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To Study the Modifications of Sagittal Split Osteotomy In Mandible

Mastan Shaik[1*]

[1]Reader, Department of Oral and Maxillofacial Surgery, ST. Joseph Dental College, Duggirala, Andhra Pradesh, India.
Email: drmastanshaik@gmail.com
Orcid ID: 0000-0003-1904-2377.

*Corresponding author

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Abstract

Background: Sagittal split mandibular osteotomy had become a standard procedure in the management of both mandibular prognathism and retrognathism. Various modifications have been made to increase bone interface, thus assuring adequate bone healing, stability, to diminish the risk of damage to the neurovascular bundle of the mandibular canal. **Methods:** The study group in this investigation consisted of 5 treated patients who presented to the Department of Oral and Maxillofacial Surgery, St.Joseph Dental College, Eluru for surgical correction of mandibular prognathism and retrognathism. The mean age was 20-30 years. **Results:** Number of female participants in this study was 2 and number of male participants was 3. Number of males was 3 between the age of 20 -25 years and number of females was 2 between the age group of 25-30 years. **Conclusions:** Bone plates and screws were used for stabilization of sagittal split osteotomy. It was concluded that Neurologic alteration is one of the major complications of sagittal split osteotomy.The likelihood of nerve injury is mainly dependent on manipulation during surgery.

Keywords:- Sagittal Split Osteotomy, Modifications, Mandible.

INTRODUCTION

The sagittal split osteotomy of the mandible was first described by Schuchardt in 1942, and then modified by Trauner and Obwegessor in 1957.Various modifications have been made to increase bone interface, thus assuring adequate bone healing, stability, to diminish the risk of damage to the neurovascular bundle of the mandibular canal, and to reduce the possibility of unfavorable fractures during the operation.[1]

Sagittal split mandibular osteotomy had become a standard procedure in the management of both mandibular prognathism and retrognathism when compared to oblique subcondylar osteotomies vertical sub-sigmoid, inverted L and C osteotomies of the ramus.[2]

The percentage of patients with impaired function of the inferior alveolar nerve after BSSO varies considerably in the literature.These differences are probably the result of the varying time that had elapsed since surgery when the research was performed and use of nonstandardized testing methods. There are doubts about whether changes in sensation should be tested with subjective or objective tests. Westmark et al. showed a positive correlation between tests with the monofilament and subjective tests, which were used in our evaluation of this

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method. Our results show the incidence of to be 100% of patients immediately after surgery, and the quickest recovery was after six months.[3]

Ylikontiola et al followed patients for one year, with subjective assessments of sensory loss on the face using a 5-point scale. They found that recovery tailed off over time as in our study, and that most subjects returned to full sensation by one year. Chen et al, in their prospective study, used similar facial pictures as we did in a patient questionnaire completed by patients and clinicians after 2-point discrimination testing at four weeks postoperatively. They showed marked loss of sensation regardless of the type of surgery. The prospective randomized clinical trial of Cunningham et al into the cost and efficiency of rigid vs. wire fixation also tested sensory disturbance objectively and subjectively. Using a similar questionnaire to ours, preoperatively and 6 months postoperatively, they found that 73% of patients reported sensory loss in the facial region. However, their objective testing with light-touch and brushstroke techniques showed that only 47% and 58% had disturbances, respectively.[4]

The importance of discussing postoperative aspects of surgery with the patient and with their family should not be overlooked and by forewarning patients of the problems they are likely to experience, postoperative satisfaction is more likely to be achieved. Advice and explanations should be given both verbally and in written form, with an information leaflet given to all patients. Leaflets should be attractive to look at and easy to read. Families and friends should be encouraged to attend hospital appointments where possible, especially in the perioperative period. Advice leaflets could also be prepared specifically for relatives in order to prepare them for problems which may be experienced and to provide advice in immediate aftercare.[5]

MATERIAL AND METHODS

The study group in this investigation consisted of 5 treated patients who presented to the Department of Oral and Maxillofacial Surgery, St.Joseph Dental College, Eluru for surgical correction of mandibular prognathism and retrognathism. The mean age was 20-30 years. All the procedures were performed by using a standard method to accomplish the osteotomy. Bone plates and screws were used for stabilization of sagittal split osteotomy.None of the patients had previous maxillofacial surgery or any report of neurosensory deficit before. During surgery no case of severe compression, stretch or traction of trigeminal nerve were observed. All tests were performed by a single investigator, all data was recorded by the same investigator, each site was tested three times, and a correct response is considered two out of three appropriate answers. During procedure patient was asked to close his / her eyes.

