

Evaluation the Distribution of Implant Supported Prostheses between 2005-2009 Years

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II. MATERIALS AND METHODS

Abstract—The aim of this retrospective study was to evaluate the parameters of dental implants such as patient gender, number of implant, failed implant before prosthetic restorations and failed implant after implantation and failed implant after prosthetic restorations. 135 male and 99 female patients, total 234 implant patients which have been treated with 450 implant between 2005-2009 years in GATA Haydarpasa Training Hospital Dental Service. Twelve implants were failed before prosthetic restorations. Four implant were failed after fixed prosthetic restorations. Cumulative survival rate after prostheses were 97.56 % during 6 years period.

Keywords—Dental implants, implant supported prostheses, single implants, single crown

I. INTRODUCTION

THE use of implant supported prosthetic reconstructions has become a common treatment modality for patients. Dental implant restorations have the highest survival rate compared with any other prosthesis to replace missing teeth. Dental implants made of commercially pure titanium initiated a revolution in dental practice [1], [2]. The early studies of Brånemark et al [3] and Schroeder et al [4] have been the pioneering clinical studies. The retrospective study of single implant support for single crown prosthetic rehabilitation is rarely documented in the literature [5]-[8].

For the successful conclusion of implant applications, adequate preoperative planning and analysis with the oral surgeon and prosthodontists [3],[5],[8]. Thus possible complications should be avoided paying attention to anatomical structures. Presence of a limited adequate bone, advanced surgical techniques and used to obtain bone approaches to the risks of complications associated with surgery brings. Therefore, the present bone assessing the amount, proper planning and case selection of the appropriate implant size is important [8], [10].

The criteria for success according to Albrektsson and colleagues [8] were also used to define implant performance, allowing for 1.0-mm bone loss during the first year of function followed by a maximum 0.2mm of bone loss for the following years. Prospective studies present implant survival rates ranging from 95.5% to 97.9% when evaluating fixed bridges [6],[11]-[13].

The objective of this retrospective study was to evaluate single implant and implant supported single crown treatment between 2005-2009 years.

This retrospective study was approved by local university ethics committee. All participants received information about the study and gave their written consent. Data were obtained from the dental-treatment records of the patients of the GATA Haydarpasa Training Hospital Dental Service. 135 male and 99 female patients, which have been successfully treated with 450 implant between 2005-2009 years. The mean age was 42 (33 ± 9.14). All patients had remaining teeth and all prosthetic restorations were implant supported, all of single implant supported single crown without cantilever. Oral surgeon and prosthodontist planned implant and prosthetic treatment and then appropriate surgical technique used on implantations by same surgeon of all cases. All implants had internal connections and screw design of various implant systems. After the healing period, prosthetic treatments were completed by same prosthodontist in all cases. After this period first 6 months and 1 year after implantation all patients were controlled. Annually in subsequent years all patients were controlled. In this study all patients' data was saved as the information of all controls is used to investigate from dental implants' patients archive.

Minimum criteria success were; individual unattached implant is immobile when tested clinically, the radiograph does not demonstrate any evidence of periimplant radiolucency, vertical bone loss is more than 0.2 mm annually after the first year, absence of pain, infection. Prosthetic criteria success were; whether loss of cementation, abutment screw loosening, fracture of resin denture teeth or not. None of these criteria were considered 100% successful.

III. RESULT

The mean age of the patients at the time of implant placement was 42.33 ± 9.14 years. All of single implant retained crowns were cement retained. The mean time period between implant insertion and abutment connection was 3 months. Of the 450 examined implants, 12 did not integrate before loading and revealed periimplant infection with suppuration. We considered these as early failure and this resulted in 2.66 % early failure rate (Table I). These were not included in the study. During the healing period the remaining implants showed no clinical signs of inflammation and/or periimplant radiolucency. Four implants were surgically removed during the 4 and 2 year follow-up period due to recurrent peri-implant infection (Table II). We considered these as failure after prostheses and this resulted in 0.88 % failure rate. All of the failed implants demonstrated continuous peri-implant radiolucency. There were not show signs of peri implant infection and periimplant radiolucency in remaining implants. Screw loosening was more frequently prosthetic complication than others (3.33%) (Table III). Veneering material fracture was observed in four implants 0.88 % and loosened cementation in eight implants (1.77%) (Table III). The cumulative prosthetic success rates were 94% (Figure 1).

