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Evaluation of Complications in Implant-Supported Locator Retained Removable Dentures: 24 Months Retrospective Study

İmplant Destekli Locator Tutuculu Hareketli Protezlerde Meydana Gelen Komplikasyonların Değerlendirilmesi: 24 Aylık Retrospektif Çalışma

Sadeq Moahmmed Taqi Fadhil, Emre Mumcu

Eskişehir Osmangazi University, Faculty of Dentistry, Department of Prosthodontic, Eskişehir, Turkey

ORCID ID: Sadeq Moahmmed Taqi Fadhil 0000-0003-4462-0642, Emre Mumcu 0000-0002-3791-6472

***Sorumlu Yazar / Corresponding Author:** Prof. Emre MUMCU, **e-posta / e-mail: emremum@yahoo.com**

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Abstract

Aim	The purpose is to evaluate the complications that occur in implanted locator supported removable dentures for 2 years clinically and radiologically.
Materials and methods	Study between the years of 2014-2019, was performed on 121 patients who underwent 284 dental implants and came to their controls at the 12th and 24th months. Patients included in the retrospective study were 52 men and 69 women. Complications detected in the first 24 months after the implant supported prosthesis applied; relining and rebasing, loss of retention (housing removal, wear of the retaining clip) and fracture in the base of prosthesis were recorded and evaluated. Data were analyzed using One-way ANOVA and Tukey's HSD tests. A P value of < 0.05 was considered statistically significant.
Results	In implant-supported removable prostheses, there are significant differences were found between the increasing complication rates at 12th and 24th months ($p < 0.05$). The most common complication at the end of 24th month in overdenture prosthesis with implant supported locator holder applied to the maxilla and mandible, respectively; relining of prosthesis (11.57%), rebasing of prosthesis (6.6%), loss of retention (5.79%) and prosthetic base fracture (4.13%).
Conclusion	Based on the data analyzed in our study, removable prostheses showed different types and frequency of complications. Treatment of implant-supported overdenture prostheses, routine control of the prostheses is important.
Keywords	Dental Implant, Overdenture, Locator, Prosthetic Complication

Öz

Amaç	*Bu çalışmanın amacı, implant üstü locator destekli hareketli protezlerde meydana gelen komplikasyonları 2 yıl boyunca klinik ve radyolojik olarak değerlendirmektir.*
Gereç ve yöntem	*Bu retrospektif çalışmaya 2014-2019 yıllar arasında 284 implant uygulanan, 12. ve 24. ayda kontrollerine gelen toplam 121 hasta üzerinde yapılmıştır. Hastaların yaşları 40 ile 81 arasında değişmekte olup, ortalama yaş 63.27'dir. Çalışmaya dahil edilen hastaların 52'i erkek ve 69'ı kadın katılımcıdan oluşuyor. İmplant destekli hareketli protezlerde, protezi yükledikten sonra, 24. ayda karşılaşılan komplikasyonlar değerlendirilerek kaydedilmiştir. Verilerin analizi, tek yönlü ANOVA ve Tukey HSD testleri kullanılarak anlamlılık düzeyi $p < 0.05$ olacak şekilde analiz edildi.*
Bulgular	*İmplant destekli overdenture protezlerde 12. ve 24. ayda protetik komplikasyon yüzdeleri arasında anlamlı derecede farklılıklar belirlenmiştir ($p<0.05$). Alt ve üst çeneye uygulanmış implant destekli locator tutuculu overdenture protezlerde 24. ayın sonunda en çok rastlanan komplikasyon sırasıyla; astarlama işlemi gereksinimi (%11,57), tutucu parçanın yıpranması ve atması (%6,6), kaide yenileme gereksinimi (%5,79) ve protez kaide kırığıdır (%4,13).*
Sonuç	*Bu çalışmada analiz edilen verilere dayanarak, hareketli protezler farklı tip ve sıklıkta komplikasyonlar göstermiştir. İmplant destekli overdenture protezlerde tedavi bittikten sonra hastaların protezlerinin rutin bir şekilde control ettirmesi önem taşımaktadır.*
Anahtar kelimeler	*Dental İmplant, Overdenture, Locator, Protetik Komplikasyonlar.*

INTRODUCTION

To ensure chewing function, it depends on the quality and health of the bone in the dental arch. To eliminate the dental deficiency that occurred in the patient for any reason, removable dentures, fixed dentures or implant dentures can be applied according to the condition of the toothless area.[1-3] The difficulty of using removable dentures in excessive alveolar crest resorption causes many problems in the functional, funasional, and psychosocial aspects of patients. In implant-supported removable prostheses, the reason that the supporting teeth are not damaged and the jaw bone is preserved is that prosthetic restorations are supported by implants placed in the toothless region.[4]

