

Management for the rehabilitation of atrophic mandible fracture: case using a conservative approach and short implants

Manejo para a reabilitação de fratura atrófica de mandíbula: caso usando uma abordagem conservadora e implantes curtos

Manejo para la rehabilitación de fracturas atróficas de mandíbula: caso con abordaje conservador e implantes cortos

Received: 12/02/2021 | Reviewed: 12/07/2021 | Accept: 03/01/2022 | Published: 03/10/2022

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Abstract

The treatment of atrophic jaw fracture is a challenge in maxillofacial surgery, due to both local and systemic factors of the affected patients. This article aims to report a case of bilateral atrophic fracture of the mandible treated with an intraoral approach through a thinner and locked 2.0 mm system mandibular plate and subsequent rehabilitation with an implant-supported prosthesis. This technique provided the patient with excellent masticatory, aesthetic, and functional recovery with less morbidity and faster recuperation.

Keywords: Atrophic Mandible Fracture; Conservative Approach; Short Implants; Senior patients; Systemic diseases.

Resumo

O tratamento da fratura atrófica da mandíbula é um desafio na cirurgia maxilofacial, tanto por fatores locais quanto sistêmicos dos pacientes afetados. Este artigo tem como objetivo relatar um caso de fratura atrófica bilateral de mandíbula tratada com abordagem intraoral por meio de placa mandibular mais fina e travada com sistema de 2,0 mm e posterior reabilitação com prótese implantossuportada. Essa técnica proporcionou ao paciente excelente recuperação mastigatória, estética e funcional, com menor morbidade e recuperação mais rápida.

Palavras-chave: Fratura Atrófica De Mandíbula; Abordagem conservadora; Implantes curtos; Pacientes idosos; Doenças sistêmicas.

Resumen

El tratamiento de la fractura atrófica de mandíbula es un desafío en la cirugía maxilofacial, debido a factores tanto locales como sistémicos de los pacientes afectados. Este artículo tiene como objetivo reportar un caso de fractura atrófica bilateral de mandíbula tratada con abordaje intraoral a través de una placa mandibular más fina y bloqueada del sistema de 2.0 mm y posterior rehabilitación con una prótesis implantossuportada. Esta técnica proporcionó al

paciente una excelente recuperación masticatoria, estética y funcional con menor morbilidad y una recuperación más rápida.

Palabras clave: Fractura de mandíbula atrófica; Enfoque conservativo; Implantes cortos; Pacientes mayores; Enfermedades sistémicas.

1. Introduction

Edentulism is a condition present in the great majority of the elderly and results in the atrophy of the involved bone, either maxilla or mandible (Oliveira *et al.*, 2015). Mandibular atrophy causes a great decrease in vascularization and bone mass (Chee *et al.*, 2014; Tiwana *et al.*, 2009) with this the bone becomes more vulnerable to fractures and makes repair difficult (Wittwer *et al.*, 2006; Ellis III *et al.*, 2008; Madsen *et al.*, 2009).

The treatment of atrophic jaw fracture is a challenge in maxillofacial surgery, due to both local and systemic factors of the affected patients. Difficulties in fracture reduction and immobilization can result in unsatisfactory bone repair, as well as poor bone quality and poor vascularization may add to the problem (Vajgel *et al.*, 2013; Clayman *et al.*, 2012). Other point is those patients are many time systemically compromised. Usually require overtime hospitalization and intensive care units can be necessary.

The literature describes several ways for the rehabilitation of atrophic jaws, including grafts, alveolar nerve lateralization, and short implants (Bell *et al.*, 2009; Pistilli *et al.*, 2014; Duttchenhofer *et al.*, 2015; Peñarrocha-Oltra *et al.*, 2014). Patients rehabilitated with osseointegrated implants after mandibular fractures have a good prognosis, with the recovery of quality of life, chewing, aesthetics, and phonetics.

This article aims to report a case of bilateral atrophic fracture of the mandible treated with a conservative approach performing to intraoral incision and two bilaterall small transcutaneous incision. Then a thinner and locked 2.0 mm system mandibular long plate and subsequent rehabilitation with implant supported prosthesis.

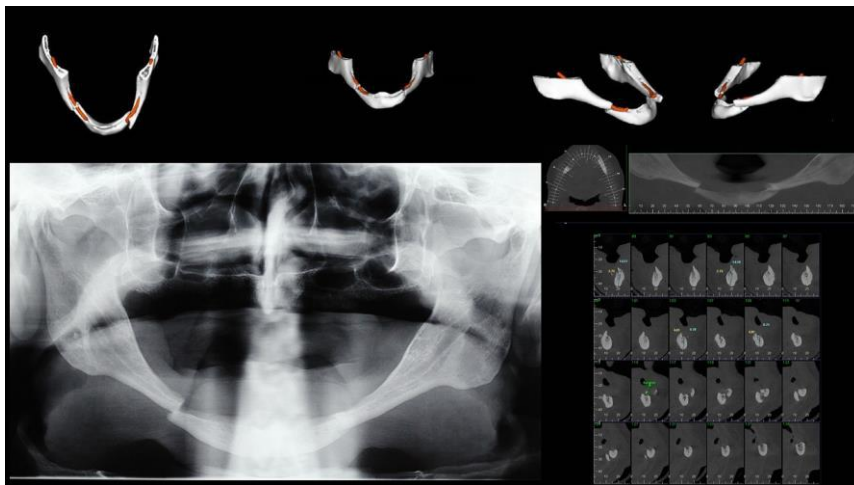
2. Methodology

This clinical case report is part of a descriptive observational study, which in addition to discussing the proposed treatment, also aimed to discuss the topic through the bibliographic survey carried out (Ribeiro-Júnior *et al.*, 2018; Klein *et al.*, 2019). And thus contribute to the scarce scientific literature on the subject. Thus representing a descriptive and qualitative content. The case was conducted according to clinical and professional ethics. The patient reported in the study has a personal data sheet and anamnesis, where he authorized the use of images, clinical, radiographic and socioeconomic data for educational and research purposes, and with this signed a Free and Informed Consent Form and the Informed Consent Form. Consent of the Person's Participation as a Subject, which were duly read and explained.

3. Case reporte

EB patient, 87 years old, suffered a fall from the height that caused a facial trauma. Medical history with cardiopathies and emphysema. Clinical examination showed mobility and bone crepitation in a region of bilateral parasymphysis, paresthesia in the region of the lower lip and sublingual hematoma. In the radiographic and tomographic imaging studies, bilateral mandible fracture traces were observed in the region of the parasymphysis (Figure 1).

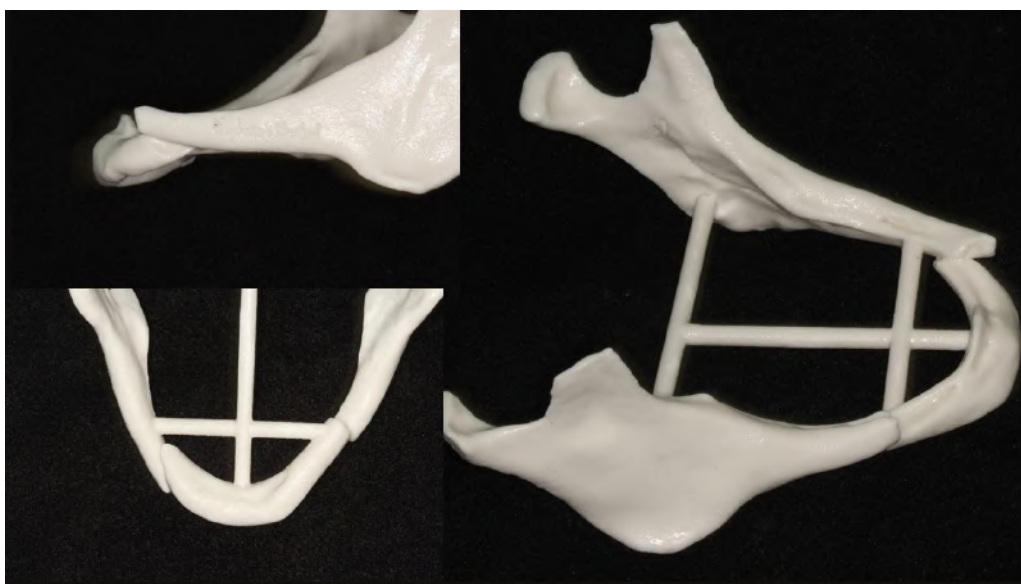
Figure 1: In the radiographic and tomographic imaging studies, bilateral mandible fracture traces were observed in the region of the parasymphysis.



