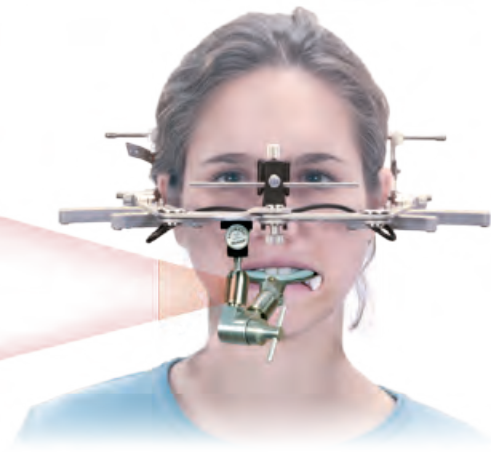
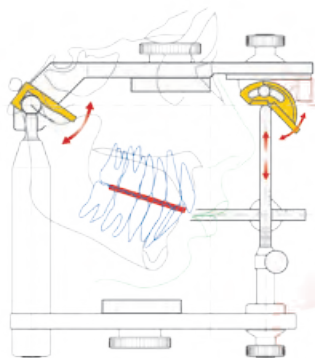
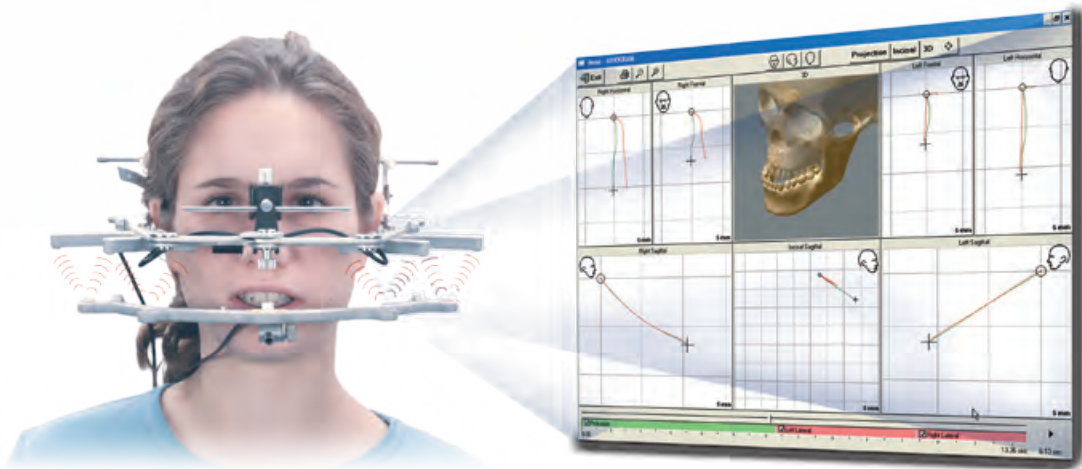


AXIOQUICK[®] RECORDER

ULTRASONIC AXIOGRAPH[®]

VERSION 1.0 MANUAL



FEATURES

Unique to the AQR System is the use of ZERO REFERENCE PLANES determined by Anatomic Porion posteriorly and Orbitale anteriorly. This also makes Frankfort Horizontal and Axis Orbital planes identical. This also establishes pre-determined Hinge Axis reference points that are colinear and within clinical accuracy for recording articulator data.

Rapid setup and positioning of AQR Anatomic Recording Face Bow.

The AQR Face Bow is used with an interpupillary line leveler that gives the operator the correct esthetic plane for articulator cast mounting procedures.

The AQR positioning protocol eliminates the artifacts normally seen because of rotation and translation movements. Protrusion and Mediotrusion movements are coincident in the initial 6 to 8 mm of movement in healthy patients. The use of Porion assures a colinear axis is within the central area of the condylar head.

Direct online visual tracking on your computer monitor.

Sensors are calibrated at the beginning of each recording session.

After determination of hinge axis the system automatically makes the corrections.

Recording sequence movements can be made manually or interactive with the patients.

Identification and comparison of intercuspal position with centric relation position of the condyle. Also possible to overlay protrusive and or mediotrusive movements on recording of intercuspal position.

Due to the unique method of establishing a ZERO REFERENCE POSITION and the fact the REFERENCE always remains constant in the upper Flag Bow the very important Frontal Plane along with the Sagittal and Horizontal Planes you receive level of recording accuracies. This is very important for making an accurate diagnosis.

Recording measurement accuracy is 0.01mm with 50 measurements per second.

Individualized setup is possible for each operator.

Each recording type can be selected from the menu along with any color you desire.

Magnification of recordings on the output screens.

Each recording can be individually animated.

In Axiogram and Axiogram Analysis there are endless analysis possibilities.

Clicking joint movements can be identified in magnification modes and also in the numeric output in the Axiogram.

Anatomic 3D animation is available for patients to see and clarify what is going on.

Accurate documentation and collection or recording data can be used for diagnosis, analysis, and treatment planning.

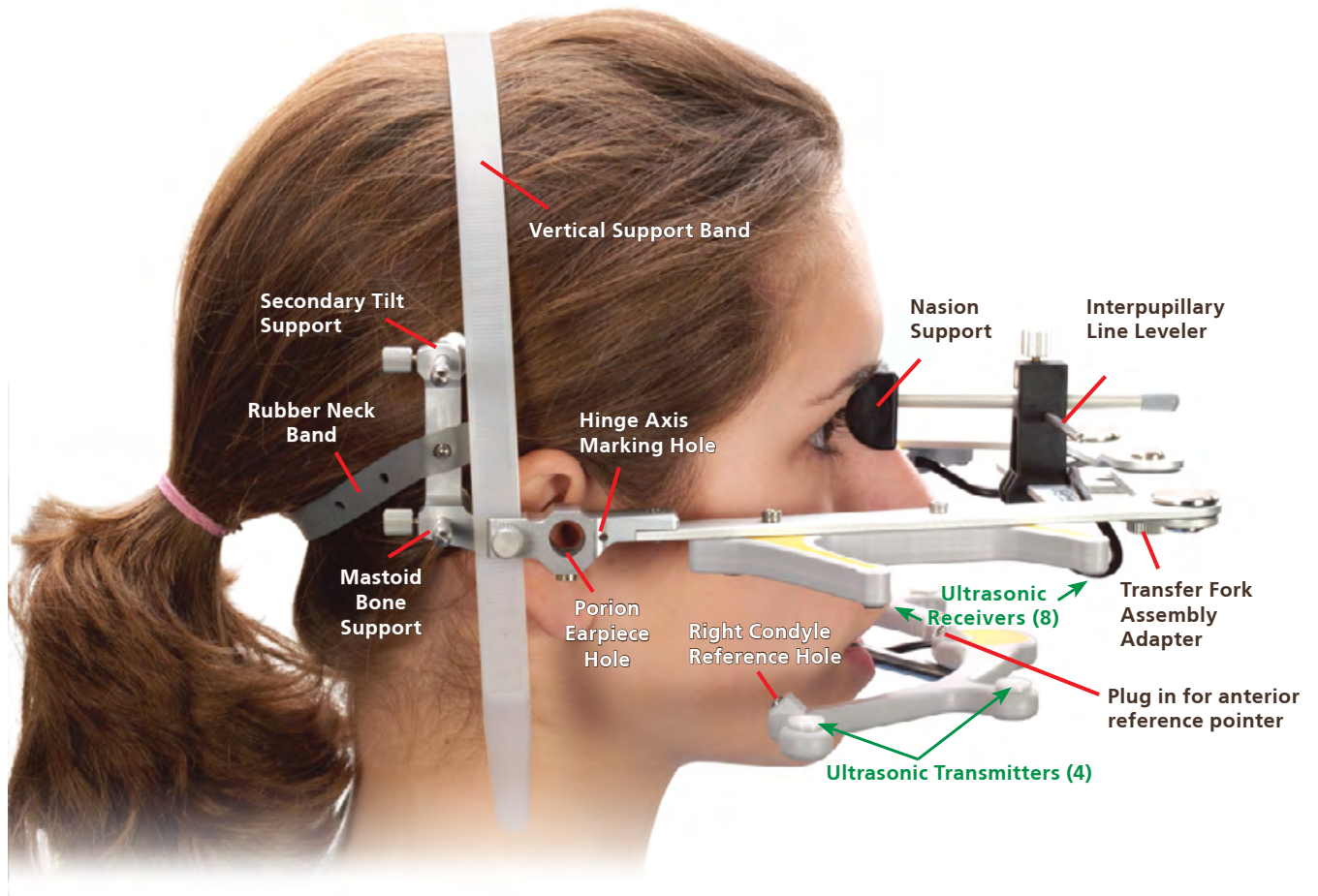
FORWARD

Recording data is rarely without some signs of dysfunctional movement. Centric Relation of the condyle and the intercuspal fit of the teeth are normally not identical. It is important when considering the setting of articulators that therapeutic data be used rather than dysfunctional. The AQR System gives you the opportunity to accomplish this.

The original AXIOGRAPH® established the reference system for recording mandibular movement such that you could make a direct analysis of the recordings and they would compare favorably with the patient movements.

The AXIOTRON®, electronic AXIOGRAPH®, took the basic AXIOGRAPH® to the next step in that it now allowed the visualization of the very important Frontal Plane. Reference ZERO in the system permitted an accurate reproduction and display of the Frontal view. The Frontal view is usually not seen in other recording systems due the missing ZERO reference starting point.

The AXIOQUICK RECORDER® uses the same concept as the Axiotron and is now the state of the art in the recording of mandibular movement. It is easy, quick and accurate. This innovation is a product of SAM Prazionstechnik, Munich, Germany



The Axioquick Recorder is oriented to an Anatomic Face Bow in a fixed relationship. This guaranties an exact Reference Plane and also for an exact upper cast transfer recording.

Measurements for articulator setting can be made quick and easy by using the pre-determined axis position already present in the upper flag bow that is referenced to the Frankfort Horizontal and Axis Orbital Planes. Hinge Axis determination can be used for recordings and Condyle Position analysis. In addition, EMG studies can be done.

AXIOQUICK® RECORDER - THE SYSTEM TO MEET ALL YOUR NEEDS

Rapid jaw movement registrations for the setting of your articulators. And also, at the same time, an upper facebow registration that is related to the cranium and not to moveable mandible as is common in most other face bow systems. Your upper cast mounting will be esthetically correct in your articulator without the usual asymmetries seen in the past.

The combination of AXIOQUICK® transferbow or AXIOGRAPH® flag bow with a contactless ultrasonic recording device allows the 3D acquisition of all lower jaw movements. are relation to the condyle rotation axis. You are able to record joint movement data, front tooth guidance, and also EMG information. The ZERO reference plane and points are the right and left anatomic porion and orbitale which product the Frankfort Horizontal Plane which is parallel to the Axis Orbital Plane. This information has been extracted from published research.

