

Postoperative Complications of Mandibular fractures: A literature review

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Abstract

Mandibular fracture treatments are to improve the patient's function and aesthetics, but it is not uncommon that postoperative complications to be present. Postoperative complications include surgical site infection, nonunion, malunion, malocclusion, nerve injury, scar tissue, Temporo-Mandibular Joint Disorder (TMD), as well as dental problem. This literature review aimed to understand and describe the postoperative complications of mandibular fractures based on previous studies.

Keywords: Mandibular fracture; Postoperative; Complication

1. Introduction

Mandibular fracture, breach of the continuity of the mandible, is a very well documented topic to date [[1]]. Most common causes of mandibular fracture are traumatic causes such as Road Traffic Accident, assault, falls. Other less common causes are pathological as well as iatrogenic causes [[2]]. Mandibular fractures are classified using the *AOCMF* Classification Level-2, which groups the fractures into symphysis/parasymphysis, body, angulus/ramus, coronoid, and condyle fractures [3]. Treatments are to improve the patient's function and aesthetics, but it is not uncommon that post operative complications to be observed [4]. Previous studies noted that post operative complications rate may reach 58% of patients, or more than half of all patients treated for mandibular fractures [5].

2. Mandibular fracture

Mandibular fracture is defined as a breach of the continuity of the mandible, is due to impact force that exceeds that mandible's ability to withstand [1]. Traumatic causes are such as road traffic accident, assault, falls [2]. Pathological causes are processes of cancer, tumour, osteonecrosis, osteomyelitis, or cyst on the mandible [6]. Iatrogenic causes are due to third molar extraction during oral/mandibular surgery [7]. On clinical examination, tenderness, mobility, hematoma, and swelling are frequent finding [8]. The pathognomonic finding is sublingual ecchymosis, especially in indicating symphysis, parasymphysis, or corpus region [9]. To confirm these finding, radiographic imaging has to be done. Panorex/Orphantomogram may provide sufficient panoramic view of the mandible, however if it is not available, series of plain X-ray providing several certain views of the mandible can be an alternative [9]. CT scans however is the preferred modality when it comes to evaluating fractures caused by traumatic injuries with a 100% sensitivity rating [10]. AOCMF Level-2 classification can be used after a series of X-Ray or CT has been done. This classification divides the mandible into symphysis/parasymphysis, body, angle/ramus, coronoid, and condyle fractures [3]. Treatment options ranging from conservative (soft diet for a month and follow-up), non-invasive (closed reduction with MMF), and invasive (open reduction and internal fixation/ ORIF) [11].

3. Post operative complications

Post operative complications of mandibular fracture may affect patient's quality of life [12]. Generally, post operative complications are classified into three which are anatomically related, internal fixation related, and patient related [13]. Anatomically, complications not only vary with fractures sites but also depends on the surgical approach being used, where extraoral approach in managing condyle fracture increases the risk of 7th cranial nerve injury, or extraoral approach in general tends to increase the risk of malocclusion due to reduced intraoperative occlusion visualization [13][14]. Internal fixation, is due the material being faulty, hypersensitive, and improper choice and fixation application. Patient, every patient is different, their obedience and behavior, systemic health, recovery time may result in post operative complications that varies between patients [13]. Risk factors includes initial injury severity, surgical treatment, patient's compliance, time to treatment, tobacco consumption, tooth removal, and distance to the healthcare facility [12][15]. The post operative patients are to be observed for at least 6 months [16]. Clinically, post operative complications include surgical site infection, nonunion, malunion, malocclusion, nerve injury, scar tissue, Temporomandibular Joint Disorder (TMD), as well as dental problem [4][12][15].

1. Surgical site infection

Factors include time to treatment, segment mobility, loosening of osteosynthesis screws, improper plate adaptation, insufficient cooling during drilling, screw placement on the fracture line, negligence of injured teeth on the fracture line. Clinically, signs of surgical site infection include cellulitis, abscess, fistula, osteomyelitis, and fasciitis necrosis. CT scan is required if infection involves the neck, and antibiotic sensitivity and culture are essential [13].

2. Nonunion

Nonunion is the failure of the bone to unite. It is usually a clinical diagnosis by detecting mobility around the fracture site. The mobility may also be accompanied with infection. The most common causes of nonunion are fracture instability/mobility, early infection, improper selection of hardware, inaccurate and inadequate fracture reduction [13]. Infection, systemic conditions, old age, mandible atrophy, as well as smoking are nonunion contributing factors. Reoperative rate for nonunion may vary [15].

3. Malunion

Malunion is when mandible heals in an abnormal position, may occur due to several reasons such as inadequate occlusal reduction, improper internal hardware, and inadequate stability [15]. In certain cases, malunion may further cause malocclusion [13].

4. Malocclusion

Malocclusion and facial asymmetry due to improper alignment of fracture fragments. It remains the most significant post operative complications, and is usually the result of technical error in fixation placement. Therefore, the final occlusion should be examined after the MMF has been removed. Most of the patient will then be scheduled for reoperation [17].

5. Nerve injury

Injury to sensory nerves such as the inferior alveolar, mental, and facial nerve is frequently found postoperatively. Preoperatively, nerve injury is a common finding amongst displaced mandibular fracture patients. Postoperatively however, can be due to delayed treatment and improper use of drills or screws [15].

Motoric nerve injury at the facial nerve preoperatively may cause paralysis due to concurrent temporal fracture, while could also be caused due to dislocation of the condyle. Postoperatively however, it is often due to iatrogenic injury during surgery [15].

6. Scar tissue

Scar tissue is usually caused due to transfacial approach for *ORIF*. The management is relatively simple, with the use of silicon-based topical gel. Pigmented scars however, are usually caused by asphalt debris, which is usually treated surgically [15].

7. Dental problems

Dental problems are such as necrotic pulp, fracture, and dislocation of the teeth [4]. Iatrogenic causes of these dental problems include internal fixation screw that penetrates the root or neurovascular bundle. To determine the presence of dental problem, radiographic imaging as well as neurology testing have to be assessed postoperatively [13]. To prevent this irreversible complication, it is essential to immediately give initial emergency treatment after imaging and test result turned out positive [4].

8. Temporo-Mandibular Joint Disorder (TMD)

TMD can be characterized by limited mouth opening, pain on movement, as well as presence of swelling at either one side of the mandible despite the location of the fracture. TMD which is associated with condyle fracture, can be prevented with compulsory postoperative physio kinesis treatment [15].

These complications can be reduced with early and accurate identification of complications that would help select proper treatment modalities [18]. Initial injury severity, can be minimized with the type of helmet used [19]. Surgical treatment risk factor can be minimized with proper aseptic procedure, adequate irrigation, as well as proper reduction and immobilization. Patient's compliance risk factor can be minimized through strict follow-up on the antibiotic consumption, diet restrictions, smoking cessation and early education of these possible complications [12][15]. System level intervention to reduce risk factor such as time to treatment may include increasing access to the operating room there for reducing the time to start fixating the fracture [12]. Therefore, postoperative complications are thought to be easily minimized with routine follow-up and patient's compliance [20].

4. Conclusions

Postoperative complication rate of mandibular fracture is very common and the prevalence could be as high as 58% of mandibular fracture patients. Postoperative complications include surgical site infection, nonunion, malunion, malocclusion, nerve injury, scar tissue, TMD, as well as dental problem. Reduction of complications can be achieved through early and accurate identification, as well as mitigation of initial severity of fracture, proper surgical treatment, increasing patient's compliance, education, and strict follow-up to ensure the best result possible.

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