ORIGINAL RESEARCH ARTICLE

Investigation of Dental Implants Operated in Private Dental Office: Cross-Sectional Study

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Abstract

Purpose: The aim of this study is to analyze the demographic characteristics of patients who underwent dental implant surgery and various features of the implants applied, in a private clinic from January 2019 to June 2022 in Turkey by descriptive methods.
Materials and Methods: The files of the patients who were operated were analyzed. Gender, age, type of edentulousness, implant brands used and various characteristics of the patients were recorded. The obtained data were evaluated with descriptive statistical analysis.
Results: Total of 90 patients, 39 (43.34%) male and 51 (56.66%) female, were included in the study. It was determined that implant treatment was most prevalent between 39-48 years of age which constituted 30% (n=27) of the patients included in the study. Of the 247 implants applied, 139 (56.27%) were placed on the right side (1st and 4th regions), and 108 (43.72%) were placed on the left side (2nd and 3rd regions). When examined according to the jaws they were applied to, 137 (55.46%) of them were applied to the mandible and 110 (44.53%) of them were applied to the maxilla. Of these implants, 44 (17.81%) were in the anterior position (incisors and canine teeth region), and 203 (82.18%) were in the posterior position (1st premolar and beyond).
Conclusions: Dental implants can be easily applied to every individual in line with the appropriate indication. The findings in this article will help operators to choose the suitable indication.

Key words: cross-sectional study; dental implant; dental treatment.

Introduction

Alloplastic materials that support removable, partial or fixed dentures by being placed inside or on the surface of the jaw bones are called dental implants.[1] One of the goals of dentists is to provide function and aesthetics. Dental implant treatment is a treatment method that provides functionally and aesthetically successful results for tooth loss.[2] It is crucial to perform clinical and radiographic examinations of patients and to evaluate risk factors before dental implants are applied. Performing routine check-ups after the implant application also increases the success of the operation and the duration of using the implant. Risk factors should be considered as factors that may affect the success of dental implant applications.[3]

Before dental implant application, an analysis of bone and soft tissue anatomy, distance to neighboring anatomical structures, quality and quantity of existing bone can be performed with appropriate radiological techniques. It is also possible to determine the most suitable type of implant, its quantity and the area where it will be placed.[4] Despite the high success and survival rates of dental implant applications, failures are also encountered in some cases.

It has been previously shown that factors such as implant diameter and length, implant characteristics, operation site and loading protocol, as well as other factors such as operator experience, affect the success of dental implant application.[5]

There are many studies available that give operators insight into design, surface properties, abutments, and surgical procedures. However; there are very few studies that would guide operators about demographic characteristics, distribution of implants according to locations, which implant can be used in which indication, and the use of implants of different diameters and lengths.[6] In this sense, it is very important to put the right indication and minimize possible mistakes. The aim of this study is to evaluate the demographic and clinical aspects of dental implants applied in a private dentist's office between 2019 and 2022 and to analyze the characteristics of the implants used retrospectively with a descriptive statistical method.

Material and Methods

This study was conducted in accordance with the Principles of the Declaration of Helsinki and ethical approval was received from the Ethics Committee of Çankırı Karatekin University (Decision Date: 28.09.2022, Meeting no: 27). In this study, 247 dental implants applied to 90 patients by the same physician in a private dental clinic in Turkey were included in our study. Three different dental implant brands were included in the study and their names are: Nucleoss (Şanlılar Medical Devices Medical Kimya San Tic Ltd Şti, Turkey), Medentika (Institut Straumann AG, Germany), NTA (Pilatus Swiss Dental GMBH, Switzerland).

Before starting the operation, detailed anamnesis was taken from each patient and recorded in their files. Patients were informed about tooth extraction, grafting, additional surgical procedures and dental implants, and their written consent was obtained. In addition to demographic information such as age and gender, the teeth that were extracted, the number and location of implants that were inserted, the length and diameter of the implants applied, the edentulous state of the jaws, immediate implants, additional surgical procedures, and whether a healing cap was worn in the same session were all recorded in the patients' files. All patients were routinely invited for follow-ups on the first day and 1 week after the operation. Stitches were removed after a week. Depending on the additional surgical procedure, the patients were called back to the clinic for suprastructure procedures after 3 or 6 months. The patients were evaluated with descriptive statistical analyses according to the data obtained from the notes taken in their files.

Results

Total of 90 patients, 39 (43.34%) male and 51 (56.66%) female, were included in the study. The youngest patient was 22 years of age, the oldest patient was 74 years old, and the mean age of 90 patients was 46.41 years. When examined by decades, 8 (8.88%) patients were between the ages of 19-28, 19 (21.11%) patients were between the ages of 29-38, 27 (30%) patients were between the ages of 39-48, and 19 (21.11%) patients were between the ages of 49-58. It was determined that there were 10 (11.11%) patients between the ages of 59-68 and 7 (7.77%) patients of 69 years of age and over.

