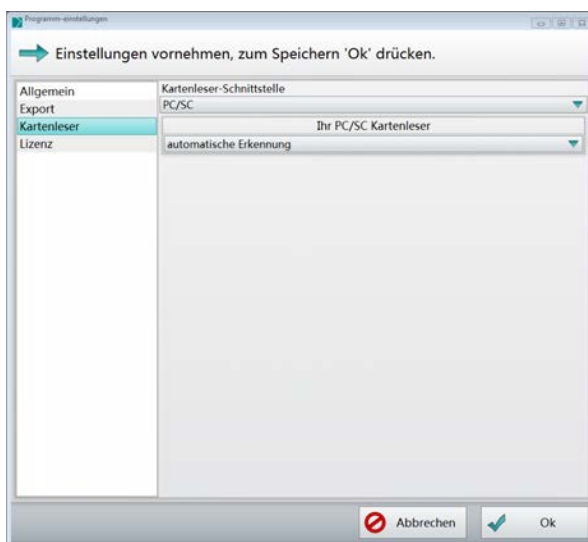
PC/SC for eGK

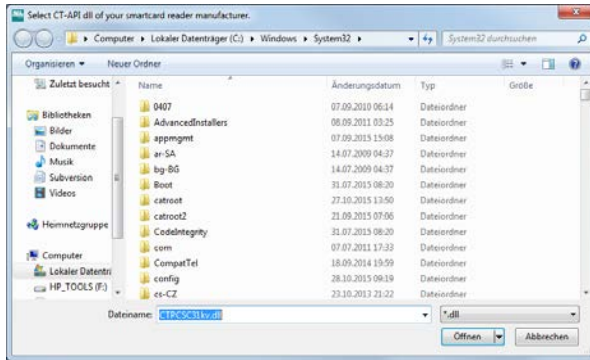
CT-API for KVK and eGK

If you have selected PC/SC, confirm afterwards with **Close**.

3. CT-API

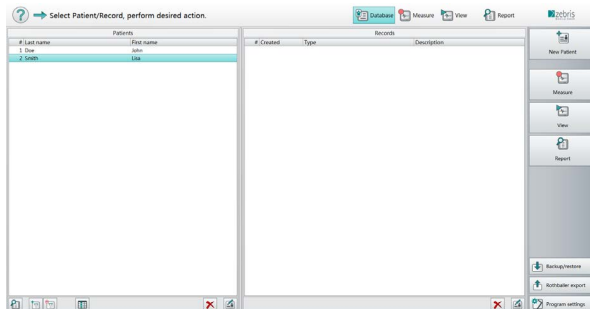
CT-API can read both KVK and eGK. The preset proposition is the driver of the EHEALTH-BCS keyboardG871504 of the manufacturer Cherry. Click on **Browse** afterwards in order to choose the corresponding dll file of your CT-API-drivers.





4. Select dll drivers

Select on your hard disc the corresponding CT-API driver. Please find details in the manual of the card reader manufacturer.



5. Insert card

Insert a card into the reading device.

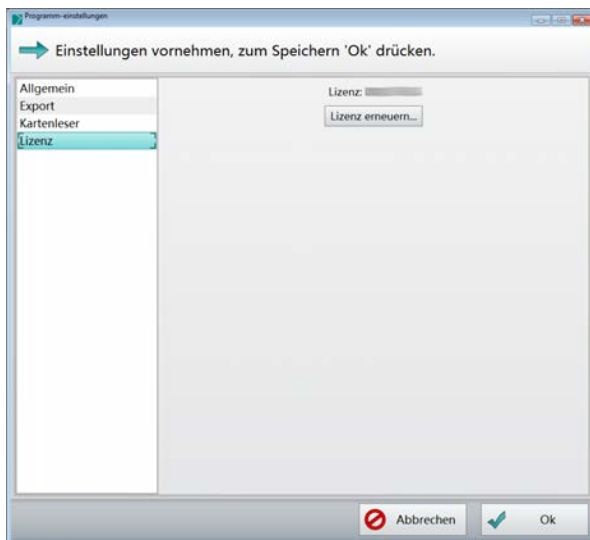
6. Create new patient

Click on New Patient and the data from the card is pasted automatically.

3.11.4 License

1. Choose license

Click on the left side on license.



In the right pane, the current End User License Agreement is displayed. To renew the license, please click on the Renew license button.

2. Software activation

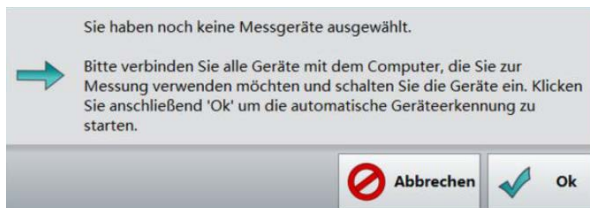
Activation of the customer software is provided via the Internet. Please click onto the button Activation via the Internet.

This task must be carried out also during installation, see chapter [Licensing](#)³⁴. You will be notified whether the activation was successful or not. If not successful activation has occurred, please contact your customer service.

4 Device settings

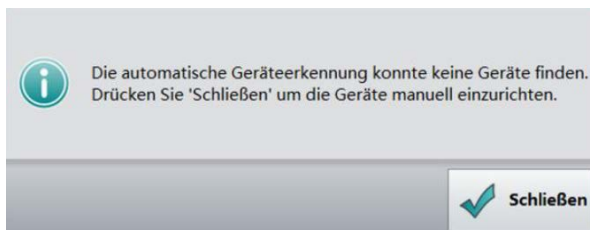
Before you can use your measuring devices, you must create a device profile (i.e. one or more devices in a group). This applies to those modules for which the button “Device settings” is displayed on the bottom right after the module has been selected.

4.1 Establishing a connection via USB



Automatic detection

Connect all devices that you want to use for measurements to your PC using the supplied USB cables. Make sure that the sensors are also properly connected to the device and that the devices are switched on. Then confirm with **Ok**.



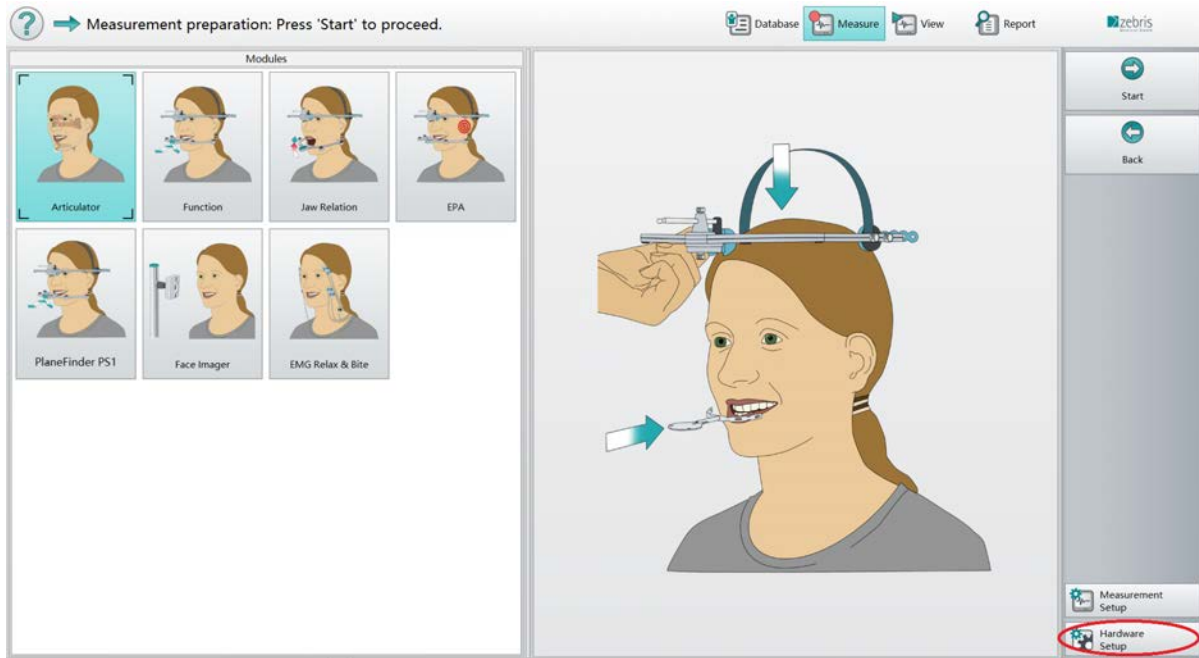
Device detection failed

No device was detected. If you have already plugged in the devices, check the power supply and switch on the connected devices.

Manually add devices to a profile by clicking on **Close**.

4.2 Establishing a connection via Bluetooth

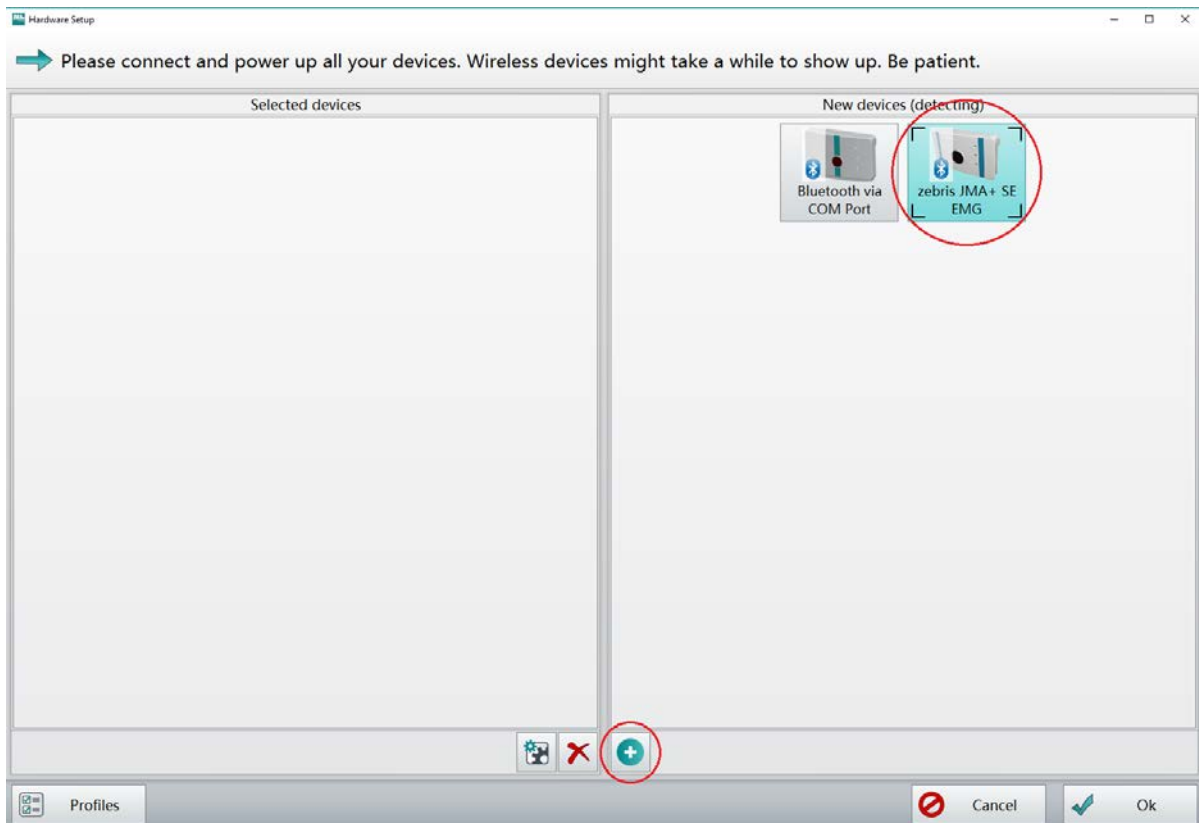
If your PC has an integrated Bluetooth interface or you have received the zebris Bluetooth USB dongle with your system, it is possible to connect the JMAlyser measuring system directly from the WINJAW + user software via Bluetooth. For this purpose please open the device settings and switch on your JMAlyser+ measurement system.



The device manager in the device settings now automatically searches for an existing Bluetooth device to connect it to the PC and the WINJAW + software. This process may take several minutes.

Once your JMAlyser+ device is found, it is displayed on the left side of the device manager. Please select the device by double clicking the icon of the device.

Additionally, you can simply select the device with a simple click, so that it is highlighted in green and then click the "Add" icon.

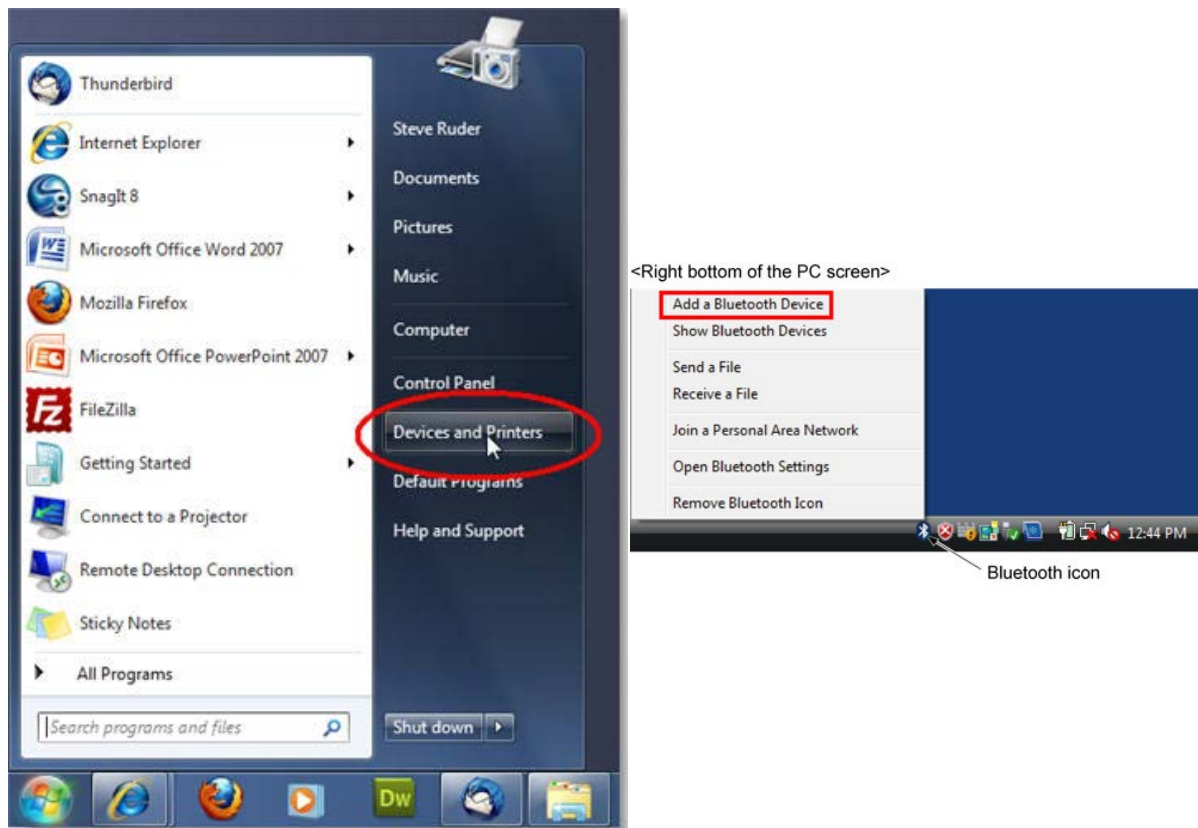


A Windows task is now displayed in the lower right-hand side of the screen, which can be used to establish a connection via Bluetooth.

Please click on this task to perform the automatic pairing and proceed with the instructions from JMAlyser+ Pairing^[37].

4.2.1 Add your JMAlyser+ manually to your Bluetooth devices

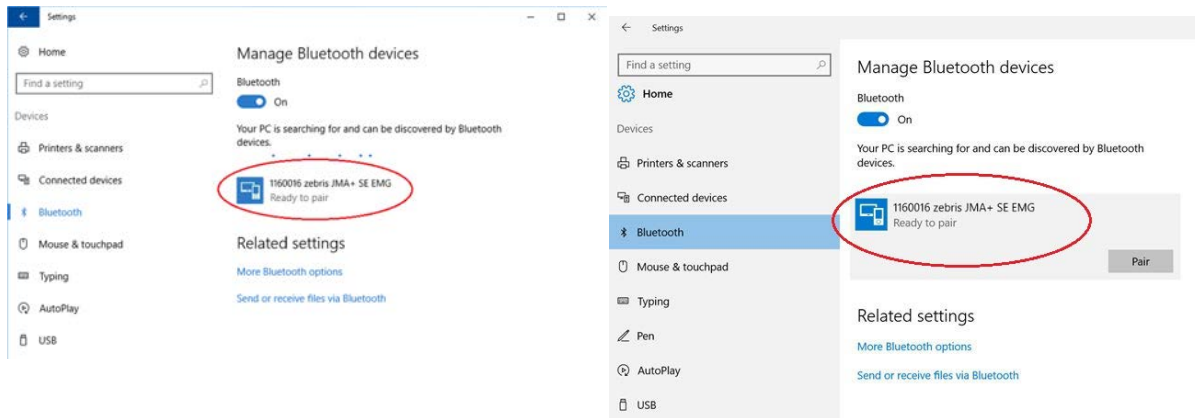
First, select the "Devices and Printers" folder from the Start menu. Alternatively, you can also directly select the "Add Bluetooth device" button on your taskbar.



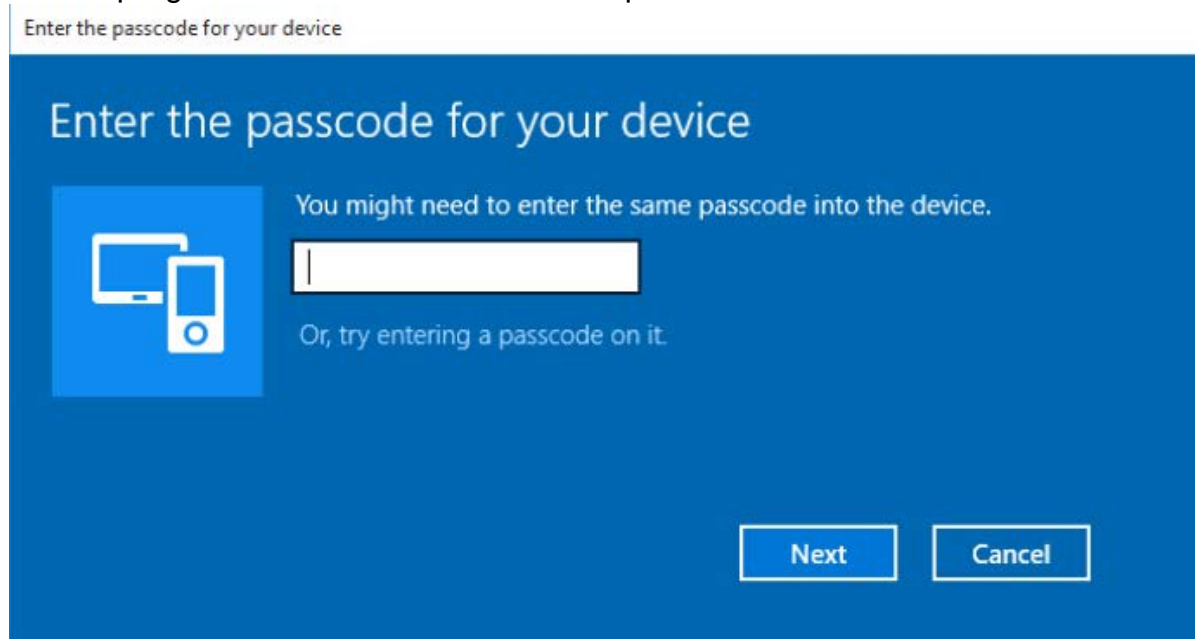
Among the "System control"> "Devices and printers" you will find the button "Add device". By recognizing the "1 1600xx zebris JMAlyser", this device can now be paired with the PC and added to the Bluetooth enabled systems.

