



Complications of Dental Implants in Patients Undergoing Prosthetic Surgeries and Complications of Mini-Screws in Patients Undergoing Orthodontic Treatment

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KEYWORDS

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ABSTRACT:

Background: This study was conducted to assess the complications of dental implants in patients undergoing prosthetic surgeries and complications of mini-screws in patients undergoing orthodontic treatment.

Material and methods: This study comprised of 100 subjects who belonged to the age group of 20-40 years. The mean age of the subjects was 27.9 years. The procedure was explained to the subjects and they were asked to give consent. The subjects who were willing to participate in the study and give consent had been included in the study. 50 subjects underwent prosthetic surgeries using dental implants and 50 subjects underwent orthodontic treatment in which mini-screws were used. The complications of dental implants and mini-screws were assessed in this study. Statistical analysis was conducted using SPSS software.

Results: In this study, 16 subjects belonged to the age group of 20-25 years, 53 subjects belonged to the age group of 26-30 years, 24 subjects belonged to the age group of 31-35 years and 7 subjects belonged to the age group of 36-40 years. There were 50 subjects in group 1 and 50 subjects in group 2. Implant fracture was the most common complication of dental implant seen in 5 cases, followed by infection in 3 cases, peri-implantitis in 2 cases and nerve damage in only 1 case. Implant bending was seen in 6 cases, loosening of mini-screws was seen in 2 cases, root damage and mini-screw drift was seen in 1 patient, each.

Conclusion: Among patients undergoing dental implant surgery, the most common complication was implant-fracture while among those undergoing orthodontic treatment, the most common complication of mini-screws was implant bending.



INTRODUCTION

Tooth loss is very common and it can happen as a result of disease and trauma; therefore, the use of dental implants to provide support for replacement of missing teeth has a long and multifaceted history.¹⁻³

Statistics provided by the American Association of Oral and Maxillofacial Surgeons show that 69% of adults ages 35 to 44 have lost at least one permanent tooth to an accident, gum disease, a failed root canal or tooth decay. Furthermore, by age 74, 26% of adults have lost all of their permanent teeth.⁴ Therefore, the use of dental implants reveals that about 100,000-300,000 dental implants are placed per year, which approximates the numbers of artificial hip and knee joints placed per year.⁵

Research on dental implant designs, materials and techniques has increased in the past few years and is expected to expand in the future⁶ due to the recent growth of the global market for dental implants and the rising in the demand for cosmetic dentistry.

Orthodontic anchorage is a prerequisite for the success of orthodontic treatment. Various types of anchorages are available, composing onplants, palatal plates, miniplates, and miniscrews.⁶ Among them, miniscrews have been used more widely for orthodontic anchorage reinforcement due to good stationary quality, various insertion sites, simple placement or removal procedures, light tissue invasion, immediate or early loading allowance, minimal patient compliance, and low cost.^{7,8}

Miniscrews have been proved to provide reliable anchorage and placed in numerous clinical applications such as deep bite correction, space closer, midline correction, extrusion, intrusion, distalization, mesialization, and en-masse retraction with high success rate; in addition, the uses of miniscrew have widened the scope of nonsurgical orthodontic therapy.⁹ Moreover, it was shown that miniscrews could facilitate more favorable outcomes compared with conventional methods.¹⁰ Nonetheless, complications could occur not only during and after insertion but also under loading, during, and after removal. It is necessary for clinicians to comprehensively understand its complications and related factors to minimize the failure rate.

This study was conducted to assess the complications of dental implants in patients undergoing prosthetic surgeries and complications of mini-screws in patients undergoing orthodontic treatment.

MATERIAL AND METHODS

This study comprised of 100 subjects who belonged to the age group of 20-40 years. The mean age of the subjects was 27.9 years. The procedure was explained to the subjects and they were asked to give consent. The subjects who were willing to participate in the study and give consent had been included in the study. 50 subjects underwent prosthetic surgeries using dental implants and 50 subjects underwent orthodontic treatment in which mini-screws were used. The complications of dental implants and mini-screws were assessed in this study. Statistical analysis was conducted using SPSS software.

RESULTS

Table 1: Age-wise distribution of subjects

Age group	Number of subjects	Percentage
20-25 years	16	16
26-30 years	53	53
31-35 years	24	24
36-40 years	07	07
Total	100	100

16 subjects belonged to the age group of 20-25 years, 53 subjects belonged to the age group of 26-30 years, 24 subjects belonged to the age group of 31-35 years and 7 subjects belonged to the age group of 36-40 years.

Table 2: Group-wise distribution of subjects

Groups	Number of subjects	Percentage
Group 1 (Dental implants)	50	50
Group 2 (Mini-screws)	50	50
Total	100	100

There were 50 subjects in group 1 and 50 subjects in group 2.

