

Anterior projection of the maxillomandibular soft tissue complex after surgical correction of maxillary hypoplasia: a Scottish perspective

Muireann O'Donovan^a, Balvinder S. Khambay^{b,*}

^a Orthodontic Postgraduate Student, University of Glasgow

^b Associate Professor of Orthodontics, Hong Kong University

Received 12 February 2014; accepted 25 August 2014

Available online 17 September 2014

Abstract

After orthognathic surgery the forehead remains unchanged. To produce facial harmony, the planned projection of the maxillomandibular complex must be placed in the correct relations to the unchanged position of the forehead. We have compared the anterior soft tissue projection of the maxillomandibular complex relative to the forehead after Le Fort I advancement surgery for correction of maxillary hypoplasia with that of a local reference group chosen by lay assessors. We retrospectively studied 32 patients (16 men and 16 women) all of whom had previously been treated by Le Fort I maxillary advancement. In addition a panel of 8 lay assessors selected a reference group of 24 women and 16 men. Standard profile photographs were taken, and horizontal measurements made, of several landmarks from a true vertical line (TV) passing through glabella. Together with facial harmony values these were compared between the groups. The orthognathic group had significantly more anterior mandibular projection relative to the forehead than the female reference group ($p=0.03$). As a result half of the horizontal harmony values were smaller in the orthognathic group. For men the position of the mandible, particularly the chin, was acceptable even though it was positioned more anteriorly. We have provided values for maxillomandibular projection derived from lay assessors and identified areas where differences from those of a reference group were detected. The projection of the mid and lower face of the local reference group to the forehead should guide preoperative planning.

© 2014 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Keywords: Projection; Maxillomandibular complex; Scottish; normal; Le Fort I; maxillary advancement.

Introduction

Dentofacial deformities can range from mild problems with one jaw to more complex panfacial abnormalities. Orthognathic surgery aims to correct the position of the maxillomandibular complex to improve the aesthetics of the soft tissues.¹

Diagnosis and planning involve both clinical and cephalometric evaluation. However, the use of cephalometric “normal values” can lead to contradictory plans, so should be viewed with caution.^{2,3} Planning should begin by addressing the primary concern of the patient and creating the ideal soft tissue. The position of the underlying skeletal and dental positions that are required to produce this change can then be calculated, which is known as “backward planning”. Clinical guidelines are therefore required, which should be patient-centred rather than clinician-centred, and lay assessors should decide when ideal facial harmony of the soft tissues is acceptable.⁴

* Corresponding author. Pediatric Dentistry and Orthodontics, Faculty of Dentistry, The University of Hong Kong, Hong Kong. Tel.: +852 2859 0260.
E-mail address: bkhambay@hku.hk (B.S. Khambay).

During orthognathic surgery certain areas of the face such as the forehead will remain unchanged. To achieve “facial harmony”, therefore, the position of the planned maxillomandibular complex must be in correct relation to the forehead. The same problem arises in plastic surgery during rhinoplasty. Correct projection of the nasal tip in relation to the projection of the chin and the geometry of the lip is essential to achieve a well-balanced face.⁵ This concept can be extended to orthognathic surgery. Projection of the maxillomandibular complex relative to the forehead should be correct to achieve a well-balanced face.

The use of a true vertical line that passes through subnasale, with the head in a natural position, has previously been reported.⁶ Measures of soft tissue points relative to the true vertical line produce absolute projection values for each point. The absolute values can then be related to one another to assess facial harmony. These values provide a measure of balance within the subject's face, the majority are independent of the anteroposterior placement of the true vertical, and can provide another means of analysis.⁶ However, subnasale will change as a result of maxillary advancement and is therefore not suitable as a reference structure. The use of the forehead (glabella) therefore seems more clinically relevant.

The aim of the study was to compare the anterior soft tissue projection relative to the forehead, of the maxillomandibular complex after Le Fort I advancement for correction of maxillary hypoplasia, with the measurements of a local reference group chosen by lay assessors.

Subjects and methods

Ethical approval was obtained from the Local Area Dental Ethics Committee of North Glasgow University Hospitals NHS Trust (REC reference number 07/S0709/59).

Selection of reference group

Selection has been previously described in detail.⁷ In summary 112 white volunteers 18–35 years of age with no history of previous facial surgery were recruited locally. Each volunteer was photographed using 3-dimensional stereophotogrammetry. A panel of 8 lay assessors (4 men and 4 women) viewed a standard 3-dimensional facial video clip of each participant and rated each image for overall facial harmony on a 100 mm horizontal visual analogue scale (VAS).

After the VAS had been ranked from most attractive to least attractive, those who were ranked in the top two thirds by at least 6 lay panel members were chosen to be part of the reference group of 16 men and 24 women.

Calculation of sample size

Using a level of significance of 0.05 and a power of 80%, a SD of 3.0 mm⁸ and a clinically relevant difference of 3.0 mm

in the site of the landmark⁹, we calculated that a minimum of 16 patients were required within each group.

Selection of maxillary advancement group

We recruited non-syndromic patients with class III skeletal deformities and without clefts, who were diagnosed with maxillary hypoplasia and treated with Le Fort I advancement only. The diagnosis had been reached by clinical, photocephalometric, and model planning. There was minimal vertical change and no accompanying mandibular operation. We studied 16 men and 16 women, 18–43 years old, a minimum of 6 months postoperatively. The mean planned maxillary advancement was 7.3 (range 6–11) mm for men and 7.1 (range 6–9) mm for women.

Photography protocol

All subjects and volunteers were photographed using a 35 mm digital SLR camera (Fuji S2, Tokyo, Japan) with a 105 mm macro lens mounted on a tripod (Bilora Stativ, model number 75–64, W.Germany). This was lit by 2 foreground flash lamps (500 watt, Elinchrom style 400 FX) positioned either side of the subject at a 45° angle. The distance between the subject and the camera was fixed at 1.5 metres.

The tripod was vertically adjustable to make allowances for the height of the camera, according to each subject's height, and ensuring the correct horizontal position of the optical axis of the lens of the camera. The camera was used in the manual setting with the shutter speed set to 1/125, and aperture set to f/22. Digital photographic images were recorded on to a flash drive compact flash card (MicrodriveTM 512 MB, IBM, Thailand).

Calibration

A 10 cm metal ruler with a weight attached was suspended from the arm of a second tripod to indicate the true vertical reference line and positioned behind the subject's chair in the midsagittal plane. The scale on the ruler enabled us to calibrate photographs so that objective linear measurements could be compared directly. A mirror was positioned roughly 110 cm in front of the subject's chair to allow the consistent recording of the natural position of the head.

Capture of images

Before the photograph was taken subjects were asked to remove spectacles, jewellery, and makeup and ensure that the hair was drawn completely off the face and neck. The subject was then seated on a chair in front of the camera, and positioned so that the profile of the right-hand side of the face and the 10 cm ruler were both visible in each image. The position was checked to ensure that the photograph was taken perpendicular to their midsagittal plane. Immediately before

Download English Version:

<https://daneshyari.com/en/article/3123081>

Download Persian Version:

<https://daneshyari.com/article/3123081>

[Daneshyari.com](https://daneshyari.com)