

Bridging the Gap: A Hybrid Approach to Managing Multiple Edentulous Mandibular Fractures

Dr. Shivaraj S. Wagadargi¹; Dr. Navaneeth Y.²; Dr. Nishmitha K. M.³;
Dr. Shreya H. R.⁴; Dr. Jalashri Shamanewadi⁵

Department of Oral and Maxillofacial Surgery, Subbaiah Institute of Dental Sciences, Shivamogga, Karnataka

Publication Date: 2025/09/11

Abstract: The management of fractures in an atrophic edentulous mandible presents a significant surgical challenge due to compromised bone quality, reduced vascularity, and the absence of dental occlusion for guidance. Treatment must be carefully individualized to balance the need for stable fixation with the risks of invasive procedures in often geriatric patients. Here we present a case of 65-year-old male with multiple fractures of an edentulous mandible, including a parasymphysis fracture, unilateral coronoid fracture and bilateral intracapsular condylar fractures, following a road traffic accident. The patient was managed with a hybrid treatment approach, combining open reduction and internal fixation (ORIF) for the displaced parasymphysis fracture with closed reduction and stabilization of the condylar fractures and coronoid fracture using a custom-fabricated Gunning splint. This case report details the successful application of this combined modality, which provided adequate stability for bone healing while utilizing a conservative approach for the condylar segments.

Keywords: Edentulous Mandible Fracture, Gunning Splint, Open Reduction Internal Fixation, Condylar Fracture, Coronoid fracture Atrophic Mandible.

How to Cite: Dr. Shivaraj S. Wagadargi; Dr. Navaneeth Y.; Dr. Nishmitha K. M.; Dr. Shreya H. R.; Dr. Jalashri Shamanewadi (2025). Bridging the Gap: A Hybrid Approach to Managing Multiple Edentulous Mandibular Fractures. *International Journal of Innovative Science and Research Technology*, 10(9), 244-249. <https://doi.org/10.38124/ijisrt/25sep326>

I. INTRODUCTION

Fractures of the edentulous mandible are complex injuries that predominantly affect the geriatric population. Advancing age, progressive alveolar ridge resorption, and decreased vascularity impair the structural integrity of the mandible, predisposing it to fracture from even minor trauma¹⁻³. The treatment of these fractures is controversial, as surgeons must weigh the benefits of open reduction against the risks associated with extensive surgery in patients who may have compromised healing potential^{1,4}. The lack of teeth eliminates the most reliable guide for achieving proper anatomical reduction and maxillomandibular fixation (MMF)⁵. In such cases, Gunning splints have been used for over a century to provide occlusal guidance, stabilize fractured segments, and immobilize the jaws, serving as a cornerstone of conservative management^{6,7}.

II. CASE REPORT

A 65-year-old male presented to our department with a history of a road traffic accident that occurred after falling from a moving vehicle. The patient had no history of loss of consciousness, vomiting, seizures, or bleeding from the nose, but did report an episode of bleeding from the ear.

On clinical examination, facial asymmetry was noted with swelling on the right side of the face and periorbital edema around the right eye. Sutured laceration noted on the chin region measuring approximately 3cm. Extraoral palpation revealed tenderness over the right temporomandibular joint (TMJ) region, temporal and zygomatic regions, and the right infraorbital region. Step deformity elicited on the lower border of the left parasymphysis region. Intraorally, a sublingual hematoma was present, and the patient had restricted mouth opening. A computed tomography (CT) scan of the face and brain was performed, which confirmed the diagnosis of a right parasymphysis fracture along with bilateral condylar (intracapsular) fractures and a right coronoid fracture.

After obtaining the informed consent from the patient, surgery was performed under general anesthesia. Under nasoendotracheal intubation, the parasymphysis fracture was approached through an existing laceration on the chin. After proper stripping of the periosteum, the fracture was identified and reduced. Fixation was achieved by placing one 2mm, 6-holed miniplate with 8mm screws. Gunning splint was fabricated by the department of Prosthodontics for the closed reduction.