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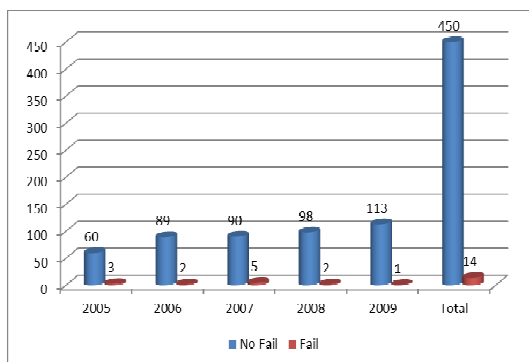


Fig. 1 The distribution of implant treatment success

TABLE I

DISTRIBUTION OF IMPLANT AND PROSTHETIC TREATMENTS

Years	Maxilla	Mandibula	Fail	
			After surgery	After Prostheses
2005	24	36	3	
2006	39	50	2	
2007	35	55	3	2
2008	39	59	2	
2009	38	75	1	2
Total	175	275	12	

IV. DISCUSSION

For years, patients preferred fixed prosthetic restorations than partial denture despite the limitations. Many dentists feel the most natural method to replace a tooth is to use an implant, rather than preparing adjacent teeth and joining them together with prosthesis. The primary reasons for suggesting the fixed partial denture were its clinical ease and reduced treatment time [2], [14]. In this retrospective study, it was determined that most of implant treatment planning was performed to implant retained fixed prosthesis in our clinic. This study was included in those performed between 2005-2009 years.

TABLE II

DISTRIBUTION OF IMPLANT CRITERIA AND PROSTHETIC CRITERIA

Years	Implant Criteria			
	Number of Implants	Radiolucency	Vertical bone (more than 0.2mm)	Pain
2005	60	-	-	3
2006	89	2	-	2
2007	90	5	2	2
2008	98	2	-	2
2009	113	1	-	1
Total	450	13	2	10

TABLE III

DISTRIBUTION OF PROSTHETIC CRITERIA

Years	Prosthetic Criteria				
	Infection	Loss of cementation	Screw loosening	Veneering material fracture	Fail
2005	2	3	5	2	3
2006	2	2	4	1	2
2007	3	1	3	1	5
2008	2	-	3		2
2009	1	2	-		3
Total	10	8	15		16

Since 1993, single-tooth implant survival has demonstrated that this procedure is the most predictable method of tooth replacement. Zarb and Schmitt [5] reported no failures for 40 implants placed in 32 patients. In 1994 Carlsson [7] reported a 4 to 7 year retrospective study of 77 patients who received 93 implants. Two implants were lost, both within the first year of function (2 % failure rate). Haas et al [15] also reported on 76 single-tooth implants. Their evaluations extended for 6 years, and they observed a 2.6 % implant loss. In our clinic cumulative survival rate after prostheses were 97.56 % for 6-2 years. Albrektsson et al [8] have stated that the require implant success rate is a minimum of 85% for 5 years. However, the initial proposed criteria do not evaluate the prosthesis. Implant survival and associated prosthesis survival rates need to be evaluated together because the most important aspect to the patient is the restorations.

Measurement of marginal bone-level loss over time is a valuable indicator in evaluating the clinical performance of implants, because the gradual loss of marginal bone eventually leads to implant failure. Care was exercised to ensure that threads on mesial distal sides of the implants were clearly imaged [16], [11]. To correct dimensional distortion, the apparent dimension of each implant was measured on the radiograph and compared with the actual implant size used in this study. Only two implant demonstrated vertical bone-level loss more than 0.2mm.

These findings are in accordance with several other studies [7], [17]-[21]. Torbjörn and Fransson (2004) [18] reported that tooth fractures are usually caused by fatigue because of mechanical factors such as the magnitude and frequency of occlusal loads, direction of forces, and the dimension and shape of the restorative material. In our results only four implants were demonstrated veneering material fracture (failure rate 0.44%). They concluded that, with proper occlusal design, the nonaxial forces can be markedly reduced. We were found 1.77% with loosened cementation and 0.88 % fracture of veneering material 6-4 years in use in our treatments. Prosthetic complications were always associated with resin-related complications. All these complications were easily

repairable, without entailing high costs. Patients who lack periodontal receptor information show an impaired fine motor control of the mandible (Trulsson 2006) [22]. This might lead to uncontrollable, high bite forces, especially in a jaw without periodontal receptors, thus explaining fractures of the resin. These findings corroborate our study results.

The clinical criteria for optimum to satisfactory health for implants primarily should evaluate prosthesis survival. Data obtained from this study, the success of the implant supported prosthetic treatments were parallel studies.

V.CONCLUSION

For the successful conclusion of implant applications, adequate preoperative planning and analysis with the oral surgeon and prosthetist paying attention to anatomical structures necessary to avoid possible complications implant and implant supported prostheses. Implant retained single-tooth crowns should be the first choice in treatment planning.

