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ORIGINAL RESEARCH

Anteroposterior and vertical maxillary changes with facial mask use in patients with unilateral cleft lip palate sequelae from General Hospital «Dr. Manuel Gea González»

Cambios maxilares en sentido anteroposterior y vertical con el uso de máscara facial en pacientes con secuela de labio y paladar hendidos unilaterales del Hospital General «Dr. Manuel Gea González»

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ABSTRACT

Cleft lip and palate is a congenital malformation which can affect breathing, swallowing, language articulation, audition and voice. These patients show an insufficient maxillary growth and a class III skeletal malocclusion due to maxillary retrusion. Orthopedic treatment of the unilateral cleft lip and cleft palate patient by means of a facemask during the right time can stimulate maxillary growth. This study reviewed 90 clinical charts (pre and post treatment) of patients with complete unilateral cleft lip and cleft palate, treated from 1996 to 2007 with rapid palatal expansion through an occlusal acrylic plate and facemask at the Orthodontic Department, General Hospital «Dr. Manuel Gea González» in Mexico City. To evaluate the sagittal and vertical maxillomandibular change the student's T test, Wilcoxon test and χ^2 test (SPSS v.10) were used. Our results show that the use of this appliance increases vertical dimension and reduces maxillomandibular discrepancy due to downward and forward growth of the maxilla.

Key words: Cleft lip and palate, facemask.

RESUMEN

El labio y paladar hendidos es una malformación congénita que puede afectar los mecanismos respiratorios, deglutorios, articulatorios, del lenguaje, la audición y la voz. A los pacientes que les falta un crecimiento maxilar adecuado presentan una relación esquelética maxilomandibular clase III por retrusión maxilar. El tratamiento ortopédico con máscara facial en estos pacientes con secuela de labio y paladar hendidos unilaterales durante un periodo adecuado puede estimular y redirigir el crecimiento del maxilar. En este trabajo se estudiaron 90 expedientes (antes y después del tratamiento) de pacientes con secuela de labio y paladar hendidos unilaterales completos (fisura labio-alveolo-palatino) que fueron atendidos en la División de Estomatología-Ortodoncia del Hospital General «Dr. Manuel Gea González» durante los años de 1996 a 2007, y que fueron tratados con máscara de protracción facial con apoyo frontomentoniano y un aparato intraoral con un tornillo de expansión rápida palatina con caras oclusales de acrílico. Para evaluar los cambios maxilares en sentido anteroposterior y vertical. Se utilizó la prueba t de Wilcoxon y χ^2 (SPSS v.10). Se concluyó que el uso de la máscara facial en estos pacientes aumenta la dimensión vertical y reduce la discrepancia maxilomandibular por una estimulación del crecimiento maxilar hacia abajo y adelante.

Palabras clave: Labio y paladar hendidos, máscara facial.

INTRODUCTION

Cleft lip and palate is a congenital anomaly whose incidence in Mexico is 1:850 newly live births. It may affect respiration, deglution, articulations, language, hearing, and the voice. This malformation has significant impact not only on an aesthetic level, but also at a social level. It is also a major public health problem. Generally, these patients lack adequate maxillary growth and have a skeletal class III relationship due to maxillary retrusion. The problem may be increased depending on the type of lip-alveolar-palate cleft and the severity of the scarring. Rehabilitation of this anomaly requires

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a multidisciplinary work by performing surgical interventions during the various growth stages of the patient, thus affecting growth of the related structures. Orthopedic treatment with face mask in patients with unilateral cleft lip and palate sequelae during an appropriate period can stimulate and redirect the growth of the maxilla, obtaining vertical and anteroposterior changes in both dimension and position. By improving the facial profile the complexity or even the surgical need can be reduced.

Anterior cross bite can be corrected with three to four months of maxillary expansion and protraction, depending on the severity of the malocclusion. The improvement of the overbite and molar ratio can be obtained with four to six additional months of maxillary protraction. In a clinical trial, overjet or overbite correction was the result of the forward movement of the maxilla (31%), posterior positioning of the mandible (21%), labial movement of the upper incisors (21%), lingual movement of the lower incisors (20%). Molar relationship was corrected to a class I or class II relationship through a combination of skeletal movements and differential movements of the upper and lower molars. Anchorage loss was observed by the mesial movement of the upper molars during maxillary protraction. Overbite was improved by the eruption of the upper and lower molars. Total facial height was increased because of the downward movement of the maxilla, the downward rotation of the maxilla and the rearward movement of the mandible.[1]

Patients with class III skeletal malocclusion often present a concave facial profile, a retrusive naso-maxillary area and a prominent facial lower third. The lower lip protrudes often in relation to the upper lip. Treatment with expansion and maxillary protraction can correct the facial profiles of the skeletal and soft tissue, as well as improve the position of the lips. These changes often lead to dental compensation.

Ngan (1997) studied patients treated with eight months of protraction maxillary. The maxilla moved an average of 2.1 mm. In control patients without treatment there was only a 0.5 mm maxillary advancement. On average, with treatment the mandible was positioned 1.0 mm back, and without treatment it advanced 1.7 mm. In addition, without treatment, the incisors compensated the skeletal discrepancy by upper incisor proclination and retroinclination of the lower incisors.[1]

Patients with cleft lip and palate sequelae often exhibit a skeletal deficiency of the maxilla, which results in anterior or posterior crossbite unilateral or bilateral. In cases of maxillary discrepancy, the forward and down position of the maxilla should improve occlusion and profile. Therefore, orthopedic treatment with maxillary protraction by means of a facial mask has been recommended by more than two decades. However, many studies of protraction in orthopedic patients with cleft lip and palate sequelae have been based on case reports and small groups. In addition there are no studies of the vertical change with the use of a face mask.[2-5]

Cephalometrically, the sagittal maxillo-mandibular relationship can be assessed by angular variables; for example, ANB angle (angle that measures the line drawn from the more posterior point of the anterior concavity profile of the maxillary bone; the more anterior point of the frontonasal suture and the most posterior point of the anterior concavity of the anterior edge of the mandible).

In 1977, Hasund studied Norwegian children with normal occlusion; he found an ANB of -4.5 to 8.5 degrees (average 2.5 degrees). Tindlund (1993) found an ANB from 3.5 to 4.6 degrees in patients from six to nine years of age. Holdaway (1956) and Hasund (1977) mentioned that an ANB of 0 to 4 degrees is considered a favorable value after puberty.[6-9]

Tindlund (1994) studied horizontal changes of the maxilla after the orthopedic use of protraction in 72 patients with cleft lip and palate sequelae before 10 years of age. It was found that in the favorable group (63% of the total cases), presented an increased ANB (3.3 degrees), maxillary advancement (1.8 mm) and the upper teeth advanced (3.6 mm).[10] Gavidia (1997) studied the orthopaedic appliance that has a cap of the premaxilla and cranial support to produce positional changes of the premaxilla and found that it acted by inhibiting vertical growth of the premaxilla, and that causes retrusion in an anteroposterior direction, so that the appliance complied with the intended purpose.[11]

METHODS

This study was a comparative (before and after), open, observational, retrospective and longitudinal study. We assessed 90 cases of patients with a complete unilateral cleft lip and palate sequelae who were treated at the Stomathology-Orthodontics Division of the General Hospital «Dr. Manuel Gea González» during the years 1996 to 2007, and treated with protraction facial mask that consisted in an appliance of rapid palatal expansion with acrylic on the occlusal face *(Figure 1)*. To assess the changes in the maxilla in an anteroposterior and vertical direction with the use of facial mask in patients with unilateral cleft lip and palate sequelae taking as baseline references the following values: