ORIGINAL ARTICLE

Distribution and pattern of implant therapy in a part of the Turkish population

Müge Cina Aksoy,[1] Gülperi Kocer,[2] Hakki Cenker Kücükesmen,[3] Erdal Eroglu,[4] Mehmet Fatih Sentürk[5]

Abstract

Objective: To report the distribution and pattern of implant replacement of missing tooth/teeth.

Methods: This retrospective study was conducted at the Suleyman Demirel University, Isparta, Turkey, and used data of patients who had undergone implant replacement of missing teeth/tooth from May 2008 to May 2013. Data analysis included age, gender, number of implants placed, implant location distribution, additional surgery protocol, type of dentures and failure rate. SPSS 12 was used for data analysis.

Results: A total of 843 dental implants were performed on 280 patients, 143(51.1%) of whom were men and 137(48.9%) women. Besides, 89(31.8%) of all the participants were aged between 40-49 years. Moreover, 218(77.9%) patients received fixed dentures and 62(22.1%) received overdentures. The posterior region of mandible was the location in 281(33.3%) implants. Bone augmentation was performed in 152(54.3%) patients. Hard tissue grafting with sentetic bone grafts was used in 125(63.8%) patients. Failure was observed in 23(2.7%) implants.

Conclusion: The relationships between denture type and age, and denture type and additional surgery were statistically significant.

Keywords: Turkish, Dental, Implant, Dentures, Surgery. (JPMA 66: 1277; 2016)

Introduction

Because of increasing awareness of health in Turkey, oral implant therapy has become widespread and is now regarded as a predictable treatment modality. Implant dentures have become a useful and common treatment for the restoration of missing teeth.[1] There are several methods for rehabilitation of a missing tooth or teeth including removable dentures, fixed partial dentures, or dental implants. Each treatment option has its own advantages and disadvantages.[2] Treatment of partial and total edentulism with dental implants has become an accepted treatment in dentistry on the basis of long-term results.[3] In particular cases, such as single tooth loss, implant therapy is becoming the standard of care because it is predictable and often more conservative than a conventional crown and bridge.[4] Thus, implant placement can be difficult or even impossible.[5,6] Therefore, at the time of implant placement additional surgical protocols are widely used.[5,7]

Because of higher implant treatment costs, conventional methods such as removable dentures or partially fixed dentures are still widely used in Turkey. However, the trend is restoring aesthetics and function with dental implants and it is gaining popularity day by day with many more patients. As a result, the number of implant performing dentists and dental clinics or centres available for implant treatments is increasing.

The current study was planned to report the distribution and pattern of implant replacement of missing teeth.

Patients and Methods

This retrospective study was conducted at the Suleyman Demirel University, Isparta, Turkey, and used data of patients who had undergone implant replacement of missing teeth/tooth from May 2008 to May 2013.

Systemic medical condition and dento-alveolar status were evaluated before implant surgery. Patients with severe diseases, such as severe heart, renal or liver diseases, history of radiotherapy in the head and neck region or chemotherapy for malignancy at the time of surgical procedure, uncontrolled diabetes mellitus (DM), alcohol abuse or excessive smoking, were excluded. Poor oral hygiene, bruxism, bleeding disorders, metabolic bone disorders, immunocompromised state, psychiatric disease, and use of bisphosphonates are also the contraindications of implant therapy in our study. Patients with periodontal or mucosal diseases of the areas concerned were treated before implant surgery. Smokers were informed of the risk of implant failure and advised to stop smoking at least a couple of weeks before and after the implant surgery.

Favourable intermaxillary relationships for dentures and qualitative and quantitative bone volume were evaluated before the surgery protocol. Patients requiring bone augmentation were assessed. Bone length of areas of

Dentistry Faculty, [1,2,5]OMFS Department, [3,4]Prosthetontics Department, Suleyman Demirel University, Isparta, Turkey.

