

## LETTER TO THE EDITOR

**Management of an anterior mandibular fracture in a 13-year-old patient**P.M. Marra<sup>1</sup>, A. Itró<sup>1</sup>, R. Santoro<sup>2</sup> and A. Itró<sup>1</sup><sup>1</sup>*Complex Operative Unit of Stomatological Surgery in Developmental age, University of Campania Luigi Vanvitelli, Naples, Italy;* <sup>2</sup>*Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania Luigi Vanvitelli, Naples, Italy**Received April 19, 2020 – Accepted July 13, 2020*

To the Editor,

Paediatric mandible fractures are the most common paediatric facial injuries requiring hospitalization and are rarer than in adults. Proper and rapid treatment is required to restore the patient's oral function and aesthetics (1). In addition to road traffic accidents, both direct and indirect trauma can occur as a result of sports activities and falls (2). Furthermore, damage to the lower jaw may be caused by cystic lesions, neoplasms, and metabolic diseases (1-2). The mandible is one of the most frequently injured areas, accounting for 23-97% of all facial fractures. (3), with the mandible involved in 16-42% of cases (3). After analysing 700 maxillofacial injuries, Halazonetis (3) noticed that the most frequent fractures involved the lower and middle third of the facial skeleton, with single fractures frequently occurring in the angle region of the male dentulous jaw (38%) as a result of fights and sports. An association between condylar injuries and concomitant fractures of the mandibular body was addressed by Lindahl (4), demonstrating the impact of the occlusion. The prevalence of these injuries increases with age (1-2). Additionally, some regions of the mandible present with weakness, including the mental foramen, mandibular angle, and the condylar neck (3, 5). The aim of this case report is to show the management of an anterior mandibular fracture in a

13-year-old patient, also presenting with a unilateral right subcondylar fracture. The patient was treated with open reduction internal fixation with two titanium miniplates to fix and immobilize the bone segments, restore the occlusion, and stimulate bone healing in the labio-inferior position.

*Case presentation*

A 13-year-old Caucasian male presented to the Complex Operative Unit of Stomatological Surgery in Developmental Age in Naples complaining of pain in the lower right mandibular region two days following a fall from a bicycle. Intraorally, the patient presented with permanent dentition, and bone crepitation and pain without any bone exposure. There were no signs of dental trauma, enamel fractures, or teeth subluxation. The vitality test was positive.

Extraorally, the patient presented with monolateral submandibular oedema, as well as swelling and redness in the lower right mandibular region. No swelling or redness were present in the mandibular condyle region. Panoramic X-ray demonstrated a vertical fracture in the mandible as well as a right condylar fracture (Fig. 1A). Cone Beam Computed Tomography (CBCT) was performed to differentiate the fracture lines and for the final diagnosis (Fig. 1B). The 3D examination confirmed the diagnosis of a mandibular fracture in the anterior region between

*Key words: growing patient; mandibular fractures; two miniplates**Corresponding Author:*

Paola Martina Marra, DDS, MS, research fellow  
Complex Operative Unit of Stomatological surgery in Developmental age  
University of Campania Luigi Vanvitelli,  
Piazza Miraglia 2, 80138 - Naples, Italy  
Tel.: +39 3338626207 - Fax: +39 0818614680  
e-mail: pablati3@hotmail.it

0393-974X (2020)

Copyright © by BIOLIFE, s.a.s.

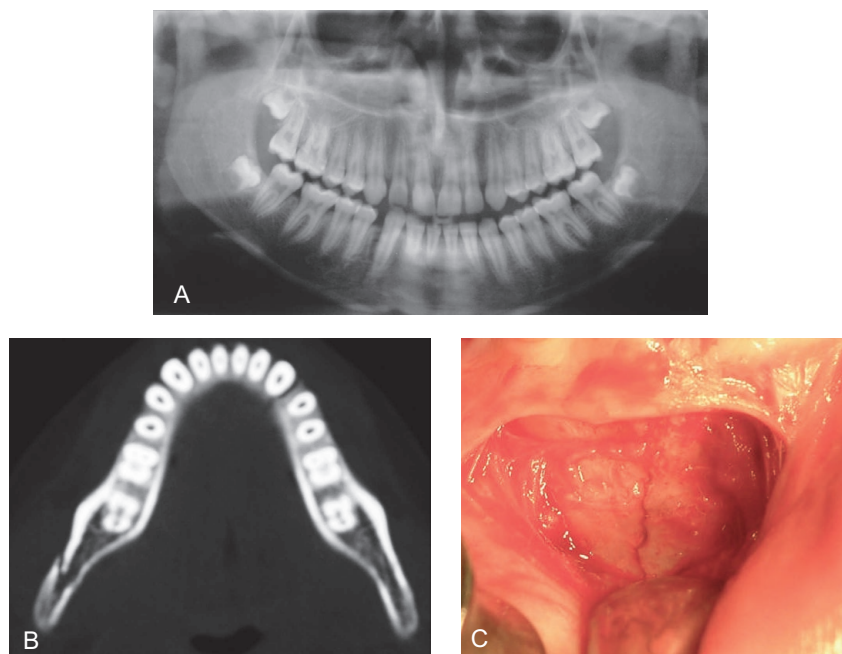
This publication and/or article is for individual use only and may not be further reproduced without written permission from the copyright holder.