4.2.2 JMAlyser+ Pairing

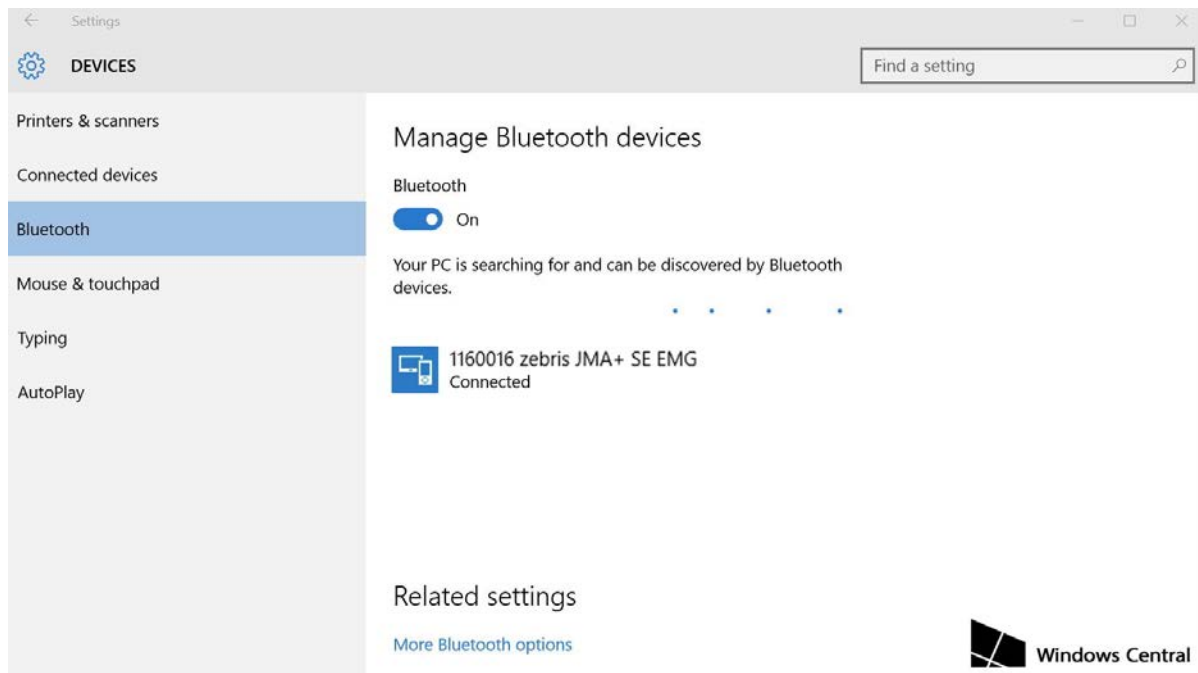
If the JMAlyser+ symbol is highlighted by clicking on it, please use the left mouse button to click on it and the pairing process will be started.



The "coupling code" must then be entered for the JMAlyser measuring system. The coupling code is "0000" as shown in the picture below:



The device is ready for operation if the blue Bluetooth LED is activated and the description "Connected" in the "Device and Printer" task is shown.

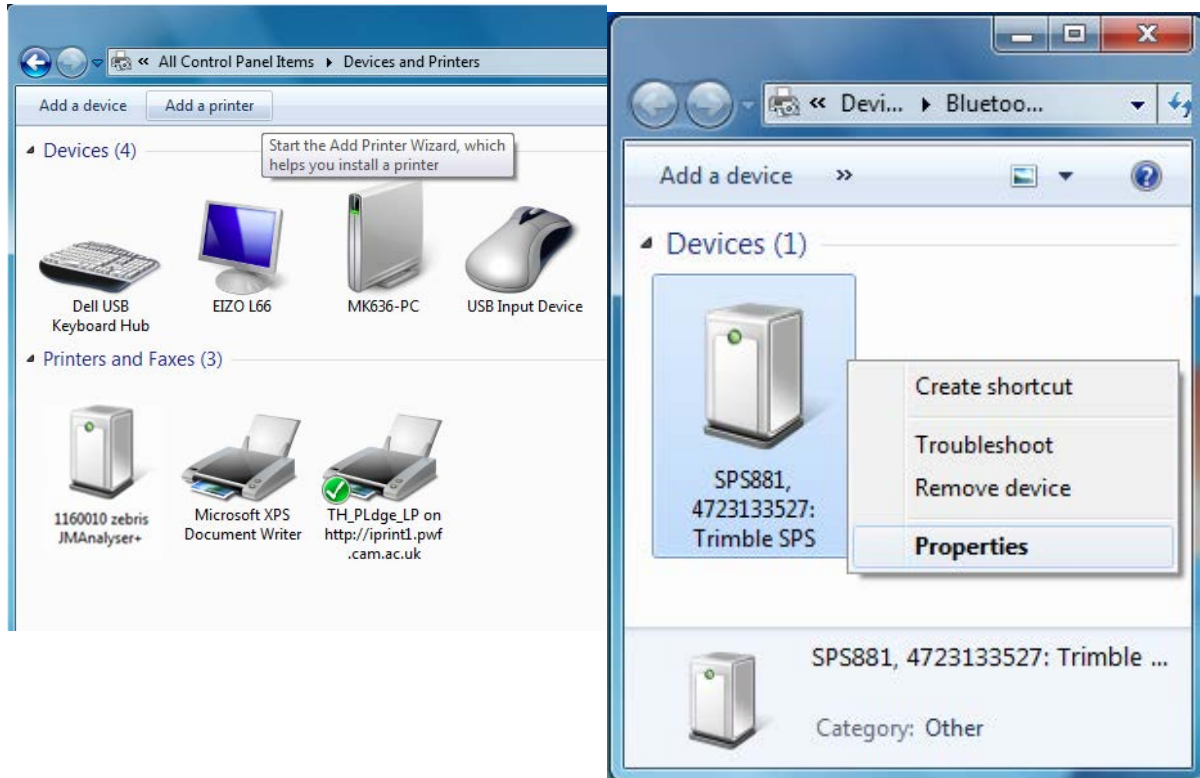


4.2.3 Bluetooth-connection via Com Port

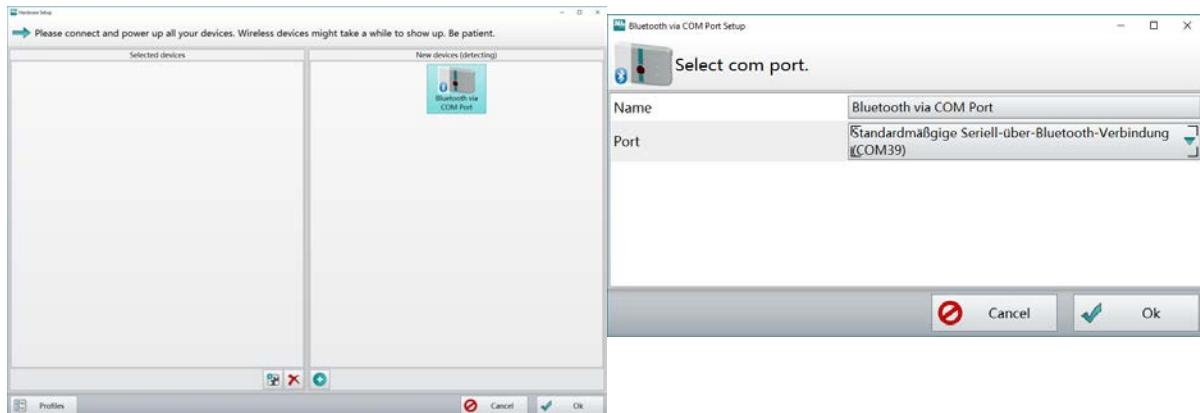
If you are using the device via Bluetooth with a PC which is not equipped with a Windows 10 operating system, the following steps are also required:

Pairing works in Windows 7 to Windows 8.1, similar to the procedure described in Add your JMAlyser+ manually to your Bluetooth devices^[37].

In addition, the "COM port" to which the device is connected must be selected in the device settings for the JMAlyser measuring system. The "COM port" can be found in the "System control" under "Devices and printers". The paired device is selected and its properties are called, via "right click" on the symbol of the device.



In the device manager, the correct COM port must now be set for the device selection.



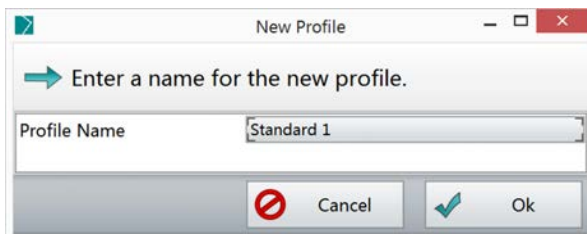
Confirm with OK. The operation of the device is confirmed by the flashing of the blue Bluetooth LED.

4.3 Manually selcting devices



1. Creating a device profile

To create a device profile click on „**Profiles**“ and “**Create new elements**“.



A new window will open. Please enter here the intended name for the device profile.

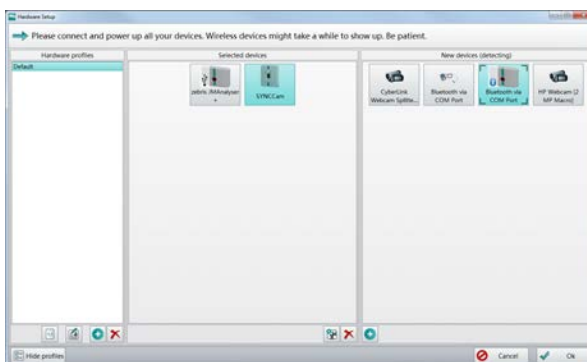
2. Selecting a device



The dialogue window to the right displays all detected devices (which are enabled according to your license).

Please select the device, which you want to add to your profile and click on **Add selected device**.

If the device is a camera, a configuration dialogue will be displayed (see section Measurement settings^[45]). Repeat this step until all devices that you want to use for measurement have been added.



3. Finished profile

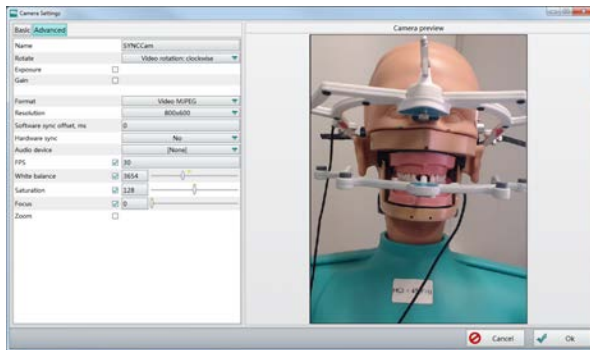
When you have added all devices which you want to use for measurements to the profile, click on **Ok**.

4.4 SYNCCam (USB)

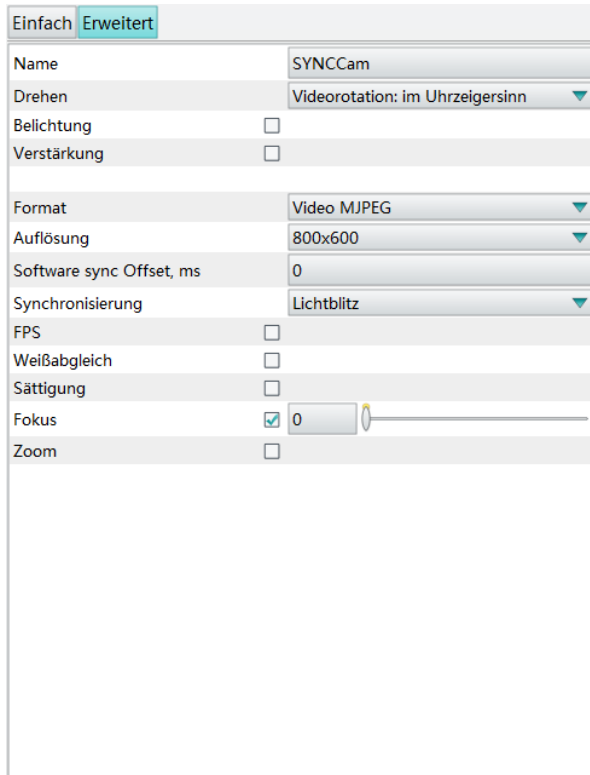
The settings required for the use and synchronization of connected cameras will be explained hereafter. These settings must be made once per camera connected.

Other settings are not required for the function and in some circumstances might affect image quality. Please only change other settings if you are familiar with the system.

4.4.1 Configuration dialogue



On the right you can see a live image of the camera and on the left the possible settings, **Basic** and **Advanced**.



Name

Enter a unique name for your camera. You cannot have several cameras with the same name.

Turning

Here you can turn the frame in 90° steps if it is required.

Exposure

Here you can set the exposure to light.

Gain

Here you can choose the image gain.

Format

For smooth recordings choose the „MJPEG“ setting.

Resolution

Here you can choose the frame size (resolution) of the recorded video.

FPS

Here you can set the desired number of frames per second.

White balance

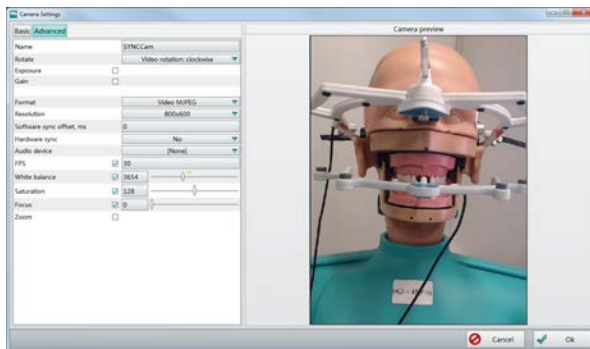
Here you can set the colour balance in the camera image.

Saturation

Here you can set the colour saturation.

Focus

Here you can define the focus. Making a setting here will deactivate the automatic.



Save the settings

When you have made all settings as recommended, close the dialogue by clicking **Ok** to save the settings.



The camera has autofocus and white balance (for natural colors). If a function is ticked, it is manually controlled via the slide button.



For recording fast movements while using a separate light source set the “exposure” to the smallest possible value. Use the “gain” controller to brighten the image.

5 Module selection

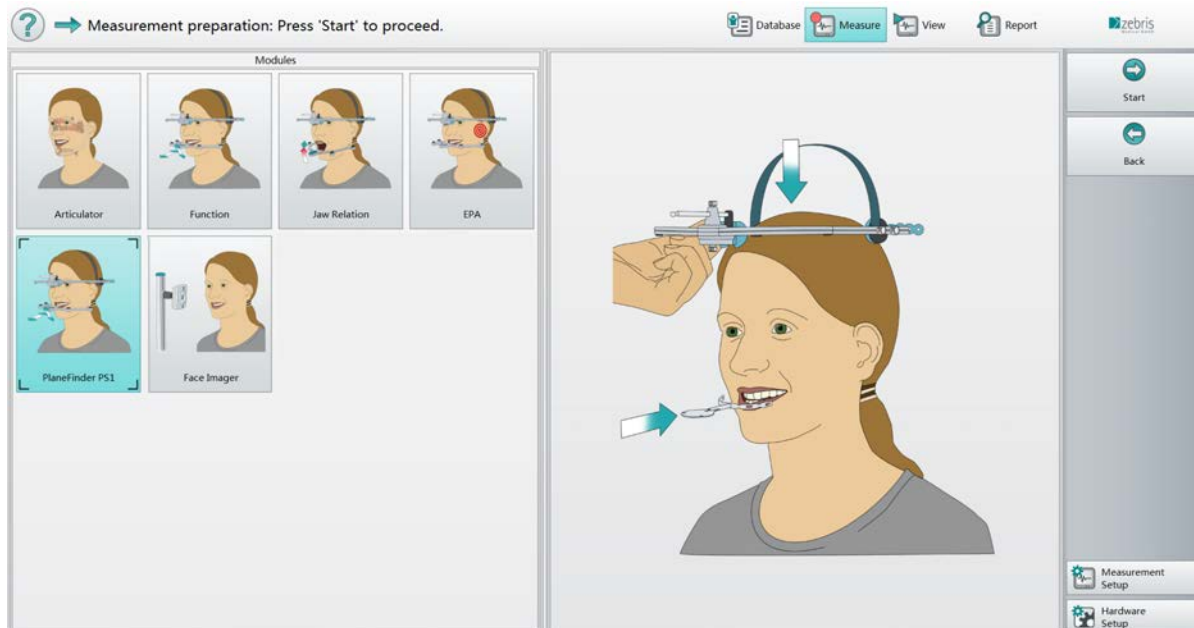
5.1 General

By clicking on Measure, the software moves from the database to the module selection.

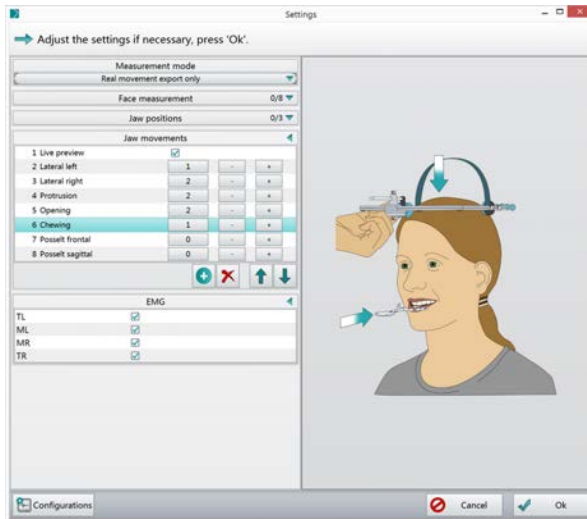
The module selection depends on the license key you have purchased. The systems are software and hardware extendable. Ask your supplier for additional applications

In the module selection, you can choose on the left side with which module you want to start. Afterwards you can make settings, after clicking the **Measurement Setup Button**, on the right side depending on the selected module. For details about the settings, please refer to the appropriate module chapter. In addition, various configurations, e.g. different treatment or analysis processes can be stored and called again. Measurement specific settings are explained in the following chapters of the modules.

Before the modules can actively support the measurement process, the connection and selection of the hardware is necessary.



5.2 Measurement settings



Click on the Button Measurement Setup. Open the tabs via the Down arrow bar to open, determine and define the individual parameters. The selection varies by the chosen module.

