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ORIGINAL RESEARCH

Comparison between two techniques for registering mandibular position in patients with hemifacial microsomia of the Federico Gomez Children's Hospital

Comparación de dos técnicas para el registro de posición mandibular en pacientes con microsomía hemifacial del Hospital Infantil de México «Federico Gómez»

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ABSTRACT

To determine the true position of the mandible is one of the most important aspects of orthodontic-surgical diagnosis. It provides information about the skeletal discrepancy between the maxilla and mandible even in patients with conditions other than a normal pattern of mandibular stability. In patients with hemifacial microsomia it is difficult to determine the true position of the mandible, since due to their condition, they present structural alterations that hinder record taking. The purpose of this study was to assess two techniques for recording mandibular position (power centric technique and the gothic arch technique) to determine the most effective method to provide greater accuracy in the record taking process. Eight patients with hemifacial microsomia, ages between 13 and 17, four female (50%) and four male (50%) were assessed. A total of 16 semi-adjustable articulator mountings were conducted using both techniques. Changes in the overjet, vertical discrepancy and between dental midlines were monitored. The results showed that there were significant sagittal, vertical and transverse differences with the gothic arch technique.

RESUMEN

Determinar la verdadera posición mandibular es uno de los aspectos más importantes para el diagnóstico ortodóncico-quirúrgico, el cual nos proporcionará la discrepancia esquelética entre el maxilar y la mandíbula, más aún en pacientes que presenten condiciones diferentes a un patrón normal de estabilidad mandibular. En los pacientes que presentan microsomías hemifaciales es difícil determinar su verdadera posición mandibular, ya que por la misma condición presentan alteraciones estructurales que dificultan la toma de registros. El propósito del estudio fue evaluar dos técnicas para el registro de la posición mandibular (técnica céntrica de poder y técnica del arco gótico) con objeto de determinar el método más eficaz para brindar mayor veracidad en el registro, dado que, en nuestra institución se han experimentado algunas inconsistencias durante la obtención de registros en pacientes con malformaciones o discrepancias esqueléticas considerables. Se evaluaron ocho pacientes con microsomía hemifacial de entre 13 y 17 años de edad, cuatro del sexo femenino (50%) y cuatro del sexo masculino (50%). Se realizaron 16 montajes en un articulador semiajustable utilizando ambas técnicas, se monitorearon los cambios en la sobremordida horizontal, vertical y discrepancia entre las líneas medias dentales. Los resultados mostraron que hubo diferencias significativas sagitales, verticales y transversales con la técnica del arco gótico.

Key words: Hemifacial microsomia, gothic arch, power centric.
Palabras clave: Microsomía hemifacial, arco gótico, céntrica de poder.

INTRODUCTION

To determine true mandibular position is one of the most important aspects for the surgical orthodontic diagnosis of a patient. It will help in determining the skeletal discrepancy between the maxilla and mandible, even more in patients with conditions different to a normal pattern of mandibular stability. In patients who have hemifacial microsomia it is difficult to determine mandibular position, since by their same condition, they have structural alterations

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that hinder record taking. Currently, a variety of clinical techniques are used to obtain mandibular records in centric relation (CR). All of them involve some type of mandibular manipulation, followed by the placement of a registration material (wax) that reproduces cusp indentations with which the models are mounted. One of the most frequently used techniques is the one-hand rearward pressure. There are others referred by Woelfel such as the neuromuscular guided RC (Lucia jig and the Leaf Gauge by Long).[1]

The method that Roth suggests is the power or force centric that uses two segments of wax and results from mandibular manipulation and an anterior stop for the CR record.[2,3] Other method is the record of the Gothic Arc tracing, considered as a starting point from which protrusive and lateral mandibular movements begin in patients. The vertex is the point of reference designated as CR. In this technique there is no manual mandibular manipulation.[4,5]

Background on centric relation records

In 1756 Phillip Ptaff[6] was the first to describe his technique for bite registration called «taking bite». Since the end of the nineteenth century it was the most commonly method used however, several clinical trials have developed other techniques for centric relation records. In 1955 Shanahan[7] described the technique «swallowing or free closure», which was based on the fact that swallowing saliva was the determining factor for the vertical dimension and centric relation. Other researchers used the technique described by Mc-Collum[8] called «chin-point guidance» which retrudes the prognathic jaw and emphasize the importance of the axial axis in the records of centric relation. Dawson[9] recommended the technique of «bilateral handling», which emphasized the importance of guiding the mandible upwards by positioning the operator's fingers in the goniac angles while the thumbs apply pressure to the chin to facilitate condylar settlement in centric relation. Another technique known as «Myo-monitor» is based on stimulated muscle contractions to register centric relation.[10]

Lucia[11] in 1964 suggested the use of an anterior jig designed to minimally separate the maxillary and mandibular teeth, and to break the proprioceptive pattern resulting from dental contact thus allowing the muscles to seat the condyle. Lundeen[12] and Wood[13] reported that a strong muscle contraction performed by a patient with an anterior rigid stop seats the condyle into the uppermost position compared to other techniques. Williamson[14] advocated the use of calibrated sheets with the same purpose: an anterior upper settlement of the condyle by action of the upper head of the lateral pterygoid muscle and the temporalis muscle without the influence of dental contact. Roth designed a technique called centric that uses two segments of blue wax Delar[MR] (Dollar Co, Lake Oswego) for bite registration. This technique allows the patient's muscles to seat the condyles without the influence of the dental contact.[15]

The first graphic record was based on the studies of mandibular movements by Balkwill in 1866.[16] The arch intersection produced by the left and right condyle forms a vertex known as the Gothic arch tracing.

The first «tracing vertex» was reported by Hesse in 1897, and the technique was imposed and popularized by Gysi around 1910.[17] The plotter designed by Gysi was an extraoral plotter. The tracing plates, coated with wax, were attached to the mandibular arch.

An incisal guide pin was mounted in the maxillary arch. When successful record was taken, the patient kept the plates centered on the apex of the tracing sustained by a niche so that they were recorded and fixed.[18] In 1927 Hanau[19] recognized that the Gysi tracing is effective for recordings, but its universal use is not good. On the other hand, Tench[20] established that the Gysi tracing technique should be the only method to perform the centric relation records; and that all other methods were «deception and games». Gysi concluded that his tracing technique only has five degrees of error, while the records obtained with bite wax displayed up to about 25 degrees of error.[21]

Hemifacial microsomia (ocular-auricular-vertebral syndrome, Goldenhar)

Hemifacial microsomia is the most common form of facial asymmetries. It affects about one in every 5,000 births and occupies the second place of the most common facial deformities.[22,23]

In 1960 hemifacial microsomia was defined as a condition that affects the development of the primary ear, mouth, and mandible. The disease varies from mild to severe, and the anomaly is just on one side in many cases, but bilateral involvement is also known to occur, with a more severe expression on one side. The Goldenhar syndrome is considered a variation of this condition, characterized by vertebral anomalies and epibulbar dermoids. The condition is known for being extremely complex and heterogeneous.

Although there is no consensus upon a minimum of diagnostic criteria, the characteristic facial phenotype