Unauthorized reproduction may result in financial and other penalties  
**DISCLOSURE: ALL AUTHORS REPORT NO CONFLICTS OF INTEREST RELEVANT TO THIS ARTICLE.**

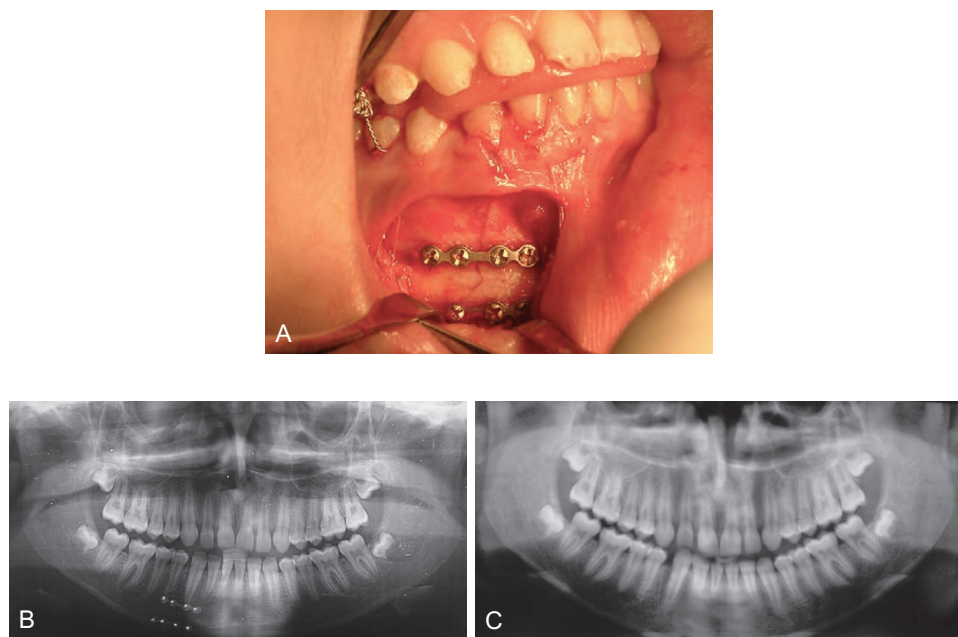
the lower right canine and the lower right first premolar, as well as a unilateral fracture in the right

subcondylar region.

Written consent for surgery was obtained from the



**Fig. 1.** *A) Initial panoramic X-ray highlighting the fracture line in the lower right mandible and the right subcondylar region; B) Initial CBCT showing the two fractures; C: Mandibular fracture exposure during open surgery.*



**Fig. 2.** *A) Titanium miniplates were used with 2 mm × 6 mm screws in the upper and lower borders; B) Panoramic X-ray 1 month postoperatively; C) Panoramic X-ray 3 months postoperatively after removal of the titanium miniplates.*

patient's parents. The treatment plan was based on an open reduction and internal fixation of the fracture segments, since it was necessary to immobilize the bone segments as well as to recover the contour of the mandibular fracture. As the patient was a teenager and the lower jaw is habitually well-developed at this age, the risk of facial asymmetry caused by plating was highly unlikely.

Before surgery, laboratory diagnostic tests, as well as cardiological and anesthetic examinations, were performed. The patient was administered antibiotic prophylaxis before and after surgery to reduce the risk of infection (6). Under general anaesthesia, an intraoral approach with vestibular incision was performed. The injured area (Fig. 1C) was exhibited, with segments of the mandibular body reduced and fixed with two miniplates (Fig. 2A) in the labio-inferior position. Titanium miniplates were used with 2 mm × 6 mm screws in the upper and lower borders. Closure was performed with 4-0 non-absorbable sutures, which were removed 10 days post-surgery. The procedure was performed by a single surgeon. Fracture healing was evaluated radiographically after 1 month (Fig. 2B). The plates were observed to be firmly stable, with progression of segment reduction. The patient did not complain of pain or discomfort. Considering the management of the current paediatric lateral condyle fracture with an acceptable occlusion, no other intervention measures were indicated.

