Title Page

Manuscript Title: Treatment of mandibular body fracture in a 15 year old child by using closed reduction and intermaxillary fixation– a case report

Manuscript type: Case Report

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Introduction

Trauma-induced maxillofacial injuries in children may affect function as well as esthetic appearance. Hence these must be diagnosed and managed appropriately to avoid disturbances of future growth and development. The overall frequency of facial fractures in children is much lower than that in than that in adults[1] Only 0.87-1.0% of facial fractures occur in children younger than five years, whereas 1.0-14.7% occur in patients older than 16 years. [2] Approximately half of all paediatric facial fractures involve the mandible. A fall from a bicycle or stairs is the most common cause of mandibular fractures[3]. Many pediatric fractures are non-displaced or greenstick-type fractures, and observation alone is adequate. There is almost no indication to open a fracture because the abundance of developing teeth in the bone makes fixation almost impossible without damaging these structures[4] . Treatment may include the use of absorbable plates and screws as these have been reported to cause less harm and disturbance in facial skeletal growth , but are still associated with the risk of damaging unerupted teeth even when using monocortical screws.[5]. An understanding of conservative treatment options is necessary to make informed choices which will best manage these injuries [6]. This case report describes a case of fracture of mandible (Right Side) in which conservative management was done using arch bar placement and intermaxillary fixation.

CASE REPORT

A 15 year old boy reported to the department of paediatric and preventive dentistry with a chief complain of pain and difficulty in chewing on right back teeth region of mouth for last 3-4days. He also gave a history of fall from a motor bike 4days back. There was no history of vomiting or loss of consciousness after the accident. Clinical and radiographic examination (Orthopantomogram) OPG showed fracture of body of mandible with of right side.(Fig1)The fracture was between the right lateral incisor and canine. There was a displacement of the dentoalveolar segment distal to the fracture line(Fig 2). This resulted in a altered occlusion..There was swelling and tenderness of right upper cheek region of face on palpation. There were no other fracture lines on TMJ or bony structures. No individual tooth fracture was present. There was a slight mobility (Miller,s Grade 1) in mandibular right canine which was present in the line of fracture.

Fig 1. Pre- Operative Orthopantomogram showing fracture of body of mandible extending from right canine (mesial surface) to lower border posteriorly. Type of fracture – Vertically unfavourabe confined fracture.

Fig 2. Intra oral clinical picture showing displacement of fractured fragment

TREATMENT

Under local anaesthesia interdental wiring with 0.5mm stainless steel wire was done along with Erich's arch bar fixation in both maxillary and mandibular arches. Thereafter fracture reduction was done manually and intermaxillary fixation was done. The fracture ends were manually moved carefully during repositioning , so that further reduction of fracture was seen. A favourable occlusion was achieved and it was retained using intermaxillary fixation **(Fig3,4).** The method of carrying out IMF in this case was with the use of elastics which resulted in a semirigid fixation. The right canine, 43 was planned for endodontic treatment

followed by placement of a prosthetic restoration as it was in good condition and assisted in establishing occlusion[7].

Post operative instructions given were

Having a soft diet till completion of the procedure (6weeks)

Warm saline rinses plus providone iodine mouthwash to be used twice daily for 6weeks

To maintain oral hygiene till completion of the procedure.

The IMF procedure was carried out for 6weeks . The patient was called for a follow up visit thereafter. Occlusion was checked and found to be settled. **(Fig 5)** Orthopantomogram after 6weeks was done and the fracture showed uneventful healing.(**Fig 8**).

Oral prophylaxis was carried out using ultrasonic scaling and instructions for further maintenance were given.

Fig 3. Intra oral clinical picture showing intermaxillary fixation using elastics.

Fig 4. Orthopantamogram showing reduction of fracture and arch bar fixation.

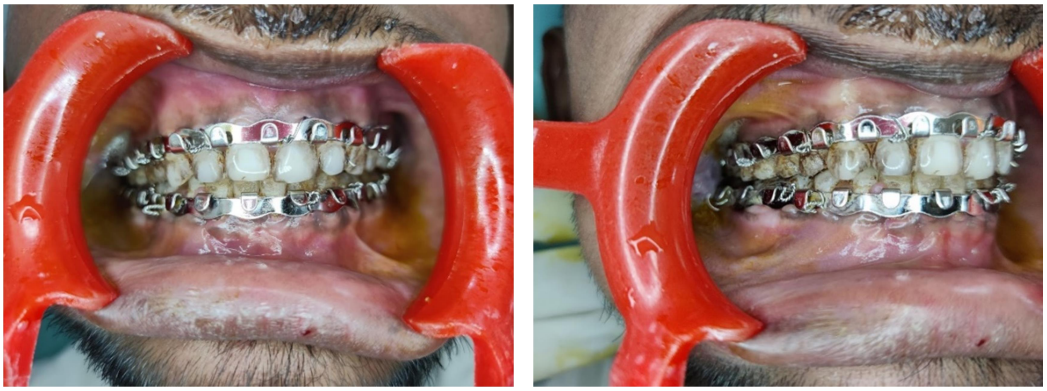

Fig 5. Intraoral picture after 6weeks showing removal of elastics.
(Note the poor oral hygiene after removal)

Fig 6. (Intra – oral pictures showing settlement of occlusion after oral prophylaxis)

Fig 7. Post operative Extra- Oral clinical picture showing resolved swelling after 6weeks

Fig 8. Post – Operative OPG after 6weeks showing uneventful healing of fracture

Endodontic treatment of 43 was done and restored with a porcelain fused to metal crown (Fig 9)

Fig 9. Intraoral picture showing 43 restored with

Discussion

The present case is normally treated by conservative technique using manual reduction and intermaxillary fixation using elastics. Treating mandibular fractures involves providing the optimal environment for bony healing to occur: adequate blood supply, immobilization, and proper alignment of fracture segments. As a result, most fractures require reduction and fixation to allow for primary or secondary bone healing.[8] In this case the treatment advocated was to use intermaxillary fixation using arch bars and elastics after manual reduction. This treatment has several advantages like does not traumatize the vascular envelope and is less expensive for the patient. The potential foreign body infections are less likely with this technique. [9].It has some disadvantages like it is associated with a significant period of immobilization and closure of the oral cavity, and requires intact dentition or some form of dental records. Patient compliance is a factor which to a greater extent decides the success of IMF treatment, which in this case was lacking. In this case tooth 43 was situated on the line of fracture and it was then treated conservatively by carrying out endodontic treatment. In the authors' clinical practice, the criteria for the extraction of teeth in the fracture line are as follows: teeth that prevent the reduction of fracture fragments, teeth with fractured roots that cannot be treated, teeth with extensive periodontal damage and extensive periapical lesions, loss of integrity of the alveolar bone around the tooth with the resulting formation of a deep pocket (making optimal healing doubtful), and partially impacted wisdom teeth with the presence of pericoronitis and acute infection in the fracture line [10]

Conclusion

Mandibular fractures are common craniofacial injuries. The proper approach of these injuries depends on both fracture and patient characteristics(Patient compliance). Whereas certain regions of the mandible have clear-cut options and solutions in case of injury, many injuries have intensely debated management plans, and even years of research have not been able to delineate a clear evidence-based answer, and in truth, there may not be a single right answer. Despite the fact that the goal of treatment is to establish the bony architecture to pre-injury state as non-invasively as possible, the

challenges with closed reduction and IMF are many. However, some authors have indicated that IMF using arch bars is safe in children, especially those older than 9 or 11 years.[11]

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