



REVIEW ON THE HANAU ARTICULATOR

Babita Yeshwante¹ and Neha Choudhary^{2*}

¹HOD and Professor, CSMSS Dental College, Aurangabad, Maharashtra, India.

²yr MDS². CSMSS Dental College, Aurangabad, Maharashtra, India.

Article Info

Received 23/02/2015

Revised 16/03/2015

Accepted 19/04/2015

Key words:- Hanau articulator, Mandibular movements.

ABSTRACT

Articulator is a mechanical device which represents the temporomandibular joint and jaw member to which maxillary and mandibular casts may be attached to simulate some or all of the mandibular movements". Rudolph L. Hanau, an engineer during the time of First World War in 1921 developed a research model called the 'Hanau - Model C Articulator' which had provision for controlled movement with more accurate and accessible controls, and its adjustments and operation simplified. Later in 1923, he devised the 'Kinoscope', which provided exact measurement of mandibular movements. In the later years, Hanau introduced more instruments such as Model 110, which had individual condylar guidance adjustments in both sagittal and horizontal planes, and the lateral condylar angle calculated by the formula $L = H/8 + 12$, where H = Horizontal condylar angle. In 1927, he modified the model 110 with the introduction of Incisal guide table.

INTRODUCTION

Hanau-brand articulators were first introduced to the dental profession in 1921 by Rudolph Hanau. The articulator was designated the Model H. It was originally designed for complete dentures [1].

The Hanau Model M Kinescope (1923)

In 1923, he developed another research model, the Hanau Model M Kinescope articulator with double condylar posts on each side. Bennett angle is adjustable. These models accept face Bow. Horizontal condylar guidance was adjusted by Protrusive inter occlusal record. In these instruments, the lateral setting was calculated by $L = H \div 8 + 12$ these were arcon instruments

The Hanau Model H Series Articulator (1923)

The Hanau Model H Series Articulator having incisal guide table which allowed for adjustments in three dimensions through a considerable range.

Corresponding Author

Neha Choudhary

Email: - drneha26sep@gmail.com

The Hanau Model H₂ Series (1958)

The Hanau Model H₂ series were developed in 1958. Some models are:

Model H2-O (with orbital indicator attachment), Model H2-PR (with calibrated adjustments to protrude or retrude the condylar balls up to 3 mm, H2-X (with extendable condylar shaft) and Model H2 - XPR (combination of above models), Model 96H2. This is the current model of the original articulator. It maintains most of the features of the model H. The condylar elements are on an axle attached to the upper frame. The guidance assembly is a closed-slotted system that is part of the lower frame and fixed at 110 mm. The side shift (Bennett angle) is adjustable from 0° to 30° and is progressive in nature. The horizontal condylar guidance is adjustable from 0° to 75° and is rectilinear in nature.

This model accepts a wide range of accessories. It will receive either an ear-bow or face-bow transfer. It is also available in a special maxillofacial design with the upper frame raised 1 inch to provide for additional space.

Model 158 (1977)

The Hanau 158 model was introduced in 1977. The mechanical features are quite similar to the 96H2 but are arcon in nature. A special face-bow is available for this



model, but it will receive most other face-bows. The horizontal condylar path is adjustable from 0° to 60°, and the side shift is adjustable from 0° to 30° [2].

Model 165 Hanaumate

Based on fixed average value incorporated into its design. The condylar element is at 110 mm and has a 30° horizontal inclination, 15° progressive sideshift, and 10° exclusive inclination on the incisal guide table. The upper frame can be separated easily by loosening two locks. It will receive most face-bows. Cast is mounted using quick-release pins instead of mounting plates. There is excellent lingual visibility.

Model 166 Radial Shift (1981)

Arcon Fixed Inter Condylar Distance - 100 mm. HCG adjustable from 0° - 60° and has ¾ inch curvature. Medial wall has precurent side shift curvature of 3mm radius which is adjustable from 0-3 mm. Both facial and earpiece face-bows can be used with this articulator.

Wide-View Models 183 And 184

The Hanau models 183 and 184 are arcon in type and have similar features.

The only difference is that the upper and lower frames on the 184 model can be separated.

The design results in the most openness at the posterior of any of the Hanau models. The horizontal condylar path angle is adjustable from -20° to + 60°, and the side shift angle is adjustable from 0° to 30°. Both have rectilinear guidances [3].

Modular Articulator System

This is a system with a series of interchangeable guidance assemblies. The basic frames of the articulator are produced in two forms, one with a fixed intercondylar width at 110 mm and an adjustable version with adjustable intercondylar width at 100, 110 125, and 140 mm. This system permits a choice in the degree and type of condylar guidances necessary to achieve optimum results based on the desires of the dentist and the complexity of the treatment needs. The choices include the following:

Adjustable "Bennett" (side shift) The side shift is adjustable from 0° to 30°, has a ¾ -inch radius superior condylar tracking surface, adjustable horizontal inclination from 0° to 90°, and latches.

The latches lock the upper and lower frames in terminal hinge position, can be released to permit excursive translations without disengagement, and can be opened to allow for rapid separation of the frames.

Adjustable Protrusive This has the same capabilities as the adjustable Bennett plus a micrometer adjustment of the posterior stop from 0 to 6 mm in protrusion.

