

Significance of Facebow Transfer

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Abstract

Introduction: A precise understanding, recording, and transfer of jaw relations from the patient to the articulator are important for restoring the dental function, appearance of face and to maintain patient's oral health. The maxilla-mandibular relationship should be satisfied, or else it can eventually lead to the failure of prosthetic restoration which may demand time and money to repair. The use of a Facebow can play an integral part in transferring the maxilla-mandibular relationship from patient's oral cavity to the articulator.

Aim of the Work: The review summarizes the relevance and significance of facebow transfer in dental restorative treatment.

Methodology: This article is a comprehensive review of PUBMED from the year 1953 to 2018.

Conclusion: The lack of facebow use can lead to discrepancies in occlusion. Every masticatory movement of the mandible is governed by the hinge axis. Therefore, it is important that this axis is precisely captured and transferred to the articulator so that it becomes a satisfactory representation of the patient which makes it feasible to provide a biologically acceptable restoration. Hence the usage of facebow in prosthodontic treatment is of utmost importance.

Keywords: Facebow; Condyle; Prosthetics; Occlusal Splints

Introduction

In 1899 George snow introduced the facebow to help locate the rotation axis of the lower jaw. Facebow is a caliper like an instrument that helps to record the spatial relationship of the maxillary dental arch to any anatomic reference point, which can help transfer this relationship to an articulator [1].

The procedure of facebow transfer confirms that the maxillary arch is oriented in the same or comparable distances to the hinges on the articulator as it is assumed as the axis of rotation of the temporomandibular joint. The successful registration of this record can ensure the fabrication of prostheses like complete dentures, occlusal splints, crowns, and bridges [1].

The primary purpose of the face bow is to help transfer the arbitrary condylar rotational axis. (terminal hinge axis/hinge axis) to the articulator's opening and closing axis and to attach the cant of the maxillary occlusal plane to the upper compartment of the articulator [2]. However, the evidence is still unclear on the fact that a better clinical outcome is resulted because of facebow usage [1].

The registration of the condylar path on the articulator can influence the success of complex prosthodontic procedures. It helps the clinician to estimate the correlations between the condylar path traced during mandibular movements and morphology of the occlusal surfaces, which helps in the restoration of occlusion without interferences [3].

A facebow record can be used for balancing the occlusion in complete dentures, edentulous Class I and Class II cases, edge to edge bite or open bite, single restoration of the first or second molar, anterior/segmental or restoration of the entire quadrant [4].

Why facebow?

A single predetermined scheme of occlusion cannot be used in all the patients. Facebook is also required while using the cusp form of teeth in order to balance the occlusion in all positions since monoplane teeth can only be used in certain circumstances. Even though basic articulators are not programmed to accept a facebow transfer, it doesn't mean we can avoid the step of facebow transfer [1].

There can be changes seen in the vertical dimensions in complete dentures due to processing. If remounting in such cases shows changes in occlusal records, then a facebow transfer is mandatory. Cuspal inclinations can also vary when the casts are placed at different levels in articulators. It is widely accepted that a facebow must be used for mounting the upper cast on any articulator, which has a fixed axis of opening. Developing the correct orientation of the occlusal plane and the inclination of the plane can have a direct effect on the masticatory performance [1].

Types of facebow transfer

The Horizontal condylar guidance (HCG) can be determined clinically and radiographically. In semi-adjustable articulators, the condylar guidance is set by protrusive or lateral interocclusal registrations. These are recorded using the appropriate medium and can be determined with the help of radiographs like tomographs, lateral cephalograms, and pantomographs [3,5,6].

Horizontal condylar guidance can be done by direct or indirect type of facebow transfer [2]. If the facebow registration has been obtained from the patient and ear-bow halves have been removed and then transferred directly to the articulator to mount the maxillary cast, it is known as direct mounting. Whereas in indirect mounting after the facebow registration, the transfer assembly is removed from the spring bow and positioned on to the articulator with the help of a transfer jig and mounting platform for mounting the maxillary cast [7].

Articulator preparation

The popularly used semi-adjustable articulator (HANAU™ Wide-Vue Articulator, Whip Mix Corporation, USA) has condylar guidance that has graduations at 5° intervals. A sectioned modified protractor is used for more accurate readings which are graduated at per degree interval and is usually attached to the inner side of the graduated markings on the condylar element. An L-shaped 23-gauge orthodontic wire is attached to the reference zero line where the articulator, which zeroed according to the Hanau™ manual [7].