The 3D REFERENCE plane is related to the interpupillary line with a special eye leveler attached to the Nasion Relator.

The Ultrasonic Recording System works similar to the GPS (Global Positioning Satellite System).

The doctor, patient, and recording data base allows for direct access and use plus export, import of data for storage and also transfer of ASCII data.

The Axiogram is the graphic rendition of the measurements. Special diagnostic evaluation is possible, in which the recording is played as animation. Analog and digital data plus reports can be printed.

Condyle Position Analysis (CPA) allows for up to ten (10) intercuspal position (IP) registrations. You can compare IP to any selected reference point of your choice. This results is a higher degree of accuracy then the Trend Analysis you receive with articular mounted casts and the Mandibular Position Indicator (MPI) System.

The report shows the angular adjustments and curvatures of the articulators before printing. The user is able to of individualizing report masks and/or the structure of report. Additionally as in the Axiogram new measurements of angle and distance can be made or different attitudes can be changed through mouse-click in the text field.

A number of different reports are available wherein you can see angle and curve pathways to be used in your articulator plus the digital data values.

Axis determination is automatically determined by simple opening and closing movement in contrast to prior techniques whereby a stylus was used and adjustment to a point of pure rotary movement.

Also available are 3D animations of movements plus recording overlays. Direct online movement recordings and determinations are possible.

Axiogram Analysis shows 3D movements along with timing and digital data. Condylar plus posterior tooth and anterior Guidance pathways are shown. The 3D coordinates of posterior are entered from digitized mounted casts.

THE PRINCIPLES OF 3D MOVMENTS AND THE RESULTANT VIEWS ON YOUR MONITOR

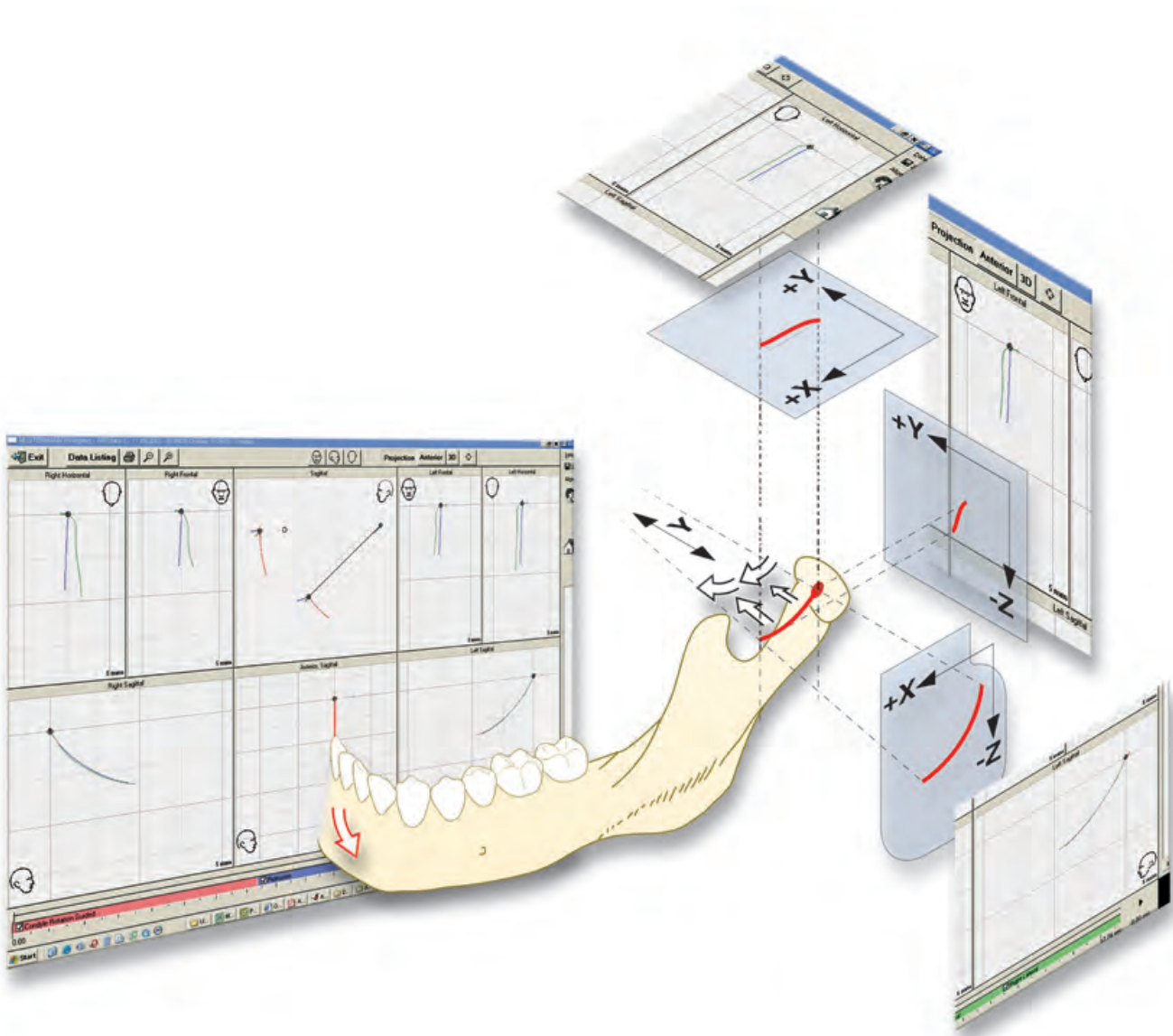


Illustration shows mandible and corresponding available outputs that will be shown on the computer screen. Horizontal is XY direction, Frontal is YZ direction, and Sagittal is XZ direction.

Recordings will also show anterior incisal point movement along with condylar movement pathways.

For each movement there is a data listing available in the AXIOGRAM.

INSTALLATION

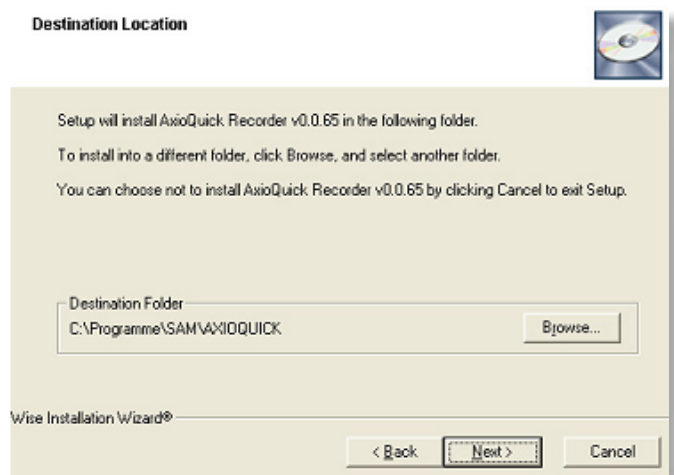
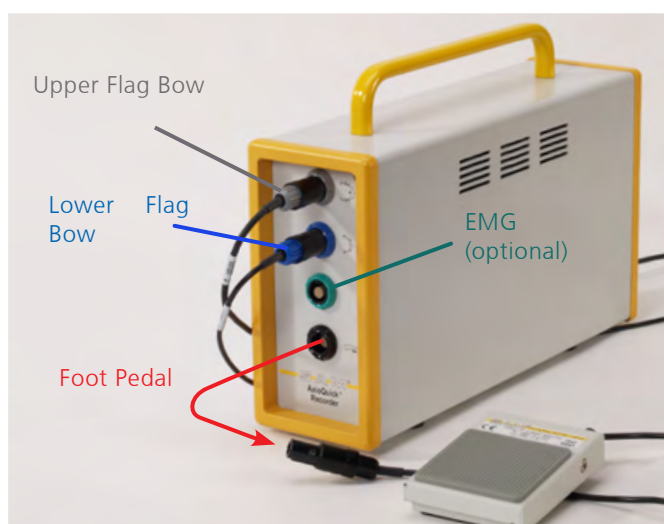
Click Next or on Browse to select a different folder for your program C:\Program Files\SAM\AXIOQUICK

WINDOWS XP AND CONNECTION OF USB DEVICES:

Do not connect AQR US cable until you have completely installed the AQR Software.

The Microsoft Operating System will not operate correctly and the USB drivers will not be installed correctly. The AQR Software must be installed first.

Each cable is color coded and will only fit in the correct socket. Simple rotate cable plug until it slips in the socket.



Please do not ignore this warning.

Installation is normally problem free and you need only click next when prompted regardless of what you see on the screen.



MAIN MENU

Exit Program Operator Selection, New, Edit Delete Select Anatomic Face Bow or Hinge Axis

Recording Type

Recording Settings

Data Output

PATIENTS New Edit Delete Import/Export

MUSTERMANN Wolfgang
MUSTERMEIER Wilhelmine

RECORDINGS Edit Delete Import/Export

APTdata-1
CPA-1
SCREEN-FH

New Patient, Edit, Delete, Import/Export Patient Data

Patient Recordings, Edit, Delete, Import/Export Patient Recordings

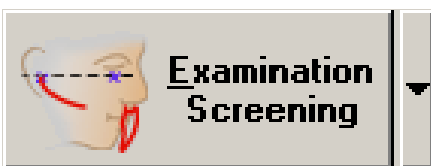
RECORDINGS

- Examination Screening
- Condyle Position RP : IP
- Articulator Data Guided
- Tooth Pathways FDI-Coordinates

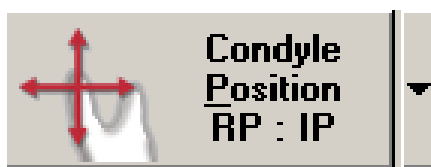
REPORTS

- Axiogram
- Axiogram Analysis
- Report

RECORDINGS



Screening Examination
minimal recordings for a quick analysis



Comprehensive Examination
maximum recordings based on your choice for a comprehensive exam

Condyle Position
Condyle Position Analysis compared with a selected Reference Position. Overlay of Protrusion and/or Laterotrusion Movements.



