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Dentoalveolar fracture treatment and management: A review article

Nanda Rachmad Putra Gofur[1*], Aisyah Rachmadani Putri Gofur[2], Soesilaningtyas[3], Rizki Nur Rachman Putra Gofur[4], Mega Kahdina[4], Hernalia Martadila Putri[4]
[1] Department of Health, Faculty of Vocational Studies, Universitas Airlangga, Surabaya, Indonesia
[2] Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia
[3] Department of Dental Nursing, Poltekkes Kemenkes, Surabaya, Indonesia
[4] Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

Abstract
Dentoalveolar fracture (DAF) is quite common and usually seen as an emergency. Dentoalveolar fracture may be defined as that fracture in which displacement, subluxation, avulsion or fracture of the teeth occurs in association with fracture of the alveolus. Alveolar process is that part of the mandible and maxilla, which surround and support the teeth. The alveolar process is formed with the development and eruption of teeth and conversely it gradually diminishes in height after the loss of teeth. Alveolar process is that part of the mandible and maxilla, which surround and support the teeth. The alveolar process is formed with the development and eruption of teeth and conversely it gradually diminishes in height after the loss of teeth. The study shows that majority of the patients were in their young age. Males were more common than females. The most common etiological factor was road traffic accident, followed by fall. In the light of present study the following recommendations are made.
Discussion: Most alveolar fractures occur in the premolar and incisor regions. The treatment of these fractures involves proper reduction and rapid stabilization. Manipulation by pressure and rigid stabilization of the fragments are accepted closed-reduction techniques. Major displacement or difficulty with closed reduction may necessitate open reduction. Alignment of the involved teeth, edema of the segments, restoration of proper occlusion, and edema of the teeth in the fractured segment are important. The removal of teeth with no bony support may be considered, but should not be performed before the fractured bony segments have healed, even if the teeth are considered to be unsalvageable. Segment edema can be performed with acrylic or metal cap splints, orthodontic bands, fibreglass splints, transosseous wires, small or mini cortical plates, or transgingival lag screws; these materials should be applied for at least 4 weeks.
Conclusion: Dentoalveolar fracture management is required using archbar treatment, we believe that this technique could also be helpful in providing rapid MMF to stabilize maxillofacial fractures during mass casualties such as war injuries or natural calamities.

Keywords: dentoalveolar, fracture, archbar, management

Introduction

Dentoalveolar fracture (DAF) is quite common and usually seen as an emergency. Dentoalveolar fracture may be defined as that fracture in which displacement, subluxation, avulsion or fracture of the teeth occurs in association with fracture of the alveolus. Alveolar process is that part of the mandible and maxilla, which surround and support the teeth. The alveolar process is formed with the development and eruption of teeth and conversely it gradually diminishes in height after the loss of teeth. Alveolar process is that part of the mandible and maxilla, which surround and support the teeth [1].

The alveolar process is formed with the development and eruption of teeth and conversely it gradually diminishes in height after the loss of teeth. The study shows that majority of the patients were in their young age. Males were more common than females. The most common etiological factor was road traffic accident, followed by fall. In the light of present study the following recommendations are made [2].

Radiographic studies should be performed before intraoral manipulation. Radiography should determine the presence of root or jaw fracture, degree of extrusion or intrusion and its relationship to possible existing tooth germs, extent of root development, and presence of tooth fragments and foreign bodies lodged in soft tissues. The combination of periapical, occlusal, and panoramic radiographs is used most frequently for the detection of damage to underlying tissues. Periapical radiographs provide the most detailed information about root fractures and tooth dislocation [3].

Occlusal radiographs, however, provide larger fields of view and nearly the same level of detail as periapical radiographs; they are also very useful for the detection of foreign bodies. Panoramic radiographs provide useful screening views and visualize fractures of the mandible, maxilla, alveolar ridges, and teeth. Computed tomography (CT) offers insufficient resolution for the diagnosis of dental trauma, but cone-beam CT technology provides sufficient resolution to serve as a valuable tool in the diagnosis of various dental injuries [4]. This article aims to review

dentoalveolar fracture management.

Discussion

Involvement of the supporting bone

Most alveolar fractures occur in the premolar and incisor regions. The treatment of these fractures involves proper reduction and rapid stabilization. Manipulation by pressure and rigid stabilization of the fragments are accepted closed-reduction techniques. Major displacement or difficulty with closed reduction may necessitate open reduction. Alignment of the involved teeth, edema of the segments, restoration of proper occlusion, and edema of the teeth in the fractured segment are important. The removal of teeth with no bony support may be considered, but should not be performed before the fractured bony segments have healed, even if the teeth are considered to be unsalvageable. Segment edema can be performed with acrylic or metal cap splints, orthodontic bands, fibre glass splints, trans osseous wires, small or mini cortical plates, or trans gingival lag screws; these materials should be applied for at least 4 weeks [5].

Arch Bar Management

One of the most basic concepts in the treatment of facial fractures is that the dental occlusion can be used as a guide to fracture reduction and as a therapeutic tool. Thus, maxillomandibular fixation (MMF) is important in the treatment of maxillofacial fractures and in ortho gnathic surgery, and is usually applied by wiring together the fixed upper and lower arch bars [6].

Many kinds of MMF methods, including an Ivy loop wiring, a wired arch bar, an a cry lated arch bar, the Gottingen quick arch bar, a bonded arch bar, Dimac wire thermoforming plates and a bone screw system, have been reported. However, these techniques require more time, involve a high cost, are complicated, need more laboratory support, extended operating time and require surgical intervention. We report a new type of MMF technique (Rohtak Dental College (RDC) technique) using 26-gauze stainless steel wires [7].