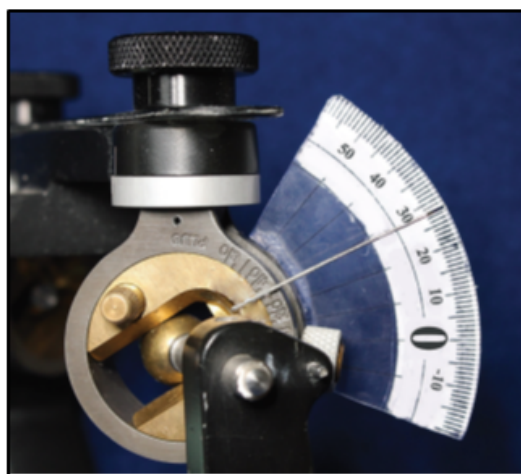


Figure 1: Magnified condylar guidance [7].

Direct facebow transfer

Once the face-bow record is made, the earpieces of the springbok can be used for suspending the bow over the condylar shaft ends of the Hanau™ Wide-View articulator. The anterior elevator is adjusted to position the top of orbitale pointer on the spring-bow to the underside of the orbitale indicator and secured by the thumbscrew. The bite fork index should be checked to be adequately supported by the cast support before placing the maxillary cast and plaster mounting to the articulator [7].

Indirect facebow transfer

The spring-bow can be unscrewed from the transfer assembly after the direct transfer. The lower member supports the mounting platform by the cast support. The cast support is then raised to support the bitefork index following which the maxillary cast can be mounted.

The mandibular casts are then mounted using maximum intercuspation using suitable wax.

A single protrusive record is made to program the, directly and indirectly, transferred casts.



Figure 2: Direct face-bow transfer and indirect face-bow transfer [7].

Facebow transfer can be recorded clinically and radiographically. Clinically several extraoral and intraoral methods can help to directly record condylar guidance. Extraoral methods are usually used in edentulous patients, whereas intraoral oral methods include jigs, intraoral tracers, and protrusive wax records. Despite the fact that the material used inconsistencies in the intraoral methods are because of the differences in the horizontal condylar angle depending upon the degree of protrusion. Any intraoral record will only represent one point along this path [8].

Advantages of facebow

- It allows more accurate use of lateral rotational points for arrangement of teeth.
- Secures a securing anterior-posterior positioning of the cast in relation to the condyles.
- Helps in establishing a correct horizontal and incisal plane.

- Aids in the vertical positioning of the casts in articulators [4].

The use of a facebow record can be negated in cases where

- Monoplane teeth are arranged in an occlusal balance.
- No alteration of occluding surfaces of the teeth that necessitates the changes in the vertical dimension.
- No interocclusion check reports that would be of different thicknesses [4].

Significance of anterior reference points

The importance of an anterior reference point came into light because a horizontal reference plane in the patient needed to be related to the articulator for better esthetic and functional results. Different anterior reference points are dependent on the accuracy of reliability of the anatomical points of the Frankfort plane to the points of the axis-orbitale plane, the position of the porion and orbitale with respect to the condylar plane, the location of the horizontal in the patient and its duplication in the articulator [9].

Three points of different orientation (that cannot be on the same line) should be identified and positioned in space. This forms the baseline of the articulator with the help of the maxillary cast where all the occlusal relationships start. Two points located posterior to the maxillae and one point located anterior to them form the plane. The horizontal reference plane is established on the face of the patient by one anterior reference point (usually on midface) and two posterior reference points. Measurements of the posterior anatomic determinants of occlusion and mandibular motion can be made from this. Posterior reference points are located one on either side of the face (area of the transverse horizontal axis) [10].

Conclusion

Failure in the usage of facebow can lead to faulty occlusion. Occlusal interferences can hinder with mandibular movements if the condylar guidance is not taken into account. Every masticatory movement of the mandible is governed by the hinge axis which forms its major component. Hence the importance of registering the hinge axis accurately and transferring it to the articulator is emphasized. This is what becomes the satisfactory representative of the patient, and only then a functionally and aesthetically acceptable restoration is possible. Hence, the use of facebow should become a fundamental part of a patient's prosthodontic treatment to avoid any kind of errors that could affect the quality of the prosthesis or restoration provided.

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