Articulator Data
Quick recordings to program an articulator



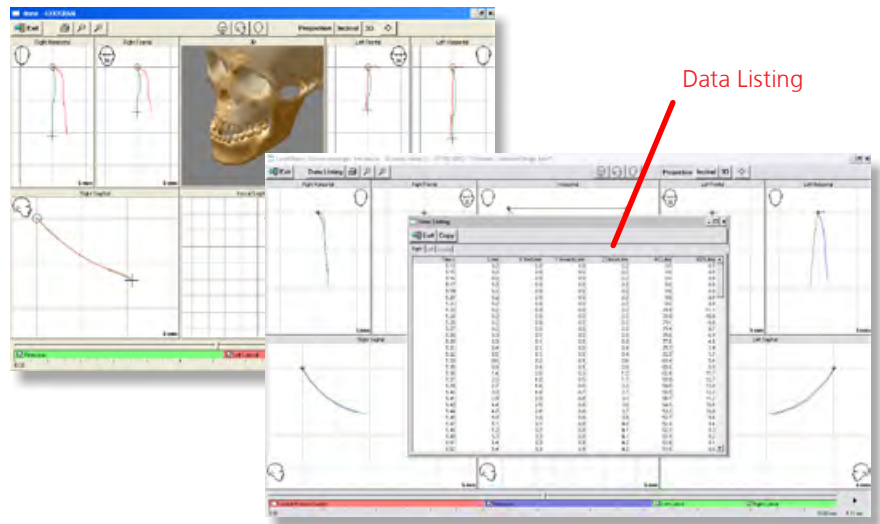
Tooth Pathways Coordinates
Laboratory procedure to record individual and/or combination tooth contact movement pathways.

REPORTS



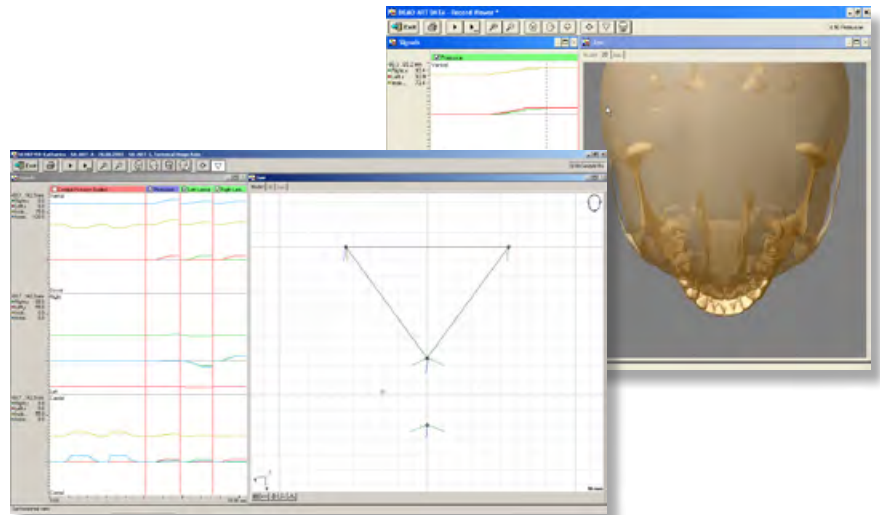
Axiogram

Graphic output in the frontal, sagittal, horizontal, and anterior areas. Animations of movements and analysis plus data listing output.



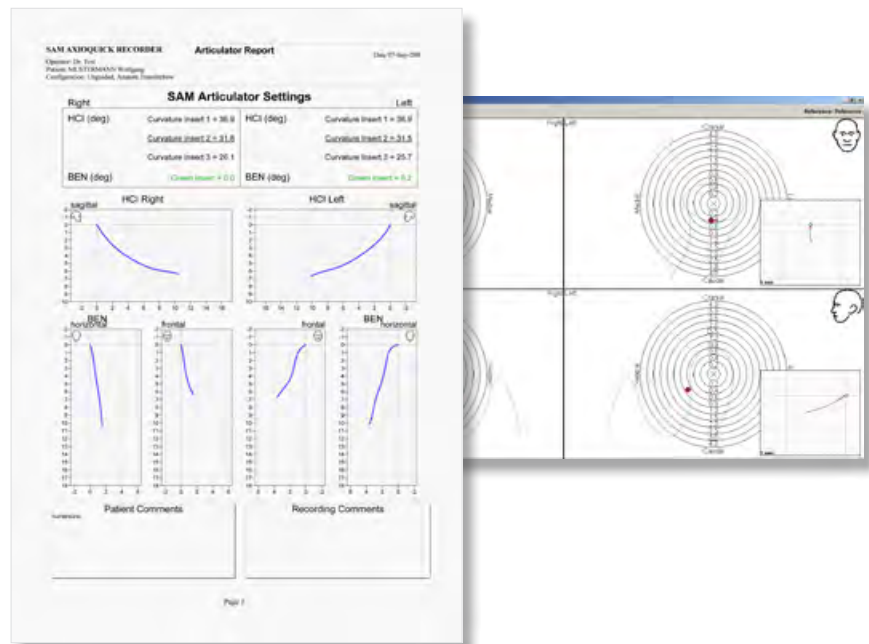
Axiogram Analysis

A more extensive analysis of the Axiogram including all perspectives of the recording.



Report

Graphic and digital reports can be viewed on the screen or printed as hard copy. Reports can be customized to fit your needs. Each recording type has its own type of report.



QUICKSTART

The following are quick and easy sequences you can use to allow you to become familiar with the AQR System as you receive it.

Additional possibilities will be described later in this manual. It will become very clear that there are endless possibilities with the AQR.

1.



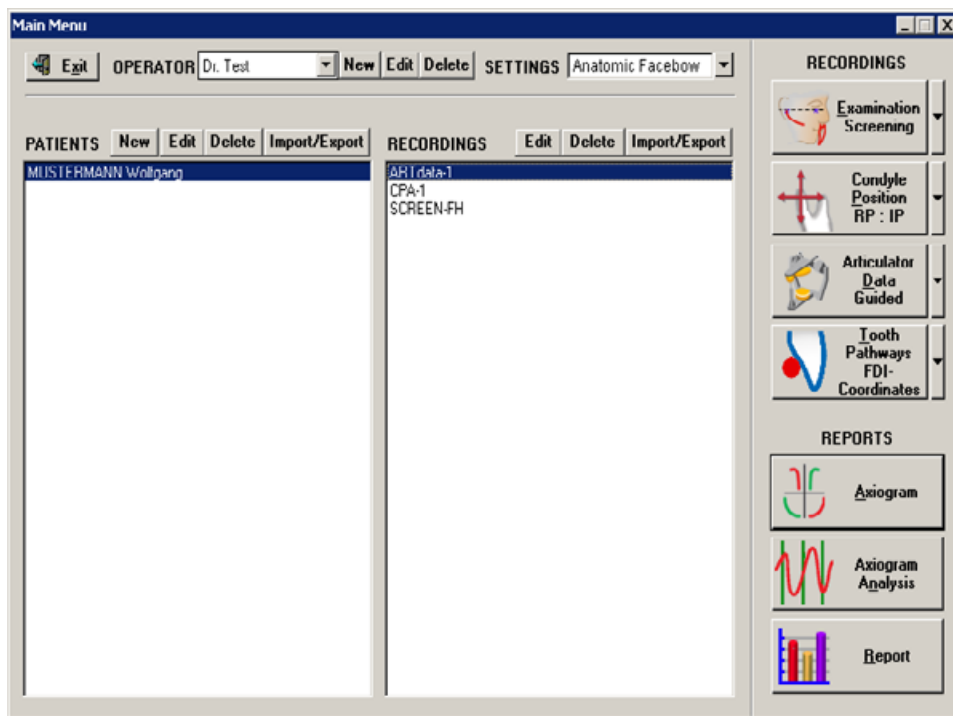
2.



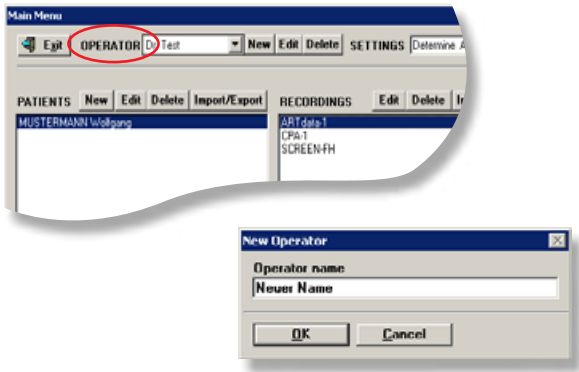
Either Click or Double Click the AQR Icon on your Desktop or Start Menu to start the AQR Program.

This screen will be viewed and followed by several other screens.

3. The following menu screen will allow you to access all of the features of the AQR.



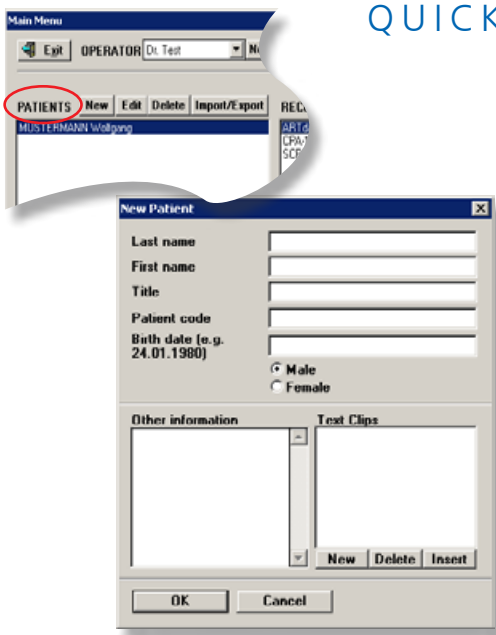
4.



You will need to add your name as an operator. Click **New** and add your name and fill in the requested info. It is possible to later **Edit** your name or **Delete** it. Remember deleting your name will delete all files related to your name.

5.

QUICKSTART ARTICULATOR DATA



You will need to enter a patient name to establish a data folder for all recordings associated with that patient. In the left window will be a list of patients. When patient name is highlighted in left window then all recordings for that patient will show up in right recordings window.

Again you must click **New** to enter new patient, you can also **Edit** and **Delete**.

Clicking **Import/Export** allows you save patient files and/or recordings to a CD, external hard drive, USB drive, or another folder on your hard drive.

Again, remember that DELETE is permanent and be sure on what you wish to delete be it operator, patient, or recordings. You will be prompted as a measure of security.



