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## Research Article

# USE OF PRE-EXISTING REMOVABLE PARTIAL DENTURES AS MODIFIED SPLINT FOR INTERMAXILLARY FIXATION IN CASE OF GUARDSMAN FRACTURE: A CASE REPORT

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### ABSTRACT

The mandible though being membranous during its embryonic stage, its physical structure resembles a bent long bone, and it is subject to biomechanical compression, bending, torsion and traction. This arch of cortico-cancellous bone projects downward and forward from the base of the skull and constitutes the strongest and most rigid component of the facial skeleton. However, it is more commonly fractured than the other bones of the face, and the teeth or lack thereof may be the most important factor in determining where fractures occur. The fractures of edentulous mandible represent a group of maxillofacial injuries that more commonly affect the geriatric patients due to its prominent and exposed position, loss of bone mass and decreased vascularity which in turn decreases its strength. Management of mandibular fracture with partially edentulous jaws especially Kennedy's Class I poses a great difficulty. Intermaxillary fixation (IMF) becomes a difficult task in cases with sparse or absent dentition and the complexity increases in geriatric patients. Decreased blood supply, atrophic ridges, reduced healing potential and lack of definitive occlusal surfaces to capitalize on for fracture reduction and IMF are most notable limitations in such cases. A case management of Guardsman fracture with partially edentulous maxillary and mandibular arches using pre-existing removable partial dentures as modified splint for intermaxillary fixation is being presented.

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## INTRODUCTION

The mandible though being membranous during its embryonic stage, its physical structure resembles a bent long bone, and it is subject to biomechanical compression, bending, torsion and traction. This arch of cortico-cancellous bone projects downward and forward from the base of the skull and constitutes the strongest and most rigid component of the facial skeleton. However, it is more commonly fractured than the other bones of the face, and the teeth or lack thereof may be the most important factor in determining where fractures occur.<sup>1</sup> The fractures of edentulous mandible represent a group of maxillofacial injuries that more commonly affect the geriatric patients due to its prominent and exposed position, loss of bone mass and decreased vascularity which in turn decreases its strength.<sup>2</sup> The most common mechanisms of injury to this bone include motor vehicle crashes, falls, fights, sports injuries and disimpaction of third molars.<sup>3</sup> Management of mandibular fracture with partially edentulous jaws especially Kennedy's Class I poses a great difficulty. Intermaxillary fixation (IMF) becomes a difficult task in cases with sparse or absent dentition and the complexity increases in geriatric patients. Decreased

blood supply, atrophic ridges, reduced healing potential and lack of definitive occlusal surfaces to capitalize on for fracture reduction and IMF are most notable limitations in such cases.<sup>4</sup> A treatment plan must be individualized depending on bone available, degree of comminution, availability of dentures, medical comorbidities and patient preference.<sup>5</sup> A case management of Guardsman fracture with partially edentulous maxillary and mandibular arches using pre-existing removable partial dentures as modified splint for intermaxillary fixation is being presented.

## CASE REPORT

A 70years old female presented with history of head injury due to Road Traffic Accident on 26/02/2018 followed by transient loss of consciousness. No H/o convulsions, vomiting, otorrhea or rhinorrhea present. GC Scale was registered at 15/15. On extraoral examination there was tenderness in both TM Joint region with 1½ finger mouth opening. Intraoral examination revealed partial edentulous arches with 11,12,13,14,15, 21,22,23,31,32,33,41,42,43 present (Kennedy's Class I) (Fig. 1). She was already wearing removable partial dentures in both the arches irt 16-17, 24-25-26-27, 34-35-36-37 and 44-45-46-

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47. Hematoma was present over left buccal mucosa. Radiographic examination revealed comminuted displaced fracture of both the condyles with symphyseal fracture (Guardsman fracture).



Figure 1

Patient was asked to try existing removable partial dentures which was found to be retentive and in proper centric occlusion at predetermined vertical dimension. In the procedure, access holes were drilled interdentally in pre-existing U/L RPD and eyelet wiring was done in 16-17, 25-26, 35-36 and 46-47(Fig. 2).



Figure 2

Retentive clasp was tightened and RPDs placed intraorally to check for fit and occlusion (Fig. 3).



Figure 3

Arch bar wiring was done in present teeth and elastics were placed for 48 hours. Inter Maxillary Fixation was done after that for 21 days (Fig. 4&5). After removing IMF, elastics were given and mouth opening exercises advocated with 2½ finger mouth opening post-operatively.