Source: Authors.

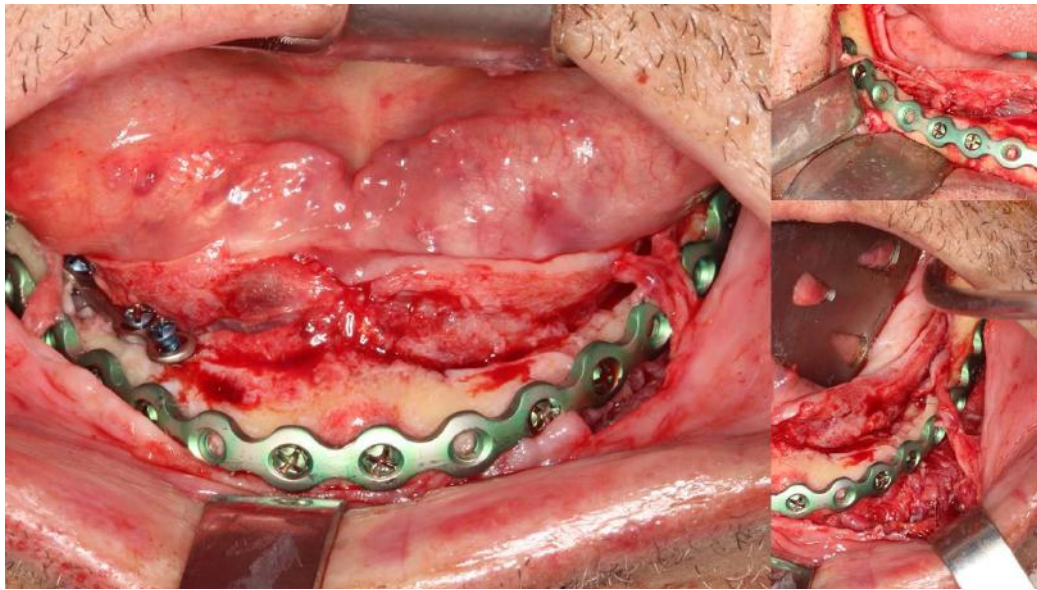
One 3D mandible model was requested with the purpose of pre-bending of the plate pre-operatory, thus reducing the surgical time (Figure 2). In the surgical procedure, under general anesthesia, an intraoral approach was performed in the region of the alveolar mucosa from the left to the right mandibular angle, maintaining the integrity of the mental nerves. The anterior segment of alveolar nerve was displacement to superior. The fracture was anatomically reduced and fixed with 2.0 mm locking long plate and 2.0 mm screws (Figure 3). Two small submandibular transcutaneous approaches were performed on each side that allowed access to the more proximal screws. The surgical time was 92 minutes and the patient were discharged 24 horas of the surgery. He did not need to go the intensive care. After 5 months the patients were rehabilitated with four dental implants and immediate loading in the office. (Figure 4).

Figure 2: From the computed tomography examination, a complete mandible model was requested with the purpose of pre-folding the plate, thus reducing the surgical time