Dental Implants have revolutionized our age in terms of oral rehabilitation in dentistry. They improved their functional and phonasion capabilities by increasing the treatment opportunities for patients.[5,6] The important goal of dental implant treatment is to satisfy aesthetic, functional and functional desire by replacing the patient's one or more missing teeth. However, despite the long-term success of dental implants, complications and failures occur in the percentage of cases. Some complications are relatively minor and easy to correct, but others are more important, leading to loss of implants, prosthesis failure, and serious tissue loss.[6]

Problems and failures that may occur in implant and implant supported prostheses can be caused by the implant system, patient and physician. Problems be based from the implant system include factors such as faulty design in body of implant, insufficient implant size and number, chronic screw loosening, large micro gaps between components, abutment-implant sensitivity and suitability of the implant surface for osseointegration. Patient-related failures include factors such as para-functional habits, smoking, systemic diseases, physical insufficiency, inadequate oral hygiene and trauma. In terms of prosthetics, physician-related failures occur in pre-surgery and prosthetic stages. Pre-surgery, conditions such as insufficient quantity and quality in soft and hard tissues, incomplete preparation procedures, poor occlusal relationships, improper treatment planning, and physician's inexperience cause failure. In the prosthetic stage, prosthetic failures become predictable in the presence of conditions such as improper contours, incorrect material selection, inappropriate or traumatic occlusion, excessive length of the cantilever.[7-9]

The purpose is to evaluate the complications that occur in implanted locator supported removable dentures for 2 years clinically and radiologically.

MATERİALS and METHODS

In a 5-year study period, study numbered (16.10.2018 - 256, decision no: 21) approved by the Head of the Non-Interventional Ethics Committee, the participants; Patients who applied to Eskişehir osmangazi university department of prosthetic dentistry between 2014 and 2019 for prosthetic needs and dental implant applied, patients were scanned from the archive, and records were included. Along with the demographic data of the patients; the aim was to evaluate the complications that occur in implanted locator supported removable dentures. After analyzing the data retrospectively, statistical analyzes were made.

In this retrospective study between the years of 2014-2019, was performed on 121 patients who underwent 284 dental implants and came to their controls at the 12th and 24th months. Patients included in the retrospective study were 52 men and 69 women. Complications detected in the first 24 months after the implant supported prosthesis applied; relining and rebasing, loss of retention (housing removal, wear of the retaining clip) and fracture in the base of prosthesis were recorded and evaluated.

Statistical Analysis

SPSS for Windows software (IBM, 2013, version 22.0) was used for the statistical analysis. Data were analyzed using One-way ANOVA and Tukey's HSD tests, A P value of < 0.05 was considered statistically significant.

RESULTS

Their ages vary between 40 and 81 years, and the average age is 63.27. Fifty-two (52) of the patients were male and sixty nine (69) were female participants. After applying 284 dental implants to patients, 121 patients underwent separate implant locator-related prosthesis on the upper and lower jaw. The most common complication in implant-supported locator retained overdenture prostheses applied to the lower and upper jaw are as follows (Table-1):

1. Relining of prosthesis
2. Rebasing of prosthesis
3. Loss of retention (housing removal, wear of the retaining clip)
4. Fracture in the base of prosthesis.

Table-1: Common complications

Complication	Relining	Rebasing	Loss of retention	Fracture
	*n %	*n %	*n %	*n %
12. month	2 1,65	1 0,83	12 9,92	1 0,83
24. month	14 11,57	7 5,79	8 6,61	5 4,13

When we evaluate the presence of complications according to gender distribution, it was found to be 17.31% in women, and 10.14% in men at the end of 12 months. However, at the end of the 24th month, the loss rates were 26.09% for females and 30.77% for males (Table-2).

Table-2: Complications according to gender, number of implants and localization

Gender		Men	Female
		*n %	*n %
Complication	12. month	9 17,31	7 10,14
	24. month	18 26,09	16 30,77
Localization		**Mandible**	**Maxilla**
		*n %	*n %
Complication	12. month	11 12,22	5 16,13
	24. month	23 25,56	11 35,48
Number of implants		**2**	**4**
		*n %	*n %
Complication	12. month	7 8,33	9 24,32
	24. month	18 21,43	16 43,24

When we evaluated the presence of complications according to the prosthesis localization, it was 12.22% in the mandible and 16.13% in the maxilla at the end of the 12th month. However, when we evaluated at the end of the 24th month, in the mandible was 25.56% and the maxilla was 35.48% (Table-2).

When we evaluated the patients according to the number of implants at the end of the 12th month, it was found 8.33% in 2 implant-supported overdenture prostheses, and 24.32% in 4 implant-supported overdenture prostheses (Table-2).