Figure 4

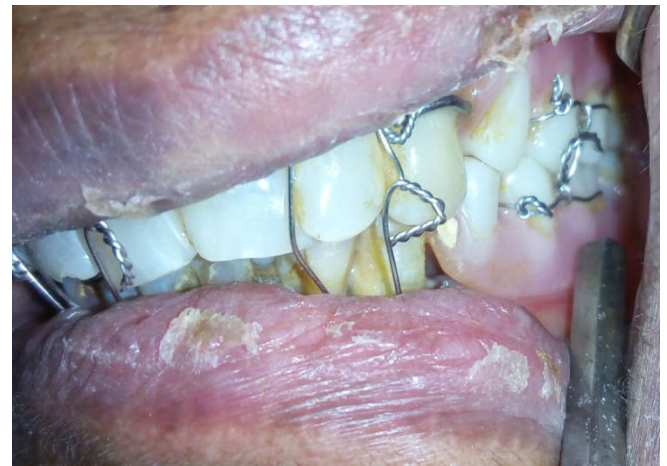


Figure 5

## DISCUSSION

Fracture of mandible is 1.5 times more common than fracture of maxilla. The weakened mandible in advanced age may get fractured even spontaneously. The basic principles of fracture treatment which are reduction of the fractured segments and immobilization, prevention of infection and rehabilitation defined centuries ago stand true even today. From time of Hippocrates, physicians described many different techniques for treating mandibular fracture, the principle of which was repositioning and immobilization of bony fragments.<sup>6</sup>

A guardsman fracture, also referred to as parade ground fracture, is one of the common forms of mandibular fracture which is caused by a fall on the midpoint of the chin resulting in fracture of the symphysis as well as both condyles. It is usually seen in epileptics, elderly patients and occasionally in soldiers (fall forwards due to syncope) and is known as guardsman fracture.<sup>7</sup>

Normal ageing process is associated with significant changes in the functional vascular supply of mandible.<sup>8</sup> The endosteal

supply from inferior alveolar artery begins to disappear and bone becomes increasingly dependent on periosteal network of vessels. Atrophic edentulous mandible has a reduced cross-sectional area as compared to dentate mandible. Due to decreased vascularity and dense sclerotic nature of bone, open reduction of mandible will lead to slow and complicated healing process of fracture site.<sup>9</sup> If mandible is atrophic, then the fractured fragments will be more easily displaced. Closed reduction with splints is advantageous because, not only it preserves the periosteal blood supply but also provides firm mandibular fixation and immobilization.<sup>1</sup> Compared to open reduction, condylar fracture is satisfactorily treated by closed reduction. Many researchers recommend closed reduction because of problems of surgical approach such as infection, injury to nerve and vessels and scar formation, TMJ pain and arthritis and ankylosis.<sup>10</sup> Closed reduction may be conducted considering various factors such as geriatric patients, difficulty in conduct of general anesthesia due to systemic condition, no other facial fracture and secured stability of occlusion according to Klotch and Lundy and Widmark *et al.*<sup>11</sup> Majority of surgeons seem to favor nonsurgical treatment of condylar fractures. This preference is largely the result of 3 main factors. First, nonsurgical treatment gives satisfactory results in majority of cases. Second, there are no large series of patients reported in the literature who have been followed after surgical treatment. Third, surgery of condylar fractures is difficult because of inherent anatomical hazards. Treatment of condylar fractures today seems to be based mostly on tradition and experience. If one pursues the literature on this topic, one will find 3 main treatment modalities for condylar fractures: 1. IMF followed by functional therapy, 2. Functional therapy without period of IMF, and 3. Open reduction. However, closed reduction is a misnomer, because reduction of fracture does not generally occur. So the term "closed treatment" or "non-surgical treatment" is preferred.<sup>12</sup>

The solution to overcome problems in a partially edentulous patient is to create an occlusal guidance by either existing dentures or by fabricating intraoral splints to guide in reduction of jaws in correct alignment. Bean introduced customized oral splints for fixation.<sup>13</sup> Thomas Brian Gunning opined that reduction and fixation should be achieved immediately, whenever possible, to permit function. He designed splints for reduction, fixation and immobilization of unilateral and bilateral fractures of edentulous maxilla and/or mandible.<sup>14</sup> However Gunning splints are contraindicated in unfavorably displaced fractures lying outside the denture bearing area, comminuted fractures and in severe posterior displacement of fractures of mandible.<sup>2</sup> Disadvantage associated with this technique include the need of fabrication of impressions and time lags associated with creating the splint. When available, pre-existing dentures are of great aid in IMF.<sup>15</sup>

GPT defines trauma as an injury or wound, whether physical or psychic.<sup>16</sup> Extensive trauma especially in the maxillofacial region involve both, however the latter component dominates once the physical aspect of the injury is taken care of. Goal of a prosthodontist is the perpetual preservation of what is present, achieving the realistic treatment goals and maintaining the outcome which should be acceptable to the patient and family. This technique allows for rapid creation of splints (<10minutes) that can be assembled in operating room and

precludes the need for the formation of impressions or splint assembly by a prosthodontist. The splints provide an indirect control on the bone fragments, transmitted through mucoperiosteum.<sup>2</sup> Final goal of the treatment lies in the achievement of occlusal stability, normal mouth opening, normal TMJ movement and prevention of TMJ derangement and joint pain.<sup>10</sup>

## CONCLUSION

As elderly population continues to increase, dentists are faced with management of more difficult injuries in this group of patients.<sup>17</sup> In almost all cases of the fracture mandible a satisfactory results can be obtained with Gunning splint. These splints can be customized according to the prevailing condition of the patient's mentioned above.<sup>18</sup> Instead of doing para-alveolar wiring in maxilla and circumferential wiring in mandible, the existing teeth and removable partial dentures were used for anchorage.

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