Following the open reduction, a prefabricated Gunning splint was used for closed reduction of the condylar fractures and to provide maxillomandibular stability. The upper Gunning splint was secured to the maxilla using peralveolar wiring passed around the alveolar ridge. The lower Gunning splint was stabilized and secured to the mandible with circummandibular wiring placed around the anterior region of the mandible on both sides. Intermaxillary fixation was

then achieved by securing the upper and lower splints together with wires. The extra oral incision was closed with 3-0 Vicryl and 3-0 Ethilon sutures. The patient was extubated successfully post operative phase was uneventful. Patient was advised to maintain adequate soft diet, oral hygiene and adequate nutritional intake. The patient was advised to follow up for review and further management.



Fig 1 Facial Asymmetry Noted



Fig 2 OPG Showing Multiple Mandibular Fractures



Fig 3 Exposure of the Parasymphysis Fracture through the Existing Laceration

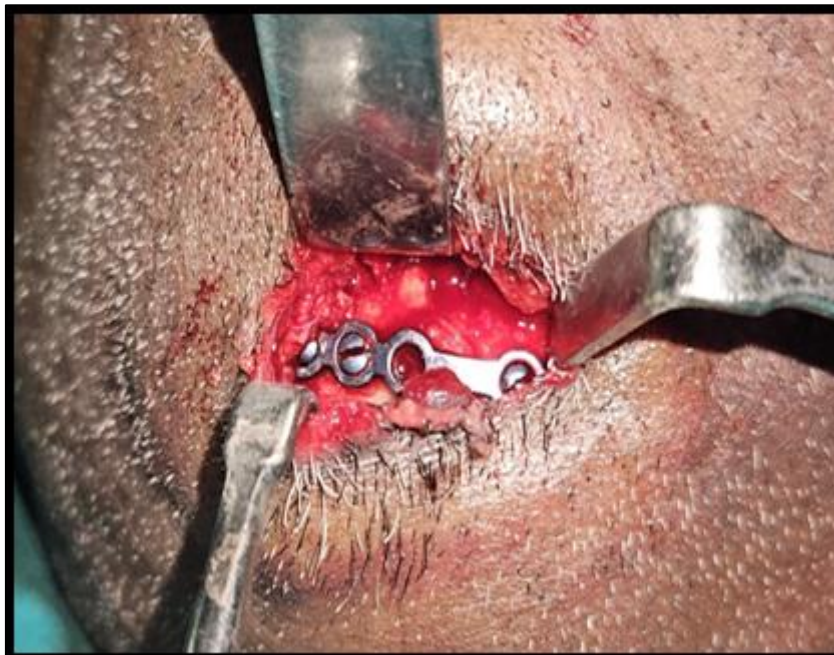


Fig 4 Fixation of the Mandibular Parasymphysis Fracture with Miniplate



Fig 5 6 Per-Alveolar Wiring of go Secure Upper Gunning Splint



Fig 5 6 Per-Alveolar Wiring of go Secure Upper Gunning Splint



Fig 7 Circum-Mandibular Wiring to Secure Lower Gunning Splint



Fig 8 Intermaxillary Fixation Done



Fig 9 Post Operative OPG

III. DISCUSSION

The treatment of edentulous mandibular fractures is one of the more difficult challenges in maxillofacial trauma. The atrophic nature of the bone leads to a reduced area of contact between fracture segments, and a diminished blood supply, which is primarily periosteal, can result in prolonged or complicated healing, particularly if stripped extensively during an open procedure^{3, 8}. Bruce and Strachen reported a 20% incidence of nonunion in such fractures, regardless of

the treatment method employed⁸. This high complication rate necessitates a carefully considered treatment plan.

The choice between open and closed reduction is a central point of debate. Open reduction with internal fixation (ORIF) offers rigid stability, which is often necessary for displaced body or symphysis fractures. However, it requires periosteal stripping, which can compromise the already tenuous blood supply in an atrophic mandible^{1, 4, 12}. Conversely, closed reduction techniques, such as the use of Gunning splints, preserve the periosteal blood supply and are

less invasive, making them suitable for medically compromised patients or minimally displaced fractures^{1, 5, 10}.