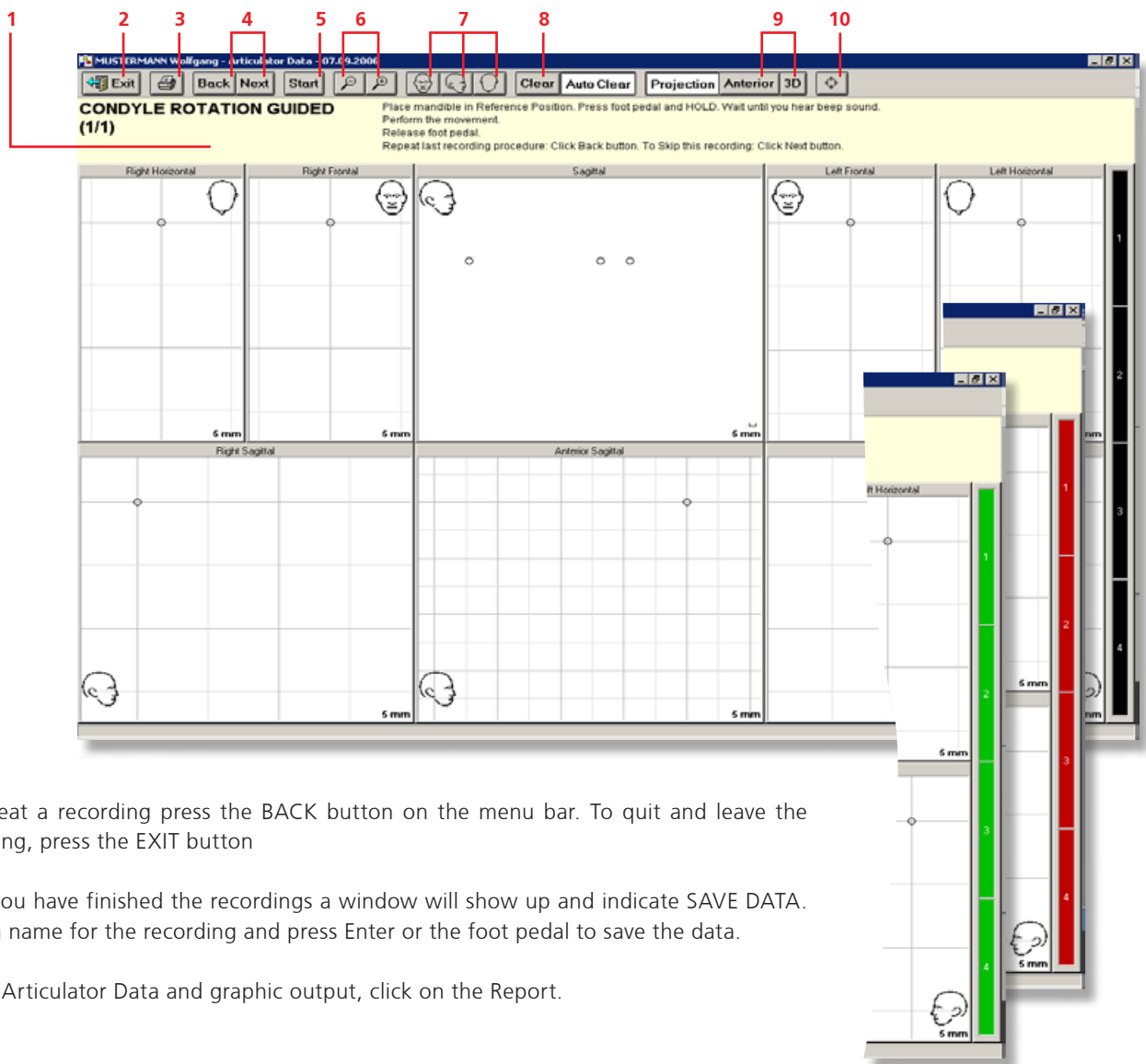
Click to start recording

This is a quick recording of mandibular movements necessary to set your articulator. This can be done with or without tooth contact depending on your wishes and needs.

The down arrow to the right will reveal setting selections that come with the program or those you have edited yourself to meet your wishes and needs.

The yellow window (1) below shows the recording type to be done plus instruction protocol. Press foot pedal and hold, do recording and release. If you want to use the enter key (5). Press it and release, do recording, then Press enter key and release to stop recording.

When recording is active you will see a vertical GREEN Bar on the right side of the window and when recording is stopped or is not active it will be RED.

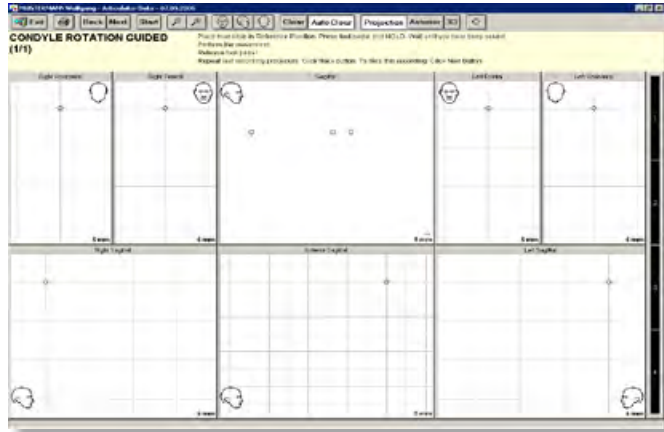


To repeat a recording press the BACK button on the menu bar. To quit and leave the recording, press the EXIT button

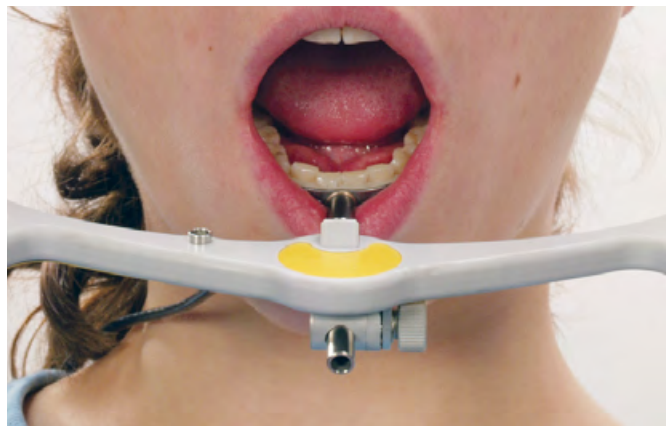
After you have finished the recordings a window will show up and indicate SAVE DATA. Enter a name for the recording and press Enter or the foot pedal to save the data.

To see Articulator Data and graphic output, click on the Report.

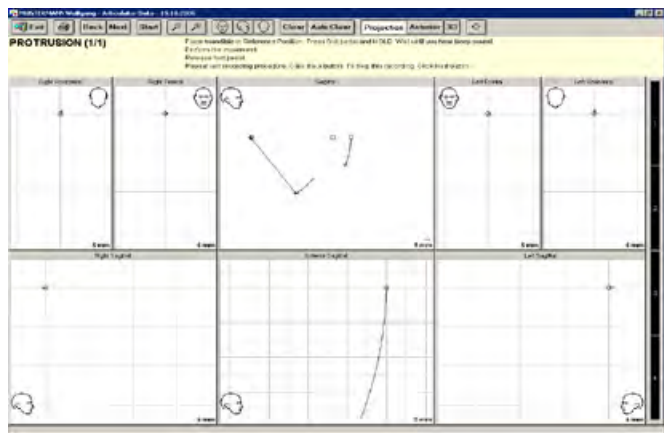
The AQR System uses a ZERO reference point for all recordings and output. Therefore, it is important that you place the patient's mandible in the reference position ZERO prior to any recording procedure and only then do you press the foot pedal, hold it, do the recording and then release the foot pedal. You will see in the graphic output on the screen a red dot in the middle of the reference circle.



When you make a simple rotation movement to establish a ZERO Reference position it is important to only hinge about 10 mm more or less.

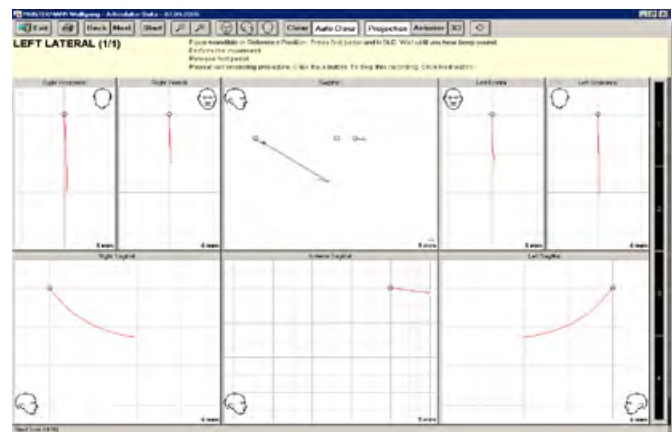


When you release the foot pedal, the next recording movement selected will show up in the yellow window and is normally a protrusive movement.



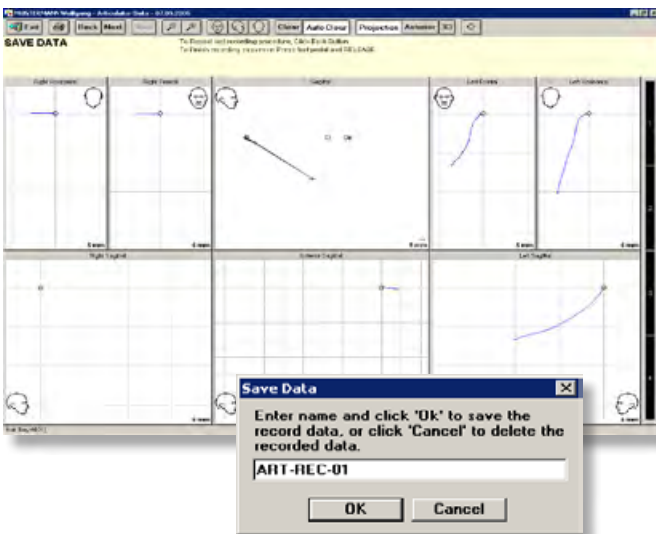
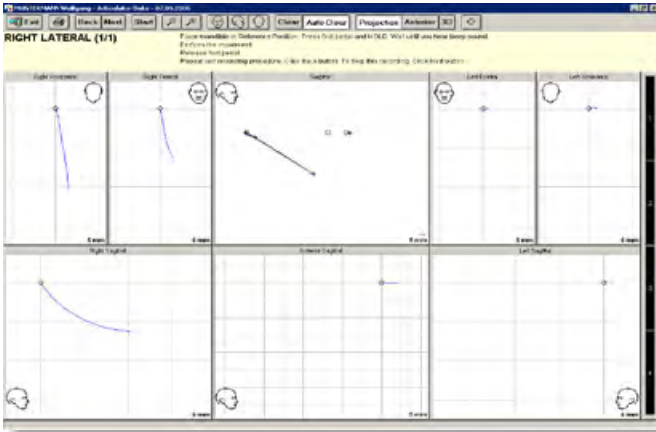
Before each movement the operator should place patient in desired reference position. Press foot pedal and hold move have patient make desired movement or the operator can guide the patient through the movement.

At the end of the protrusive movement, release the foot pedal. The next movement, left lateral, will show in the yellow window along with instructions. Instruct patient as to left lateral movement, press foot pedal, and have patient make a left lateral movement.