Facial fracture management aims to restore aesthetics and function. Intermaxillary fixation (IMF) achieves these goals since it restores facial contouring and masticatory function. IMF may be performed with the use of the Erich arch bar, re-establishing functional occlusion through intercuspidation. The advent of fixation technique using plates and screws enables immediate function while dispending with the traditional 4-6 weeks of occlusal fixation associated with IMF. Despite new fixation approaches, the erich arch bar utilization is still indicated during the intraoperative time for occlusal restoration [8].

The Erich arch bar is an important tool to restorre proper occlusal relationship, especially in cases of comminuted and oblique fractures, along with the loss of continuity of the mandible. However, in cases where a unique fracture line is present, we perform the described technique. Of the 130 midface fractures (maxillary and zygomatic complex fractures), 56 were treated with closed reduction and fixation and 28 with open reduction and internal fixation. 46 cases of undisplaced zygomatic complex fractures were treated conservatively with regular follow-up. Among the mandibular fractures, 148 cases were treated with closed methods and 111 cases with open reduction and fixation. 21 cases with dentoalveolar fractures were managed with arch bars and splinting [9].

Different treatment modalities were used for the closed treatment of midface and mandibular fractures including intermaxillary fixationand circummandibular fixation. In open methods of fixation, mini plates were used to fix the fractured fragments. In the treatment of zygomatic complex fractures Gilles temporal approach was used for elevation of zygomatic bone. Maxillofacial fractures in children were treated by closed methods like eyelet wiring, Gilmer's wiring, arch bar wiring and circummandibular wiring [10]. But the use of arch bars did not have a significant effect on major complications. This trend was consistent for cases of one and two mandible fractures. These data suggest that many patients with mandible fractures maybe safely treated without arch bars [11].

Tehnique Management

In this technique, a wire is passed around the neck of the upper first molar tooth, both ends of wire going from buccal to palatal, one along the mesial surface and other end along the distal surface of tooth. Then both ends of wire are passed back around the lower first molar from lingual to buccal aspect in a similar manner. Similar procedure is repeated on the premolar teeth and on the contralateral side (molar and premolar regions). After achieving the occlusion, the ends of wire are twisted together on the buccal surface of the lower premolar and molar teeth on both sides. At the end of treatment, wires can be easily removed with minimum trauma to patient [12].

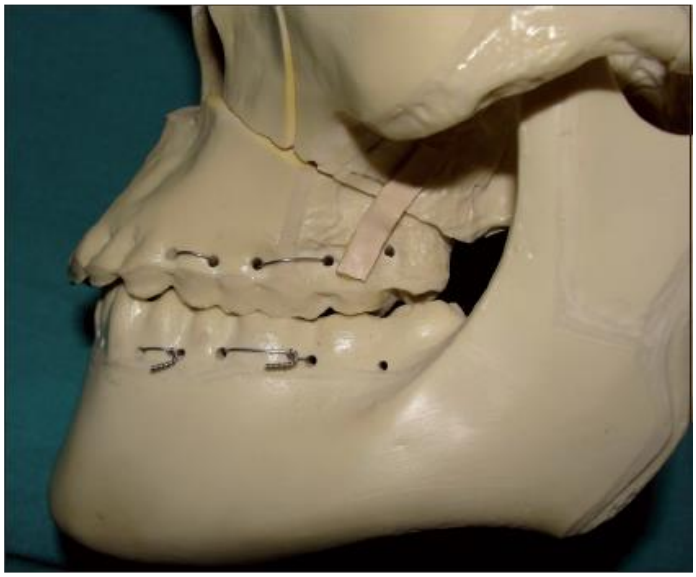

Fig 1: Arch Bar Treatment Management[4]

Currently, the most common technique of fixating the jaw after a facial fracture is called MMF which can be achieved by various methods available in the literature. While thinking of an ideal design for an MMF technique, the factors that should be considered include easy and quick application; low cost; need to securely hold the lower jaw tight to the upper jaw; avoidance of forces on front teeth as they are easily moved out of alignment; being minimally invasive; being safe for the patient during application and healing; and also presence of an emergency quick release system [13].

From our clinical experience of 1 year, we feel the present design

incorporates most of these ideal requirements. It is a simple, economical and minimally invasive technique. It firmly holds the two jaws together and forces are avoided on the anterior teeth. No specialized instrument or laboratory work is necessary. The total cost of this design is about $0.22. The greatest advantage of this technique is that it only just requires 10–15 minutes for MMF and has the quick release if needed in case of any emergency. Another advantage is that force vector in upper molar tooth is neutralized by force vector in lower molar tooth, as they are equal and opposite to each other. This mechanical principle helps in lesser postoperative periodontal problems [14].

It can be used either as an intraoperative aid to keep the mandible in the desired reduced position while the plates are being fixed, or as the only therapeutic regimen to immobilize the mandible for some time to ensure bone healing. Typical indications for its use are minimally displaced fractures in which manual reduction could be performed, orthognathic surgeries and in tumor resection surgeries. However, it has some limitations for partially edentulous patients since premolars and molars are necessary for their application, patients with open interdental contacts and severely displaced fractures [15].

Conclusion

Dental alveolar management is required using archbar treatment, we believe that this technique could also be helpful in providing rapid MMF to stabilize maxillofacial fractures during mass casualties such as war injuries or natural calamities.

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