When we evaluate the presence of complications according to the opposite jaw condition, at the end of the 12th month, it was 20.00% against fixed dentures, 9.09% against mobile partial, 15.09% against total dentures and 4.76% against implant-supported removable dentures, at the end of the 24th month, it was 48.00% against fixed dentures, 27.27% against mobile partial, 26.42% against total dentures, and 9.52% against implant-supported removable dentures (Table-3).

Table-3: Complication rate according to the opposite jaw

Opposite jaw		Fixed	Removable denture	Complete denture	Implant Supported overdenture
		*n %	*n %	*n %	*n %
Complication	**12. month**	5 20,00	2 9,09	8 15,09	1 4,76
	24. month	12 48,00	6 27,27	14 26,42	2 9,52

DISCUSSION

Many researchers have conducted retrospective and prospective studies on the distribution of different failures over the years and reported different rates. Naert et al.10 reported that technical complication are occurred both in the first at 12th months after treatment and in the long term, while the frequency of technical complication decreases in

course of time. In our retrospective study, technical problems related to implant-supported locator retained overdenture prostheses generally appeared in the first 24 months after treatment. Gotfredsen et al.[11], the most common complications in bar holder systems were related to the removal and wearing of the retaining clips. In our study, one of the problems encountered was the loss of retention due to wear and removal of the retaining clip. Wearing and/or throwing of the retaining clip decreased significantly at the end of 24 months compared to 12 months.

One of the complications that we encounter over time in implant-supported prostheses is fractures in base of prosthesis. In 2015, dhillon et al.,[12] prevented the fracture of the prosthesis base by supporting with cast chrome-cobalt metal substructure to prevent base fractures. In our study, the base fracture in the mandible locator holders was more at the end of the 24th month. We supported it with a metal substructure to prevent the base fracture. In a study by Çakarer et al.,[13] they concluded that the locator system showed unsurpassed clinical results than ball attachments and bar connections in the sense of the rate of prosthetic complications and maintaining oral function. In our study, patient satisfaction with locator attachments showed positive results in terms of retention and phonation during chewing.

In a study by Dudic et al.,[14] the extension of the bar holder systems and the re-tightening of the female parts were higher, while the loss, retention or loss of the retaining clip parts required significantly more repair in other holding systems than the bar systems. In our study, when we compared the locator holder system in the 12th and 24th months, the need for prosthetic base fracture, priming and plinth renewal required a significantly higher need at the end of the 24th month. Bilhan et al.,[15] stated that in their study, implant-supported overdenture prostheses decreased feeding requirement and retention especially at the end of 24 months.

Cehreli et al.,[16] stated in their study that dislocated clips or housing, a worn or loose clip was more common after the 12th months, and the most common repair was replacing permanent rubber parts. In our study, we found that the clip was worn and / or the separation of the retaining female part from the prosthesis was less common after 12 months in locator retained systems. Van Kampen et al.,[17] showed in a study that bar systems provide more retention when exposed to both vertical and horizontal forces compared to other single holding systems. In the evaluation of comparing the patient's functional and fonasion satisfaction with conventional dentures in terms of retention, the studies showed that the implant-supported locator and bar holder systems showed better results compared to conventional dentures.[18-20] Kutkut et al.[21] showed patients treated with mandibular implant-supported overdentures superior characteristics in satisfaction, quality of life, function, and bite force than patients treated with a conventional complete denture.

When we evaluate over-implant overdenture prostheses according to the opposite jaw condition, overdenture complication rate against fixed dentures occurred at a relatively high level of incidence compared to other types of dentures, which indicates that there is a need for further improvement in denture dental materials. When the 1st year was left behind after the prosthesis came into function, the need for maintenance of the removable dentures became more and more evident. The most frequently required repair or maintenance operations were the need for feeding as a result of the retention mechanism remaining inside the prosthesis due to abrasion, separation from the prosthesis or cavities under the prosthesis due to alveolar atrophy. This situation is consistent with the evaluations made in terms of frequency of complications in the literature. In general, loss of retention due to an average of 30% overdenture retaining mechanism wear, the requirement for feeding in 19% implant-prosthetic implants and 12% pedestal fracture have been reported.[22]

CONCLUSION

Development of the surface of implant and the attachment accessories, made this prosthetic rehabilitation very successful and concession. Based on the data analyzed in our study, removable prostheses showed different types and frequency of complications. Treatment of implant-supported overdenture prostheses, routine control of the prostheses is important. When the requirements in these controls are completed, future complications can be prevented. Complications may not be avoided, but faults can be avoided.