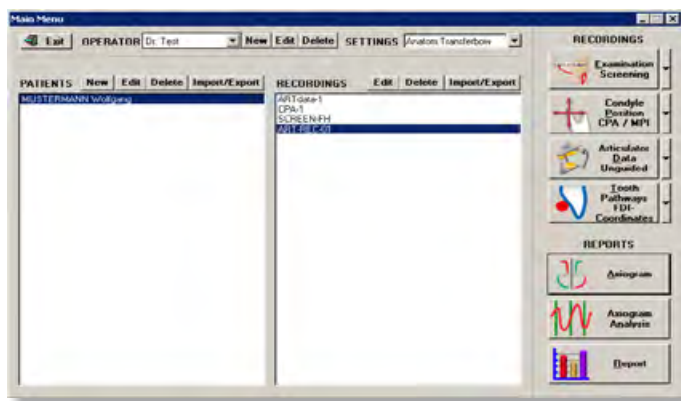
At the end of the left lateral movement, release the foot pedal to end the recording.

Again, the next desired movement will be shown in the yellow window and repeat protocol as described earlier for left lateral.



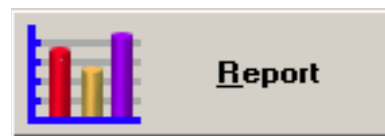
Note when foot pedal is pressed you should see a Green Bar on the right side of the screen.

At the completion of the movement and release of the foot pedal the Save Data Screen will appear. Type in ArtData and whatever info you like and press foot pedal or enter key to save data.

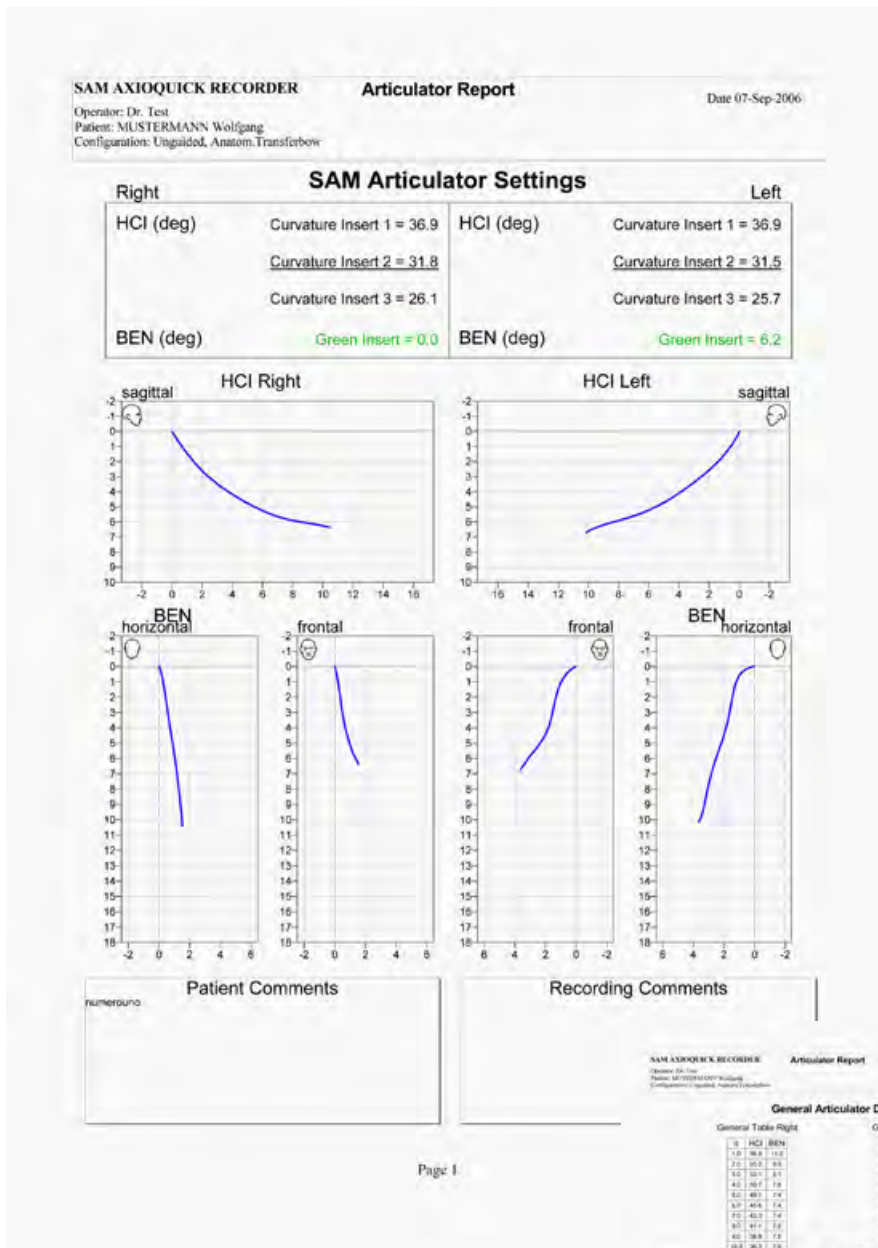


With articulator data recording highlighted, click on the

Report button and you will receive the Articulator Data Report.



DATA OUTPUT (REPORT) FOR ARTICULATOR



The Articulator Report will give you both graphic and numeric data for the setting of your selected articulator system.

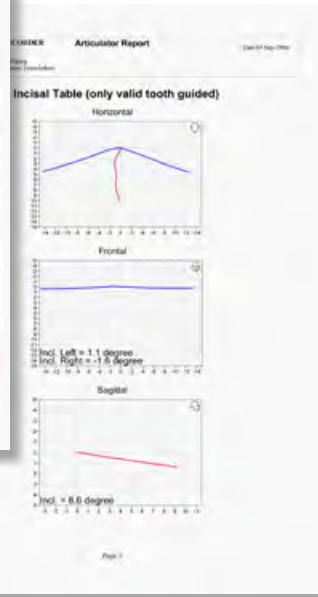
By selecting print in file menu you can print one or more pages of the Articulator Report.

Information shown for Anterior Guidance is only relevant if you use a paraocclusal clutch system for the recording procedure.

The Articulator Data will be generated automatically when you select ArtData Recording.

The examination recording will output different information based on the recordings selected.

The graphic tracings are in the examination recordings and can be measured directly and thereby you also have the Articulator Data.



CLINICAL PROCEEDING



If functional occlusion is to be recorded then the clutch system must be attached to the outside surfaces of the teeth. There are many systems that are being used.

Using the clutch system supplied with the AQR you simply form the flexible band against the labial surface of the lower anterior teeth. Use something like ProTemp Resin to make an impression index. Check that teeth do not touch the corrected tray. Always dry the teeth and attach with several drops of cyanacrylate glue or something like Ketac Cement which is preferred. Again, it is your choice.



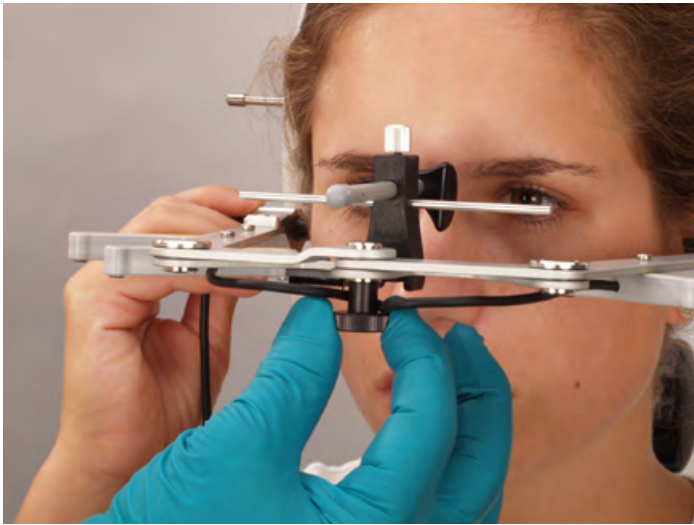
Prior to positioning the Upper Flag Bow on the patient it is necessary make some initial preparations. Fully seat Porion Earpieces inwardly and lock with thumbscrews. Loosen thumbscrews on both cranial supports distal to earpieces and move support devices outwardly and lock in place. Position Nasion Relator loosely such that it can rest on the nose when the upper flag bow is being positioned on the patient. Vertical head support band should be put in place with excess space above the head. Black thumb screw in front should be loosened.



Check that lower clutch is firmly on the teeth. If not, remove and reset.

Patient is instructed to place the thumb and last finger under the flag bow and the remaining three fingers above the flag bow such patient can hold flag bow safely.

The operator can support the flag bow in front, if necessary.



The patient is instructed to place the earpieces inward in the outer ear until the hearing is lightly and evenly blocked. Then the patient moves the earpieces superiorly and inwardly into the depression found in that area of ear. The operator then views the interpupillary line leveler to assure alignment with the eye pupils. The Black Thumb Screw is secured.



The Nasion Relator ideally should be covered with putty silicone to be more comfortable for the patient. The Nasion Relator is lightly positioned and secured with thumb screw.



Patient should hold position earpieces upward and inward and the vertical head support band should fixed in place and thumb screws tightened.



Vertical head band is checked.



The mastoid bone support and secondary support should be put in position and locked in place.



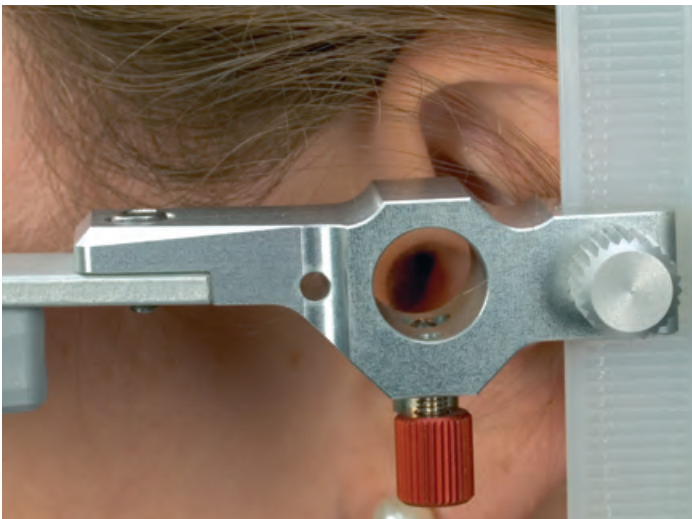
The Nasion Relator should be adjusted firmly in position and locked in place. Attach the rubber neck band in position such that is firm. Recheck upper flag bow and make sure it does not move.



The lower recording bow is attached to the clutch rod and made relatively level to the upper flag bow.



Loosen the thumb screws that hold the black earpieces. Remove each one by rotating the earpieces and sliding outwards. Recheck that upper flag bow is secure and firm in position.



The earpiece alignment protocol places the horizontal axis orbital reference plane identical to the frankfort horizontal plane.

