

Rapid Maxillary Expansion to Correct Palatal Fracture Malunion: A Case Report

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ABSTRACT

Mid palatal fractures are usually present in conjunction with Le Fort I maxillary fractures. Literature on isolated mid palatal fractures as seen in this case is relatively rare. A novel approach for the management of this case was undertaken. A rapid maxillary expander was used to separate palatal segments which healed well. The patient's crossbite and open bite was corrected with elastic use. The protocol of management of malunion of isolated mid palatal fractures is simple with reduced costs, morbidity and higher rates of acceptance. We report a case of a 26-year-old male patient involved in a road traffic accident leading to an isolated mid palatal fracture which is a rare entity. Due to lack of specialized care, the fracture fragments united inadequately resulting in deranged occlusion, open bite and reduced masticatory efficiency.

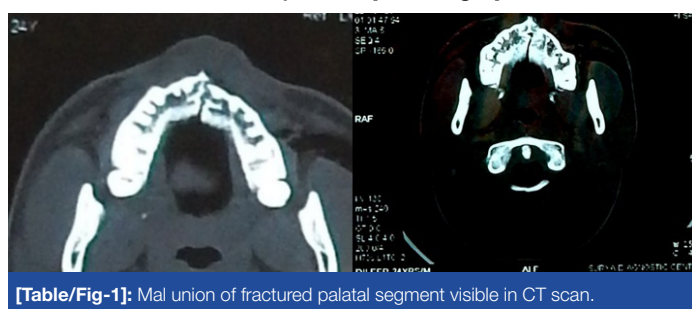
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CASE REPORT

A 26-year-old male patient reported to the Department of Oral and Maxillofacial Surgery with deranged occlusion and decreased chewing efficiency. He gave a history of falling from a two wheeler in a road traffic accident three months back.

Within 24 hours of the accident, the patient visited a government primary health centre for first aid and review. He was advised a course of antibiotics and painkillers along with a soft diet for 10 days. No radiographs or specialised dental care procedures were undertaken. After a week, he visited a local dentist due to continuous pain in some teeth. Examination showed teeth 13 and 21 to be non-vital. Root canal procedures were undertaken for teeth 13 and 21 and porcelain fused to metal crown was cemented on both teeth.

The patient had mild continuous pain in the upper jaw with inability to chew for several months after the local dentist completed dental procedures. He reported to the Department of Oral Surgery for an opinion where a CT scan was immediately advised. The scan showed there was a mal-union of the mid palatal fracture zone with the fracture line clearly visible [Table/Fig-1].



[Table/Fig-1]: Mal union of fractured palatal segment visible in CT scan.

Intra oral examination revealed a Class I molar and canine relationship bilaterally with 2mm of overjet. Evaluation of mandibular movements revealed occlusal pre maturities with respect to 16 and 46 causing a generalised open bite in anterior as well as posterior segment on the right side [Table/Fig-2]. Cross bite with respect to the molar and premolar region on the left side was present, 22 was missing with over retained 63 causing ectopic eruption of 23 [Table/Fig-3].

The treatment plan for the patient was divided into two phases. Prior to treatment procedures being undertaken, the patient was informed about the planned options which included surgical open reduction or conservative management of the palatal fracture with use of a rapid maxillary expander which would serve the dual purpose of separation of the mal-united segments and also help in post expansion stabilization. The patient selected the second option and informed consent was obtained. Phase 1 involved placement of a rapid palatal expansion screw in the maxillary arch to obtain separation of the lateral palatal segments by expansion. This would help widen the maxillary arch, correct posterior cross bite and enable repair and consolidation of the fractured segments in the desired position. This approach was unique as no evidence of such a procedure being undertaken was found in a search of three databases (Pub Med, Pub Med Central and Cochrane Library). Phase 2 involved placement of arch bars in the maxillary and mandibular arches with simultaneous use of cross elastics for a month to settle the dentition and correct the bilateral open bite malocclusion.

The rapid expander was cemented on upper 1st molars and premolars and was activated by a quarter turn every day. Each quarter turn produced 0.25 mm of expansion. The screw was



[Table/Fig-2]: Mal union of fractured palatal segment visible in CT scan. [Table/Fig-3]: Cross bite in premolar and molar regions. [Table/Fig-4]: Expanded maxilla (4mm in 16 days).



[Table/Fig-5]: Occlusal settling with heavy elastics for one month. **[Table/Fig-6]:** Two months right side post settling view. **[Table/Fig-7]:** Two months left side post settling view.

activated by a quarter turn for 16 days giving 4mm of overall expansion [Table/Fig-4]. The buccal segment cross bites were fully corrected at the end of this phase. The mid palatal mal union had also fractured and widened enabling stabilisation and consolidation.

Arch bars were placed in both arches after allowing mid palatal consolidation along with concomitant use of heavy elastics for a month from the upper arch bar to the lower on both sides enabling rapid settling of the posterior occlusion and reduction in open bite. The patient was using elastics continuously except at meal times and during brushing [Table/Fig-5].

The patient was instructed to use light elastics for a further period of a month at night to maintain open bite correction. The arch bars were then removed and the patient was advised to consider orthodontic treatment for refinement of the occlusion after another eight weeks of consolidation. The expanded maxillary segments healed well with no recurrence of problems [Table/Fig-6,7]. The patient was given a removable Begg's retainer to use after treatment to help maintain the transverse width of the expanded maxillary arch.

DISCUSSION

Rapid maxillary expansion is a well established clinical procedure used to correct transverse maxillary deficiency and increase arch length in adolescents [1]. This procedure was first introduced as early as 1860 by Angell and has been the treatment of choice in transverse discrepancy situations where growth is remaining [2]. Heiss carried out midline splitting in the anterior maxilla for expansion of the compressed maxillary arch for orthodontic reasons [3]. In 1961, Haas described the downward and forward movement of the maxilla that occurs during rapid maxillary expansion (RME) because of the location of the cranio maxillofacial sutures [3]. Function should be the prime concern of the surgeon, and one of the major factors in assessing indications for operation [4]. The patient may encounter difficulty in speech and mastication. Because of disturbed centric relationship, dysfunction of the temporo-mandibular joints may occur [5]. Isolated mid palatal fractures are generally rare. When present, they are usually associated with Le Fort I maxillary fractures. Chen et al., described the management of palatal fractures in association with Le Fort fractures in a study comprising of 162 subjects in 2008 [6].

A meta- analysis by Hamed – Sangsari et al., published in the year 2015 clearly indicates that the force from a RME device is transmitted to the mid palatal suture after surgical splitting of the suture and leads to expansion [7]. In this case, the fractured segments healed improperly with fibrous mal union. Waldrop et al., discussed palatal fracture repair with a light cured resin splint [8]. This approach could not be used in the present situation due to the fracture site healing improperly and causing an open bite malocclusion. This approach could be useful in immediate treatment of palatal fractures not associated with malocclusions.

CONCLUSION

A novel method of rapid maxillary expansion to distract the palatal segments was attempted with good results and correction of cross bites. Occlusal settling improved chewing efficiency and overall function. The patient was comfortable after treatment with significant improvement in aesthetics and chewing efficiency.

The procedure described is easy to perform and usual complications that are associated with open reduction and splitting mal united palatal segments such as bleeding, pain and morbidity are eliminated. There is increased patient acceptance with reduced costs. In selected cases of isolated palatal fractures with improper healing, this approach could give satisfactory results.

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