In this study, a total of 247 dental implants were applied to 90 patients. When examined according to the regions where they were placed, 139 (56.27%) of 247 implants were applied to the right side (1st and 4th regions) and 108 (43.72%) were applied to the left side (2nd and 3rd regions) of the patients. When analyzed according to the bones they were placed, 137 (55.46%) of them were applied to the mandible and 110 (44.53%) of them were applied to the maxilla. Of these implants, 44 (17.81%) were in the anterior position (incisors and canine teeth region), and 203 (82.18%) were in the posterior position (1st premolar and beyond). The number of implants placed immediately was 94 (38.05%), while the number of implants placed normally was 153 (61.94).

In our study 247 implants were applied on a total of 146 jaws; According to the Kennedy Classification, there were 13 (8.90%) cases with Kennedy Class I, 37 (25.34%) with Kennedy Class II, 53 (36.30%) with Kennedy Class III, and 1 (0.68%) with Kennedy Class IV. In addition, there were 5 (3.42%) cases with total edentulism and 37 (25.34%) cases with a single missing tooth.

There were 16 implants which needed additional surgical procedures among a total of 247 implants. These include 3 (18.75%) grafted implants, 12 (75%) implants that needed internal sinus lifts, and 1 (6.25%) that required an open sinus lift operation.

Only 1 (1.11%) of 90 patients was an orthodontic patient. 21 (8.5%) of 247 implants were left to heal with a healing cap.

Cases with a single missing tooth were also evaluated according to decades in the study. According to decades, 8 (100%) of 8 patients aged 19-28, 12 (63.15%) of 19 patients aged 29-38, 9 (33.33%) of

Table 1. Tooth numbers and number of implants placed

Tooth number	Number of implants	Tooth number	Number of implants
11	4	21	3
12	1	22	1
13	9	23	8
14	7	24	9
15	12	25	9
16	11	26	23
17	10	27	5
41	0	31	0
42	2	32	1
43	8	33	7
44	9	34	7
45	11	35	8
46	27	36	31
47	15	37	9

27 patients aged 39-48 years old had single missing teeth. 5 of 19 patients (26.31), 2 (20%) of 10 patients aged between 59-68 years, and 1 (14.28%) of 7 patients aged 69 years and older had single missing teeth.

The tooth region with the highest number of implants was the 36 numbered tooth region and 31 (12.55%) implants were placed in this region. Which was followed by tooth region 46 with 27 (10.93%) implants. No implants were placed in the teeth areas 31 and 41, and the least number of implants were placed in the areas of teeth 12, 22 and 32 with 1 implant (0.40%) each (Table 1).

Nucleoss implants with a diameter and length of 4.1-10 mm were used most frequently (n=45, 20.73%), followed by 37 implants (17.05%) with a diameter and length of 4.8-10 mm. The least used implant was 1 implant (0.46%) with a diameter and length of 4.1-6.5 mm. This was followed by 3.5-10 and 4.8-6.5 with 5 implants (2.30%). Other brands and all diameters and lengths used were given in Table 2.

Discussion

Implant-supported dental restorations have become quite popular being a suitable solution for replacing missing teeth in recent years.[7] Dental implant surgery and suprastructure are performed in universities by different branches in a multidisciplinary manner and have been the subject of many studies.[2,5,6] The dental implants included in our study were applied and the suprastructure was made by the same dentist in a private clinic in Turkey.

It has been the subject of many studies that implant treatments are related to the age of the patient. Urvasızoğlu et al.[2] reported that the mean age of patients who underwent dental implant surgery was 41.1 years, and their age ranged from 46 to 55 years. Eltaş et al.[8], on the other hand, studied a wider age range and reported that patients ages were between 20 and 78 years with an average age of 45.2. The sample size of the study by Vehemente et al.[9] was slightly larger and they found that the age range of the patients who had dental implants was 16-92, and the mean age was 53.5 years. Although the sample size of our study was quite large, the youngest patient was 22 years old, the oldest patient was 74 years old, and the mean age was 46.41 years. Although the sample sizes in the studies conducted so far are different, the average ages given in similar studies in the literature are almost the same as in this study.

Bozkurt et al.[5] reported the percentage of female patients as 55.3% and the percentage of male patients as 44.7% in their study. According to the results of our study, 56.66% of the patients were women, while 43.34% were men. It is supported by other studies that the results are quite similar and the percentage of female patients in dental implant operations is higher.[10]

According to the study conducted by Urvasızoğlu et al.[2], the

Table 2. Implant diameter and length (mm) and number of implants used according to brands