DATA RECORDING

Each recording movement can be started in a ZERO reference position. It is only up to the operator to position the recording equipment according to protocol and then to position the mandible to this ZERO position. For sure, at times, there is problems with mandibular joint complex and this is not possible. However, the system is so designed that there is a built in ZERO in the upper flag bow that is

very easily used if the mandible does not have a reference ZERO. Included in the program is the possibility to record and or mark the ZERO Reference Position on the skin and also set it into the program.

The screenshot shows the SAM software interface. At the top, a toolbar contains the following icons and labels:

- Exit
- Back
- Next
- Start and Stop measurement (red dot icon)
- Step forward and back (square icon)
- Zoom in and out selected Windows (magnifying glass icon)
- Select View (head icons)
- Clear
- Auto Clear
- Delete Recording (trash icon)
- Projection
- Incisal
- 3D
- View as Bone (bone icon)
- Incisal Point
- CT Animation
- Centrate window (crosshair icon)
- Pointer position (hand icon)

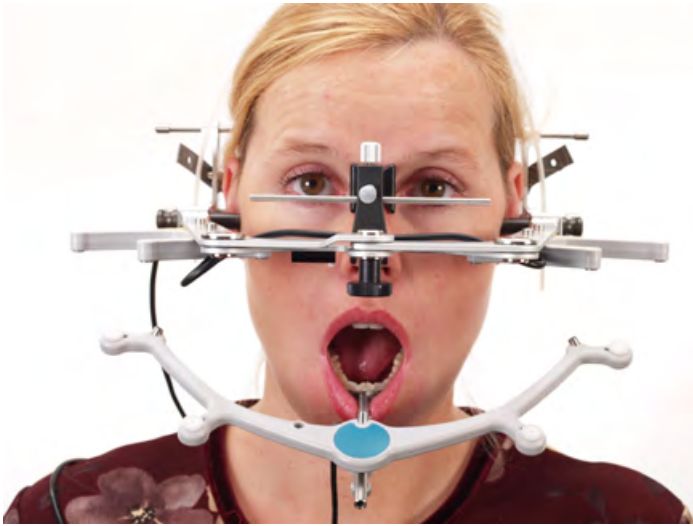
Below the toolbar, the main window displays a grid of views for axis verification:

- Right Horizontal
- Right Frontal
- Sagittal (central view showing concentric circles and a green dot)
- Left Frontal
- Left Horizontal
- Right Sagittal
- Incisal Sagittal
- Left Sagittal

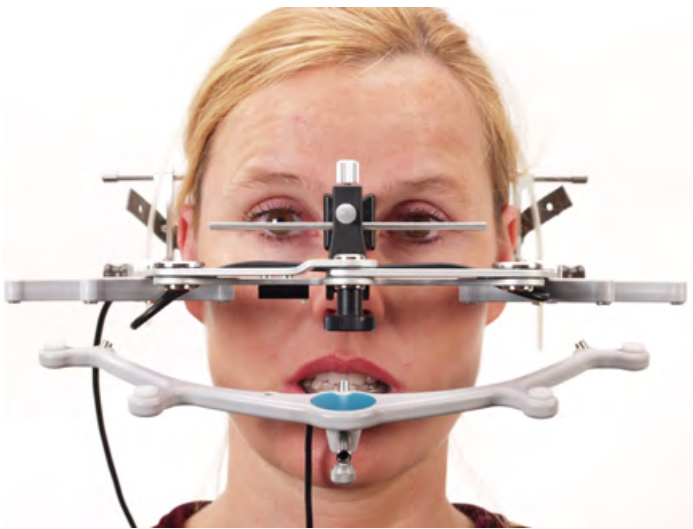
Scale bars are present in each view: 5 mm for most, and 2.5 mm for the central Sagittal view.

Text annotations on the screenshot include:

- "Show right condylus: Show the condylus with right pointer or press ENTER or foot pedal to continue" (yellow bar)
- "This vertical bar will be either Black as not being ON, Red is ON but sensors not communicating or Green and OK to record." (pointing to a vertical bar on the right)
- "Screen showing axis verification protocol." (pointing to the central Sagittal view)

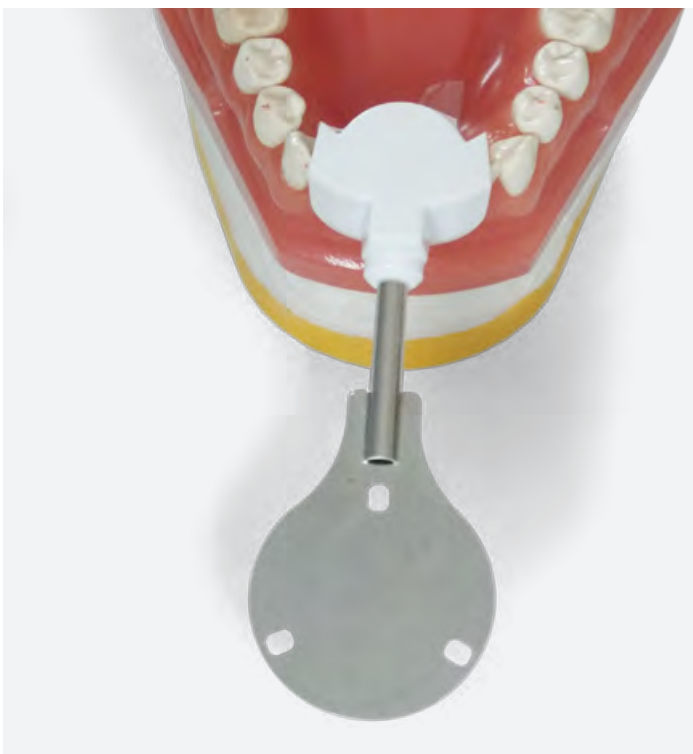


Clinical recording and analysis can be done in rotation sequences and also in all desired excursive movements including chewing, bruxing, etc. All of which can later be analyzed in the AXIOGRAMS and hard copy documentation is also available.



In any case it is important that everything be properly related to a reference point and the only reliable reference is a Joint Based Position of the mandible which is related to a rotation axis within the condyle. This can be easily determined if there is a reasonably healthy TMJ. If not, then the operator can use a predetermined axis that has been shown by research to be clinically acceptable for therapies.

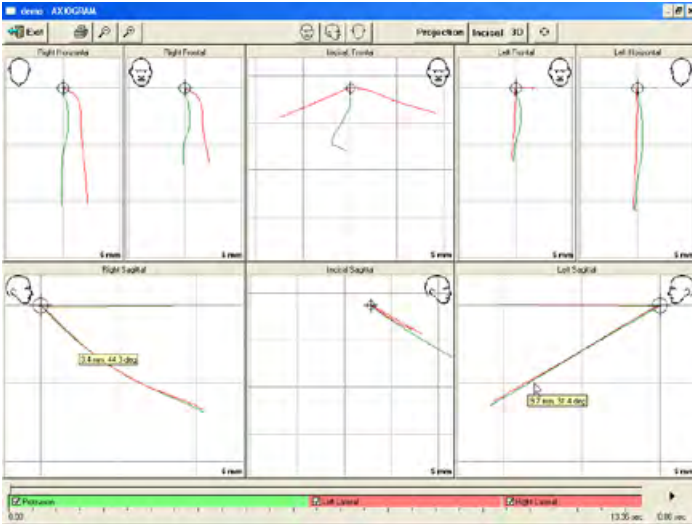
It is easy to determine if there is an acceptable condylar rotation axis with the AQR System. Guide patient to CR position, rotate open and close from 10 to 18 mm and you will quickly see if there is an acceptable rotation of the condyle. You can normally find this axis is the majority of the patients, however, the mandible may not always be positioned correctly to the cranium but that does not mean you do not have an axis.



Optional:

With magnetic mounting adapter

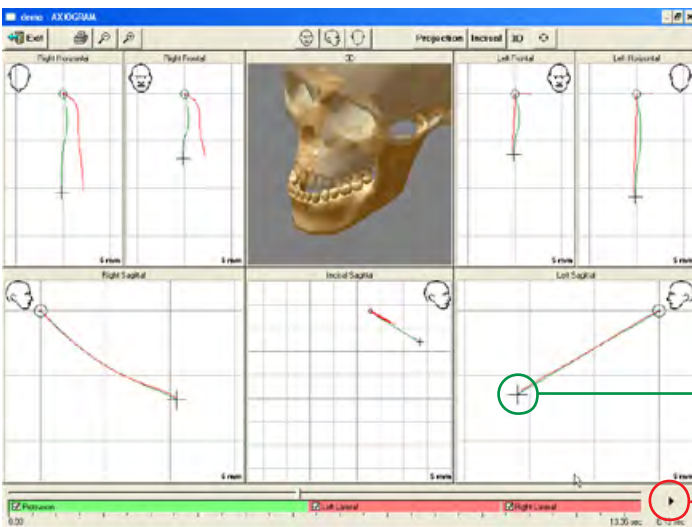
DATA OPUT IN THE AXIOGRAM



The AXIOGRAM output shows the graphic output of all recordings.

Selectively one or more of the recordings can be selected or deselected.

The AXIOGRAM is interactive with mouse clicks.

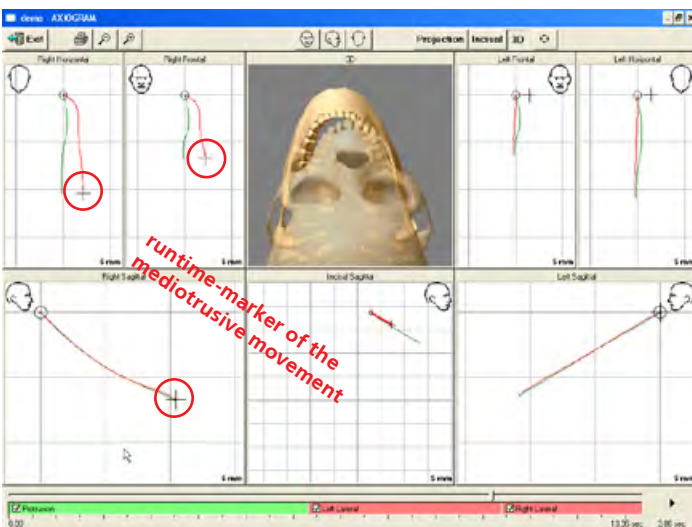


Shown is a protrusive movement.

Click the 3D button changes the upper middle window to represent the movement you select.

The 3D can be made to move by clicking the icon.

Clicking on the right arrow activates the movement.