Table 3: Complications of dental implants

Complications	Number of cases
Implant fracture	05
Infection	03
Peri-implantitis	02
Nerve damage	01
Total	11



Implant fracture was the most common complication of dental implant seen in 5 cases, followed by infection in 3 cases, peri-implantitis in 2 cases and nerve damage in only 1 case.

Table 4: Complications of mini-screws

Complications	Number of cases
Implant bending	06
Loosening of mini-screws	02
Root damage	01
Mini-screw drift	01
Total	10

Implant bending was seen in 6 cases, loosening of mini-screws was seen in 2 cases, root damage and mini-screw drift was seen in 1 patient, each.

DISCUSSION

Despite the high survival rate in many studies, implant-supported prostheses are not free from complications and morbidity, and their longevity is limited not only by biologic complications but also by prosthetic maintenance requirements and the restoration issues.¹¹⁻¹⁴ Implant complications and failures lengthen and complicate the treatment process, as well as jeopardize the clinician's efforts to accomplish satisfactory function and esthetics. For the patient, this usually involves further cost and additional procedures. Orthodontic anchorage is used to resist the force applied to teeth. Thus, successful orthodontic treatments rely on the adequate control of anchorage. Anchorage can be divided into strong, moderate, and weak anchorage. Traditionally, strong and moderate anchorage requires a headgear, a Nance bow, or a transverse palatal bar (TPA); however, recently implant anchorage have been increasingly used because of their small size, simple operation, high efficacy, and low cost.¹⁵

Successful orthodontic treatments rely on the control of orthodontic anchorage; however, in many cases, traditional orthodontic anchorage cannot achieve satisfactory results. For example, headgear is dependent on patient appliance, the Nance bow is large and oppresses the mucosa, and TPA lacks sufficient strength.¹⁶

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surgeries and complications of mini-screws in patients undergoing orthodontic treatment.

In this study, 16 subjects belonged to the age group of 20-25 years, 53 subjects belonged to the age group of 26-30 years, 24 subjects belonged to the age group of 31-35 years and 7 subjects belonged to the age group of 36-40 years. There were 50 subjects in group 1 and 50 subjects in group 2. Implant fracture was the most common complication of dental implant seen in 5 cases, followed by infection in 3 cases, peri-implantitis in 2 cases and nerve damage in only 1 case. Implant bending was seen in 6 cases, loosening of mini-screws was seen in 2 cases, root damage and mini-screw drift was seen in 1 patient, each.

Giudice AL et al (2021).¹⁷The aim of this systematic review was to evaluate the complications and side effects associated with the clinical use of orthodontic miniscrews by systematically reviewing the best available evidence. A survey of articles published up to March 2020 investigating the complications associated with miniscrew insertion, in both the maxilla and mandible, was performed using 7 electronic databases. Clinical studies, case reports, and case series reporting complications associated with the use of orthodontic miniscrew implants were included. Two authors independently performed study selection, data extraction, and risk-of-bias assessment. The database survey yielded 24 articles. The risk-of-bias assessment revealed low methodological quality for the included studies. The most frequent adverse event reported was root injury with an associated periradicular lesion, vitality loss, pink discoloration of the tooth, and transitory loss of pulp sensitivity. Chronic inflammation of the soft tissue surrounding the miniscrew with mucosal overgrowth was also reported. The other adverse events reported were lesion of the buccal mucosa at the insertion site, soft-tissue necrosis, and perforation of the floor of the nasal cavity and maxillary sinus. Adverse events were also reported after miniscrew removal and included secondary bleeding, miniscrew fracture, scars, and exostosis. These findings highlight the need for clinicians to preliminarily assess generic and specific insertion site complications and side effects.

Atieh MA et al (2022).¹⁸A retrospective analysis of patients aged ≥ 18 years and having dental implants placed at Dubai Health Authority in 2010. Relevant information related to systemic-, patient-, implant-, site-



, surgical- and prosthesis-related factors were collected. The strength of association between the prevalence of peri-implant mucositis and peri-implantitis and each variable was measured by chi-square analysis. A binary logistic regression analysis was performed to identify possible risk factors. A total of 162 patients with 301 implant-supported restorations were included in the study. The age of the patients ranged between 19 and 72 with a mean age of 46.4 ± 11.7 years. The prevalence of peri-implant mucositis at the patient and implant levels were 44.4% and 38.2%, respectively. For peri-implantitis, the prevalence at the patient level was 5.6%, while the prevalence at the implant level was 4.0%. The binary logistic regression identified three risk factors (smoking habits, histories of treated periodontitis and lack of peri-implant maintenance) for peri-implantitis. Within the limitations of this study, smoking habits, history of treated periodontitis and lack of peri-implant maintenance were significant risk factors for peri-implantitis. Early detection of these factors would ensure appropriate planning and care of patients at high risk of developing peri-implant diseases.

CONCLUSION

Among patients undergoing dental implant surgery, the most common complication was implant-fracture while among those undergoing orthodontic treatment, the most common complication of mini-screws was implant bending.

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