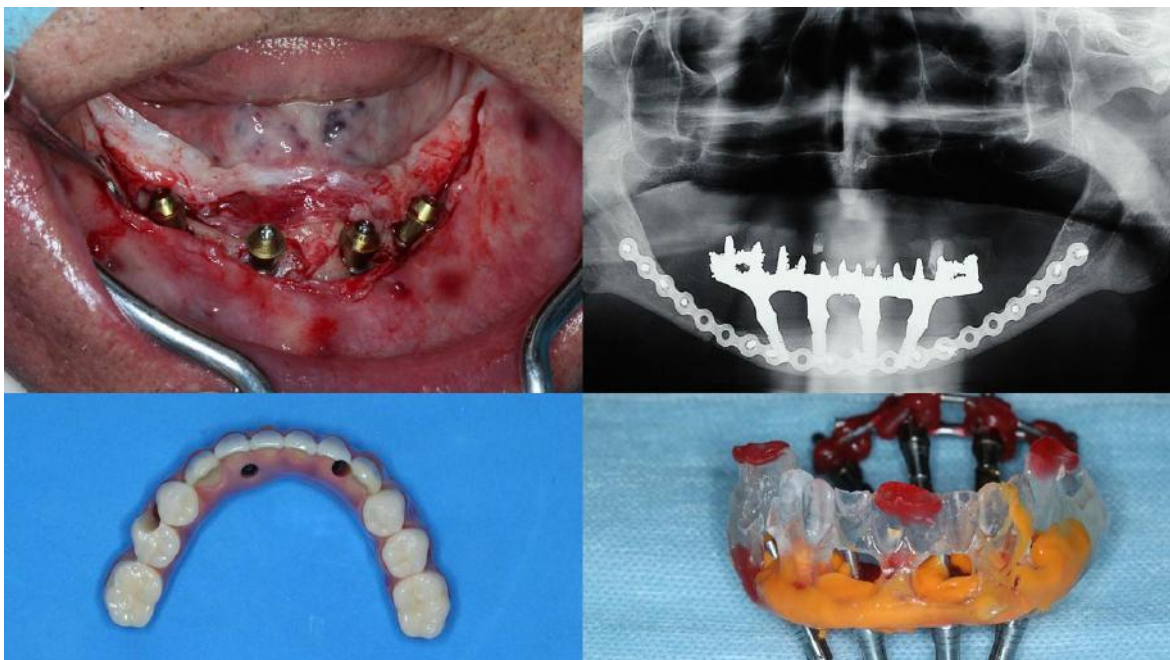
Source: Authors.

Figure 3: The fracture was anatomically reduced and fixed with the pre-folded 2.0 mm locking plate and 2.0 mm screws



Source: Authors.

Figure 4: After 5 months the patients were rehabilitated with dental implants



Source: Authors.

3. Results and Discussion

Open reduction and fixation with plates and screws are currently considered the most effective treatment for fixation of mandibular fractures (Mugino *et al.*, 2005). In edentulous patients, most of the time, mandible atrophy and, consequently, loss of bone height makes it difficult to use a miniplate in the tension zone and a fracture compression zone. In these cases, the preferred osteosynthesis is the mandibular reconstruction plates of the 2.4 mm system (conventional or Locking) (Ellis III *et al.*, 2008)

The use of the 2.0 mm Locking system presents some advantages that are the reduction of the surgical time, easiness

of adaptation, when compared to the 2.4 mm plate, and good stability of the bone segments and less morbidity (Junior RC *et al.*, 2017). The possibility of using these with intraoral approach allows faster recovery of the patient.⁸ Despite being thicker, 2.0mm Locking plates can provide bone stability similar to that provided by a 2.4mm reconstruction plate (Junior RC *et al.*, 2017; Zhan *et al.*, 2014). The 2.0 locking screw/plate systems may be another alternative for the treatment of atrophic mandible fractures via an intraoral approach, allowing faster recovery.

The possibility of rehabilitation after atrophic mandible fractures with short implants without using reconstructive procedures with bone graft is an attractive option.¹ In some cases, it's necessary virtual planning for a correct position of implants away from the osteosynthesis screws at the symphysis area.⁹ The risk of mandibular fracture atrophic after dental implants is decreased because, before the implantation, a reconstruction plate was placed.¹⁰⁻¹² (Ribeiro-Júnior *et al.*, 2018; Klein *et al.*, 2019)

4. Conclusion

The 2.0 locking screw/plate systems may be another alternative for the treatment of atrophic mandible fractures via intraoral approach. This alternative treatment in fracture shows effective, less morbidity and provided here predictable, fast, aesthetic and functional rehabilitation of the patient.

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