Radial Shift This has the ¾ -inch radius superior wall and an adjustable medial wall from 0 to 3 mm in a

curvilinear precurent fashion (radial shift) or may be used as a progressive shift from 0° to 30°.

Programmed this model has a ¾ -inch radius superior wall and a 1mm radius side shift, which meets a curved medial wall having an 11-cm curve that closely approaches the path obtained in a graphic tracing instrument.

The Modular System of Articulators permits a choice of three incisal guide pins and tables.

Hanau makes several face-bows. The Spring-Bow, introduced in 1986, has become very popular. It is an ear-bow type and features a spring steel design that will automatically center itself.

The Twirl-Bow has a similar indirect mounting feature. This feature permits multiface-bow records without tying up the frame between mounting of casts.

HANAU H2-O ARTICULATOR (Programming the Articulator)

Mounting the maxillary cast

The posterior reference points are located arbitrarily by inserting the plastic earpiece of both ends of the facebow into the patient's external auditory canals. The axis-orbital plane is established by connecting the posterior reference points to the anterior reference plane. The orbital indicator is positioned on the patient's right side to contact the right orbitale point. The prongs of the registration fork are warmed over a flame and inserted into the wax occlusion rim. The width of the facebow is adjusted so that the condylar rods are symmetrically placed in their contact with the posterior reference points. Subsequent equalized adjustment of the rods to the articulator condylar posts will maintain the symmetry of the mounted maxillary cast.

Before mounting the casts, the articulator should be adjusted. The protrusive condylar guidances are set to 30°, the lateral condylar posts to 15°, the incisal pin to 0, and the incisal table is locked in a horizontal position. Both centric locks should be tightened so that the condylar elements do not move. After transferring the facebow to the articulator, the condylar rods are adjusted equally to engage the condylar posts. The tip of the orbital pointer is brought into contact with the undersurface of the axis-orbital plait indicator attached to the upper articulator frame. The facebow height is adjusted by turning the elevating screw under the lock clamp for the registration fork. A cast support is adjusted to protect the occlusal fork from any distortion due to the weight of the maxillary cast and the mounting stone. Minimal-expansion slurry-activated stone is added to the cast to complete the mounting procedure [4].

Mounting the mandibular cast

The tentative centric relation registration is made with a pressureless impression paste such as zinc oxide and eugenol. Initially, the upper wax rim is indexed with several V-shaped notches. The lower wax rim is reduced



approximately 1.5 to 2 mm and then cross-hatched with a blade to form undercuts on the wax surface. After the registration is made, both baseplates are removed and seated on their respective casts. The incisal pin is set to 0 and both casts are related through the zinc oxide paste record. Minimal-expansion stone is added to the base of the mandibular cast and the articulator is closed [5].

Adjustment of the articulator

The protrusive occlusal record is used to set the instrument guides. An extraoral tracer can be attached to the wax occlusion rims with the central bearing plates set at the desired vertical dimension. The patient is encouraged to make protrusive and right and left lateral border movements while the pin touches the recording plate with light pressure. With the extraoral tracing assembly, the clinician can visualize the apex created that indicates centric relation. An accurate record can be made by injecting quick-setting stone between the occlusion rims while the patient maintains the centric relation position. This record can be used to verify the tentative

centric relation or for remounting to a new relation. The protrusive occlusal record is also made with stone as the patient maintains the mandible approximately 6 mm forward of centric relation as determined by the tracing. The record is used to relate the split maxillary cast to its mounting stone base. The condylar thumbscrews are loosened and the incisal pin is raised. With the casts firmly seated in the stone protrusive record, the slope of the condylar path is adjusted until the cast is accurately keyed to the mounting base. After recording the horizontal condylar guidance, the formula $L = H/8 + 12$ is used to calculate the lateral condylar guidance. According to Hanau, this formula has been used satisfactorily in determining the lateral inclinations since 1922. In the formula, L = lateral condylar inclination in degrees and H = horizontal condylar inclination in degrees as established by a protrusive relation record. The lateral condylar posts are rotated to the desired angulation in degrees and this position is maintained by tightening the thumbscrews. The approximate Bennett angle is determined and recorded.

REFERENCES

1. Nomenclature Committee. (1977). Academy of Denture Prosthetics, Glossary of Prosthodontic terms. *J Prosthet dent*, 38, 66 – 109.
Materials taken from
2. Weinberg L.A. (1963). An Evaluation of basic articulators and their concepts, Part II, Arbitrary, Positional, Semi adjustable Articulators. *J.Prosthet Dent*, 13, 645-663.
3. Weinberg L.A. (1963). An Evaluation of basic articulators and their concepts, Part IV, fully adjustable Articulators. *J.Prosthet Dent*, 13, 1038-54.
4. Weinberg L.A. (1963). An Evaluation of basic articulators and their concepts, Part III, fully adjustable Articulators. *J.Prosthet Dent*, 13, 873-88.
5. Weinberg L.A. (1963). An Evaluation of basic articulators and their concepts, Part I, basic Concepts. *J.Prosthet Dent*, 13, 622-43.
6. Weinberg L.A. (1961). An Evaluation of the Face-Bow Mounting. *J.Prosthet Dent*, 11, 32-42.