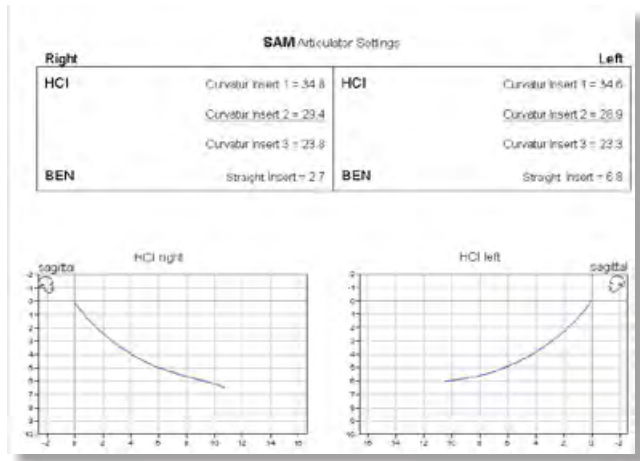
Identified in this view is shown a left lateral movement graphic.

The 3D view can be moved with ALT key and left mouse click.

Clicking this icon can put the view back in the starting position.

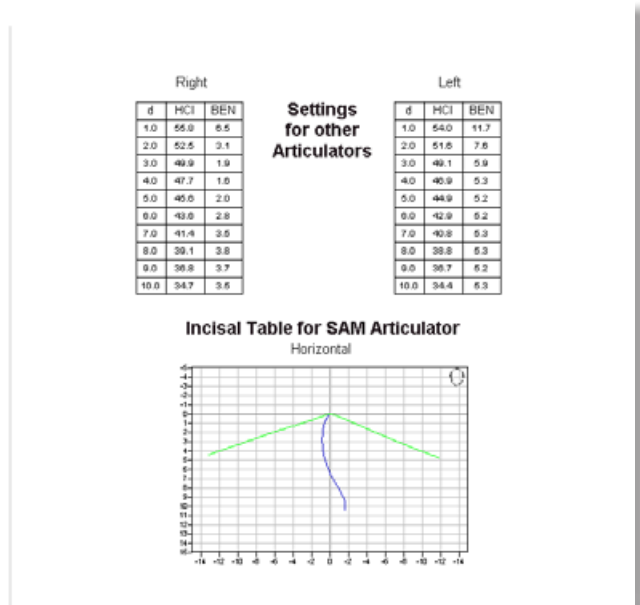


DATA OPUT IN THE REPORT



Page 1 of the Articulator Report

from the articulator data shows the numeric output for the setting of the SAM Articulators along with the graphic view.

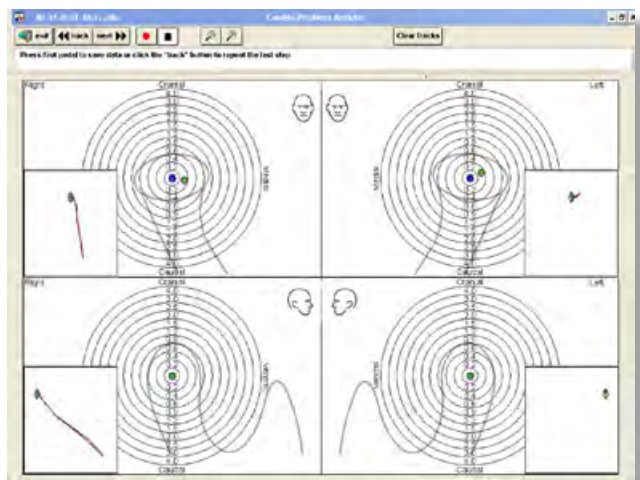


Page 2 of the Articulator Report

shows a table for generic values at each respective mm of movement for the Condylar Inclination and Bennett Guidance values

The graphic for the SAM Articulator is shown in the Horizontal View.

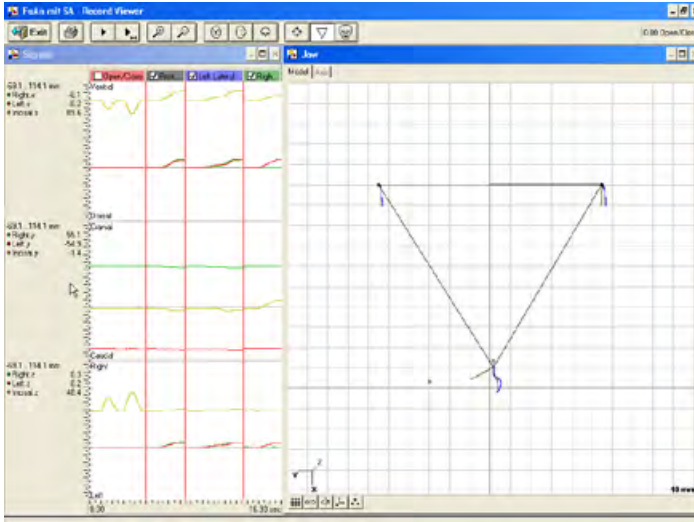
Anterior Guidance settings for the SAM Articulator are shown based on incision inferior and upper anterior teeth contact.



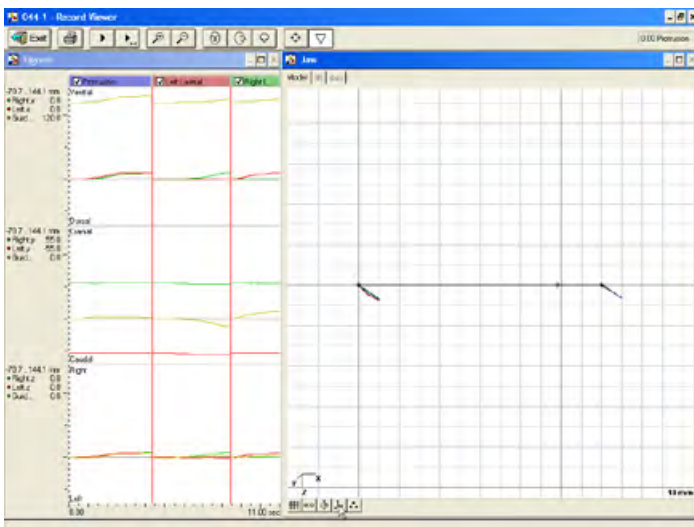
The Condyle Position Analysis report

shows the relative relationship of IP to the Reference Point and also shows the position on the protrusive and/or laterotrusive pathways.

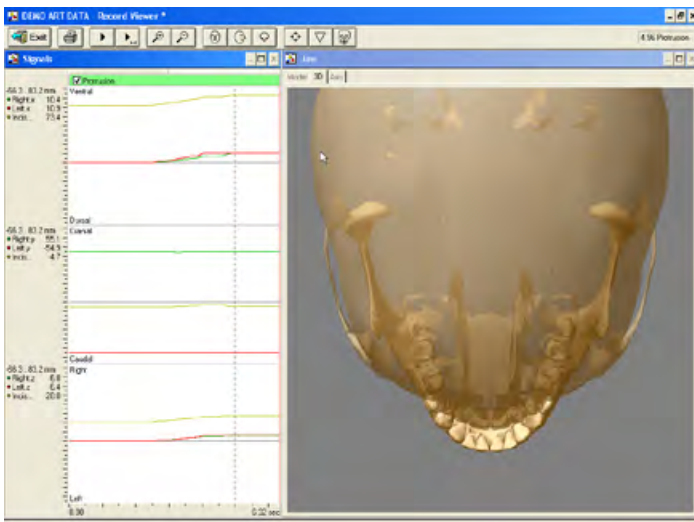
DATA OPUT IN THE VIEWER



In the AXIOGRAM Analysis we can see more information and the relative timing and separation of the movements into individual parts.



The individualized views can be selected and analyzed.

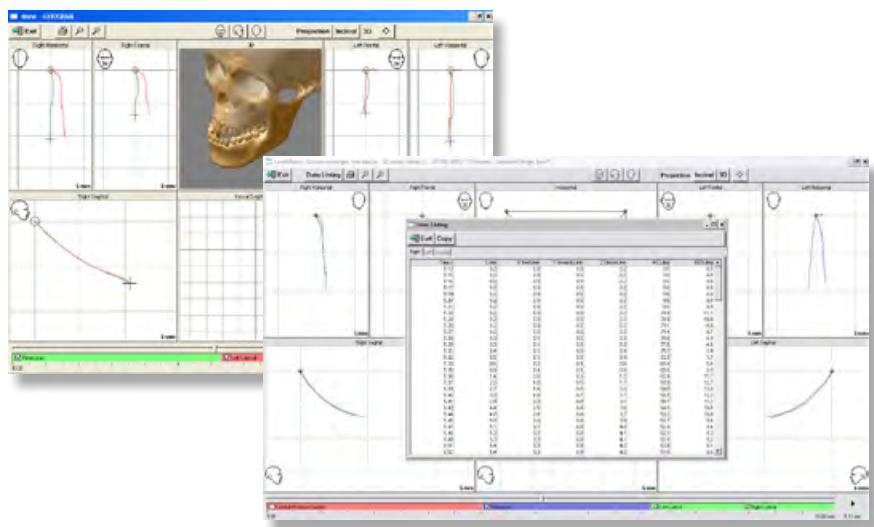


The 3D animation can be used for Didactic purposes and for patient education.