Neurosensory testing: After answering the questionnaire, patients underwent neurosensory testing consisting of two point discrimination, brush directional stroke, pins prick, thermal discrimination. The two point discrimination test is designed to test for the large, myelinated slow adapting A alpha sensory nerve fibres. Static light touch is used for large myelinated, quickly adapting sensory nerve fibres.The brush directional stroke test for large myelinated quickly adapting A alpha sensory nerve fibres. For two point discrimination test tweezer was used and for

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static light touch and brush directional stroke 00 camel hair brushes was used. The pin prick test was designed to test for the small myelinated sensory A delta nerve fibres.

The thermal discrimination test was designed to test for small myelinated and unmyelinated and A delta and C sensory nerve fibres. For pin prick test 23 guage needle was used and for thermal discrimination cotton tipped applicator saturated with ethyl chloride was used.

RESULTS

[Table 1] shows sex distribution of the participants. Number of female participants in this study was 2 and number of male participants was 3.

[Table 2] shows Age distribution of the participants. Number of males was 3 between the age of 20 -25 years and number of females was 2 between the age group of 25-30 years.

[Table 3] shows the modifications of Sagittal split osteotomy.Oblique retromolar osteotomy in one male patient, Dalpont modification in 2 patient, Hunsuck & Epkev Modification in one female patient and Obwegeser Dalpont Splitting Technique in one male patient.

Table 1: Shows Sex Distribution

Sex	Number
Male	3
Female	2

Table 2: Shows Age Distribution

Age	Males	Females
20 -25	03	-
25-30	-	02

Table 3: Modifications of Sagittal Split Osteotomy

Modifications	Male	Female
Oblique retromolar osteotomy	01	-
Dalpont Modification	01	01
Hunsuck & Epkev Modification	-	01
Obwegeser – Dalpont Splitting Technique.	01	-

DISCUSSION

Nishioka GJ, et al tested on patients who underwent bilateral sagittal split osteotomy using rigid fixation and found the incidence of neurosensory disturbance to be 45.2% for light touch, 52.4% to brush stroke direction and 33.3% to two point discrimination.[6]

T. Takeuchi, et al investigated the mechanism involved in paraesthcsia associated with sagittal split mandibular ramus osteotomy by three-dimensional computed tomography (3-D CT). The inferior alveolar neuro-vascular bundles remained intact during the sagittal osteotomy in all cases. The study examined the

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changes in the shape of the foramen mandibulae over a period of six months during which the transient mental nerve paraesthesia was recovered, and studied the distance from the foramen mandibulae to the spina mentalis (F-S distance) as measured on 3-D film. The postoperative 3-D CT scan showed bone resorption in front of the foramen mandibulae, and the F-S distance was shortened by an average of 2.94 mm. These findings suggest that possible causes of the paraesthcsia is due to compression of the nerve trunk resulting from posterior movement of the mandibular ramus.[7]

Pratt CA, et al did a retrospective assessment of labial sensory function following sagittal split osteotomy by a combination of record analysis, postal questionnaire and objective sensory testing. They noted an association between duration of temporary sensory change and magnitude of forward mandibular advance.[8]

August M, et al evaluated persistent neurosensory deficit (NSD) and functional sensory deficit (FSD) after mandibular bilateral sagittal split osteotomies (BSSO) and their association with patient age at time of operation and eight additional variables. They concluded that the incidence of persistent FSD more than two years post-BSSO increases with increasing age in a predictable and highly significant manner. Presurgical counseling should address this issue. FSD is also significantly associated with "bad splits."[9]

Jacks SC, et al determined the patient-reported incidence, duration, and perceived deficit in daily activities associated with lingual nerve (LN) sensory changes after bilateral sagittal split osteotomy (BSSO) of the mandible and compared them with inferior alveolar nerve (IAN) sensory changes in the same study population. They found that a small percentage of patients reported LN sensory changes after BSSO. When compared with IAN reported sensory changes, LN sensory changes resolve more frequently and sooner, but they are associated with greater perceived deficits in daily activity.[10]

CONCLUSIONS

All the procedures were performed by using a standard method to accomplish the osteotomy. Bone plates and screws were used for stabilization of sagittal split osteotomy.None of the patients had previous maxillofacial surgery or any report of neurosensory deficit before. It was concluded that Neurologic alteration is one of the major complications of sagittal split osteotomy.The likelihood of nerve injury is mainly dependent on manipulation during surgery.

However better techniques, proper instrumentation, illumination and access would decrease the incidence of neurosensory deficits in maxillofacial patients undergoing sagittal split osteotomy.

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