

ABSTRACT

THESIS TITLE : TREATMENT OF MICROGNATHIA BY DISTRACTION OSTEOGENESIS - A PROSPECTIVE STUDY

Background:

Maxillofacial deformities are always psychologically and physically distressing to the patients and is also challenging to the treating surgeons. The term Micrognathia verbally means a “small jaw”. True micrognathia ,where the maxilla or the mandibular skeleton does not grow to the full size can be congenital or acquired and it most often occurs due to failure of growth of one or both condyle. Distraction osteogenesis has taken precedence over orthognathic surgery in treating micrognathia as a treatment option among the surgeons since the amount of mandibular lengthening needed is more than 10mm. Distraction osteogenesis also called as callus distraction or callostasis or osteodistraction or distraction histogenesis is a biological process of regenerating newly formed bone and adjacent soft tissue by a gradual and controlled traction of surgically separated bone segments. The advantages of intraoral devices are elimination of skin scarring caused by fixation of transcutaneous pins, improved patient compliance during consolidation, improved stability in terms of attachment of the device to the bone and minimal risk of injury to facial and inferior alveolar nerve, however there is a difficulty in orientation of the device. The purpose of this dissertation is to assess the versatility of distraction osteogenesis in the treatment of micrognathia.

Materials and methods:

Four patients (three males and one female) with micrognathia mandible who reported to Rajas Dental College, were included in this prospective study. The patients were between the age group of 10-20 years. A power of 90% and P value was fixed at <0.05 to be statistically significant. A convenient sampling was done and sample size of four was arrived. In all the four patients, the following treatment protocol was carried out:

1. Osteotomy and placement of intraoral distraction device under general anaesthesia.
2. Latency phase (5-7 days)
3. Activation period-rate 1.5mm per day
4. Consolidation period of 8 weeks

5. Removal of distraction device under local anaesthesia.

The patients were assessed post operatively for wound infection. The length of the body of the mandible and ramus of mandible were evaluated using cephalometric analysis and CT scans pre and post operatively. The posterior pharyngeal space were measured using lateral cephalograms pre and post operatively. Mouth opening was assessed by maximal incisal opening (MIO), mid line shift, occlusion, facial symmetry and chin prominence, protrusive movement, laterotrusive movements and Hyomental distance were assessed on clinical examination.

Statistical analysis:

The data was analysed using SPSS (software package for social sciences) version 20.

In the first part of the analysis, the descriptive analysis of the parameters of age, gender, etiology, distraction side was done. Second test done was Paired sample t test to compare the means of Ramus height, Body length, Hyomental distance and Posterior airway space pre and post operatively. Third test was done for parameters like Occlusion, Midline shift, Chin Projection and Facial symmetry (pre op vs post op). First two parameter chi -square test was used and the last two Fisher exact test was done

Results:

Analysis of the demographic data revealed that the mean ages of the patients included in the study were 15.25 ± 3.86 , and the average mouth opening of the patients were 32.5 ± 2.21 . 75% of patients were male and secondary deformity due to ankylosis was the cause of micrognathia in 75% of patients and in 50% of patients the side to be distracted was left side. The quantitative data assessed were ramus height, body length, hyo mental distance and posterior airway space. Paired t test was done to assess the difference in these parameters pre and post operatively. The mean pre-operative ramus height was 40.6 ± 6.1 mm and post-operative ramus height achieved was 49.8 ± 6.5 mm and the p value attained was .001 showing a statistically significant improvement in the ramus height post operatively. The mean pre-operative body length was 54.6 ± 11.12 mm and the mean body length attained post operatively was 65 ± 11.47 mm with a p value of .000 which is statistically significant. The mean Hyomental distance pre and post operatively was 2 ± 1.41 , and $4.75 \pm .95$ cm respectively with a statistically significant p value of .010. The mean posterior airway space was $4.75 \text{ mm} \pm 1.5 \text{ mm}$ pre operatively and

7.75±1.25mm post operatively. Using a paired t test a significant p value of .005 was achieved. The pre op and post op occlusion and mid line shift were compared using chi square test and was found to have a statistical significant difference. The pre and post op chin projection and facial asymmetry were analyzed using Fischer's exact test and there was a significant difference statistically.

Summary and conclusion:

With an impressive success rate reported in this study intra oral distraction osteogenesis is definitely a feasible option for treating micrognathia of mandible as it is relatively simple to carry out with minimal complications and good results, however distraction osteogenesis is a highly technique sensitive surgical treatment procedure and an accurate treatment planning and execution of the planned treatment is needed to achieve best results.

ABBREIVATIONS

TMJ	-	Temporomandibular joint.
Pre op	-	Pre operatively
Post op	-	Post operatively
OPG	-	Orthopantamogram
CT	-	Computed tomogram.
DO	-	Distraction osteogenesis

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