

## Original Article

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## Assessment of Complications of Implant Supported Partial Dentures: A Retrospective Analysis.

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### Abstract

**Background:** For the treatment of partially edentulous spaces in the patient, the use of dental implants is an established treatment option. Higher incidences of enhanced success rates has been shown with improvements in implant-supported fixed restorations for partially edentulous arches.<sup>3,4</sup> Numerous investigations are being carried out to increase the longevity of prosthetic restorations on implants. Reporting the complication-free survival rate is one of the acceptable ways of describing the susceptibility to complications. Hence, we retrospectively analyzed the prosthetic complications of implant-supported fixed partial dentures. **Materials & Methods:** The present study included retrospective analysis of the patients who underwent treatment of partially edentulous spaces by implants supported fixed partial dentures (FPD). Patients between the age group of 18 to 45 years were included for the study. Recording of the patient-specific and implant-specific variables were done. Follow-up examinations were scheduled 1 week after superstructure placement, 6 months later, and annually thereafter. All the results were analyzed by SPSS software. Chi-square test and Kaplan-Meier estimates were used for assessing the level of significance. P-value of less than 0.05 was considered to be significant. **Results:** 60 single crown structures were included in the present study while splinted crown and three units FPD included 9 and 17 patient selectively. More implants were placed in the molar region in comparison to premolar region. 60 and 55 implants were placed in the molar region and premolar region respectively. In maxilla and mandible single-single implant supported fixed denture were reported with fractures. While single implant supported fixed dentures were replaced in single crown type, splinted crown type and three unit type FPD. Non-significant results were obtained while comparing the various parameters of the implant supported partial dentures. **Conclusion:** Low rate of technical complications occurred in prognosis of implant supported fixed partial dentures.

**KEY WORDS:** Complication, Implant, Survival

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## INTRODUCTION

For the treatment of partially edentulous spaces in the patient, the use of dental implants is an established treatment option.<sup>1, 2</sup> Higher incidences of enhanced success rates has been shown with improvements in implant-supported fixed restorations for partially edentulous arches.<sup>3,4</sup> Numerous investigations are being carried out to increase the longevity of prosthetic restorations on implants.<sup>2-7</sup> In earlier investigations, only implant

losses and thus the losses of crowns were rated as failures.<sup>3, 4</sup> Clinical research activities in implant dentistry have mainly focused on implant survival, and the incidence of biologic and technical complications has been addressed only to a minor extent. Some of the technical complications are usually ignored such as screw loosening, framework fractures, and veneer fractures. Reporting the complication-free survival rate is one of the acceptable ways of describing the

susceptibility to complications.<sup>2</sup> Hence, we retrospectively analyzed the prosthetic complications of implant-supported fixed partial dentures.

## MATERIALS & METHODS

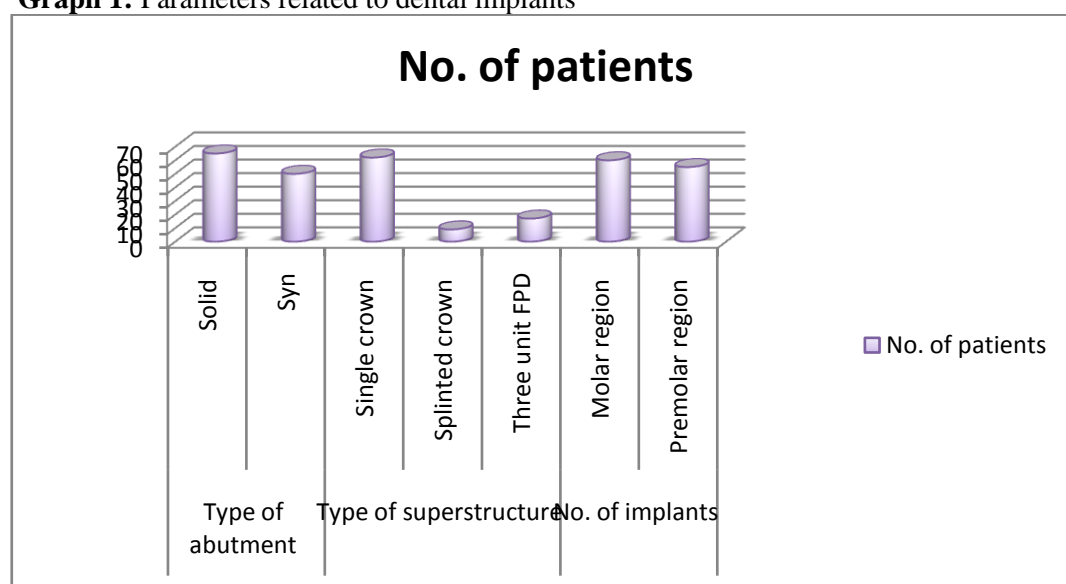
The present study included retrospective analysis of the patients who underwent treatment of partially edentulous spaces by implants supported fixed partial dentures (FPD) in the department of prosthodontics of the dental institution. Complete research protocol was explained in written to the institutional ethical committee and ethical clearance was taken. Patients between the age group of 18 to 45 years were included for the study. Patients with any systemic illness, any known drug allergy or who underwent any other surgical procedure in the oral cavity was excluded from the present study. Recording of the patient-specific and implant-specific variables were done. The type of restoration (single crown, splinted crowns on two adjacent implants, or three-unit FPD); number of supporting implants; type of abutment; location in the dental arch; opposing dentition (natural tooth, metal-ceramic restorations on teeth, metal-ceramic restorations on implants, or acrylic resin prosthetic teeth); type of occlusion (anterior disclusion or group function); presence or absence of bruxism; sex; and age were recorded for each patient. To participate, patients needed to have an opposing occlusion (natural teeth, FPD, or removable dentures). The definitive metal-ceramic