Correspondence: Mehmet FatihSentürk. Email: fatih.senturk84@gmail.com

concern were measured using digital orthopantomography radiographs, and whenever orthopantomography radiographs were not sufficient, computed tomography was used to determine the appropriate implant length and diameter. Informed consent was obtained from patients before the surgery. All surgical procedures were performed under local anaesthesia. Some operations required advanced surgical techniques, such as sinus lifting and bone grafting with otogen block bone grafts or sentetic bone grafts before implant placement. Implant placement was performed in the second seance (six months later in cases which required otogen block bone grafts or external sinus lifting). A two-stage implant surgery (implant placement - healing cap) was preferred in all cases. After placement of the implants, patients were informed about the healing period and osseointegration. Oral hygiene of the patient and implant tissue margin were evaluated at the time of prosthetic rehabilitation, 3-4 months after implant placement. Success criteria of the implants were defined as no absence of clinical mobility or fracture of the implants. Failure and success rates data was collected according to the set criteria. Percentage distribution was used to determine the failure and success rates.

SPSS 12 was used for data analysis. Chi-square test was used to determine statistically significant values. $P \leq 0.05$ was considered significant.

Results

Of the 286 patients enrolled, age of 6(2.1%) was unknown. Therefore, statistical analysis was carried out for 280(97.9%) patients who had a total of 843 dental implants. Besides, 143(51.1%) patients were men and 137(48.9%) women. Of all, 89(31.8%) participants were aged between 40-49 years, 81(28.9%) between 50-59 years, 65(23.2%) between 60-85 years, 25(8.9%) between 30-39 years and 20(7.1%) between 18-29 years (Table-1). Female patients accounted for 400(47.4%) of the dental implants, while 443(52.3%) dental implants were performed on males. The posterior mandible was the location in 281(33.3%) dental implants, followed by posterior maxilla in 274(32.5%), anterior mandible in 152(18.1%) and anterior maxilla in 136(16.1%).

Table-1: Age range and gender relation.

Age Range(year)	Female	Male	Total
18-29	10(3.6%)	10(3.6%)	20(7.1%)
30-39	10(3.6%)	15(5.3%)	25(8.9%)
40-49	45(16.1%)	44(15.7%)	89(31.8%)
50-59	40(14.3%)	41(14.6%)	81(28.9%)
60-85	32(11.4%)	33(11.8%)	65(23.2%)
Total	137(48.9%)	143(51.1%)	280(100%)

Table-2: Age range and denture type distribution.

Age Range(year)	Overdenture	Fixed	Total
18-29	3(1.1%)	17(6.1%)	20(7.1%)
30-39	1(0.4%)	24(8.6%)	25(8.9%)
40-49	8(2.9%)	81(28.9%)	89(31.8%)
50-59	20(7.1%)	61(21.8%)	81(28.9%)
60-85	30(10.7%)	35(12.5%)	65(23.2%)
Total	62(22.1%)	218(77.9%)	280(100%)

Table-3: Denture type and bone augmentation necessity relation.

Dentures type	-	+	Total
Fixed	89(31.8%)	129(46.1%)	218(77.9%)
Overdenture	39(13.9%)	23(8.2%)	62(22.1%)
Total	128(45.7%)	152(54.3%)	280(100%)

Furthermore, 218(77.9%) patients received fixed dentures and 62(22.1%) received overdentures. Among different age groups, 81(28.9%) of the participants aged between 40-49 years received fixed dentures, whereas 30(10.7%) of those aged 60-85years received overdentures (p=0.001) (Table-2). Moreover, 129(45.1%) fixed dentures required additional surgery compared to 41(14.3%) overdentures (p=0.002) (Table-3). In addition, 143(51.1%) men received both denture types compared to 137(48.9%) women. Furthermore, 158(18.7%) dental implants were used for overdentures, while 685(81.3%) dental implants were used for fixed dentures.

Bone augmentation was performed in 152(54.3%) patients while 128(45.7%) required no augmentation. Bone augmentation procedure was performed in 47(16.8%) patients aged 40-49 years, followed by 44(15.7%) aged 50-59 years, 33(11.8%) aged 60-85 years, 15(5.4%) aged 18-29 years and 13(4.6%) aged 20-29 years. Hard tissue grafting with sentetic bone grafts was used in 125(63.8%) patients, followed by internal sinus lifting in 33(16.8%), external sinus lifting in 32(16.3%) and otogen block graft in 6(3.1%).

Of all the implants, 820(97.3%) were successful while 23(2.7%) failed. Smoking was not significantly related to implant failure ($p<0.05$). However, almost all of the patients with failed implants had low oral hygiene motivation. When we analysed the failed implants, additional surgery was performed in 22(95.7%) failed implants, while no further surgery was performed in the remaining 1(4.3%) implant. Body fracture complications

were observed in 2(8.7%) failed implants. There were no complications related to fractures of screws or abutments of the implants.