Nucleoss							
Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants		
3.5-10	5	4.1-6.5	1	4.8-6.5	5		
3.5-12	13	39451	17	39664	27		
		40182	45	40394	37		
		40912	34	41125	33		
Total 217 implants							
Medentika							
Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants
3.5-8	1	4-6.5	1	4.5-8	2	5-9	2
3.5-11	2	4-9	1	4.5-9	8	5-13	1
		4-11	3	4.5-11	1		
Total 22 implants							
NTA							
Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants	Diameter-Length (mm)	Number of implants
3.7-10	2	4.2-7.5	1	4.5-4.2	3	4.8-10	1
		4.2-11.5	1				
Total 8 implants							

edentulous state of 87 jaws with implants in 67 patients was examined and it was observed that the most common edentulous state was partial edentulism (n=32, 37%) that resulted in edentulousness. This was followed by a single missing tooth (n=26, 30%), partial edentulism with a toothed ending (n=21, 24%) and, least frequently, complete edentulism (n=8, 9%). In their study, Bural et al.[11] reported that 48.2% of the implants were applied in cases of complete edentulism, and 23.2% in edentulous cases. Buser et al.[12], on the other hand, reported that the total edentulous mandible was the most common (392) and the total edentulous maxilla (23) was the least common in their study. In our study; 247 implants were applied on a total of 146 jaws, and the cases of partial edentulism with toothed ending (Kennedy III) was found to be most common with a rate of 36.30%. In addition, single tooth deficiency cases were evaluated according to decades. It was determined that all 8 patients between the ages of 19-28 had a single missing tooth. On the other hand, the 69 years and over group had the least single missing tooth (14.28%). This situation can be interpreted as the increase in tooth loss due to advancing age and the fact that single tooth deficiency is more common in young people.

Adalı et al.[13] reported that 51.6% of dental implants were localized in the upper jaw and 48.3% in the lower jaw. In another study by Urvasızoğlu et al.[14], it was reported that 52.4% of 498 dental implants were placed in the upper jaw and 47.6% in the lower jaw. In our study, 137 (55.46%) implants were applied to the lower jaw and 110 (44.53%) implants were applied to the upper jaw. Although it is thought that this opposite situation arises from the diversity of sample groups, the rates are very close to each other.

Urvasızoğlu et al.[2] reported that 40.0% of dental implants were placed in the anterior region and 60.0% were placed in the posterior region. In a study by Polat et al.[15], it was determined that 28.2% of dental implants were localized in the anterior region and 71.7% in the posterior region. In our study, 44 (17.81%) of the implants were in the anterior position and 203 (82.18%) of them were in the posterior position, which is similar with other studies. In our study, it was also emphasized that 139 (56.27%) of 247 implants were placed on the right side of the patients (1st and 4th regions), and 108 (43.72%) were placed on the left side (2nd and 3rd regions). It is thought that this situation may be related to the chewing habits of the patients.

Many studies have reported that implants placed in the extraction socket after tooth extraction provide successful osteointegration, also has similar survival rates to implants placed in healed areas.[16,17] However, in some studies, dental implants placed in the extraction socket have a higher loss rate than implants placed in healed edentulous areas.[18,19] In our study, 94 (38.05%) implants were placed immediately and 153 (61.94%) implants were placed normally. It has been observed that the implants provide osteointegration and heal normally in the 6-month follow-up. Although the rate of immediate implantation is less, it is thought that especially freelance dentists do not wait for healing after tooth extraction in order to place implants as soon as possible. In addition, in our study, it was noted that the rate of implants left to heal by wearing the healing cap in the same session in which the implant was applied was 8.5%. This situation reveals that private clinics do not avoid the second surgical procedure. However, since there are no similar studies on this subject in the literature, it cannot be discussed. This conclusion needs to be supported by other studies.

There are many studies in the literature about complications and treatments encountered in dental implant surgery. In the studies, complications were included in different classifications although they were under the same titles.[14] Complication rates encountered during implant surgery and pre-implant preparation stage vary between 35% and 44%.[20] No complications related to anatomical formations or the operation field were encountered during the application of the implants included in our study. In order to avoid complications, internal sinus lifting was performed in 12 (7.5%) and open sinus lifting in 1 (6.25%) of the 247 implants included in our study. In addition, 3 (18.75%) implants were grafted.

In the study of Urvasızoğlu et al.[2], the most implanted region was reported as the mandibular first molar region, followed by the maxillary first molar region. In the study of Sarı et al.[6], it was stated that the mandibular canine is the most implanted tooth region, followed by the maxillary first molar region, and the least implanted region was the maxillary lateral tooth region. According to the results of our study, the most implanted region is the tooth region 36. No implants were applied to the 31 and 41 tooth regions (Table 1).

There are many studies that calculate the average value of the diameter and length of the implants applied.[2,6,15] The implant diameters and lengths included in our study are given in detail in Table 2.

Conclusion

Dental implant applications have been very popular in recent years and are open to development. Large numbers of implant applications are performed in both university hospitals and private clinics.

Many prospective and retrospective studies have been conducted to facilitate physicians' indications. This study differs from other studies in that implant applications performed in a private clinic were evaluated. However, more comprehensive studies are needed.

Author Contributions

S.D.: Contributed to conception and design, drafted and critically revised manuscript. O.Y.: Contributed to conception, design, and data analysis, drafted and critically revised the manuscript. All authors gave final approval and agreed to be accountable for all aspects of the work.

Conflict of Interest

There is no conflict of interest and financial support for this article.

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