- Measurement mode
- Reference System
- Face measurements
- Lower jaw positions
- Jaw movements
- EMG

5.2.1 Measurement mode

Articulator adjustment only

In this mode only data for the analogous adjustment on the standard articulators will be generated. This adjustment has the advantage of collecting data fast and hassle-free, based on which the user can manufacture individual splints and dentures for individual patients.

Real Movement export only

This mode relates to a bite fork, movement data and the virtual recording of patient situations in a digital workflow. The processing of data is enabled via CAD/CAM interfaces.

Articulator and movement export

This measuring option requires both the simple analogous and the digital data collection via the bite fork.

Articulator adjustments only

Real movement export only

Articulator & movement export

5.2.2 The reference system

The reference system for patient measurements has several options for individual settings. To measure all measuring modules it is necessary that a skull-related reference level be entered first. There are further options for terminal and kinematic axis determination.

Determine the incisal and orbital points

If the tick mark is set, the coordinates of these points are individually determined with the pointer. If the tick mark is not set, the position of the incisal point is determined via the length of the T-Attachment, and the orbital point is determined via a mean value of this position from the cranial anatomy.



Condyle position

Tragus superior by pointer

Position taken via pointer tip.

Center of condyle by pointer

Position taken via pointer tip.

Axis determination

No

The arbitrary axis will be taken over and used for the measurement configuration.

Hinge axis

Patient carries out an opening and closing movement in terminal condyle position. This position can be used as reference axis for the measurement. Elsewise the axis can be compared to the center of rotation determined by the arbitrary axis.

Kinematic axis

Patient carries out a maximum opening and protrusion movement. This axis also can be compared to the arbitrary axis.

5.2.3 Face measurement

Face measurement			
1 Left eye corner	<input checked="" type="checkbox"/>		
2 Right eye corner	<input checked="" type="checkbox"/>		
3 Left mouth corner	<input checked="" type="checkbox"/>		
4 Right mouth corner	<input checked="" type="checkbox"/>		
5 Static points upper jaw	1	-	+
6 Dynamic points lower jaw	1	-	+
7 Static lines upper jaw	1	-	+
8 Dynamic lines lower jaw	1	-	+

Distinctive reference points from the facial symmetry, the mouth cavity or lines e.g. for the face profile, can be entered via the pointer. These points can be measured on both, the static upper jaw and the dynamic lower jaw and thus be represented in the graphic surface of the software.

5.2.4 Lower jaw positions

Jaw positions	
1 Habitual occlusion	<input checked="" type="checkbox"/>
2 Rest position	<input checked="" type="checkbox"/>
3 Jaw Relation	<input checked="" type="checkbox"/>
4 Patientenindividuelle Position	<input checked="" type="checkbox"/>

Different settings for lower jaw positions that detect the relation between lower and upper jaw can be selected and thus determine the allocation of movement data to the corresponding jaw relationship. The order in which the selected lower jaw positions are to be measured can be individually set via the arrow buttons.

5.2.5 Jaw movements

Jaw movements			
1 Live preview	<input checked="" type="checkbox"/>		
2 Lateral left	1	-	+
3 Lateral right	1	-	+
4 Protrusion	1	-	+
5 Opening	1	-	+
6 Chewing	1	-	+
7 Posselt frontal	1	-	+
8 Posselt sagittal	1	-	+

The settings of the jaw movements to be executed determine the order and frequency of diagnostic movement recordings. The order in which the selected movement exercises are to be made during the measurement can be individually set via the arrow buttons.

5.2.6 Measured parameters

Measured parameters	
Retral position	<input checked="" type="checkbox"/>
Target position	7 - +
Gothic arch	<input checked="" type="checkbox"/>
Manual correction	<input checked="" type="checkbox"/>
Guided registration	<input checked="" type="checkbox"/>
Bite control	1 - +

The user can make additional settings for the jaw relationship module in the section for measured parameters.

Here you can choose whether a **retral position** is to be measured, how many **target positions** and **bite controls** are to be carried out and whether a **Manual correction** and a **Navigated Registration** of the measurements will be added. Furthermore, the **Gothic arch** can be integrated into the measuring

procedure. By clicking on **Ok** you return to the database.

5.2.7 EMG

EMG	
TL	<input type="checkbox"/>
ML	<input type="checkbox"/>
MR	<input type="checkbox"/>
TR	<input type="checkbox"/>

The system allows you to integrate the option of measuring action potentials upon muscle contraction into the movement analysis. The masseter muscle and temporal muscle are used for this option.

The EMG channels are enabled depending on the hardware version. It is possible to make an upgrade at a later point in time.

5.3 Measuring profile management

Save acquisition profile

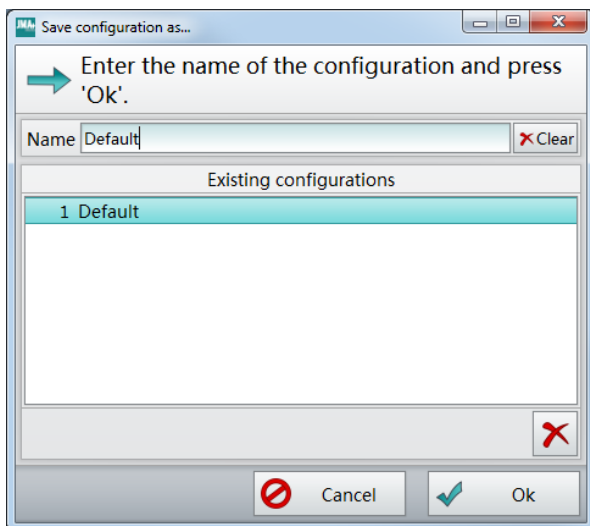
Load acquisition profile

Export configurations

Import configurations

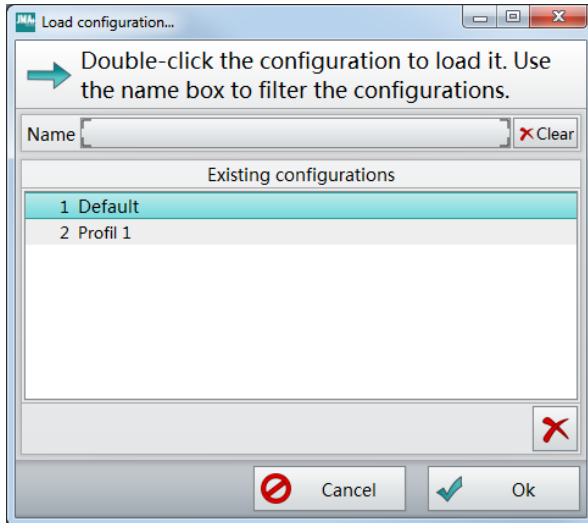
Profile Management

Click on **configurations** to manage your measurement settings.



Saving a measurement profile

Click on **Save acquisition profile** to save your measurement settings under the desired name.

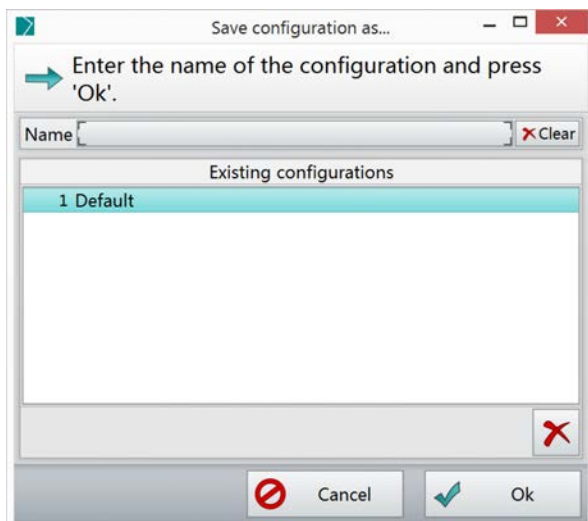


Loading a measurement profile

Click on **Load acquisition profile** to use a measurement profile that has already been saved.

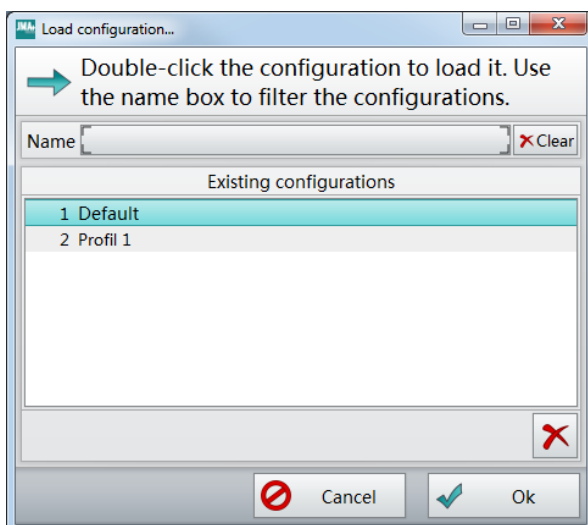
"Default" - Settings

The Default setting enables you to reset the software to its initial settings.



Exporting your measurement profiles

Choose **Export configurations** to export one or more of your measurement profiles.

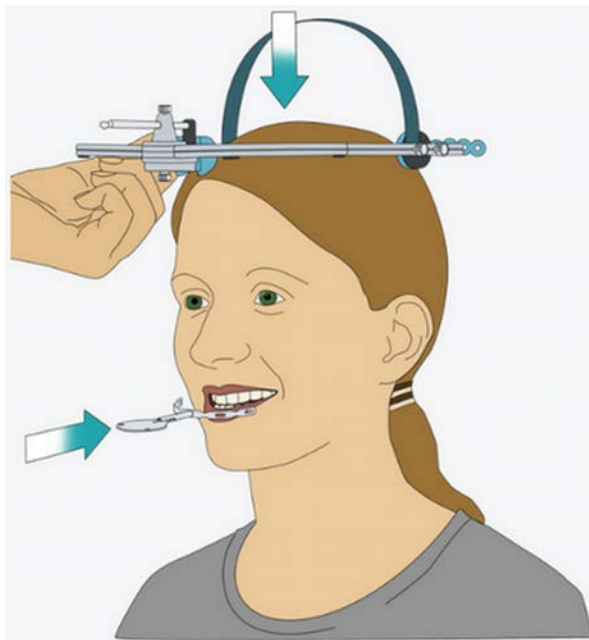


Importing measurement profiles

Choose **Importing configurations** to import a backup or a setup package for the software. Via routing, you can import the desired package with predefined measurement profiles.

5.3.1 Measurement preparations

5.3.2 Preparations



The **upper jaw sensor** must be placed stably, on the patients head.

Please pay attention to the following hints:

The upper head strap closely fits the patient's skull and the nose support without stretching the skin in the nasion area.

Stretch the elastic strap at the back of the head and ensure that it is comfortable for the patient.

Tell your patient to take the initial position depending on the respective examination method.

5.3.3 Coupling spoon

Basics referring to the usage of the coupling spoon

A coupling spoon realizes the coupling to the sensors. The reference positions of the spoon are related to the coordinate system of the measuring system. The movement data determined can be exported via XML data file and allows you to match individual movement data and scan model data. This method gives the user the ability to customize the design of rails and prosthetics under real patient-specific movements exclusively in a planning software. Afterwards the designed parts could be established directly by a milling unit.

Measuring process using the coupling spoon

To determine the position of the upper jaw, the coupling spoon is first charged with a recording material in which the patient bites. The material hardens and is scanned with the plaster models (master models) as specified by the CAD / CAM software manufacturer in the desktop scanner to match, the scan and movement data.

In operation of the measurement to the patient, the procedure is as follows. Referencing takes place via the coupling spoon. Thus, the procedure of referencing via the axis orbital plane level falls away. In measuring operation the coupling spoon is first inserted in the patients maxilla (the recording material is cured and the position of the upper jaw is reproducible on the spoon). Afterwards the placement of the lower jaw sensor on the coupling spoon takes place. This position is now measured. Thereafter, the sensor is set on the T-Attachment and the mandible in habitual occlusion is registered. Only the adapter of the coupling spoon is to remove by measuring the lower jaw position. Please make sure, that the patient keeps the coupling spoon in the mouth. This is followed as usual the movement pattern. After completion of the measurement, the XML data set is ready to export in the viewer mode of the measurement.

5.4 Measuring process

With the **start button** the measurement of the selected module is started. A measurement can be repeated any time with a click of the **back button**.

In the first measurement with a patient, a mapping of the reference system of the measuring sensor system must be made. This process can be repeated to redefine in subsequent measurements by clicking on the Button **re-enter reference plane**. So anatomical points, depending on the measurement settings, are transferred into the virtual environment. Follow the instructions shown in the message line at the left top of the window.

Representation types

The rider on the top left on the skull representation allow a change of representation. Either as a skull display model or as a representation of the reference points in a grid over the 3D rider. In this view it is possible to determine the angle of two reference points and to determine the relative length relationship from each point to the other (**Measure and angle** Button).



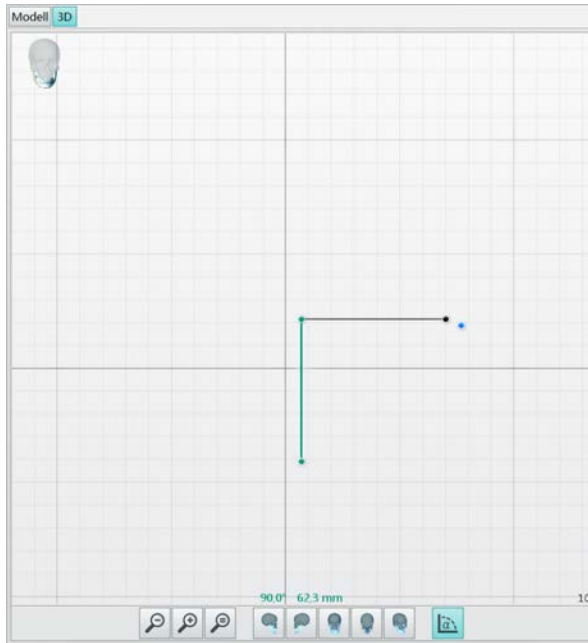
Zooming functions

The zoom buttons are used to zoom in (+) or zoom out (-) of the skull illustration. Left clicking in the 3D view before zooming, determines the point on the zooming.

The magnifying glass with the (=) adjusts the graphics window size. By turning the mouse wheel, it can also be zoomed. Here the set range displayed with the mouse is increased or decreased.

Representation perspectives

The buttons next to the zoom function, allow the choice of view. There are the perspectives of left, right, front, top, and the free model perspective available. The model can be rotated with the mouse.



Klick with the left mouse button:

Sets the pivot point

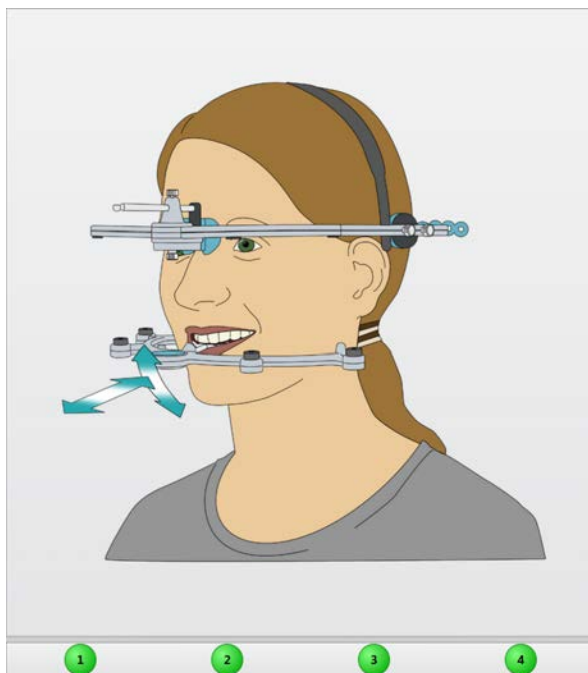
pressed middle mouse button:

moves the model without rotating

pressed right mouse button:

rotates the model around the set pivot point

Sensor status indicators



The light on the sensor testing block bottom right lights during the measurement in the color **green**. For the successful measurement, the correct calibration of the patient's reference plane is required. Glasses, but also earrings or hair, which are located between ultrasonic transmitter and receiver can affect the measurement or prevent the start of the measurement. Make sure that the round signal Fields 1-4 light solid green below the icon during measurement. **Red** or partially **red** light signal fields mean "**stop**", please consider the measuring distance and check to obstacles also please check plug connections, and cables.

Should it be found in free measurement field, that a flicker or a permanent red can be seen, please check the system on defects.

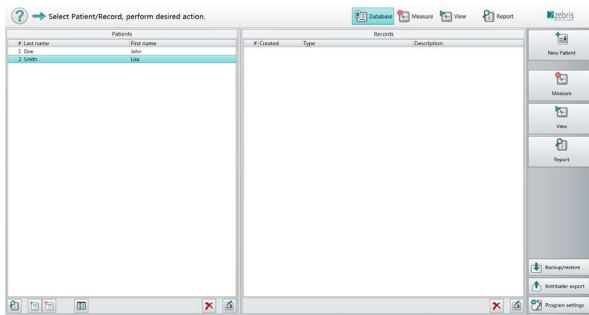
Note to the tone signals

The start of the measurement is signaled by a high-pitched signal and end with a deep signal tone. Static position measurements such as the measurement of facial symmetries or pine positions are terminated with a simple beep sound.

6 Editing the measurement (view mode)

In the “View” mode you can view and play the measurement, limit the measurement interval and mark the angle. Find a detailed explanation of the individual functions of the view mode below. The individual modules can lead to variations in representation of the images shown. However, the function described remains the same.

6.1 Basics



Opening a set of measurement data

Select a set of measurement data in the database and click on **View** in the right toolbar.

After you have completed a measurement, the view will directly change from the measurement into the **View mode**.

Playback mode view

Click on **Play** in the right toolbar.



The time display above the Play button indicates the currently displayed point of time of the measurement in seconds. Click into the field to enter a value. The current time of the measurement will be given depending on the cursor position. By clicking on **Back** you return to the database.

Timeline

The current point of time of the movement sequence displayed will be shown here.



By **double-clicking into the movement fields** you can hide or unhide movements in the timeline.

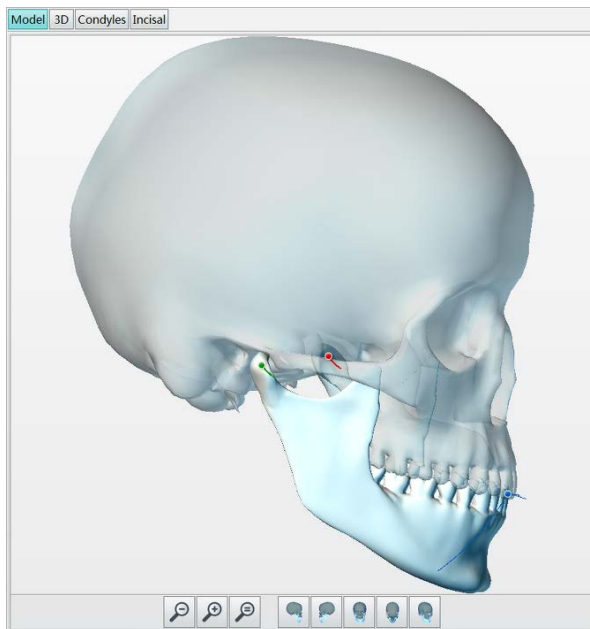
Using the **key combination** zoom you can selectively view and analyze a particular period of time of the movement.