Discussion

Implant therapy has been a commonplace method of replacing edentulous areas in daily practice.[8] Dental implant therapy is also gaining popularity among the Turkish population, especially in the upper socioeconomic class. Systemic and local risk factors, proper surgical procedures, additional surgery, age, sex, and implant region, shape, length and number are factors playing an important role in the successful rehabilitation of fully and partially edentulous patients with osseointegrated implants.[9]

Al-Quran et al.[2] stated that the age of subjects in their study ranged between 19 and 67 years with a mean age of 43.6 ± 10.4. Their study included 200 patients, 121 female and 79 male. Bural et al.[10] stated that the patient pool comprised 350 females and 266 males with a mean age of 52.12±13.79 years. Jang et al.[11] studied 6385 implants in 3755 patients, of which 3120 were male and 635 female. They reported that age distribution was from 18 to 88 years, with a mean age of 65±10.58 years. Cakarer et al.[12] reported that their study group comprised 274 patients ranging in age from 19 to 84 years (mean:50.20 ± 13.21 years), which included 109 (39.8%) men and 165 (60.2%) women. In our study, 843 dental implants were placed in 280 Turkish patients, 143 (51.1%) of them male and 137 (48.9%) female. The 40-49 age range was the most common among other rates in a part of the Turkish population in this study. Male population is different in this study.

Dental implants have been a popular alternative for the treatment of partial or complete edentulism for several decades.[10] Raghobear et al.[13] reported that the outcomes over 10 years of follow up showed that implant-supported dentures resulted in fewer complaints than conventional dentures at all intervals. Cakarer et al.[12] stated that 70 implants were restored with overdentures, while 870 implants were restored as fixed dentures. Jang et al.[11] reported that 122 (1.9%) implants were placed for overdentures and 6263 (98.1%) implants were placed for fixed dentures. In our study, 158 (18.7%) dental implants were used for overdentures and 685 (81.3%) dental implants were used for fixed dentures. Bural et al.[10] reported that the most frequently used implant indication especially in the population over age 40 years, seems to be complete redundancy. Fixed dentures were most applied in the 40-49 years age range (28.9%); however, overdentures were most used in the 60-85 years age range (10.7%). The relationship between denture type and age was found to be statistically significant in this study ($p \leq 0.05$).

To increase the mandibular bone volume, various augmentation procedures were performed with an autologous bone graft or bone substitute.[14] Maxillary sinus floor elevation is a predictable surgical procedure for overcoming bone height deficiencies.[15] In a review of 121 Nigerian patients concerning implant restoration, 76(62.8%) patients presented with sufficient alveolar bone width and height and required no bone augmentation, whereas 45(37.2%) patients required alveolar bone augmentation before implant placement. The same study reported that of the 45 patients who required augmentation, 39 patients had bone augmentation with sentetic bone graft and 6 patients had sinus lift procedure with bone augmentation.[9] In our study, bone augmentation was performed in 152 (54.3%) patients, while 128(45.7%) did not require it. Hard tissue grafting with sentetic bone grafts is the most widely used method, with 125(63.8%) patients followed by sinus lifting in 65(33.1%) patients.

Patients who are facing a therapeutic procedure more often ask questions regarding the success rate of a particular medical, surgical, or dental intervention.[16] In this study, among 843 dental implants 23(2.7%) implants failed. Yoon et al.[1] reported that bone graft materials may affect implant survival rate. Jurisic et al.[17] conducted a study in which 61 patients were divided into three groups: the first undergoing the transcrestal approach and immediate placement, the second undergoing the lateral window approach with immediate placement, and the third undergoing delayed placement. The survival rates were similar among the three groups. When we analysed the failed implants, bone augmentation was performed in 22(95.7%) failed implants, and only in 1(4.3%)failure was no surgery was performed. It can be concluded that extra surgeries for implant placement may have been a cause of failure.

Conclusion

The relationships between denture type and age, and denture type and additional surgery, were statistically significant. Failure and success rates were similar to those found in literature. More studies with larger samples and longer follow-up periods are needed to determine the causes of implant failure and success.

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Conflict of Interest: None.

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