

## Original Research

### Assessment of fracture among patients with implant supported mandibular overdentures

Alok Dwivedi

Department of Prosthetic Dental Sciences, Faculty of Dentistry, Najran University, Najran, Saudi Arabia

#### ABSTRACT:

**Background:** Over the past two decades, implant-supported overdentures have emerged as a prevalent solution for edentulous individuals, consistently yielding favorable clinical outcomes. Hence; the present study was conducted for assessing fracture among patients with implant supporter mandibular overdentures. **Materials & methods:** A total of 100 patients were enrolled. Only those patients were enrolled which were scheduled to undergo implant supported mandibular overdenture. Fracture was characterized as a total disjunction of the components of the denture and is categorized as either a midline fracture, occurring over the implant area, or as a fracture located in other regions. The overdenture did not include any metal reinforcement. Incidence rate of fractures was evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** Among the 100 patients enrolled, majority belonged to the age group of more than 50 years with a mean age of 52.8 years. 75 percent of the patients were males while the remaining were females. Among these 100 patients, overdenture fracture occurred in 21 patients. Hence; incidence of overdenture fracture was 21 percent. Also, repeated fractures were seen in 10 percent of the patients. Duration of overdenture use was a significant risk factor associated with occurrence of fracture. **Conclusion:** Single-implant mandibular overdentures are particularly susceptible to fractures. Effective long-term treatment necessitates diligent post-insertion monitoring, along with the recognition and management of each patient's unique risk factors.

**Key words:** Implant, Mandibular, overdenture.

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**Corresponding author:** Alok Dwivedi, Department of Prosthetic Dental Sciences, Faculty of Dentistry, Najran University, Najran, Saudi Arabia

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#### INTRODUCTION

The management of edentulous patients through prosthetic means has historically posed significant challenges. Traditionally, complete dentures for both the maxilla and mandible have been the standard treatment approach. Nevertheless, many patients experience difficulties in adapting to their mandibular dentures, citing issues such as discomfort, inadequate retention, instability, and challenges with mastication.<sup>1,2</sup> Over the past two decades, implant-supported overdentures have emerged as a prevalent solution for edentulous individuals, consistently yielding favorable clinical outcomes. These overdentures present numerous practical benefits compared to conventional complete and removable partial dentures. Advantages include diminished bone resorption, minimized movement of the prosthesis, enhanced aesthetics, improved positioning of teeth,

superior occlusion, increased occlusal function, and the preservation of the occlusal vertical dimension.<sup>3,4</sup> Attachment-related issues, particularly the loss of retention attributed to wear at the retentive interface, alongside fractures of the prosthesis—primarily occurring at the attachment site—appear to represent the most frequently encountered complications. Although certain studies indicate that there are only slight variations in prosthodontic maintenance and peri-implant health across different attachment systems, other research posits that the choice of attachment type may significantly influence treatment outcomes.<sup>5,6</sup> Hence; the present study was conducted for assessing fracture among patients with implant supporter mandibular overdentures.

## MATERIALS & METHODS

The present study was conducted for assessing fractures among patients with implant supported mandibular overdentures. A total of 100 patients were enrolled. Only those patients were enrolled which were scheduled to undergo implant supported mandibular overdenture. Fracture was characterized as a total disjunction of the components of the denture and is categorized as either a midline fracture, occurring over the implant area, or as a fracture located in other regions. The overdenture did not include any metal reinforcement. Incidence rate of fractures was evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was done for evaluation of level of significance.

## RESULTS

Among the 100 patients enrolled, majority belonged to the age group of more than 50 years with a mean age of 52.8 years. 75 percent of the patients were males while the remaining were females. Among these 100 patients, overdenture fracture occurred in 21 patients. Hence; incidence of overdenture fracture was 21 percent. Also, repeated fractures were seen in 10 percent of the patients. Duration of overdenture use was a significant risk factor associated with occurrence of fracture.