REFERENCES

- [1] Stoumpanis C, Kohal J. To splint or not to splint oral implants in the implant-supported overdenture therapy? A systematic literature review. *Journal of Oral Rehabilitation* 2011 38; 857–869.
- [2] Lang NP, Pjetursson BE, Tan K, Bragger U, Egger M, Zwahlen M A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. II. Combined tooth-implant-supported FPDs. *Clin Oral Implants Res* 2004;15:643–653.
- [3] Brånemark PI, Hansson B, Adell R, Breine U, Lindström J, Öhman A. Osseointegrated implants in the treatment of the edentulous jaw. Experience from a 10 year period. *Scand J Plast Reconstr Surg* 1977;11:1-132.
- [4] Schroeder A, van der Zypen E, Stich H, Sutter F. The reactions of bone, connective tissue, and epithelium to endosteal implants with titanium-sprayed surfaces. *J Maxillofac Surg* 1981; 9:15-35.
- [5] Zarb GA, Schmitt A. The longitudinal clinical effectiveness of osseointegrated dental implants in anterior partially edentulous patients. *Int J Prosthodont* 1993;6:180-188.
- [6] Rasmusson, L., Roos, J. & Bystedt, H. A 10-year follow-up study of titanium dioxide-blasted implants. *Clinical Implant Dentistry & Related Research* 2005; 7:36–42.
- [7] Carlson, B. & Carlsson, G.E. Prosthodontic complications in osseointegrated dental implant treatment. *The International Journal of Oral & Maxillofacial Implants* 1994; 9: 90–4.
- [8] Albrektsson T, Zarb D, Worthington P, Eriksson AR. The long term efficacy of currently used dental implants: a review and proposed criteria of success. *Int J Oral Maxillofac Implants* 1986;1:11-25.
- [9] Gotfredsen, K. A 10-year prospective study of single tooth implants placed in the anterior maxilla. *Clinical Implant Dentistry and Related Research* 2012;14:80-7.
- [10] Esposito, M., Hirsch, J.M., Lekholm, U. & Thomsen, P. Biological factors contributing to failures of osseointegrated oral implants. (I). Success criteria and epidemiology. *European Journal of Oral Sciences* 1998; 106: 527–551.
- [11] Fischer, K., Stenberg, T., Hedin, M. & Sennerby, L. Five-year results from a randomized, controlled trial on early and delayed loading of implants supporting full-arch prosthesis in the edentulous maxilla. *Clinical Oral Implants Research* 2008; 19: 433–441.
- [12] Gallucci, G.O., Morton, D. & Weber, H.P. Loading protocols for dental implants in edentulous patients. *The International Journal of Oral & Maxillofacial Implants* 2009; 24: 132–146.
- [13] Gokcen-Rohlig B, Yaltrik M, Ozer S, Tuncer ED, Evlioglu G. Survival and Success of ITI Implants and Prostheses: Retrospective Study of Cases with 5-Year Follow-Up *Eur J of Dent* 2009;3:42-49.
- [14] Misch, C.E. Posterior single-tooth replacement. In: *Dental implant prosthetics*. Ed. Misch, C.E, Perel M.L. 1th ed. Elsevier Mosby. St Louis, p:360, 2005.
- [15] Bergkvist, G., Sahlholm, S., Nilner, K. & Lindh, C. Implant-supported fixed prostheses in the edentulous maxilla. A 2-year clinical and radiological follow-up of treatment with non-submerged ITI implants. *Clinical Oral Implants Research* 2004; 15: 351–359.
- [16] Jemt, T. Fixed implant-supported prostheses in the edentulous maxilla. A five-year follow-up report. *Clinical Oral Implants Research* 1994; 5: 142–147.
- [17] Haas R, Polak C, Fürhauser R, Maiaht-Pokorny G, Dörtdak O, Watzek G. A long-term follow-up of 76 Branemark single-tooth implants. *Clin Oral Implants Res* 2002; 13:38-43.
- [18] Torbjörnner, A. & Fransson, B. Biomechanical aspects of prosthetic treatment of structurally compromised teeth. *International Journal of Prosthodontics* 2004;17:135–141.
- [19] Hutton, J.E., Heath, M.R., Chai, J.Y., Harnett, J., Jemt, T., Johns, R.B., et al. Factors related to success and failure rates at 3-years follow-up in a multicenter study of overdentures supported by Branemark implants. *The International Journal of Oral & Maxillofacial Implants* 1995; 10: 33–42.
- [20] Eisenburger M, Gray G, Tschernitschek H. Long-term results of telescopic crown retained dentures—a retrospective study. *Eur J Prosthodont Restor Dent* 2000; 8: 87–91.
- [21] Widbom T, Lofquist L, Widbom C, Soderfeldt B, Kronstrom M Tooth-supported telescopic crown-retained dentures: an up to 9-year retrospective clinical follow-up study. *Int J Prosthodont* 2004;17: 29–34.
- [22] Trulsson, M. The tooth as a sensor in the masticatory system. *The Journal of the SDA* 2006; 98: 30-38.