In this case, a hybrid approach was utilized. The displaced parasymphysis fracture was treated with ORIF to ensure precise anatomical reduction and stability. For the bilateral condylar fractures and unilateral coronoid fracture, a conservative approach using a Gunning splint was chosen. Gunning splints are invaluable in edentulous cases as they act as a substitute for dental occlusion, establishing the correct vertical dimension and providing a framework for MMF^{2, 6, 9}. The splint was secured using circummandibular and peralveolar wiring, traditional methods for anchoring such appliances when teeth are absent^{2, 7, 11}. This combined strategy addressed the specific needs of each fracture site, providing rigid fixation where necessary while minimizing surgical morbidity at the condyles.

The fabrication of a Gunning splint requires careful planning to establish the correct vertical dimension of occlusion, which can be difficult in the absence of the patient's dentures⁶. An anterior opening in the splint is crucial to allow for nutrition during the 4–6-week period of immobilization^{2, 7}. The use of a well-designed splint provides firm immobilization, which is essential for the satisfactory union of fractured segments in an atrophic mandible.

IV. CONCLUSION

The management of multiple, complex fractures in an atrophic edentulous mandible requires a versatile and individualized approach. This case demonstrates that a hybrid technique, combining open reduction and internal fixation for significantly displaced fractures with closed reduction using a Gunning splint for less accessible or delicate fractures like those of the condyles, can yield a successful outcome. This method effectively restores anatomical form and provides sufficient stability for healing while balancing the benefits of rigid fixation with the principles of conservative, minimally invasive management.

REFERENCES

- [1]. Madsen MJ, Haug RH, Christensen BS, Aldridge E. Management of atrophic mandible fractures. *Oral Maxillofac Surg Clin N Am*. 2009;21(2):175-83.
- [2]. Dharaskar S, Athavale S, Kakade D. Use of gunning splint for the treatment of edentulous mandibular fracture: A case report. *J Indian Prosthodont Soc*. 2014;14(4):415-8.
- [3]. Rathee M, Goel M, Hooda A, Kumar A, Kundu R. Conservative splint therapy for atrophic edentulous mandible fracture in a geriatric patient. *The Internet Journal of Geriatrics and Gerontology*. 2013;8(1).
- [4]. Krishnan S, Koli D, Nanda A, Verma M. Fracture management of an edentulous mandible in a geriatric osteoporotic patient. *Indian J Dent Res*. 2015;26(5):542-4.
- [5]. Sharma B, Sharma P, Goswami R, Jain S, Samra RK. Construction of a Gunning Splint; Case Report on the Handling of Mandibular Fractures in Edentulous Patients. *Indian J Dent Sci*. 2020;12(1):36-9.
- [6]. Goss AN, Brown RO. An improved Gunning splint. *J Prosthet Dent*. 1975;33(5):562-6.
- [7]. Siadat H, Arshad M, Shirani G, Alikhasi M. New method for fabrication of gunning splint in orthognathic surgery for edentulous patients. *J Dent (Tehran)*. 2012;9(3):262-6.
- [8]. Thaller SR. Fractures of the edentulous mandible: A retrospective review. *J Craniofac Surg*. 1993;4(2):91-4.
- [9]. Libersa P, Roze D, Dumousseau T. Spontaneous mandibular fracture in a partially edentulous patient: Case report. *J Can Dent Assoc* 2003;69:428-30.
- [10]. Sidramesh M, Chaturvedi P, Chaukar D, D'Cruz AK. Spontaneous bilateral fracture of the mandible: A case report and review of literature. *J Cancer Res Ther* 2010;6:324-6.
- [11]. Luhr HG, Reidick T, Merten HA. Results of treatment of fractures of the atrophic edentulous mandible by compression plating: A retrospective evaluation of 84 consecutive cases. *J Oral Maxillofac Surg* 1996;54:250-4.
- [12]. Knotts C, Workman M, Sawan K, El Amm C. A novel technique for attaining maxillomandibular fixation in the edentulous mandible fracture. *Cranio Maxillofac Trauma Reconstr* 2012;5:7-10.