restorations were cemented using a glass-ionomer luting agent. None of the implants were connected to natural teeth. All of the implant-supported FPDs had rigid connectors. Follow-up examinations were scheduled 1 week after superstructure placement, 6 months later, and annually thereafter. All the results were analyzed by SPSS software. Chi-square test and Kaplan-Meier estimates were used for assessing the level of significance. P-value of less than 0.05 was considered to be significant.

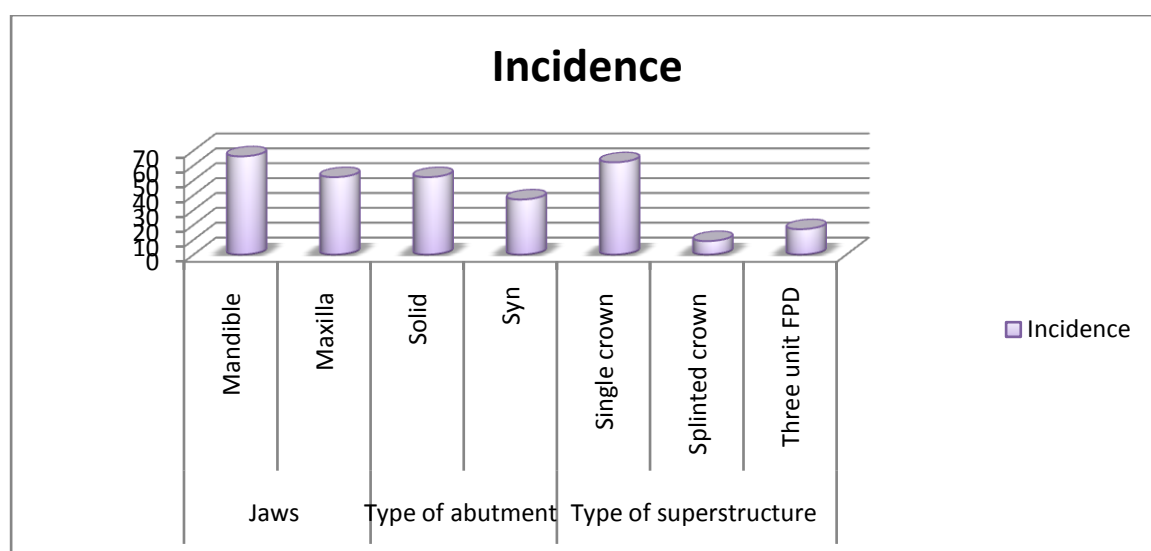
## RESULTS

**Graph 1** highlights the various parameters related to the dental implants. 60 single crown structures were included in the present study while splinted crown and three units FPD included 9 and 17 patient selectively. More implants were placed in the molar region in comparison to premolar region. 60 and 55 implants were placed in the molar region and premolar region respectively. **Graph 2** shows the incidence of dental implants. **Table 1** highlights the complications recorded in relation to various parameters. In maxilla and mandible single-single implant supported fixed denture were reported with fractures. While single implant supported fixed dentures were replaced in single crown type, splinted crown type and three unit type FPD. **Table 3** shows the results of comparative analysis of jaw type, restoration type and abutment type. Non-significant results were obtained while comparing the various parameters of the implant supported partial dentures.

