Fracture of the mandible treatment in a child: a simplified technique

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Abstract

After being hit by a motorcycle, a seven-year-old boy presented with a displaced fracture of the body of the right mandible [type III]. In the absence of orthodontic internal fixation or ligature wire equipment, suture material was used to provide approximation and stabilization of the fracture. The non-absorbable suture was fed through a cannula which was pierced through the bone on either side of the fracture. We present this simplified technique as a suitable alternative for the fixation of mandible fractures in settings with very limited resources.

Introduction

Mandibular fractures were first reported in ancient Egypt in 1650 BC, albeit the author did not recommend a therapy because of the advanced soft tissue infection surrounding the fracture site.[1] Currently, in African countries mandibular fractures are mostly the result of motor vehicle accidents and interpersonal violence.[2,3] Assault dominates the cause of mandibular fractures in urban centers of the USA.[4] Falls and sports accidents are also major contributors to mandibular fractures in children.[5] Pediatric maxillofacial fractures are seen in less than 15% of facial fractures as a result of anatomical and developmental factors.[6] Its incidence is rare below the age of ten years.[7,8] Boys are more often affected by this type of fracture; one representative study quotes a male-to-female ratio of 2.5 to 1.[9]

We present the case of a patient who received a simplified treatment for his mandible fracture due to a lack of resources.

Case Report

A seven-year-old alert and orientated boy was admitted via the emergency room after being hit by

a motorcycle on the right side of his body. He sustained multiple abrasions mainly on the right buttock and occipital area together with a forehead and back of the head wound. In the absence of a working X-ray machine, the fractures were diagnosed clinically. A closed right upper humerus fracture, a right-sided non-displaced mid-shaft tibia fracture, and a right displaced body of the mandible fracture [type III] were identified.[10]

He underwent general anesthesia for wound suturing, debridement of his abrasions, placement of an above-the-knee plaster cast for his right tibia fracture, manipulation of the humerus fracture and an initial assessment of his displaced mandibular bone fracture at the level of the premolars.

The following day we proceeded with general endotracheal anesthesia and through a one-inch submandibular incision on the right side we gained access to the fracture ends.

The fracture was aligned manually with the help of a small retractor. At the lower border of the mandible, we placed a Sterican hypodermic needle (1.10´30 mm; B Braun Melsungen, Germany) through the buccal and lingual cortex on either side of the fracture (Figure 1). A 1 Nylon suture (Ethicon, New Jersey, United States) was passed through the needle lumen followed by a second suture which was placed bi-cortically just below the dental growth area again approximately 3-4 mm from the fracture side as illustrated by the artist impression (Figure 2). The sutures allowed for a good approximation of the fractured mandible (Figure 3). The wound was closed in two layers with a Penrose drain left in for 48 hours. Postoperatively, granulation tissue formed at the wound site most likely as a result of a foreign body reaction to the drain. The tissue was excised without further disturbance of the wound healing; the sutures were removed at 10 days.

In the early post-operative phase, the patient was only allowed a liquid diet. At around 3 weeks post fixation of his jaw fracture his mother confirmed he had regained his ability to chew.

At four weeks post-surgery he received his third anesthesia to remove his plaster cast from his right leg and assess the stability of his healed fractures. The right jaw bone was found to be sound as were the two other previous fracture sites. The suture material was not obviously palpable and was left in situ as it caused him no problems.

At a review seven months after his trauma, the patient was in good spirits with no sign of any disability related to his former fractures. In particular, the lower jaw alignment felt normal on palpation.

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Discussion

Maxillofacial fractures are less frequent in small children as a result of the elasticity of young bone and flexible suture lines; fur-

thermore, children have a higher cancellous to cortical bone proportion and thicker overlying soft tissue/fat in comparison to adults.[11,12] Finally, the large head of a child protects the face, *e.g.*, the cranium-to-face ratio is 4 to 1 in a five-year-old decreasing to 2.5 to 1 in an adult.[6]

Whilst concerns for the developing mandible and the odontogenesis favor a conservative approach to the management of mandibular fractures, we had to resort to an open reduction because of the displaced nature of the fracture of the mandibular body [type III].[11]

Figure 1. Sterican hypodermic needle, B Braun Melsungen, Germany.

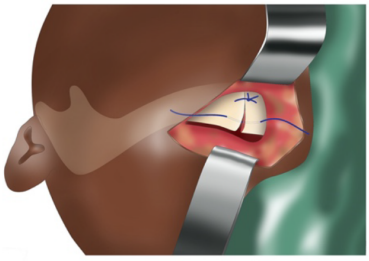

Figure 2. Drawing of the technique.

Figure 3. Fracture site after fixation.

In the absence of intermaxillary fixation devices and equipment (plates) for an open reduction internal fixation lacking, we chose to fix the fracture with sutures in these limited resources setting.

The non-absorbable sutures were placed at the inferior border of the mandibular body and below the developing tooth germs in the hope of avoiding dentition problems in the future (Figure 2). This suture technique has been used before in a premature neonate with a symphysis fracture [type III] after a forceps-assisted delivery for breech presentation.[13] Another investigator fixed the angle of mandible fracture [type II] in two cases with an absorbable polyglycolic acid suture and secured the arrangement with intraoral arch bars.[14]

We were satisfied having achieved bony union and normal occlusion for this young boy and hope to have avoided impediments to the growth of the mandible and the budding teeth.

Conclusions

While undisplaced fractures of the mandible may well be treated with conservative means; the above outlined technique may serve as a valuable strategy in dealing with displaced bodies of the mandible fractures in a setting deprived of basic resources (Figure 3). There is justified hope in achieving restoration of normal form and function with this minimalist approach.

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