The real time display can be played up to 10x or up to 1/10 of the actual **speed**. To select a particular section, move the mouse cursor onto an individually selected start of measurement and set a mark by mouse click. Define the end of the

selected section by activating the shift key and simultaneously setting a mark. This section will be highlighted in yellow.

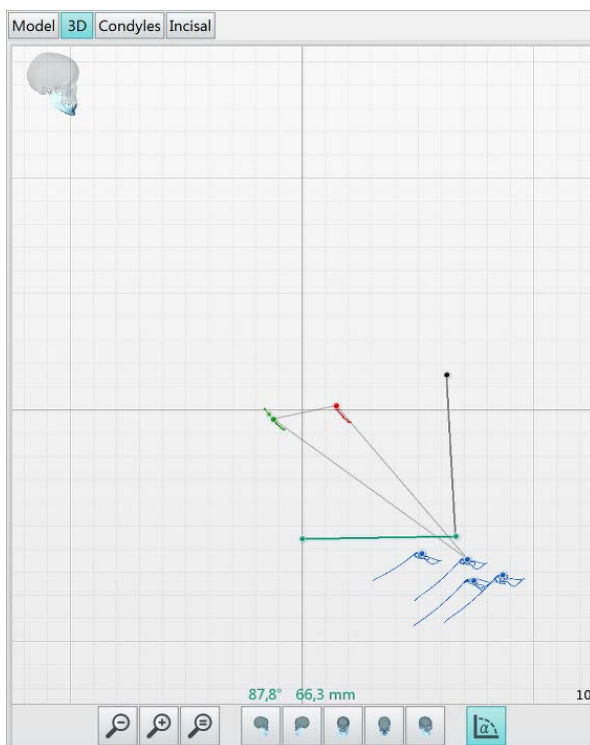
6.2 Description of the movement views in the left window

The views can also be moved at will by using the mouse wheel, the plus and minus button or the touch capabilities of corresponding PC systems.



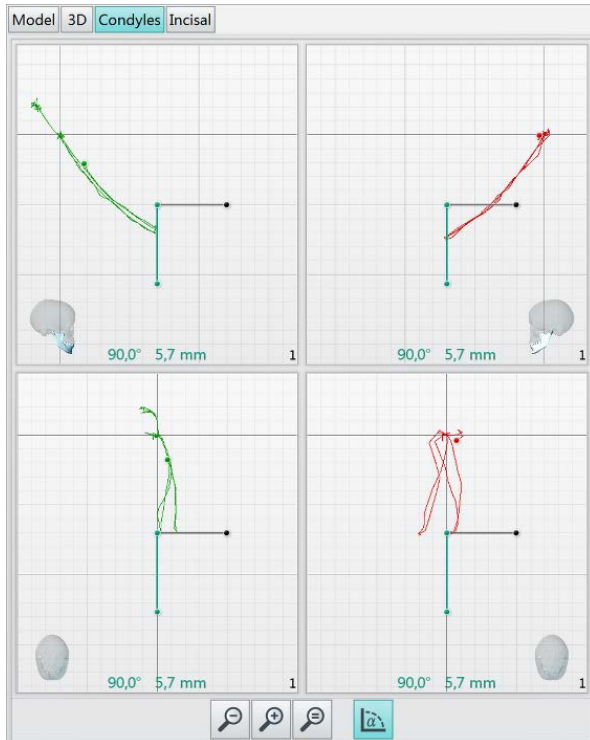
a) Model

After clicking the **Model** button the skull model will be displayed in 3D. This view can be shifted, enlarged or turned on its axis using the mouse and the respective key combinations or using the touch function.



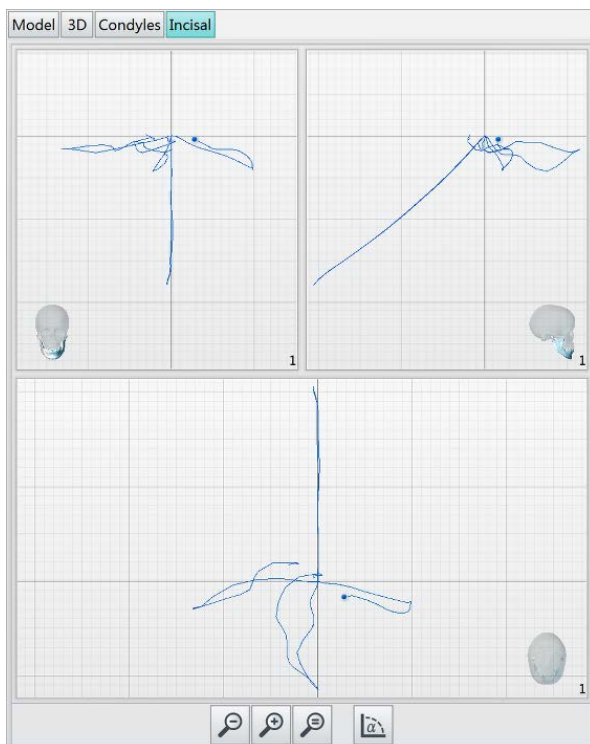
b) 3D

After clicking the **3D** button the general view of all points and lines and the Bonwill triangle will be displayed. Geometrical relations can be measured via the **Measure angles and distances** button.



c) Condyles

The condyle view displays the movement from in front and from the side. The individual view additionally displays the track of the movement from above. Angles and distances can be measured also in this window.



d) Incisal

The incisal point view displays the movement of the incisal point from the front and from the side view. In the individual view the movement path is additionally displayed from above.

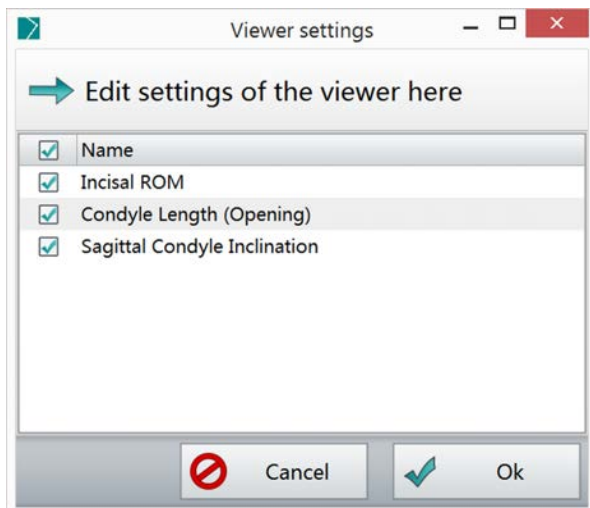
Display of EMG data

If the function for recording EMG signals is enabled, the user has the possibility to make the signals visible in temporal relation to the measured positions and movements.



Between one and four signal paths can be viewed in view mode, depending on the number of EMG channels used.

Using the (+) and (-) button you can zoom in and out of a position defined with the cursor. If a particular area of the movement is selected with the shift key, this area is also applied to the corresponding section of EMG signal.



View mode settings

Generally, all required views can be preconfigured in the view mode. Open the respective dialogue window by clicking on **Adjust**. Here you can tick mark the desired parameters.

6.3 Functions



Play

Automatic playback of the measurement by clicking on the Play button. The measurement will be played and repeated until the pause button is clicked.



Previous/next frame



Use the arrows with a dash to go forth and back.



Playback speed

Click on this button to open a selection list for playback speed.



Zoom



Enlarge or reduce the displayed platform or signal paths in the force-time diagram.

The magnifying glass with the minus sign reduces the image by 20%.

The magnifying glass with the plus sign enlarges the image by 20%.



Adjusting

The view of the 3D representation is centered and the zoom factor is determined automatically so that the model can be seen in full.



View from right

Shows the 3D skull model from the right.



View from left

Shows the 3D skull model from the left.



Front view

Shows the 3D skull model from the front.



View from above

Shows the 3D skull model from above.



Model 3D view

Shows the 3D skull model in the basic view.



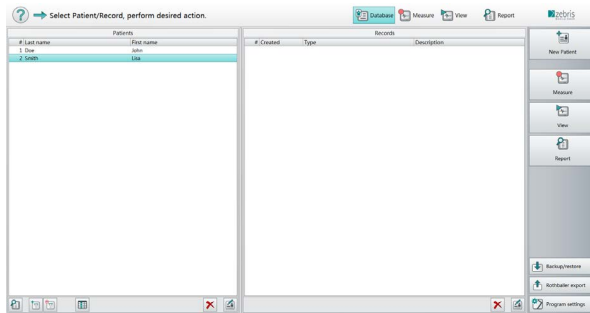
Measuring angles and distances

Draws in lines to measure angles and lengths in their anatomical relation.

7 Report Mode

In "Report" mode, the function parameters that were previously defined in view mode are analyzed and illustrated.

7.1 Basics



Opening a set of measurement data

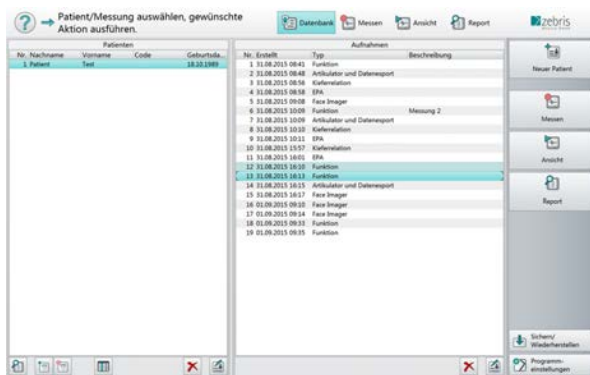
Select a set of measurement data in the database and click on **Report** in the right toolbar or change from **View mode** to **Report mode**.



Report Output

The report view enables the user to read and evaluate the data in their entirety. In report mode, the data can be printed as pdf file by clicking on the printer symbol.

Comparing two sets of data



Selecting a data set

To compare two measurements, select them in the database with **Ctrl + left mouse key**. Then the report can be opened as usual by clicking on the Report button.



Depiction in the report

In the comparison report the results of measurement A are shown in color and the results of measurements B are shown in black. The allocation to the respective measurement is also mentioned in the header.

7.2 Report specification structure

zebris Dental Function Report
 Person: Lisa Smith, 03.06.1992, Female
 Record: 28.10.2015 09:29, Function



Header

Title, Project-, Patient name, Date of the measurement as well as the specific company logo can be found in the header.

Module specific measurement data

Below the header are the visualizations of measured data. This imaging in different depending on the selected measurement module from which the measurement was taken. For more information about the displayed information, refer to the respective measurement module.

Comments
Record comments/Recommendations

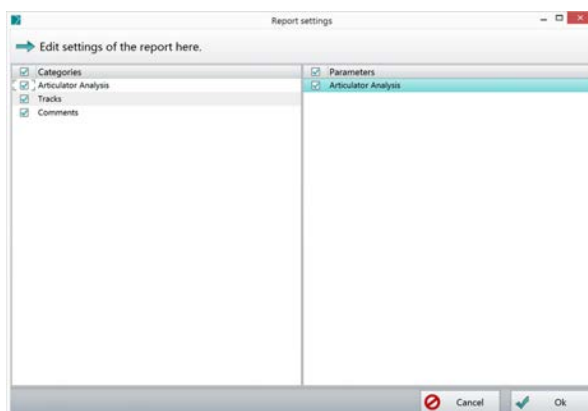
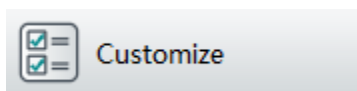
Comment.

Remarks

Here patient-specific and recording-specific remarks are displayed that were defined via the patient characteristics or recording properties.

Adjusting the report

In order to hide or unhide single report parameters click on **Adjust** and the report settings screen will open. This selectable and deselectable information can be linked to particular issues, e.g. for specific conclusions or targeted assessments. By clicking on the **OK** button you confirm the changes and return to the database.



Report settings

Categories are depicted on the left. The individual parameters of the categories selected on the left are depicted on the right. Unhide/hide parameters:

Set a tick mark on the right to show the parameter in the report. If a tick mark is removed, the corresponding parameter disappears from the report. By setting/removing a tick mark on the left you can also unhide or hide a whole category of parameters.



By setting or removing a tick mark in the selection menu Adjust, the entered data will neither be changed nor deleted.

View

These buttons can be used to defined how many report pages shall be shown at a time. Alternatively the slide button can be used to reduce/enlarge the view.



1:1

Adjust the display to enable the display of the entire page height.



Page width

The current page will be zoomed to the full available width.



Full page

Displays the pages in their original size. Due to different screen resolutions the size can deviate from the paper size of the printer.



Thumbnails

Displays all pages as small pictograms.



Printing

The report will be sent to the printer selected under Printer setup.



PDF-Export

PDF export to any registry or e.g. to an external data carrier such as USB flash drives.



Adjusting

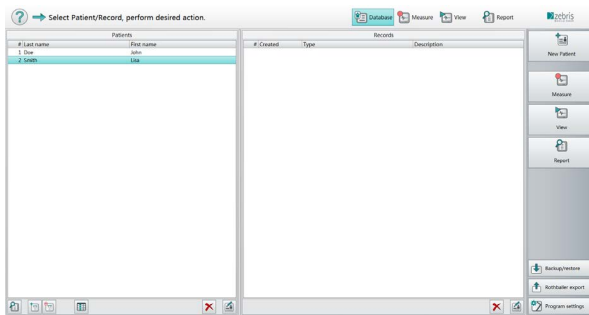
Unhiding/hiding single report parameters.



Printer Setup

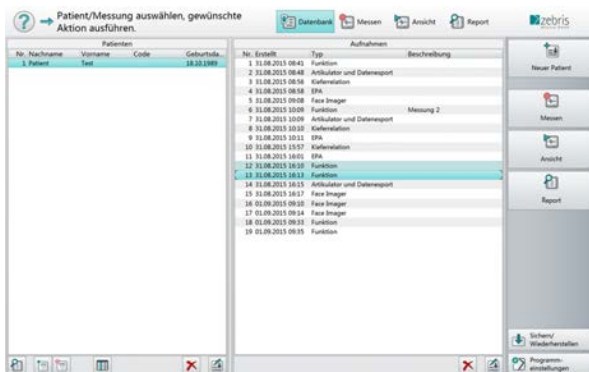
Select a printer and modify the settings for printing (e.g. format, page size, etc.).

Comparing two sets of data



Selecting sets of data

To compare two measurements, select them in the database with **Ctrl + left mouse key**. Then the report can be opened as usual by clicking on the Report button.



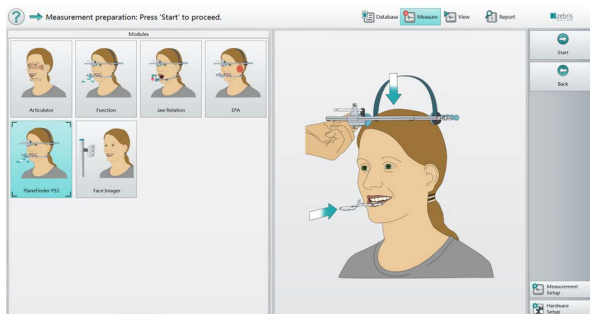
Depiction in the report

In the comparison report the results of measurement A are shown in color and the results of measurements B are shown in black. The allocation to the respective measurement is also mentioned in the header.

8 Functional analysis (3D analysis)

Analyse the movement of the lower jaw using this module in combination with a WINJAW+ system. The individual steps of a 3D analysis are described, based on the standard movements.

8.1 Carrying out a measurement (measuring mode)



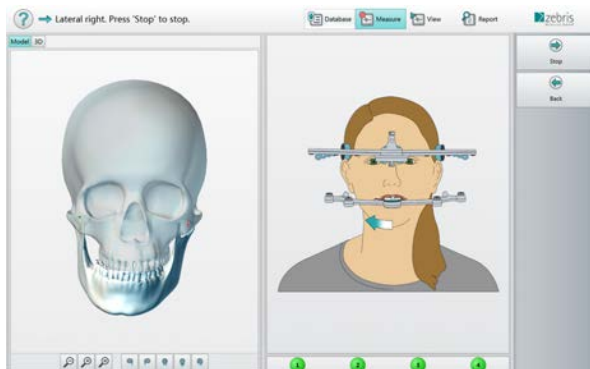
Choosing a module

Choose the **Function** module on the left and then click on the **Start** button.

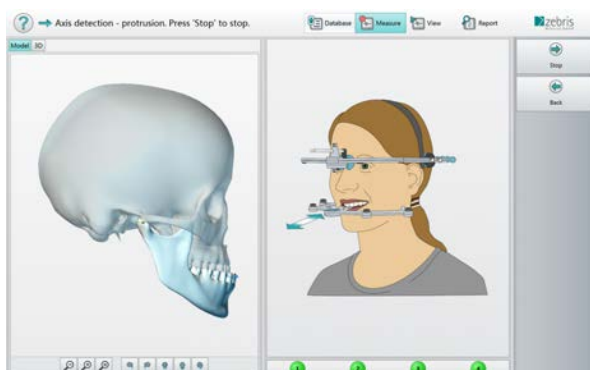
8.1.1 Recording of movements

Depending on the selected movement pattern, their number and chronology, these will be performed with the patient after the preview. Generally all measuring procedures can be designed individually in the configuration. Using the example of some standard movements, you will be led through the measuring procedure below.

Lateral movement to the right

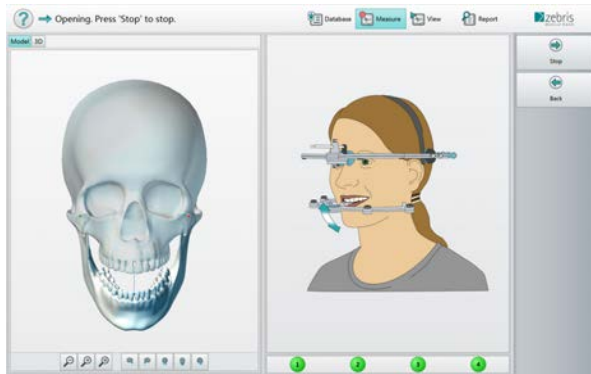


The 3D function analysis measurement starts with the maximum lateral movement to the left and the right to be achieved. The measuring procedure can be initiated by clicking on the **Record** button using the foot switch, the enter key or the mouse key. The start position is always the usual occlusion. To conclude the movement the patient brings the jaw back into the start position.



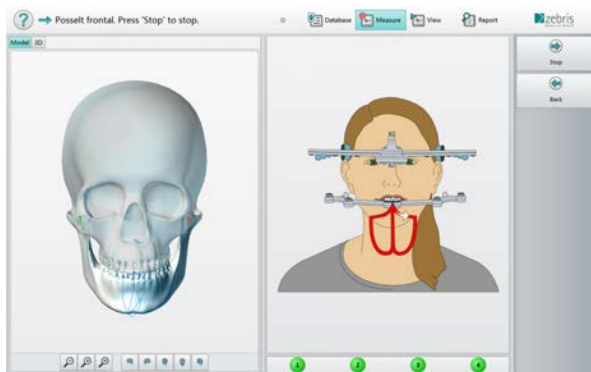
Protrusion movement

Have the patient adopt the start position and make a maximum protrusion movement from there. Then the patient can let their lower jaw slide back into the start position.