**Graph 1:** Parameters related to dental implants



**Graph 2:** Incidence of dental implants



**Table 1:** Complications recorded in relation to various parameters.

Parameter		Fractured repaired	Restoration replaced
<b>Jaws</b>	Mandible	1	0
	Maxilla	1	2
<b>Type of abutment</b>	Solid	1	1
	Syn	1	1
<b>Type of superstructure</b>	Single crown	1	1
	Splinted crown	1	1
	Three unit FPD	1	1

**Table 2:** P-value for various implant parameters

Parameter	p-value
<b>Arch</b>	0.854
<b>Type of restoration</b>	0.125
<b>Type of abutment</b>	0.426
<b>Arch and type of restoration</b>	0.321
<b>Arch and type of abutment</b>	0.921
<b>Type of abutment and type of restoration</b>	0.445
<b>All the parameters</b>	0.882

Multivariate analysis

## DISCUSSION

A successful and predictable therapy of implant-supported FPDs and tooth-implant connected prostheses is shown by various studies in the past.<sup>8</sup> The most common complications that occur during treatments involving implants are mechanical. The combination of implant-bone anchoring, the attachment of prosthetic components with screws, and the dynamics involved result in a complex load with frequent loosening and fracture of the components of the implant supported prostheses. Design characteristics of the prostheses and implants, the materials employed and biomechanical issues all exert an important influence on the outcome of these prostheses.<sup>9</sup> Screw fracture, screw loss, loss of resin covering the screw, fracture of the metallic, resin or porcelain structure and loss of over-denture retention are the main technical complications occurring with implant-supported prostheses, which can lead to failure or the need for repairs.<sup>10-12</sup>

Hence, we retrospectively analyzed the prosthetic complications of implant-supported fixed partial dentures. We observed a lower frequency of technical complications in association with tooth supported implant fixed partial dentures. A survival rate of over 95 % was observed in the present study which is in correlation with the results of Naert et al and Pjetursson et al.<sup>13, 14</sup> The differences in ceramic failure rates might be the possible cause of possible somatic cause of difference between restorations involving natural dentition versus those supported by implants.<sup>15</sup> For resisting significant deformation under occlusal loads, Porcelain should be rigid enough so that fractures can be avoided which occur due to

insufficient support from the underlying framework. Veneer failure can also be caused by technical errors, such as incompatibility between an alloy and ceramic, poor alloy surface preparation, surface contamination, and improper ceramic build-up or firing techniques. In this study there were seven porcelain fractures among the 177 implant-supported restorations examined, which is consistent with other reports.<sup>15, 16</sup> Kreissl et al evaluated the incidence of the most common technical problems, namely screw loosening, screw fracture, fracturing of veneering porcelain and framework fracture in implant-supported fixed partial dentures (FPDs), and assessed the survival and success rate (event-free survival) after 5 years of function. They analyzed 76 partially edentulous patients and concluded that low technical complications rates occur in fixed partial dentures supported by 3i-implants. Also managing these complications can cause extra amount of chair-side time and patient dissatisfaction.<sup>17</sup> Wennström et al evaluated the outcome of restorative therapy in periodontitis-susceptible patients who, following basic periodontal therapy, had been restored with implants with either a machined- or a rough-surface topography. They analyzed 51 patients and concluded that bone loss during the first year of function as well as annually thereafter was small and did not vary between implants with machined- or rough-surface designs.<sup>18</sup> Zurdo et al analyzed the potential effect of incorporation of cantilever extensions on the survival rate of implant-supported FPD prostheses and the incidence of technical and biological complications, as reported in longitudinal studies with at least 5 years of follow-up. From the results, they concluded that higher incidence of minor technical complications might be associated with the incorporation of cantilevers into implant-borne prostheses.<sup>19</sup> Nickenig et al reviewed the incidence of biological and technical complications in case of tooth-implant-supported FPD treatments on the basis of survival data regarding clinical cases. From the results, they concluded that different bridge configurations affect the technical complications of implant-supported FPDs.<sup>20</sup> Brägger et al compared the frequency of biological and technical complications with FPDs on implants, teeth and as mixed tooth-implant supported FPDs over 4 to 5 years of function. From the result, they concluded that no significant association occurs between impaired general health statuses with more biological failures.<sup>21</sup>

## CONCLUSION

From the above results, it can be concluded that low rate of technical complications occurred in prognosis of implant supported fixed partial dentures in our study. Further studies are recommended.

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