

Evaluation of prosthetic complications associated with dental implants

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Abstract

Background: Missing teeth can either be replaced by fixed or by removable implant-supported prostheses. This study was done to evaluate prosthetic complications which were associated with dental implants.

Materials & methods: A total of 40 subjects were enrolled. A detailed history was recorded. Consent was taken. Data was collected and results were analysed using SPSS software.

Results: The prosthetic complications were abutment fractured in 1, loose abutment in 2, fracture of veneering porcelain in 3, prosthesis framework fracture in 1 and screw fracture in 1 subject.

Conclusion: Prosthetic complications were abutment fractured, loose abutment, fracture of veneering porcelain, prosthesis framework fracture and screw fracture.

Keywords: Dental implants, Screw fracture, Abutment.

Introduction

Understanding the pattern of tooth loss in a population helps in determining the quality of dental health care being provided, which varies geographically and culturally between countries. Studies have demonstrated that dental caries and periodontal diseases are frequent reasons for tooth extraction.^{1,2}

In Pakistan, advanced dental caries (63.1%) followed by periodontitis (26.2%) are two major reasons for tooth loss.³ One of the main challenges faced by dentists has been replacing missing teeth to the satisfaction of their patients. Implant therapy is a basic and durable option for replacing missing teeth.^{4,5}

In addition to aesthetic and phonetic improvements, prostheses are required for chewing ability; otherwise, nutrient intake is severely restricted and can result in many health complications. Implant-supported

dentures improve the biomechanical integration of the dentures by providing them with a better retention and also increase the biting force by partially relieving the gingivo-mucosal support of occlusal loads.⁶ The maximum occlusal force of patients with dentures can be improved 300% with an implant-supported prosthesis.⁴

In various clinical trials, the long-term prognosis and predictability of implant-supported prostheses is well documented.⁷ However, researchers do not yet fully understand the etiology of implant complications. During the past 2 decades, one of the major interests in implant research has been the success and/or failure of implants from a biological point of view. More recently, implant research has focused on factors affecting prosthetic outcomes and patient satisfaction with treatment.^{5,8,9} Hence, this study was conducted to evaluate prosthetic complications which were associated with dental implants.

Materials & methods

A total of 40 subjects were enrolled. A detailed history was recorded. Consent was taken. Complications arising from prosthetic portion of dental implants were recorded. Data was collected and results were analysed using SPSS software. P value less than 0.05 was considered significant.

Results

A total of 40 patients were enrolled. Males were 22 and females were 18. Males comprised of 30 and females 25 dental implants. The prosthetic complications were abutment fractured in 1, loose abutment in 2, fracture of veneering porcelain in 3, prosthesis framework fracture in 1 and screw fracture in 1 subject. A p-value was 0.01 which was significant ($P < 0.05$).

Table 1: Distribution of patients

| Gender | Number | Dental implant |
|--------|--------|----------------|
| Male | 22 | 30 |
| Female | 18 | 25 |

Table 2: prosthetic complications

| Complications | Number | P – value |
|---------------------------------|--------|-----------|
| Loose abutment | 2 | 0.01 |
| Fractured abutment | 1 | |
| Screw fracture | 1 | |
| Prosthesis framework fracture | 1 | |
| Fracture of veneering porcelain | 3 | |

Discussion

Implant applications in recent years have become quite widespread in dentistry and there are many reasons for complications and failures that may arise. It is not possible to calculate the overall incidence of complications for implant prostheses. However, recent studies indicate that there are many clinical complications associated with implant prostheses. Studies that present prosthodontic success criteria in implant dentistry are limited, representing approximately 27% of all publications on implant success.^{5,10} In the literature, complications of implant prostheses were identified in 6 categories: surgical complications, bone loss, implant loss, mechanical complications, peri-implant soft tissue complications, and esthetic/phonetic complications.¹¹ Hence, this study was conducted to evaluate prosthetic complications which were associated with dental implants.

In the present study, a total of 40 patients were enrolled. Males were 22 and females were 18. Males comprised of 30 and females 25 dental implants. A study by Janapala SR et al, out of 86 patients, males were 46 and females were 40. Males comprised of 58 and females 42 dental implants. Prosthetic complications were abutment fractured in 2, loose abutment in 4, fracture of veneering porcelain in 5, prosthesis framework fracture in 1 and screw fracture in 3 patients. The difference was significant ($P < 0.05$).¹²

In the present study, the prosthetic complications were abutment fractured in 1, loose abutment in 2, fracture of veneering porcelain in 3, prosthesis framework fracture in 1 and screw fracture in 1 subjects. A p-value was 0.01 which was significant ($P < 0.05$). Another study by Ulku SZ et al, in total, 159 implants (98.14%) survived, 3 implants (1.86%) failed, and 100% of the prostheses were successful. There were 62 dental implants used as abutments for removable dentures and 97 for fixed dentures. The most frequent prosthetic complications after placement of an implant-supported prosthesis were loss of retention, mucositis, abutment screw loosening, and fracture. Patient satisfaction after prosthesis use was also evaluated, showing that satisfaction was systematically increased. To minimize the frequency of complications, protocols must be established from diagnosis to the completion of treatment and follow-up of implant-supported prostheses, especially in terms of adequate technical steps and careful radiographic evaluation of the components.¹³ While abutment screw fracture is a rare complication, screw

loosening was and still remains the most frequent technical problem with single implant-retained crowns, with a cumulative 5-year complication rate of 8.8%.¹⁴ Numerous developments of new screw designs and materials have led to a reduction of this problem over time of almost 50%. The 5-year rate for screw loosening ranged from 3.9% to 26.2% in the literature published prior to 2000, and was 3.1%-10.8% in studies published after 2000.¹⁰ The stability of the screw joint can be influenced by the prosthetic implant axis. It has been shown that more screw loosening occurred with angulation-correcting implants than with straight implants.¹⁵ Hence, the appropriate three-dimensional position of the implant is a crucial parameter with screw-retained implant prostheses to decrease the risk of complications. Furthermore, the number of retaining screws should be limited to one, as double screw systems exhibited a higher risk of screw loosening.¹⁶ In addition, manufacturer-recommended torque values should be adhered to.¹⁷ Finally, implants with internal implant-abutment connections are preferred to external connection systems, to reduce the risk of screw loosening.¹⁸ Chipping of the veneering ceramic is the third most frequent complication with fixed implant prostheses. The rates reported range from 3.2% to 25.5%,¹⁰ with an overall 5-year complication rate of 3.5%.¹⁴ Veneering ceramics are silica-based ceramics with excellent esthetic properties; however, they have very low fracture strength values.¹⁹ They are applied to different metallic or ceramic framework materials, establishing a bond between the veneering ceramic and the framework material important for clinical performance.¹⁹ Several factors influence the risk of chipping of the veneering ceramic.

Conclusion

Prosthetic complications were abutment fractured, loose abutment, fracture of veneering porcelain, prosthesis framework fracture and screw fracture.

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