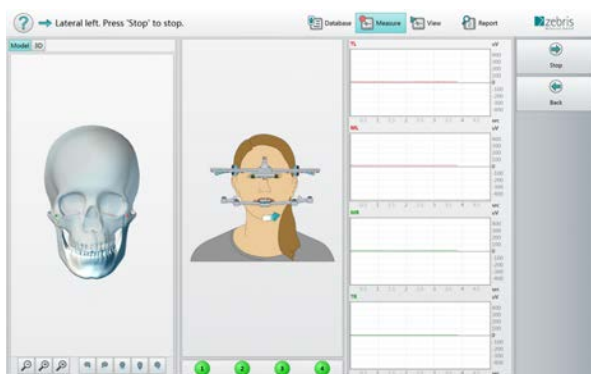
Opening movement

Have the patient adopt the start position and make a maximum opening movement from there. Then the patient can let its lower jaw slide back into the start position.



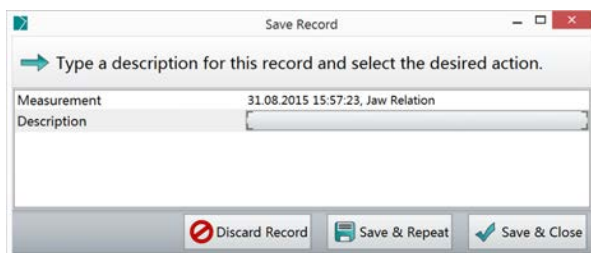
Chewing, Posselt frontal, Posselt sagittal and user-defined movement patterns

The other optional movement patterns can be carried out by analogy with the above described movements.



EMG recording

When the hardware is prepared for the EMG measurement, it is also possible to determine the muscle tone during the movement recording (3D functional analysis, articulator, relation) and evaluate it during the measurement in sync with the movement and compare it in the subsequent **View mode**.



After the measurement has been completed, a dialogue window will open:

Save and continue

The recording will be saved and the device returns to the preview mode for the next measurement to be started.

Dismiss recording

The recording will be dismissed and the device returns to the preview mode for the next measurement to be started.

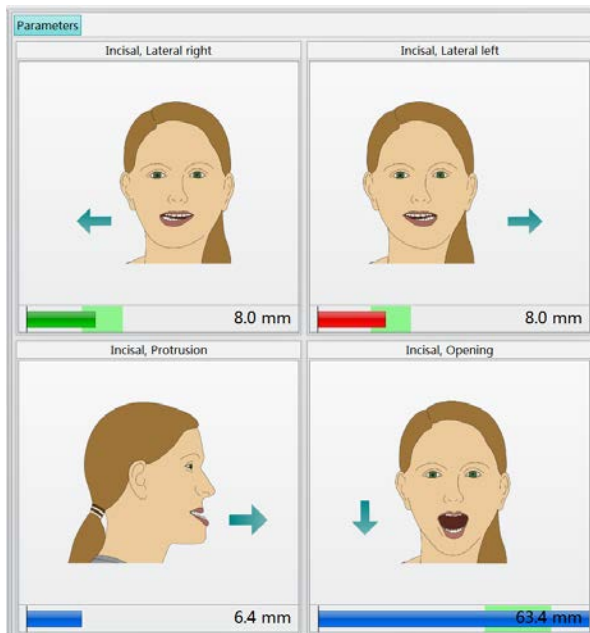
Save and close

The recording will be saved and the view of the completed measurement will be opened.

8.2 Edit the measurement (view mode)

In the following the parameters are described which are specifically measurable with the function module. Basic principles for using the View mode are described in the chapter Editing the measurement.

8.2.1 Module specific measuring parameters

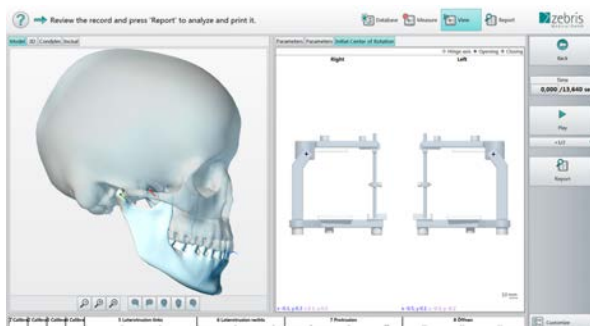


Rendition of incisal ROM

The incisal ROM tab includes the following parameters:

- Laterotrusion right/left
- Protrusion
- Opening movement

The green section indicates the normal range, which represents the scope of movement of healthy patients.



Display of the initial center of rotation

the position of the rotation axis upon opening and closing movements in relation to the arbitrary rotation axis is displayed in the tab Initial center of rotation.

8.3 Functional report (Report mode)

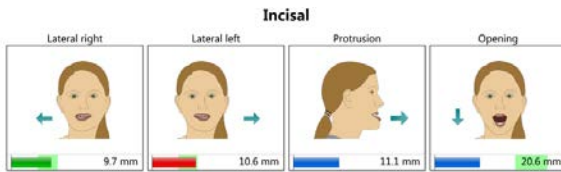
In "Report" mode, the function parameters that were previously defined in view mode are analyzed and illustrated. Basic principles for using the Report mode are described in [Chapter Report](#)⁵⁸.

8.3.1 Module specific measurement data

Depending on the definitions in the measurement settings, the report enables you to make certain conclusions. The movement data for all spatial directions are scanned and depicted in context with scientifically founded mean values. In the example the green/red/blue bars describe the individual data of the patient measured which can be immediately compared with the mean value (pastel green). This helps the user to make a general assessment on whether a functional disorder or impairment is at hand.

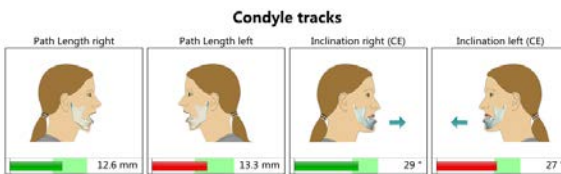
8.3.2 Explanation of the report content

Incisal point



The bar charts show the extent of movement scope based on the incisal point in the frontal and sagittal projection, upon laterotrusion to the left and right, upon protrusion and the opening of the mouth.

Condylar path



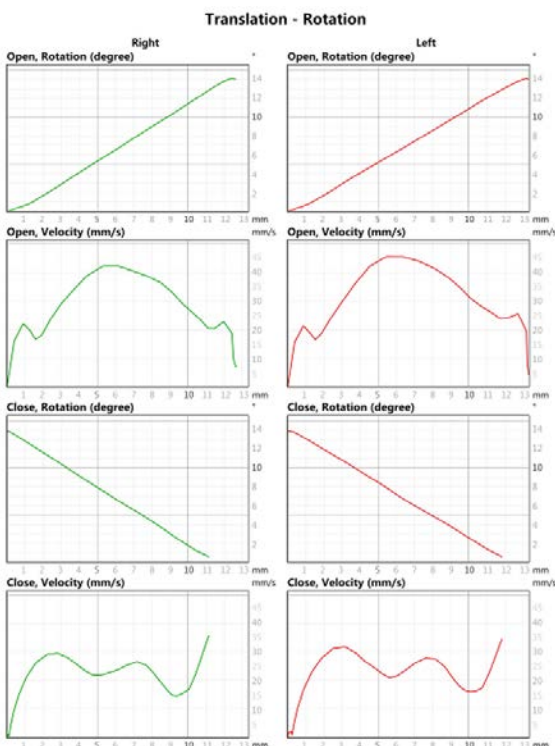
The bar charts show the path length and path inclination of both condyles upon a protruding movement.

Condylar axis movement



The figure shows phase diagrams of the intercondylar axis of the opening and closing movements.

Translation - Rotation



The depicted diagrams show the mouth opening angle or jaw rotation angle dependent on the angular velocity. Here it can be seen whether the jaw movement was carried out without trouble. When the movement is carried out homogeneously the diagram shows a mainly smooth and rising graph.

Feed velocity of the intercondylar axis during the opening and closing movement. The continuous green line represents the velocity graph of the right side during the opening movement of the mouth. The red graph represents the left side. When the feed movement of the intercondylar axis has been carried out without trouble, the graphs have a bell shape.

Motion recording

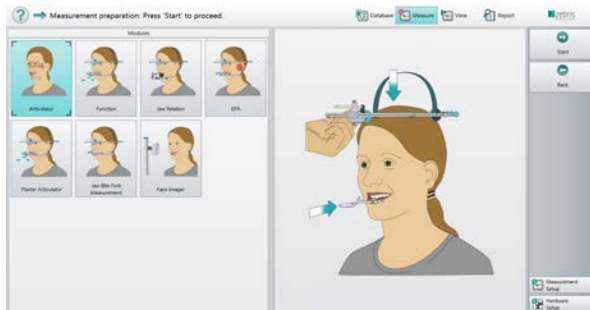
The movement traces shown are generated from the different motion tasks in terms of both joints and the incisal point. Depending on the selected axis position, as well as

reference plane the condyle paths can be represented differently in their course and angle.

9 Articulator module

The measurement encompasses the movements of protrusion, laterotrusion to the left and laterotrusion to the right. The recording results must be differentiated depending on the movement carried out by the patient. The articulator values are normally collected upon tooth contact. This allows the system to determine the value for the adjustment of the individual incisor guide plate. The same applies to the lateral movements which are led across the lateral teeth or cupids.

9.1 Carrying out a measurement (measuring mode)

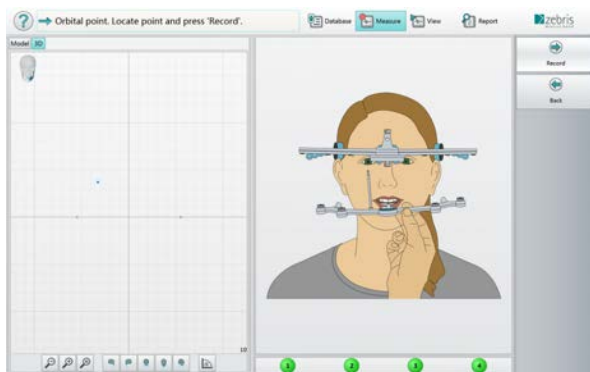


Module selection

Choose the **Function** module on the left and then click on the **Start** button.

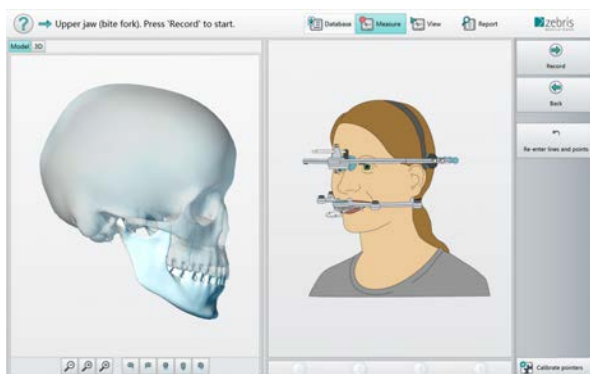
9.1.1 Reference plane

The measured data are related to a reference plane. If several measurements shall be made during the same session, each of the following measurements can be made with the reference plane already determined. Otherwise a new plane can be defined via the **re-enter reference plane** button.



Articulator Plane

The possibility to transfer the data to different articulator systems requires that the measurements are adjusted to planes like the standard anatomical position, Camper's plane and the patient's plane by way of calculation. This will be taken account of when collecting data via the anatomical reference points.



Reference of the bite fork plane

The collection of data for the transfer of movement data to the CAD/CAM interface requires the recording of the upper jaw position via the bite fork and the determination of the lower jaw position with a bite registration in usual occlusion.

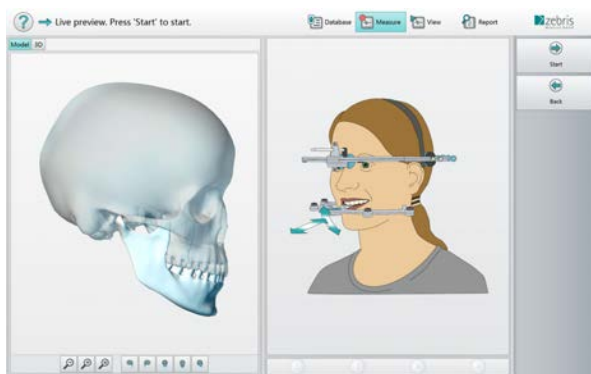
Only this measuring procedure ensures that the positional references of the lower

jaw to the upper jaw are correctly reproduced in the CAD/CAM system when later processing the data.

9.1.2 Handling method

Slightly modified as under 3D analysis in Chapter Editing the measurement (view mode)^[64] of the patient is admitted to this specific survey, since all movements should be carried out with tooth contact. The patient performs them under the control of the practitioner. Not only the practicing of the motion pattern, but also the controlled standardized performing the data acquisition brings a higher data security.

Test movement

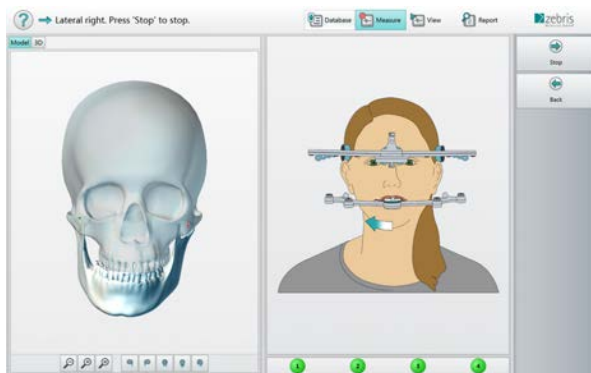


In the test movement section, movements can be displayed, checked and serve as an illustration for the patient without saving measuring values. This module can also be used to exercise special functional movements with the patient. Please activate with **Start preview**. Via the "Stop" button the test mode is switched to the following recording mode in which the measurement will be carried out.

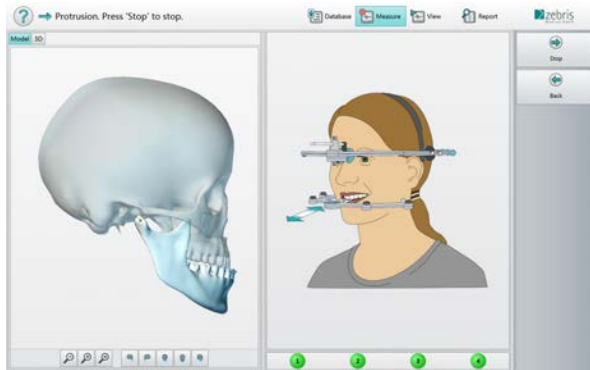
9.1.3 Recording of movements

Depending on the selected movement pattern, their number and chronology, these will be performed with the patient after the preview. Generally all measuring procedures can be designed individually in the configuration. Using the example of some standard movements you will be led through the measuring procedure below.

Lateral movement left and right

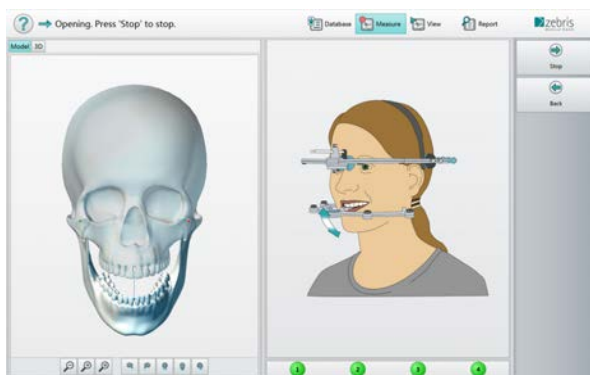


The articulator analysis starts with the maximum left and right lateral movement to be achieved. The measuring procedure can be initiated by clicking on the **Record** button using the foot switch, the enter key or the mouse key. The start position is always the usual occlusion. To conclude the movement the patient brings the jaw back into the start position.



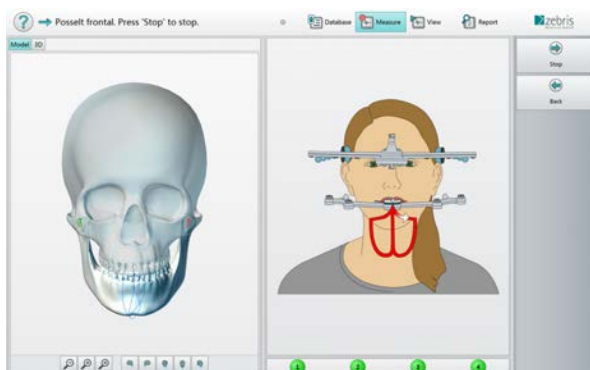
Protrusion movement

Have the patient adopt the start position and make a maximum protrusion movement from there. Then the patient can let their lower jaw slide back into the start position.



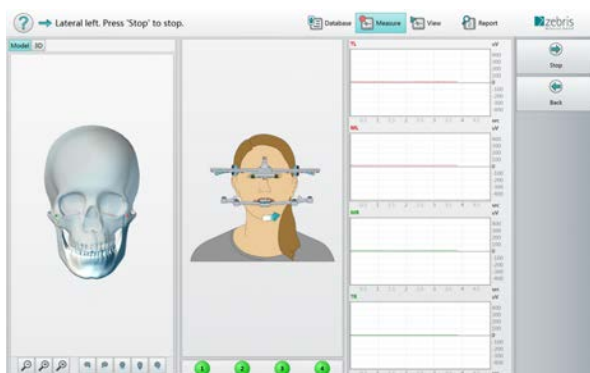
Opening movement

Have the patient adopt the start position and make a maximum opening movement from there. Then the patient can let their lower jaw slide back into the start position.



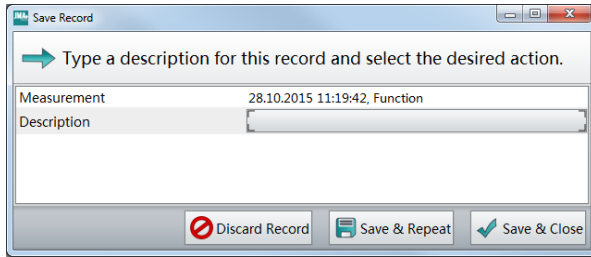
Chewing, Posselt frontal, Posselt sagittal and user-defined movement patterns

The other optional movement patterns can be carried out by analogy with the above described movements.



EMG recording

When the hardware is prepared for the EMG measurement, it is also possible to determine the muscle tone during the movement recording (3D functional analysis, articulator, relation) and evaluate it during the measurement in sync with the movement and compare it in the subsequent View mode.



After the measurement has been completed, a dialogue window will open:

Save and continue

The recording will be saved and the device returns to the preview mode for the next measurement to be started.

Dismiss recording

The recording will be dismissed and the device returns to the preview mode for the next measurement to be started.

Save and close

The recording will be saved and the view of the completed measurement will be opened.

9.2 Edit the articulator measurement (view mode)

In the following, the parameters are described which are specifically measurable with the articulator mode. Basic principles for using the View mode are described in the Chapter [Editing the measurement \(View mode\)](#)⁶⁴.