**Table 1: Demographic data**

Variable	Number	Percentage
Age less than 50 years	33	33
Age more than 50 years	67	67
Males	75	75
Females	25	25
Rural residence	32	32
Urban residence	68	68

**Table 2: Incidence of fractures and repeat fractures**

Incidence	Number	Percentage
Fracture	21	21
Repeat fractures	10	10

**Table 3: Analysis of correlation of fracture and duration of overdenture use**

Variable	Value
r-value	1.996
p-value	0.001 (Significant)

## DISCUSSION

The rehabilitation of edentulous patients experiencing residual ridge resorption has seen significant advancements due to the emergence of implant dentistry. The adoption of implant-supported overdentures has proliferated as an effective treatment option for individuals who are completely edentulous. This approach enhances retention, stability, functionality, and aesthetics, while also contributing

to the preservation of residual bone, particularly in the mandible.<sup>7-9</sup> Numerous complaints associated with traditional dentures can be mitigated through the incorporation of dental implants to support these conventional prosthetics. Overdentures are defined as conventional dentures that are secured to either remaining natural teeth or dental implants. Research has consistently shown that implant-supported overdentures in the mandible represent a viable treatment strategy, particularly for patients who have experienced significant residual bone loss. The success rate of implants placed in the anterior mandible is notably high, accompanied by a minimal incidence of surgical complications. Furthermore, the use of implants is associated with a decreased rate of residual ridge resorption in the anterior region of the mandible. Ultimately, treatment decisions should be tailored to the specific needs of the patient, taking into account their individual circumstances and financial considerations.<sup>10-12</sup>

Among the 100 patients enrolled, majority belonged to the age group of more than 50 years with a mean age of 52.8 years. 75 percent of the patients were males while the remaining were females. Among these 100 patients, overdenture fracture occurred in 21 patients. Gonda T et al compared the fracture incidence of mandibular overdentures retained by 1 and 2 implants. Forty-two subjects received a single implant, and 43 received 2 implants. In total, there were 17 fractures recorded for 13 subjects. Nine single-implant subjects experienced 11 denture fractures, while 4 double-implant subjects experienced 6 fractures. There was no significant difference in the incidence of denture fractures in prostheses retained by 1 or 2 implants. When denture fractures did occur, they were found most frequently in areas adjacent to the implant(s). The incidence of denture base fractures was not significantly different between overdentures retained by 1 implant and those retained by 2 implants.<sup>13</sup> Kavčič J et al presented the case report about a fracture of the abutment screw and later of an implant fracture and implant removal of the same patient. They concluded that due to a growing number of patients receiving treatment with dental implants, the risk factors of dental implant fractures must be considered no matter which implant system is used and higher absolute numbers of fractures can be expected.<sup>14</sup>

In the present study, incidence of overdenture fracture was 21 percent. Also, repeated fractures were seen in 10 percent of the patients. Duration of overdenture use was a significant risk factor associated with occurrence of fracture. The fracture incidence of mandibular overdentures retained by 1 and 2 implants was compared in a previous study conducted by Tomoya Gonda et al. Forty-two subjects received a single implant, and 43 received 2 implants. In total, there were 17 fractures recorded for 13 subjects. Nine single-implant subjects experienced 11 denture fractures, while 4 double-implant subjects

experienced 6 fractures. There was no significant difference in the incidence of denture fractures in prostheses retained by 1 or 2 implants. When denture fractures did occur, they were found most frequently in areas adjacent to the implant(s). The incidence of denture base fractures was not significantly different between overdentures retained by 1 implant and those retained by 2 implants. When fractures did occur, they tended to be in areas adjacent to implants.<sup>15</sup> Ciftci et al evaluated prosthetic complications with 2-implant-retained mandibular overdentures with metal frameworks having either screw- or cement-retained cantilevered bars with distal attachments. Twenty-seven prostheses had a cement-retained bar, and 46 bars were screw-retained. Of 73 overdentures, 68 were metal-reinforced. The mean observation time was 5.9 years with a range between 2 and 12 years. The most common complication was wear of the Rhein 83 polymer attachment followed by bar screw loosening. The cumulative survival rate for overdentures was 91.9% at 6.8 years. The service life of cement-retained prostheses was significantly longer ( $P < .05$ ). Bar, resin base, and mid-line fractures were only seen with cement-retained prostheses. The number of times an attachment change was required did not differ between cement- and screw-retained bars. Of 191 implants, 3 were lost, and the cumulative survival rate was 93.5% at 7.5 years. No significant difference was found between retention types in terms of implant loss ( $P > .05$ ). Based on the participant population observed, the survival rates of 2-implant-retained mandibular overdentures and their implants in the medium term were high.<sup>16</sup>

## CONCLUSION

Single-implant mandibular overdentures are particularly susceptible to fractures. Effective long-term treatment necessitates diligent post-insertion monitoring, along with the recognition and management of each patient's unique risk factors.

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