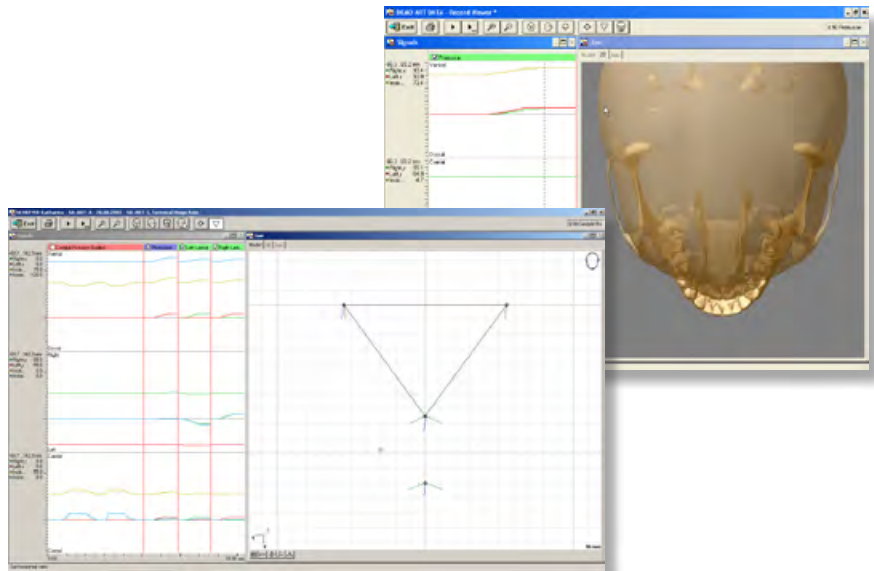
DATA RECALL



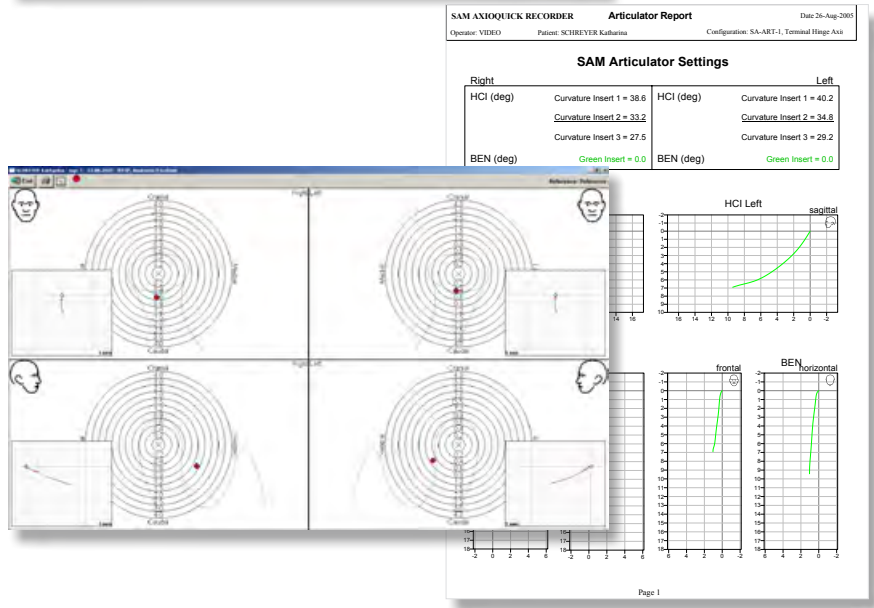
The Axiogram permits angle and line measurements of the pathways along with animations. The anterior pathways can be evaluated and measured.



The AXIOGRAM Analysis allows for more elaborate analysis and evaluations of the recordings.



The REPORTS provide both graphic and numeric output to the screen and they can also be printed for hard copy documentation and evaluation.



INDIVIDUALIZED REFERENCE POINTS



Individualized reference points can be transferred to the AQR System.

The protocol is selected in the settings.



Also markings can be made on the skin of the determined axis position or you can transfer a pre-marked position and put it in to the system.

Measurement: PATIENT/NAME Articulator: Beta

Exit Back Next [Stop] [Play] [Home] [Refresh] [Close] Auto Close Projection Incisal 3D

Show right condyle:
Show the condyles with right points or press ENTER or foot pedal to continue

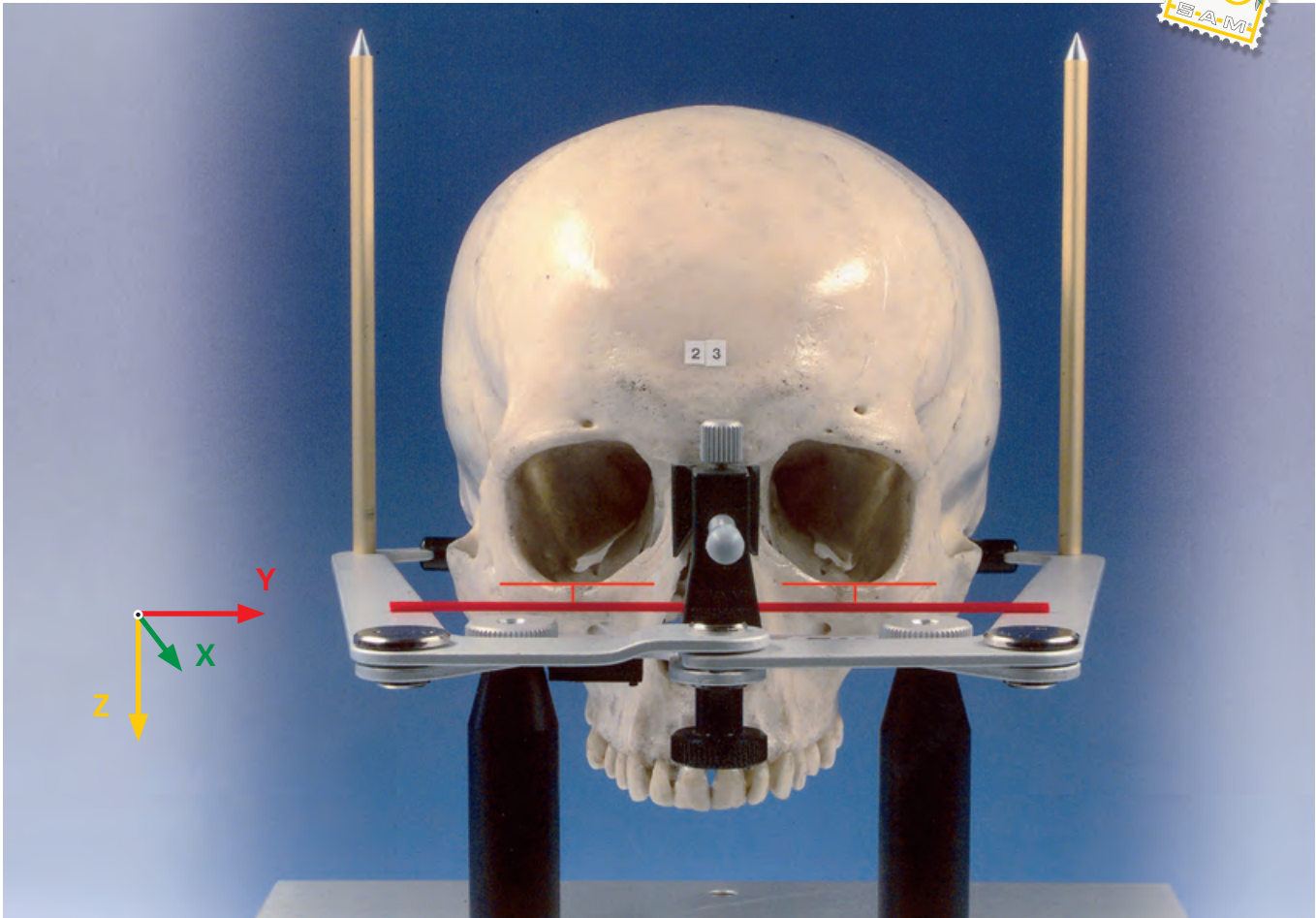
Right Horizontal Right Frontal Right Sagittal Left Frontal Left Horizontal

Right Sagittal Visual Sagittal Left Sagittal

5 mm 5 mm 2.5 mm 5 mm 5 mm

This is graphic view of the hinge position of the condyle.

This bar will show green if sensor is positioned correctly and red if there is a non communication.



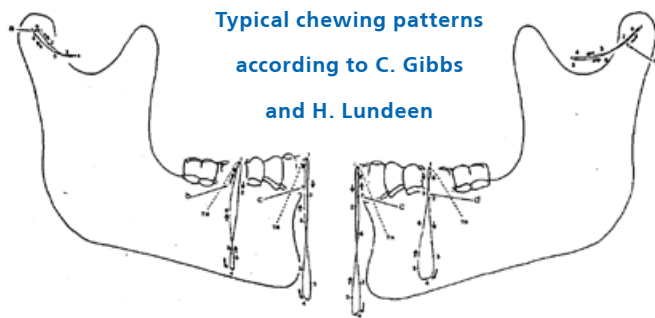
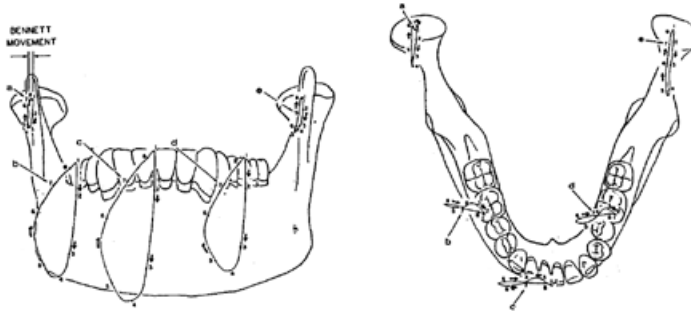
This is view of a skull study done to show the relationship of anatomic porion to the lower border of the orbit, upper border of the orbit, mid sagittal plane, orbital nerve canals,

and suture on the lateral border of the orbit. Please refer to the bibliography below for more information.

Henk F. Ergebnisse der modifizierten Anlagetechnik mit dem Anatomischen Transferbogen. Vortrag 1.12.2001,34. Jahrestagung der Arbeitsgemeinschaft für Funktionslehre in der Deutschen Gesellschaft für Zahn-, Mund- und Kieferheilkunde, Bad Homburg 2001

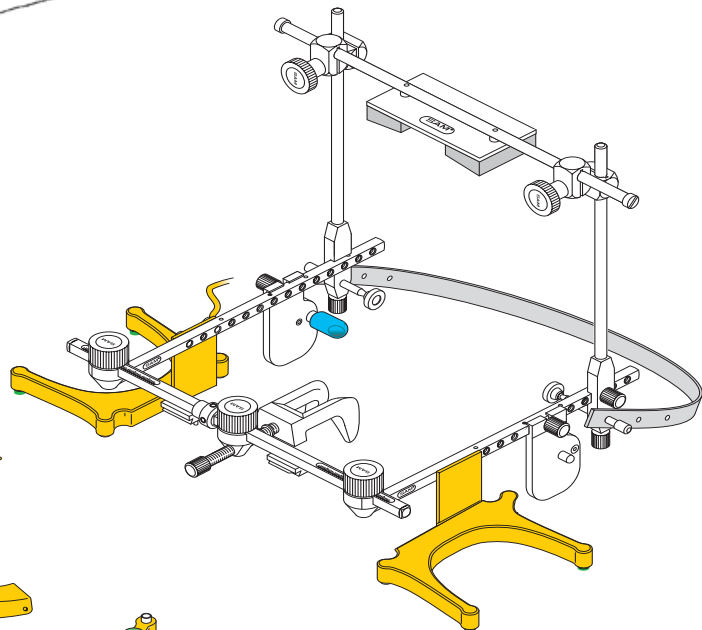
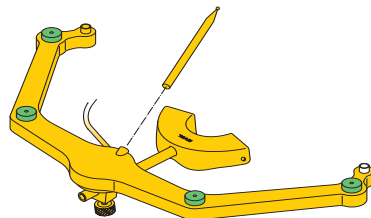
Nagy WW, Smithy TJ, Wirth CG. Accuracy of a predetermined transverse horizontal mandibular axis point. J Prosthet Dent 2002;87:387-394

THE SYSTEM FOR TEACHING, PRACTICE, RESEARCH, AND STUDY.



AXIOGRAPH® III

optional
AQR150



ULTRASONIC AXIOGRAPH®

Option to attach AQR Ultrasonic Recording Sensors onto SAM AXIOGRAPH using Axis Orbital/Frankfort Horizontal Plane.