Recording with the articulator mode

When recording in the articulator measuring mode, the view mode will only display the articulator-relevant data in the display windows. This includes the **Model, 3D, Condyles, Incisal point, Parameter** and **Initial center of rotation** tabs and the rendition of the condylar path parameter in the Parameter block.

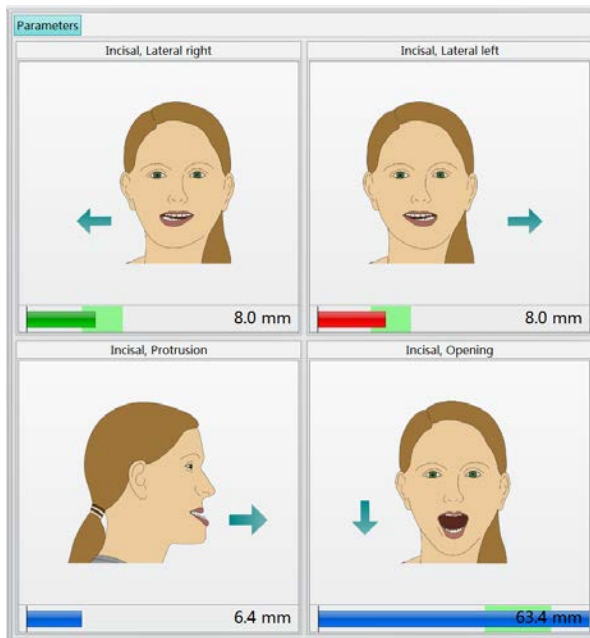
Recording with the articulator mode and data export

In view, mode the same data will be displayed as for a recording in the plain articulator mode. In addition, there will be visible positions of the bite fork in the **3D** tab. It is possible to generate a XML data export for the transmission of movement data into the CAD/CAM system via the **zebris medical real movement** export button.

Recording with the „Real Movement“ data export

In the **Real Movement Data Export** recording mode, only the rendition of bite fork positions and the incisal point will be realized in the **Model, 3D, Incisal point** and **Parameter** tabs by way of the allocation of reference levels of the bite fork. Via the **zebris medical real movement export** button the data can be transmitted to the CAD/CAM system interface.

9.2.1 Module specific parameters

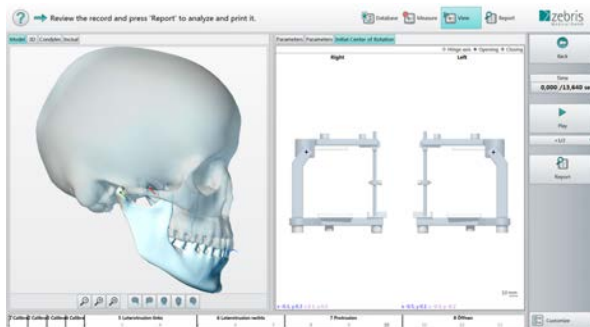


Rendition of incisal ROM

The Incisal ROM tab includes the following parameters:

- Laterotrusion left/right
- Protrusion
- Opening movement

The green section indicates the normal range, which represents the scope of movement of healthy patients.



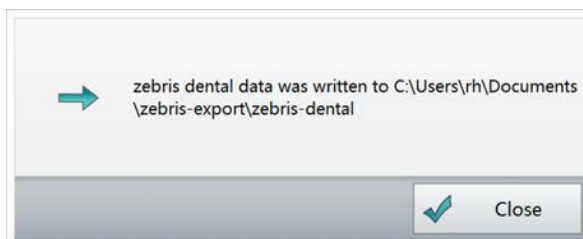
Rendition initial center of rotation

The Initial center of rotation tab includes the position of the rotation axis upon opening and closing movements in relation to the arbitrary rotation axis.

9.2.2 Data export to the CAD/CAM interface



To transfer the data of the measuring modes Articulator and Data Export and Real Movement Data Export to the CAD/CAM interface, please click on the zebris medical real movement export button.



If you have selected a standard path in the program settings, the data file will be directly saved under this path. Otherwise a task window will open after you have confirmed the button allowing you to manually define a suitable storage location.

9.3 Articulator Report

In "Report" mode, the parameters are evaluated and displayed that were previously defined in the view mode. Basic principles for using the Report mode are described in Chapter **Report mode**^[58].

Depending on the type of articulator, the standard anatomical position (SAM), Camper's plane (KaVo) and the patient's plane are distinguished from each other. The scale values of the joint path case and the incisor guide plate (individually) are adjusted to these planes. Inserts (SAM example) for the joint path inclination or Bennett movement will be taken in account in the report and are highlighted in bold. The graphs on the second page serve to assess whether the measurement has been carried out with the correct movements.

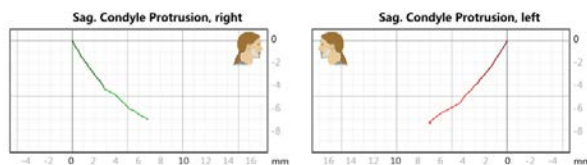
9.3.1 Module specific measurement date

The report is composed of the elements described below. Depending on the selected settings in the measurement settings, certain statements can be derived from the report. It is shown the patient-specific setting parameters of the respective chosen articulator. In this case, the beams describe the individual articulator settings data of the measured patient in the colors green / red and blue.

9.3.2 Explanation of the report content

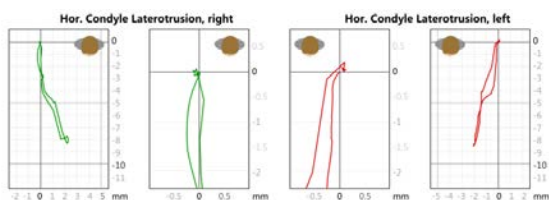
Movement tracks

The depicted movement paths are generated from the different movement definitions in relation to both joints and the incisal point. Depending on the selected axis position and the reference level, the condylar paths are depicted with different tracks and angles.



Sagittal condylar path views

The sagittal joint path inclination is calculated in a way that the best possible congruence of the measured curves with the curvature of the articulator in particular in the initial area is achieved. The diagrams show the condylar path inclination of the protrusion and opening movements.



Horizontal condylar path views

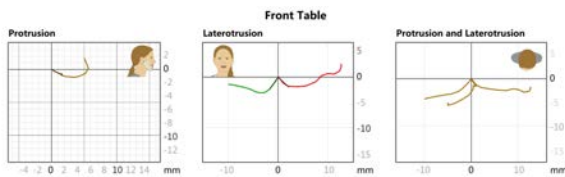
The Bennett angle and immediate side shift are calculated based on the movement capacity of the mediotrusion condyle or the moving condyle, i.e. the condyle of the non-working side. The black lines correspond to the averaged curvature of the Bennett insert of the articulator. The

red and green lines correspond to the measured movement paths.

The retrusion is calculated based on the sagittal movement of the laterotrusion condyle or the resting condyle to the side or backwards.

The shift angle continuously controls the condyle from a pure laterotrusion movement of "0°" between a maximum laterotrusion of "-20°" and a lateroprotrusion of "+20°".

Front table guidance tracks



Here the angle to the incisor or front plate guide is calculated and displayed. The front plate is adjusted according to the displayed graphs. For the articulator the sagittal front plate inclination and the inclination in frontal projection are calculated.

10 Jaw Relation module

The "Jaw relationship" tool allows you to determine the correct lower jaw relationship to the upper jaw using different procedures. The use of additional instruments, such as the classic support pin registration, a jig, the Aqualizer or manually guided positioning, is possible. The "**Jaw relation**" module supports the guiding of the lower jaw into a determined position in real time via an enlarged diagram and is prepared with registration material for the diagnostic assessment and denture supply during the analogue realization process.

10.1 Basics

Retral position

With the activation of the retral position, it is possible to assess the limitation of the defined new lower jaw position to the bilaminar zone of the jaw condyles in retral direction.

Target position

The target positions are the number of ballistic movements to be carried out on a plateau introduced into the upper jaw representing the hit target field of the determined adduction point (MCP).

Gothic arch

The recording of the arrow angle allows you to define the central relationship by displaying the tip of the arrow angle.

Target position & Gothic arch

It is possible to use different procedures by combining both recording options and this in one and the same recording session.

Manual correction

The end positions of the tip of the arrow angle and the adduction point can be shifted directly after recording either individually or in combination in terms of therapy. This point, which is also called the averaged target position, can be changed using the left mouse key and simultaneously shifting its position.

Navigated registration

Once the position has been defined, the patient can be guided back to the defined point by sliding on the plateau via the feedback procedure. This is carried out visually by following the cross to the target position and in addition by a generated signal tone. The signal sound changes to a higher pitch and a faster frequency with the lower jaw approaching the target point.

Bite control

As soon as the bite registration material has cured, it can be removed from the mouth and brought into its ideal shape so that only the impressions of the chewing surface are

used for bite control. The registration that has now been prepared will be reintroduced in the same session. The patient thus takes the same position as has been determined by the registration and the bite control can be initiated.

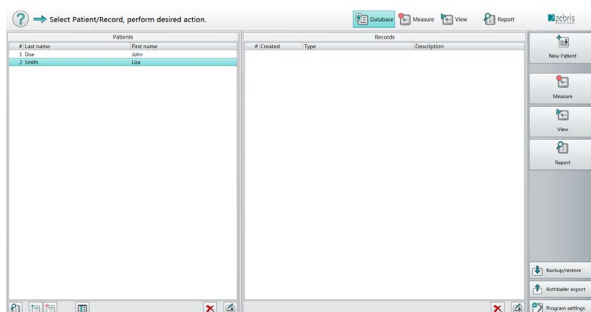
Habitual position on plateau

After the reference points are recorded and the attachment is used, the occlusal contact of the lower jaw should be removed.

Incisal positioning

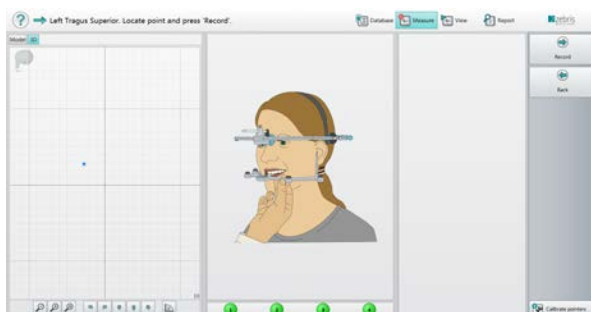
The blockage, depending on the bite and situation is made in the upper jaw on a plateau, Jig, Aqualizer or similar. The amount depends on the state of occlusion, the vertical dimension and the objective to be achieved treatment. In principle, any

10.2 Carrying out a measurement (measuring mode)



Database

After selecting the jaw relationship as module, click on Measure in the right toolbar.



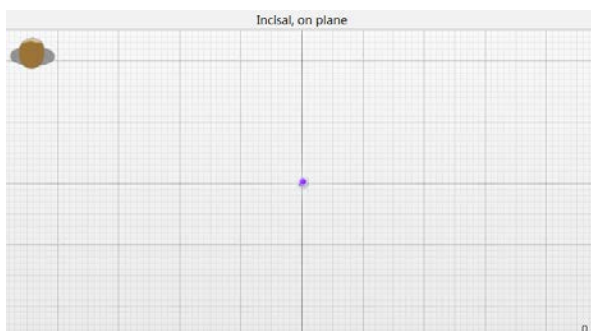
Starting the measurement

Anatomical points are transferred to the virtual environment. These are both the superior tragus in connection with the orbital point (orbitale) on the infraorbital rim.



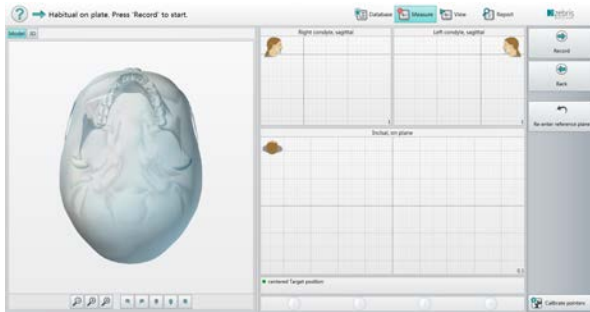
Fields of view for the condyle points

The fields of view of the right and left condyle illustrate the initial positions of the condyles and the changed positions in the measurements to come in a sagittal view.



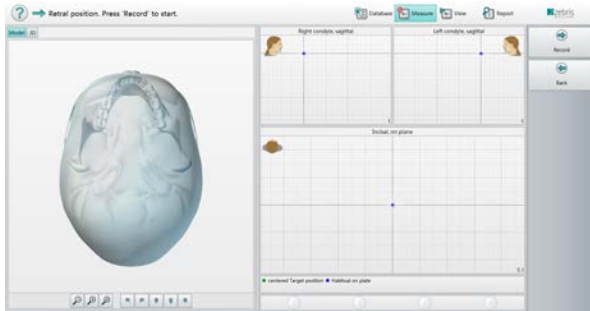
Incisal point field of view

The incisal point field of view enables you to view the changed position from a cranial perspective. The key provides information on the measuring steps carried out and the corresponding measuring points.



Habitual position on plateau

After the reference points have been recorded and the attachment has been introduced, the occlusal contact of the lower jaw must be eliminated. This will be realized by using aids (jig, plateau or Aqualizer) which initiate a slight blockage of the lower jaw in relation to the upper jaw.

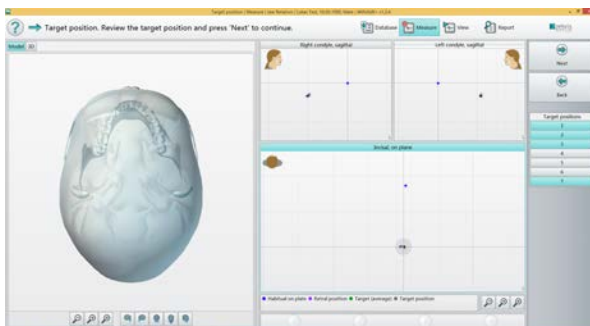


Retral position

This position will be achieved by pushing back the lower jaw and will be displayed as a violet point.

Target positions

Now you may use methods for muscle relaxation or deprogramming. This will be followed by carrying out fast, reflexive closing movements on the plateau level. The variety of these measuring points enables you to position the jaw in a centric condyle position independent from the usual intercuspitation.



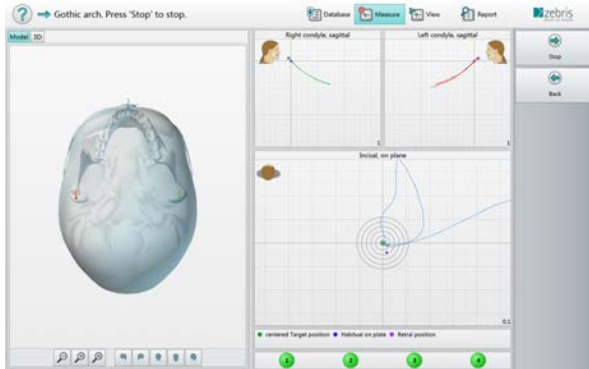
Hit rate

The quality of the hit rate can be assessed via the spread of the individual target points.

After the predefined number of closing movements has been carried out, discordant values will be automatically excluded. The overlay of the measuring points that are closest will be used for the final target position.

Gothic arch

In addition to the determination of positions, you can also apply the measurement based on the classic supporting pin registration according to Gerber. The gothic arch also uses the tip of the arrow to determine the centric condyle position and thus the new position of the lower jaw in relation to the upper jaw.

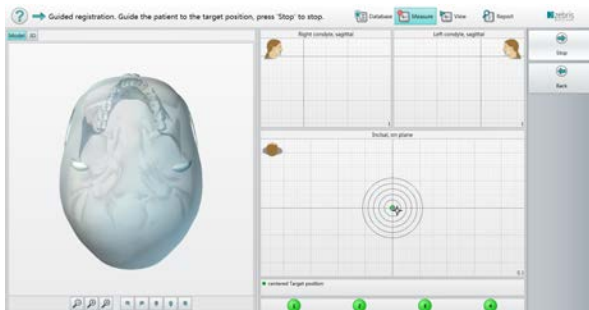


Change target position

After the patient has carried out the positioning, the therapist can correct the position and take account of therapeutic requirements. Place the mouse cursor on the green point and shift to the desired position while holding the left key.

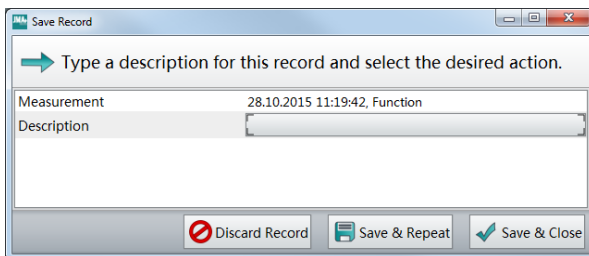
Guided registration

Via the screen, the patient will be instructed to guide the cross onto the point of the target. A rising or falling tone indicates the distance of the cross from the target point. The faster and higher the tone, the smaller the distance of the cross to the point.



Bite registration

The position of the lower jaw in relation to the upper jaw can be fixed with a suitable registration material and a bite registration can be created for further processing .



After the measurement has been completed, a dialogue window will open:

Save and continue

The recording will be saved and the device returns to the preview mode for the

Delete recording

The recording will be dismissed and the device returns to the preview mode

Save and close

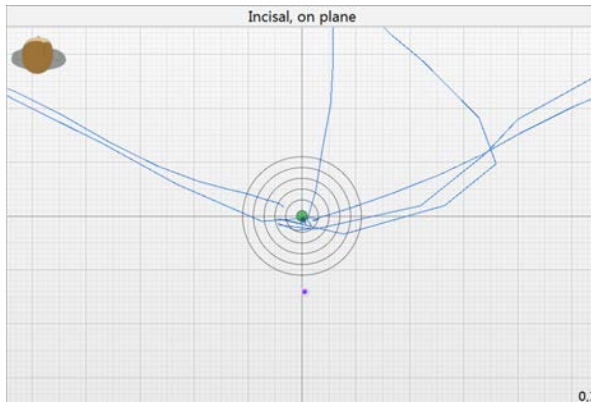
The recording will be saved and the viewer mode opens..

next measurement to be started. for the next measurement to be started.

10.3 Jaw relation analysis (view mode)

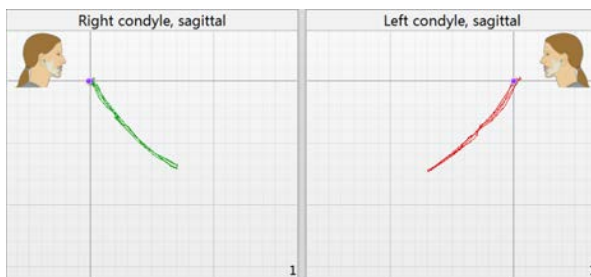
In the following the parameters are described which are specifically measurable with the jaw Relations module. Basic principles for using the View mode are described in Chapter **Editing the measurement (view mode)**^[64].

10.3.1 Module specific parameters



Display of the incisal point on the plateau

The individual positions of the lower jaw are recorded during the measurement and can be viewed in view mode. The diagram contains the recorded coordinates and an image of the movement path during the measurement.