Kaynaklar

1. *Arvidson K, Bystedt H, Frykholm A, et al. Five-year prospective follow-up report of the Astra Tech Dental Implant System in the treatment of edentulous mandibles. Clinical Oral Implants Research. 1998;9(4):225-234.*
2. *Block MS, Akin R, Chang A, et al. Skeletal and dental movements after anterior maxillary advancement using implant-supported distraction osteogenesis in dogs. Journal of oral and maxillofacial surgery. 1997;55(12):1433-1439.*
3. *Brägger U, Häfeli U, Huber B, et al. Evaluation of postsurgical crestal bone levels adjacent to non-submerged dental implants. Clinical Oral Implants Research. 1998;9(4):218-224.*
4. *Misch CE. Dental Implant Prosthetics-E-Book. Elsevier Health Sciences; 2004.*
5. *Buser D, Mericske-stern R, Pierre Bernard JP, et al. Long-term evaluation of non-submerged ITI implants. Part 1: 8-year life table analysis of a prospective multi-center study with 2359 implants. Clinical oral implants research. 1997;8(3):161-172.*
6. *Dennis Flanagan D, DABOI A. The Legends of Implant Dentistry with the History of Transplantology and Implantology. The Journal of Oral Implantology. 2010;36(3):247.*
7. *Pjetursson BE, Brägger U, Lang NP, et al. Comparison of survival and complication rates of tooth-supported fixed dental prostheses (FDPs) and implant-supported FDPs and single crowns (SCs). Clinical oral implants research. 2007;18:97-113.*
8. *Friberg B, Jemt T, Lekholm U. Early failures in 4,641 consecutively placed Brånemark dental implants: a study from stage 1 surgery to the connection of completed prostheses. International Journal of Oral & Maxillofacial Implants. 1991;6(2).*
9. *Schwarz MS. Mechanical complications of dental implants. Clinical Oral Implants Research: Chapter 10. 2000;11:156-158.*
10. *Naert I, Quirynen M, Theuniers G, et al. Prosthetic aspects of osseointegrated fixtures supporting overdentures. A 4-year report. The Journal of prosthetic dentistry. 1991;65(5):671-680.*
11. *Gotfredsen K, Holm B. Implant-supported mandibular overdentures retained with ball or bar attachments: a randomized prospective 5-year study. International Journal of Prosthodontics. 2000;13(2).*
12. *Dhillon N, Chowdhury SR, Kumar P, et al. Managing prosthetic complication in implant-retained overdenture. Medical journal, Armed Forces India. 2015;71(Suppl 2):S444.*
13. *Cakarer S, Can T, Yaltirik M, et al. Complications associated with the ball, bar and Locator attachments for implant-supported overdentures. Med Oral Patol Oral Cir Bucal. 2011;16(7):e953-959.*
14. *Dudic A, Mericske-Stern R. Retention mechanisms and prosthetic complications of implant-supported mandibular overdentures: long-term results. Clinical implant dentistry and related research. 2002;4(4):212-219.*
15. *Bilhan H, Bural C, Çilingir A, et al. Implant Retained Prosthesis, Complications and Implant Failures: 24 Month Clinical Results. European Oral Research. 2012;46(2):40.*
16. *Çehreli MC, Karasoy D, Kökat AM, et al. A systematic review of marginal bone loss around implants retaining or supporting overdentures. International Journal of Oral & Maxillofacial Implants. 2010;25(2).*
17. *Van Kampen F, Van Der Bilt A, Cune M, et al. Masticatory function with implant-supported overdentures. Journal of dental research. 2004;83(9):708-711.*
18. *Jabbour Z, Emami E, De Grandmont P, et al. Is oral health-related quality of life stable following rehabilitation with mandibular two-implant overdentures? Clinical oral implants research. 2012;23(10):1205-1209.*
19. *Geckili O, Bilhan H, Mumcu E, et al. Comparison of patient satisfaction, quality of life, and bite force between elderly edentulous patients wearing mandibular two implant-supported overdentures and conventional complete dentures after 4 years. Special Care in Dentistry. 2012;32(4):136-141.*
20. *Awad MA, Lund JP, Shapiro SH, et al. Oral health status and treatment satisfaction with mandibular implant overdentures and conventional dentures: a randomized clinical trial in a senior population. International Journal of Prosthodontics. 2003;16(4).*
21. *Kutkut A, Bertoli E, Frazer R, et al. A systematic review of studies comparing conventional complete denture and implant retained overdenture. Journal of prosthodontic research. 2018;62(1):1-9.*
22. *Goodacre CJ, Bernal G, Rungcharassaeng K, et al. Clinical complications with implants and implant prostheses. The Journal of prosthetic dentistry. 2003;90(2):121-132.*