Postoperative surgical complications, including infection, pain, paraesthesia, or implant failure, were not observed. Titanium plates were removed 3 months postoperatively under local anaesthesia through a vestibular incision. A renewed panoramic X-ray showed good wound healing and proper fracture reduction, with no signs of condylar ankylosis (Fig. 2C).

## DISCUSSION

Although paediatric mandible fractures are rare (1-2), they primarily affect the maxillofacial skeleton with the mandible usually compromised, since it moves anteriorly and inferiorly and is more susceptible to trauma (7). The paediatric skeleton is more resilient to traumatic forces, presenting a higher elasticity,

higher proportion of cancellous and cortical bone and a thicker overlying soft tissue (1, 2, 7). If recognized and treated immediately, recovery usually occurs after 2.5 to 8 weeks (7). If left untreated, they can cause severe functional and aesthetic consequences. Paediatric mandible fractures can be corrected using different techniques (1, 4), with conservative approaches based on observation and a soft diet or maxillomandibular fixation favoured in the literature (4). Another technique is open reduction internal fixation with miniplates (4), which is less commonly indicated in children due to the risk of long-term facial deformity. Other fixation options reported for the anterior mandible include transosseous wiring, miniplates, lag screws, and dynamic compression plates (1-5). Two miniplates are indicated for anterior mandibular fractures to obtain adequate stability and proper osteosynthesis, with positioning of the plates on the labial cortex (7). For this reason, rigid and proper surgical fixation is required to avoid several complications, such as malunion, non-union, delayed fracture healing, plate fracture, infection, and implant failure (8-12). This case report describes an uncommon and unusual method to treat a vertical mandibular fracture in a paediatric patient and demonstrates the stable outcome of the conservative approach in an isolated condylar fracture.

Further studies are required to compare surgical approaches on a larger patient cohort, also using 3D miniplates to ensure minimal stress of the fracture fragments.

## REFERENCES

1. Ferreira PC, Amarante JM, Silva PN, et al. Retrospective study of 1251 maxillofacial fractures in children and adolescents. *Plast Reconstr Surg* 2005; 115:1500-508.
2. Edwards TJ, David DJ, Simpson DA, Abbott AA. Patterns of mandibular fractures in Adelaide, South Australia. *Aust and N Z Surg* 1994; 64:307-11.
3. Halazonetis JA. The 'weak' regions of the mandible. *Br J Oral Surg* 1968; 6:37-48.
4. Lindahl L. Condylar fractures of the mandible. I. Classification and relation to age, occlusion, and concomitant injuries of teeth and teeth-supporting

- structures, and fractures of the mandibular body. *Int J Oral Surg* 1977; 6:12-21.
5. Pickrell BB, Hollier LH Jr. Evidence-Based Medicine: Mandible Fractures. *Plast Reconstr Surg* 2017; 140:192e-200e.
  6. Staderini E, Patini R, Guglielmi F, Camodeca A, Gallenzi P. How to Manage Impacted Third Molars: Gernectomy or Delayed Removal? A Systematic Literature Review. *Medicina (Kaunas)* 2019; 26:55(3).
  7. Kao R1, Rabbani CC1, Patel JM2, Parkhurst SM1, Mantravadi AV1, Ting JY1, Sim MW1, Koehler K1, Shipchandler TZ1. management of mandible fracture in 150 children across 7 years in a US tertiary care hospital. *JAMA Facial Plast Surg*. 2019; 21:414-18.
  8. McGoldrick DM, Parmar P, Williams R, Monaghan A, McMillan K. Management of pediatric condyle fractures. *J Craniofac Surg* 2019; 30:2045-47.
  9. Patini R, Staderini E, Camodeca A, Guglielmi F, Gallenzi P. Case reports in pediatric dentistry journals: a systematic review about their effect on impact factor and future investigations. *Dent J (Basel)*. 2019; 24:7(4).
  10. Pelo S, Saponaro G, Patini R, et al. Risks in surgery-first orthognathic approach: complications of segmental osteotomies of the jaws. A systematic review. *Eur Rev Med Pharmacol Sci* 2017; 21:4-12.
  11. Marra PM, Nucci L, Abdolreza J, Perillo L, Iтро A, Grassia V. Odontoma in a young and anxious patient associated with unerupted permanent mandibular cuspid: a case report. *J Int Oral Health* 2020; 12:182-6.
  12. Marra PM, Lupo G, Iтро A. Surgical management of compound Odontomas: piezoelectric surgery or rotary instruments? A clinical study. *Minerva Stomatol* 2020; 16.