Sagittal display of condyles

Here you can see the individual measured positions from the condyle perspective on the left and right. This allows you to directly compare the differences between the individual measured e.g. retral positions in comparison to the usual position.

10.4 Evaluation of the jaw relation analysis

The jaw relationship report can be started directly after the measurement in the view mode or via the database. The report contains the graphic depiction of the target. The location of the measured positions in relation to the condyles is shown in sagittal view, separately for the left and right side. The different given position measurements are illustrated by colored points in the target and in the condyle views. In the target field of view, you can also find the movement paths again. In the measuring field of the target also the trajectories find. Basic principles for using the Report mode are described in Chapter **Report Mode**^[58].

View the report and click 'Print' to print it.

Database Measure View Report

zebris Jaw Relation

Person: Test Patient, 18.10.1989, Male
Record: 31.08.2015 08:56, Jaw Relation

Right condyle, sagittal Left condyle, sagittal

Inclinal, on plane

centered Target position Hubkugel auf Plateau Retrale Position

Printed 31.08.2015 15:43:13 © zebris Medical GmbH Page 1 / 2

zebris Jaw Relation

Person: Test Patient, 18.10.1989, Male
Record: 31.08.2015 08:56, Jaw Relation

Comments

Patient comments

Gelenkschmerzen beim Öffnen
CMD
Knackeln links

Printed 31.08.2015 15:43:13 © zebris Medical GmbH Page 2 / 2

Back

Print

Create PDF

Customize

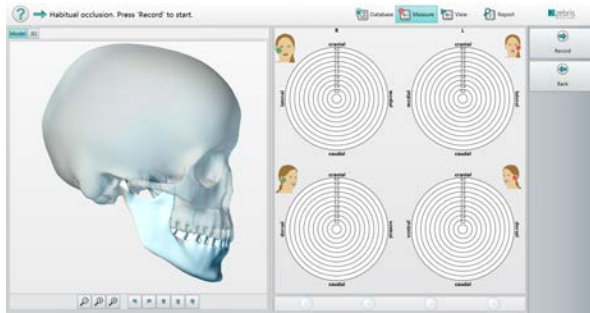
Printer setup

Zoom 63 %

11 EPA the electronic condylar position analysis

The electronic position analysis enables you to determine the positions of the condyles and the lower jaw in relation to the upper jaw. Registrations that are introduced between the tooth rows, can be compared to each other and splint positions can be controlled. In addition, the measuring points are related to the condylar path. This allows you to identify painful positions caused by condylar malposition's.

11.1 Carrying out a measurement (measuring mode)



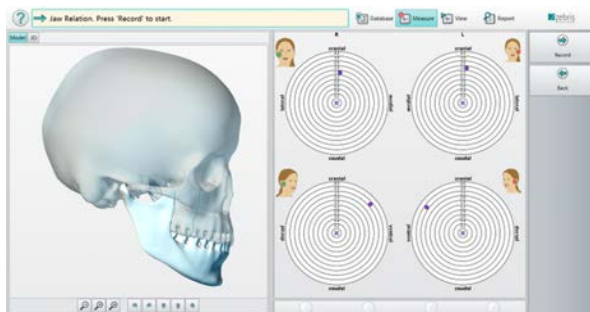
Habitual occlusion

In the first step, the Habitual final bite position of the patient is measured.



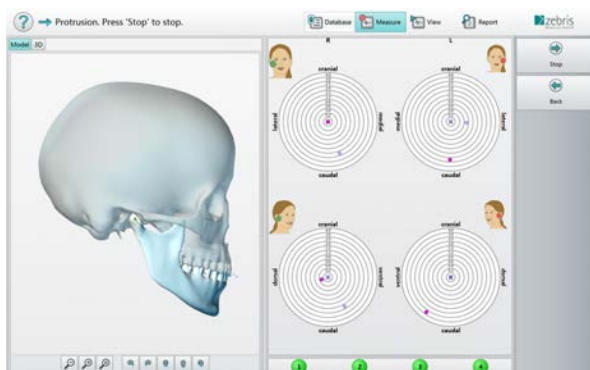
Rest position

Thereafter, the distance between the maxilla and mandible is determined in relaxed muscular position.



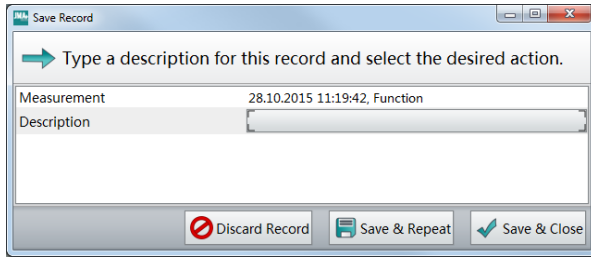
Jaw relation

By measuring the jaw relationship, the positional relationship of the jaws is determined to each other, this is also the last default position which is incorporated in the workflow.



Protrusion

There is the option, depending on the previously measured positions, to measure a moving lane.



After the measurement has been completed, a dialogue window will open:

Save and continue

The recording will be saved and the device returns to the preview mode for the next measurement to be started.

Delete recording

The recording will be dismissed and the device returns to the preview mode for the next measurement to be started.

Save and close

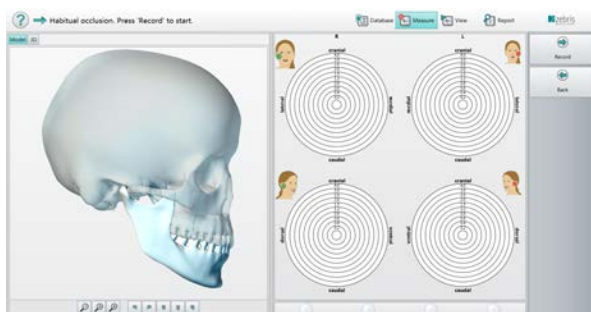
The recording will be saved and the database reopens.

11.2 EPA view mode

In the following, the representation of the reference and the target position will be explained. Basic principles for using the View mode are described in Chapter **Editing the measurement (View mode)**⁶⁴.

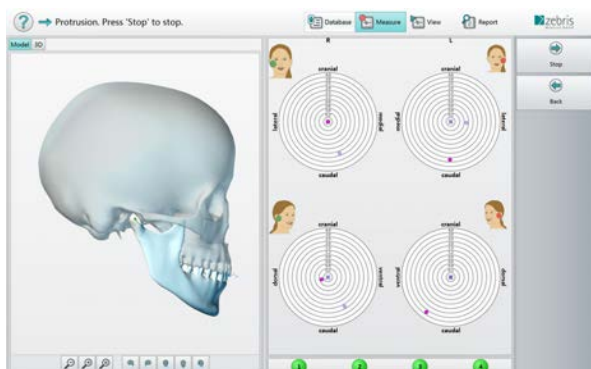
Reference position

The targets allow the viewer displaying the positions of the temporomandibular joint in the joint space of the front view (upper targets) respectively right and left condyle and from the profile view (Lower Targets). The determined position describes the passage point of the predetermined axis. This refers, for example, the initial position of the condyles in their current position in the final bite. Should this be changed in the course of therapy, the positions can be compared and evaluated.



Target position

The target is in measuring distances with a resolution of 0.2 mm; 0.3 mm and 0.5 mm to the maximum value of 4.0 mm shown in radius. The target position of the condyles is thus represented in relation to the reference position in view of the frontal plane and in the sagittal plane.



11.3 Evaluating the EPA measurement

Basic principles for using the Report mode described in Chapter [Report mode](#)⁵⁸.

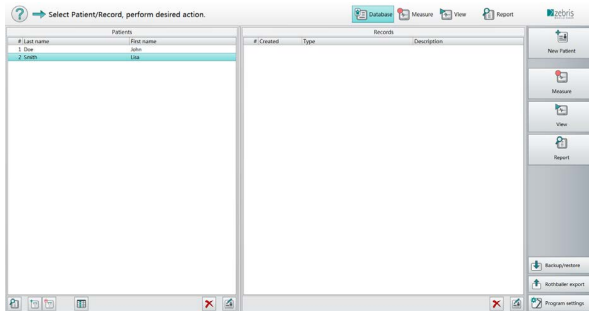


The EPA data set will be opened directly after the measurement or can be selected via the database. The reports contain the diagram of the target from a frontal and lateral view. The different given position measurements are illustrated by colored points in the targets. In addition, the coordinates of the condyle positions are given in the lower report section. The field of view, which also displays movements paths of the measuring points, is attached to the targets.

12 Video Module

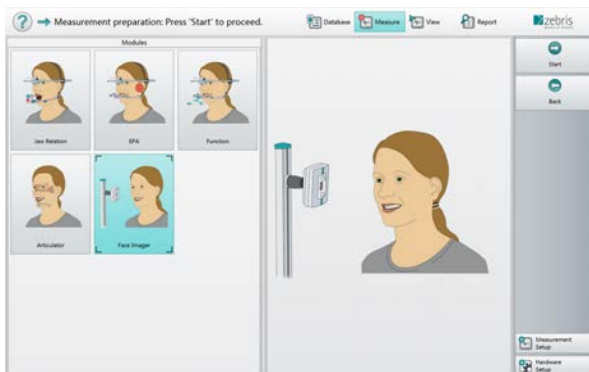
Record the jaw movements using this software in combination with a WINJAW+ system. If a video camera is connected, a live video is displayed in the right part of the measuring screen.

12.1 Preparing the recording



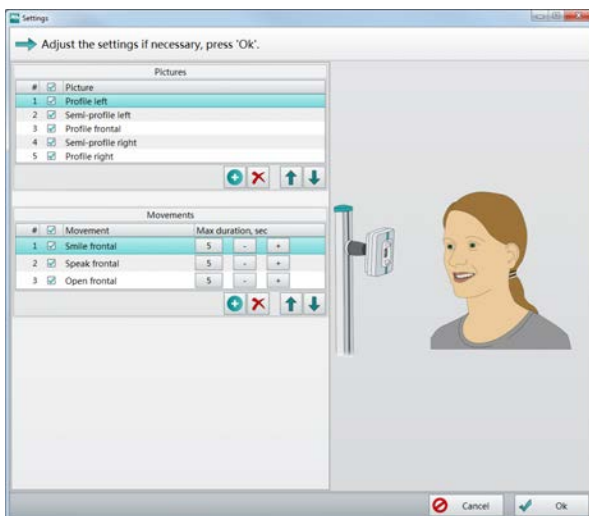
Database

Click on **Measure** in the right toolbar.



Choosing a module

Choose the **Face Imager** module on the left and click the **Start** button.

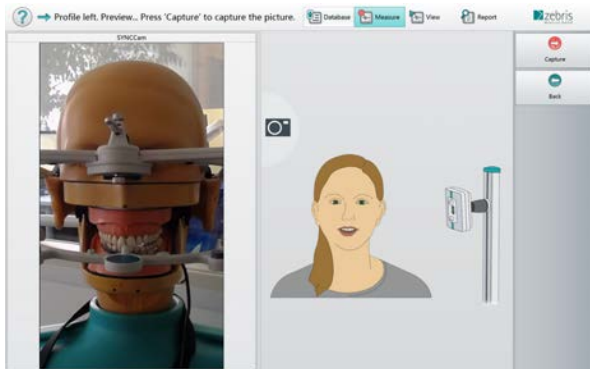


Measurement settings

Here you can choose which views off he patient shall be photographed or recorded. You can define any position in which the patient shall be recorded.

Via the recording time you can define the duration of a video sequence.

Preparation

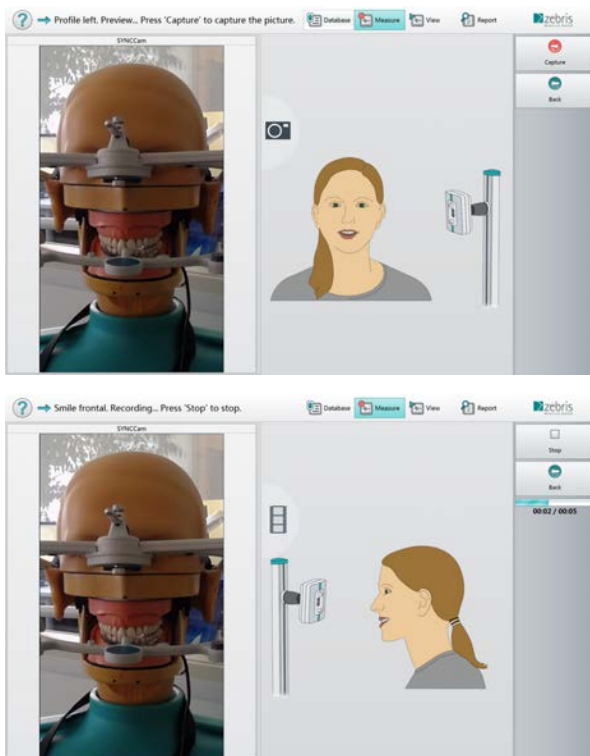


Instruct your patient to stand directly in front of the camera so that the patient can easily look directly into the camera.

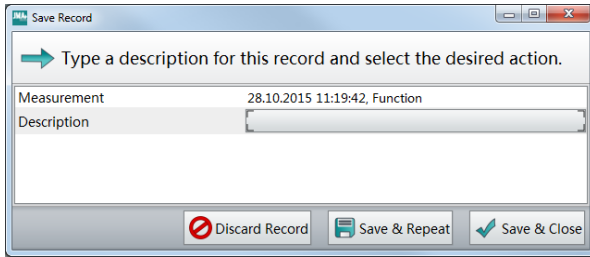
Then click on **Next** to change to the recording mode. Prior to each recording you have the possibility to align the patient based on the camera image which is shown in the software.

By clicking on **Back** you return to the module selection.

12.2 Carrying out a measurement



After starting the recording by confirming the **Record** button, the frames or video sequences will be recorded for the predefined duration. The progress bar shows the elapsed duration of the recording of a video. The measurement can be stopped at any time by clicking on the **Stop** button.



After the measurement has been completed, a dialogue window will open:

Save and continue

The recording will be saved and the device returns to the preview mode for the next measurement to be started.

Delete recording

The recording will be dismissed and the device returns to the preview mode for the next measurement to be started.

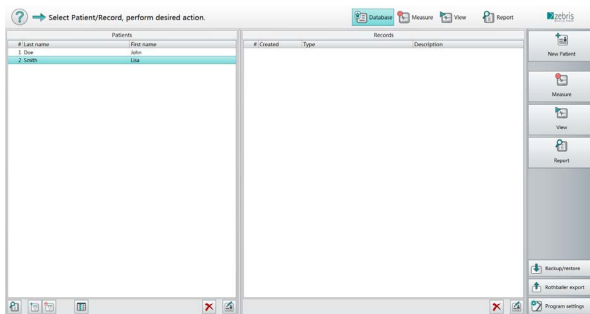
Save and close

The recording will be saved and the database reopens.

12.3 Video analysis in the display view

In the “View” mode you can view measurements, play video sequences and mark angles and lengths. Find a detailed explanation of the individual functions of the view mode below.

12.3.1 Basics

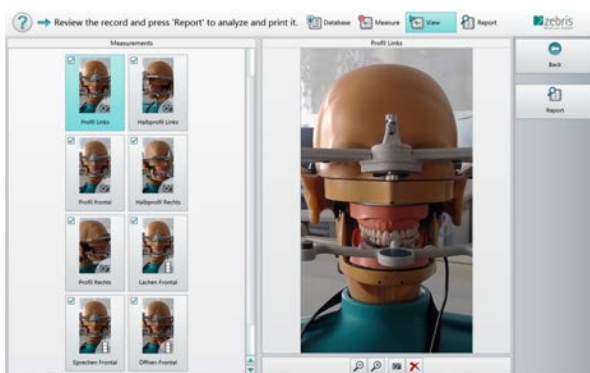


Opening a set of measurement data

Select a set of measurement data in the database and click on **View** in the right toolbar.

After you have completed a measurement, the view will directly change from the measurement into the **View mode**.

Playback mode view



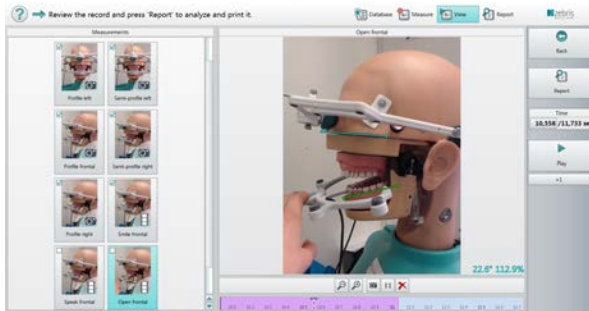
Click on **Play** in the right toolbar to view video sequences.

The time display above the Play button indicates the currently displayed point of time of the measurement in seconds. Click into the field to enter a value. The current time of the measurement will be given depending on the cursor position.

By clicking on **Back** you return to the database.

Timeline

The current point of time of the video sequence displayed will be shown here. With the **Buttons** you can hide or unhide individual frames or sequences in the timeline for the report.

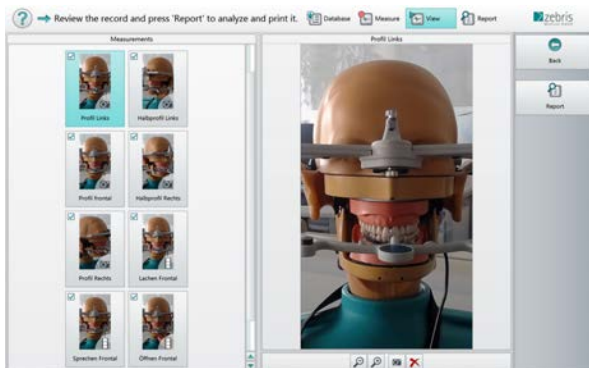


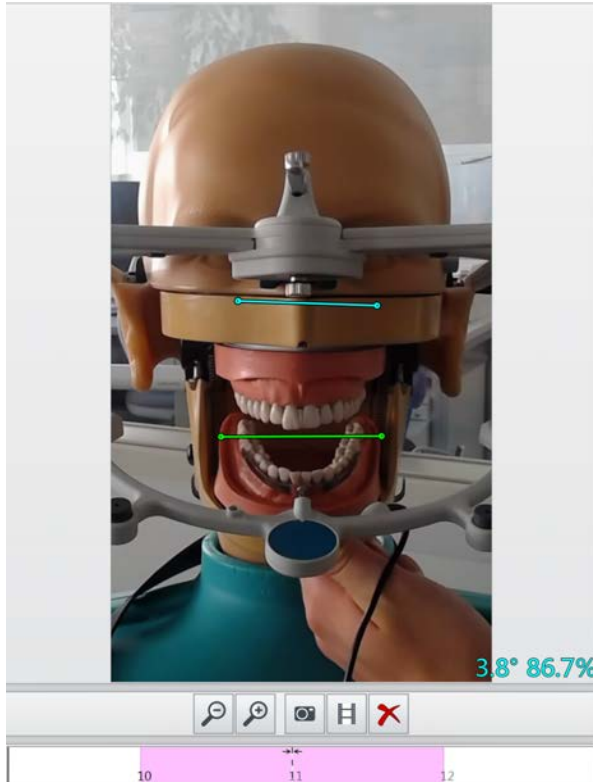
Using the **key combination** zoom, you can selectively view and analyze a particular period of time of the movement.

The real time display can be played up to 10x or up to 1/10 of the actual **Speed**. To select a particular section, move the mouse cursor onto an individually selected start of measurement and set a mark by mouse clicking on the dedicated symbol. The section selected for a video sequence is highlighted in pink. A light blue frame marks selected individual frames.

Recordings

In the view mode the recorded images and videos are listed on the left half. By double-clicking on the symbol of each frame you can select or deselect frames for the report. With a single click, the respective frame or video will be transferred into the detail view to be edited.





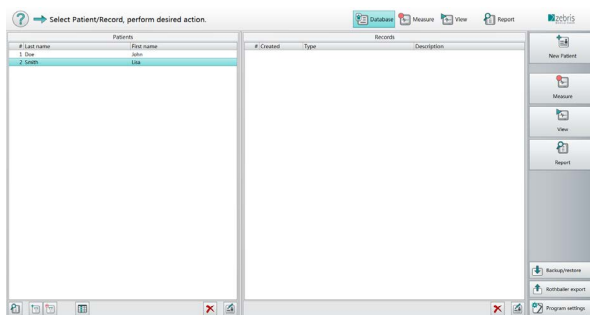
Detail view

In view mode you can find the detail views to be edited on the right. Here you have the possibility to view details of recordings more closely by using the **zoom** functions and to draw **lines and angles** into the frame, delete frames or tick mark frames for the **report**.

12.4 Video analysis report

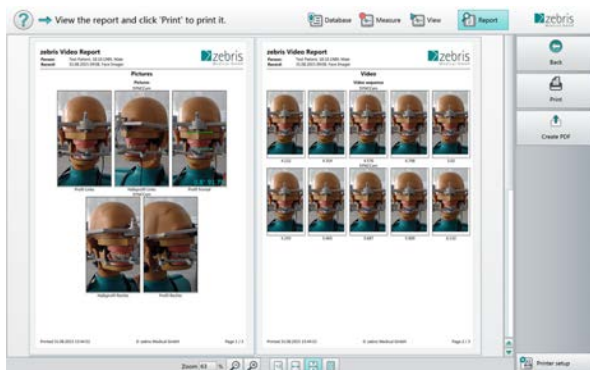
The report for the video module contains individual frames, tick marked frames that were zoomed or a symmetry measurement or other tick marked video sequences, depending on the selection made by the user.

12.4.1 Basics



Opening a set of measurement data

Select a set of measurement data in the database and click on **Report** in the right toolbar or change from **View mode** to **Report mode**.



Report output

The report view enables the user to read and evaluate the data in their entirety. In report mode, the data can be printed as pdf file by clicking on the printer symbol.

Movement Recording:

Frame sequences of relevant parts of a video can be integrated into the report in order to document patient-specific characteristics such as laughing style.

Frame sequences:

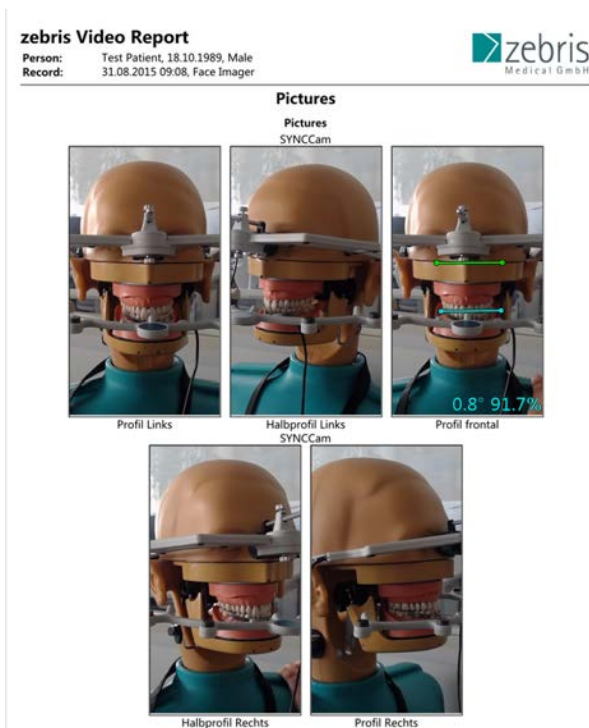
Depending on the definitions in the measurement settings, specific frames can be shown in the report. Select relevant patient-specific adjustments for the respective aesthetic or symmetric aspect. These report diagrams then can be used for comparison in order to assess the patient's aesthetics prior to and after the intervention.

Symmetry measurements:

With the symmetry measurement you have the possibility to compare particular facial features. An example for such a comparison would be the measurement of the eye line to the mouth line in order to illustrate the proportions of facial symmetry

12.4.2 Explanation of report content

The report consists of the elements described below:



Frames

Displays the single frames selected in the View module including all defined angles and lengths.

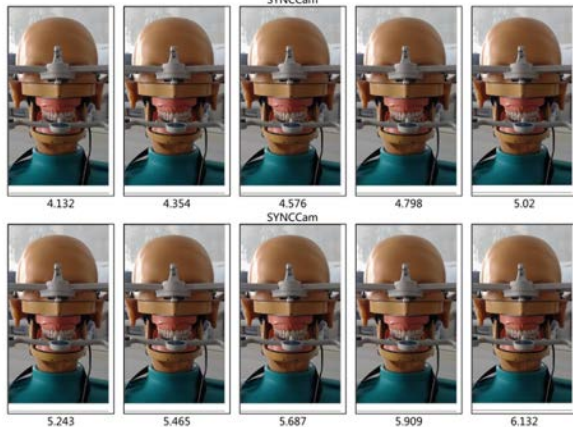
zebris Video Report

Person: Test Patient, 18.10.1989, Male
 Record: 31.08.2015 09:08, Face Imager



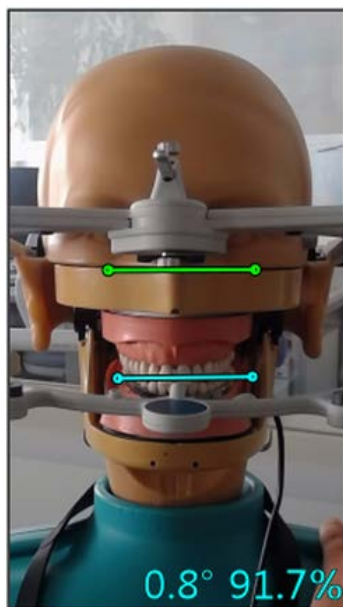
Video

Video sequence
 SYNCCam



Video sequences

Displays the defined video sequence in the View module, e.g. "Laughing frontal" with five frames with the same interval in between. Below the frame the time of the recording is shown in seconds.



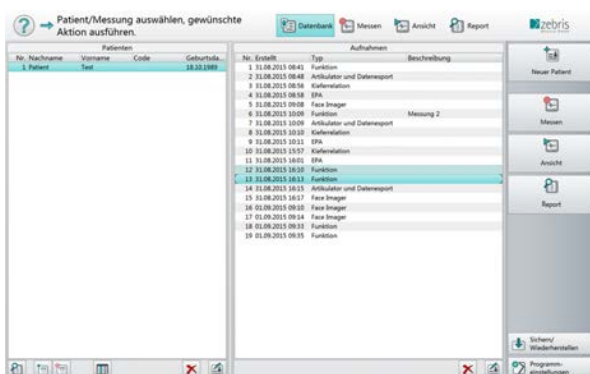
Selected single frames

Displays the single frames selected in the View module including all defined angles and lengths. Below the frame the time of the recording is shown in seconds.

Drawn lines

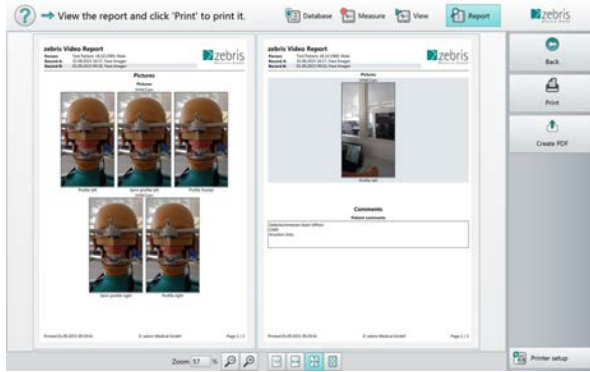
The lengths and lines defined in the View module are distinguished in green and turquoise. The angle between both lengths and the relation of the length in percent are given at the bottom right of the frame.

12.4.3 Comparing two sets of data



Selecting sets of data

To compare two measurements, first select them in the database with **Ctrl + left mouse key**. Then the report can be opened as usual by clicking on the Report button.



Depiction in the report

In the comparison report the results of measurement A are shown in colour and the results of measurements B are shown in black. The allocation to the respective measurement is also mentioned in the header.

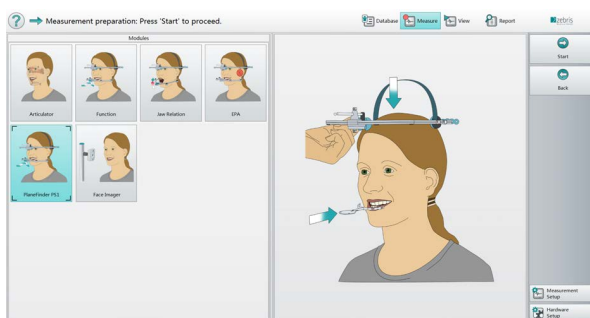
13 Calibrating the sensors

The system provides the customer with a manual calibration option for fine tuning the sensors which is explained in the following quick guide.

The calibration is realized via the allocation of the pointer inserted into the lower jaw sensor to calibration bores of the upper jaw sensor. There are three bores in the upper jaw sensor. The allocation will be made in the predefined order. Keep the sensors as parallel one above the other as possible so that the marker and the microphones can easily communicate. Place the tip of the pointer precisely into the small recess (again on the right from the patient's perspective). To know in which order to calibrate the pointers, please refer to the following description.

After starting a measuring module now activate the calibration with the **Calibrate pointer** button. Then follow the instructions below (which will also be given by the software).

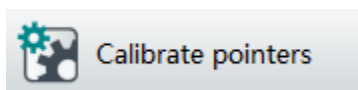
13.1 Description of the calibration process



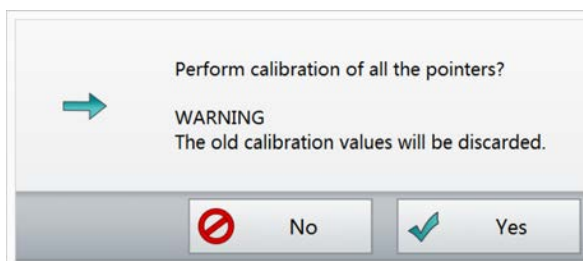
Start calibration

In order to be able to start the pointer calibration you first need to start a measurement with a module which uses ultrasonic sensors.

Then click on **Calibrate pointers** on the right bottom in the first measurement window that appears.

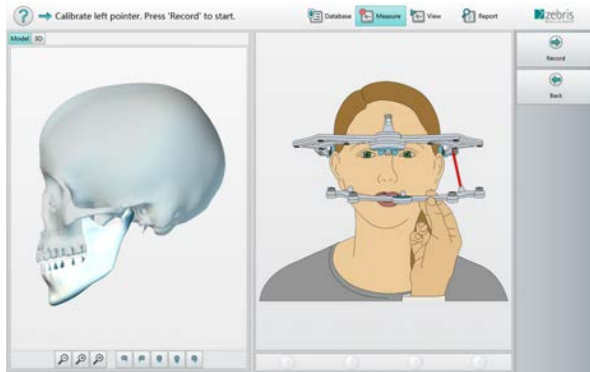


Warning that the current calibration will be lost



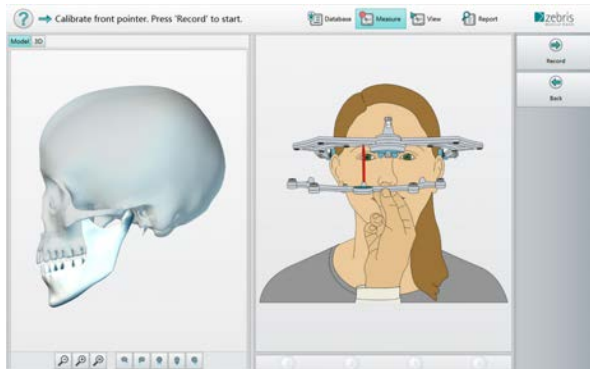
To avoid that the calibration is started accidentally, a warning message informs the user that the calibration will be carried out now. If you really want to carry out the pointer calibration now, confirm by clicking the Yes button. Use No to return to the screen of the started measurement.

Calibration of the left pointer



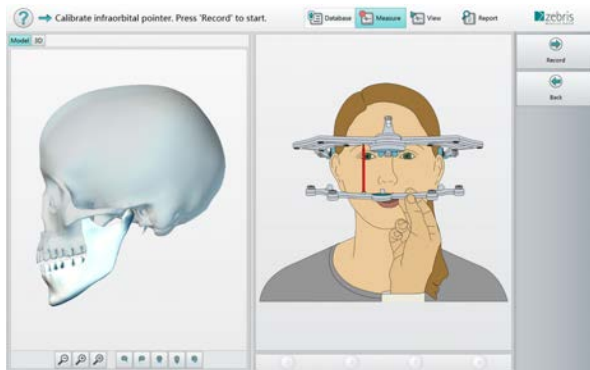
The calibration will start on the left side. Insert the pointer into the socket (2) of the lower jaw sensor. Now insert the pointer tip into the dedicated bore in the head bow and confirm with the **Record** button or start the recording with your **foot switch**. If you have attached the pointer in the wrong place, you can correct the calibration position via the **Back** button at any time.

Calibration of the middle pointer

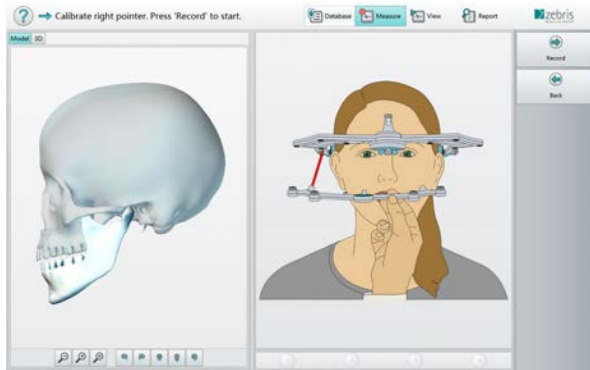


Now insert the pointer into the socket (4) of the lower jaw sensor. Now insert the pointer tip into the dedicated bore in the middle of the head bow and confirm with the **Record** button or start the recording with your **foot switch**.

Calibration of the orbital pointer



Now insert the pointer into the socket (1) of the lower jaw sensor. Now insert the pointer tip into the dedicated bore in the middle of the head bow and confirm with the **Record** button or start the recording with your **foot switch**.



Calibration of the right pointer

Now insert the pointer into the socket (3) of the lower jaw sensor. Now insert the pointer tip into the dedicated bore on the right side of the head bow and confirm with the Record button or start the recording with your foot switch.

Conclusion of the calibration

As soon as the calibration has been completed, you will be able to directly continue with the measurement of the patient. If you have made a mistake during the calibration process, you can restart from the beginning.

14 Troubleshooting

This section contains frequent error messages caused by faulty operation and provides some possible solutions.

If an error message occurs, please first follow these possible solutions from the list prior to contacting our customer support. The list is not intended to be exhaustive.

14.1 SYNCCam



1. Check whether the USB connector has been plugged into the computer (if the LED is green, the camera is powered via USB) and whether the other USB connector is firmly plugged into the jack of the camera.
2. Open the device settings (see Chapter Device Settings^[35]), delete the current hardware profile ("Delete" at the top right), press 'Ok' and reopen the device settings. The automatic device detection starts. Confirm and check whether the camera has been added.
3. Plug the USB cable into another jack on your PC and repeat step 2.
4. Open the Windows device manager and search for the entry Image processing devices >> "Logitech HD Pro Webcam C930". If you cannot find it, unplug the USB cable and plug it in again. Windows will now install the camera drive, following the device will appear in the list. If this is not the case or if the name of the camera is only "HD Pro Webcam C920", right-click on this entry and select "Update drive".

Now Windows will update the drives and might require a restart of your PC.

14.2 General

“3D display impossible, your graphics driver does not support OpenGL 3.3 (Irrlicht).”

“3D view cannot be generated (OpenGL x.y).”

Possible cause	Solution
Open GL 3.3 not supported	During software installation it will be checked whether your graphics hardware supports OpenGL 3.3, which is required for the correct execution of the software.
Graphics driver has been changed	If this error message is displayed after installation, either you have two graphics chips or your graphics driver has been changed in the mean time. Systems with two graphics chips often provide a switching option; in case of a changed driver please make an update.

„Timeout reading from USB”

Possible cause	Solution
USB cable not plugged in	Connect the USB cable of your device to the PC.
Device not switched on	Switch on the device with the corresponding button or establish power supply via the power supply unit. For further details refer to the hardware manual.

14.3 Bluetooth Connection does not work

Verify that the PC has an integrated Bluetooth adapter. Bluetooth flash drives are only suitable to a limited extent to simultaneously transmit the incoming data. Furthermore, driver problems can occur as well. Ensure that the latest driver is installed on the PC.

In general, the zebris medical base unit should always be charged as it is battery-operated. For charging, the USB data cable can be used either in connection with a PC with the supplied power supply unit. For further information refer to the hardware manual.

When manually pairing the computer with zebris medical base unit, the corresponding Com Ports must be determined and selected in the zebris medical basic software via the setup.

15 Import Interfaces

WINJAW+ offers several interfaces for the data exchange with other software packages such as e.g. doctors office management software. To know if your software is enabled for one of these interfaces, please refer to the manufacturer information.



The patient's name and surname and, since version 1.0, the patient's date of birth are compulsory information to be provided for the patient database in the WINJAW+ software. When measurements are taken over from older software packages that did not contain the date of birth, the field will remain empty for now. If an action requires the date of birth, you will be informed by a corresponding message.



In the following, the installation of the interface as well as the available amount is described, if the interface is supplied by several providers, the software of your third-party supplier is described in the following as **third-party software**.

16 Data export interface

WINJAW+ provides an interface for the further processing or evaluation of the received data with CAD/CAM programs.

The "**zebris medical Real movement**" interface is available in the articulator module in view mode.



The patient's name and surname and, since version 1.0, the patient's date of birth are compulsory information to be provided for the patient database in the WINJAW+ software. When measurements are taken over from older software packages that did not contain the date of birth, the field will remain empty for now. If an action should require the date of birth, you will be informed by a corresponding message.

16.1 zebris-specific formats

16.1.1 XML

This export interface is available in the View mode in the articulator module. The XML data format is intended for further processing by software packages with XML parser, which were coordinated with zebris medical.

Along with metadata such as patient and recording data, mainly the patient's movement data are outputted, which then can be amalgamated with lower jaw scan data.

17 Notes

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