## Short Communication

# Survival of Abutment Teeth Used for Telescopic Abutment Retainers in Removable Partial Dentures

Britta Dittmann, Dr Med Dent<sup>a</sup>/Peter Rammelsberg, Prof Dr Med Dent<sup>b</sup>

This retrospective clinical study investigated the survival of 385 abutment teeth retaining 117 removable partial dentures with 3 types of telescopic abutment retainers. Within a mean service time of 6.26 years, 8.8% of 385 abutment teeth were extracted. Cox regression analysis revealed a significantly higher risk of tooth loss for posterior teeth (odds ratio: 2.985) and for teeth with root canal treatment (odds ratio: 3.298), whereas age, sex, and number and type of telescopic retainer had no influence on survival. Root canal-treated teeth did not show a higher fracture rate, excluding this as an explanation for an increased risk of tooth loss. *Int J Prosthodont 2008;21:319–321*.

Telescopic abutment retainers are used to retain removable partial dentures (RPDs) and to transmit chewing forces from the artificial teeth to the abutment teeth. Three types of telescopic retainers can be used: the friction parallel telescope, the conical double crown, and the resilience telescope. For all systems, the primary coping is cemented to the abutment tooth, and the secondary crown is rigidly connected to the RPD. Investigations on the prognosis of abutment teeth revealed survival rates between 88% and 96% after 5 years.<sup>1</sup> Other studies calculated a 90% survival time of 5.9 years for men and 7.5 years for women.<sup>2</sup>

Previous studies predominantly investigated one type of telescopic retainer and did not perform multivariate survival analysis for abutment teeth. Therefore, the aim of this retrospective clinical study was to isolate risk factors for abutment tooth loss and tooth fracture of abutment teeth retaining RPDs using 3 different telescopic abutment retainers.

### **Materials and Methods**

The study sample included 385 abutment teeth retaining 117 RPDs with telescopic retainers in 86 patients. The patients (41% men; mean age at the time of insertion: 63 years [ $\pm$  9.4]) had been treated by graduate students or by resident dental clinicians. The mean time in service was 6.26 ( $\pm$  2.21) years with a mean number of 3.54 abutment teeth. Twenty-seven percent of the RPDs were anchored by friction parallel telescopes, 44% by conical double crowns, and 29% by resilience telescopes. Fifty-two percent of a total of 385 abutment teeth were located in the maxilla and 48% were in the mandible, including 20% incisors, 39% canines, 30% premolars, and 12% molars. Forty-seven percent of the RPDs were in the maxilla.

Tooth loss and other complications were evaluated by comparison with baseline data and by chart review. The probability of survival was estimated using Kaplan-Meier survival curves. Cox regression analyses were used to identify risk factors for abutment tooth loss and tooth fracture.

#### Results

Thirty-four (8.8%) of 385 abutment teeth had been extracted during a mean time in service of 6.26 years. A failure rate of 20% was found for abutment teeth with root canal treatment, compared to 5.7% for vital teeth.

<sup>&</sup>lt;sup>a</sup>Dentist, Department of Prosthodontics, University of Heidelberg, Germany.

<sup>&</sup>lt;sup>b</sup>Director, Department of Prosthodontics, University of Heidelberg, Germany.

**Correspondence to:** Prof Dr Peter Rammelsberg, Poliklinik für Zahnärztliche Prothetik, Im Neuenheimer Feld 400, D-69120 Heidelberg, Germany. Fax: 49 6221 565371. E-mail: peter\_ rammelsberg@med.uni-heidelberg.de



Fig 1 Influence of root canal treatment on the probability of abutment tooth loss.



Fig 2 Probability of tooth loss for anterior and posterior abutment teeth.

Table 1	Cox Regression	Analysis of Risk Fact	ors for Abutment Tooth Loss
---------	----------------	-----------------------	-----------------------------

	В	SE	Wald	df	Р	Odds ratio	95%	CI
Variable							Lower	Upper
Age	-0.020	0.022	0.776	1	.378	0.980	0.938	1.025
Sex	-0.352	0.375	0.884	1	.347	0.703	0.337	1.466
Maxilla/mandible	0.253	0.354	0.508	1	.476	1.287	0.643	2.579
Anterior/posterior	1.093	0.369	8.767	1	.003	2.985	1.447	6.155
RCT	1.193	0.349	11.685	1	.001	3.298	1.664	6.537
Retainer type	0.442	0.288	2.358	1	.125	1.556	0.885	2.736
No. of abutment teeth	-0.219	0.164	1.780	1	.182	0.803	0.582	1.108
Student/dentist	-0.527	0.492	1.148	1	.284	0.590	0.225	1.548

RCT = root canal treatment.

 Table 2
 Cox Regression Analysis of Risk Factors for Abutment Tooth Fracture

	В	SE	Wald	df	Р	Odds ratio	95%	CI
Variable							Lower	Upper
Age	0.016	0.032	0.249	1	.618	1.016	0.954	1.082
Sex	0.205	0.565	0.132	1	.717	1.227	0.406	3.712
Maxilla/mandible	-0.106	0.555	0.037	1	.848	0.899	0.303	2.667
Anterior/posterior	0.719	0.542	1.765	1	.184	2.053	0.710	5.935
RCT	0.249	0.553	0.202	1	.653	1.282	0.434	3.789
Retainer type	0.542	0.472	1.316	1	.251	1.719	0.681	4.336
No. of abutment teeth	0.384	0.214	3.219	1	.073	1.468	0.965	2.231
Student/dentist	-1.773	0.846	4.390	1	.036	0.170	0.032	0.892

RCT = root canal treatment.

Furthermore, posterior teeth (13.6%) were extracted more often than anterior teeth (5.3% incisors and canines). Kaplan-Meier analysis revealed a 90% probability of survival of 7.3 years for vital abutment teeth, compared to 4.7 years for teeth with root canal treatment (Fig 1). After 5 years, 89% of the abutment teeth with root canal treatment and 97% of the vital teeth were still in function. The 90% probability of survival was estimated at 7.9 years for anterior teeth and 5.7 years for posterior abutment teeth (Fig 2).

Cox regression analysis identified root canal treatment (P=.001) and tooth type (P=.003) as significant risk factors for tooth loss (Table 1). The odds ratios were 3.298 (95% confidence interval [Cl]: 1.6 to 6.5) for root canal treatment and 2.985 for posterior abutment teeth (Cl: 1.341 to 5.615). Other variables, such as age, sex, number or type of telescopic retainer, maxilla versus mandible, and treatment by students, were not significant.

The probability of an abutment tooth fracture was 4.4% after 5 years, with no differences between vital and root canal-treated teeth. Cox regression analysis indicated that treatment by dental clinicians reduced the risk by a factor of 0.17 compared to students, whereas other variables had no significant influence (Table 2).

## Discussion

Survival rates of abutment teeth retaining RPDs with telescopic retainers were comparable to those reported in previous studies.<sup>1-3</sup> Root canal treatment was identified as a significant risk factor (odds ratio: 3.3), confirming previous reports of reduced survival rates after 5 years for root canal-treated teeth (87%) compared to vital abutment teeth (96.2%).<sup>2</sup> However, root canal-treated teeth used as abutments for fixed partial dentures demonstrated significantly higher survival rates.<sup>4</sup> A significantly reduced prognosis was evaluated for posterior abutment teeth (odds ratio: 3.0) compared to anterior teeth. In contrast to a previous study,<sup>5</sup> the number of abutment teeth had no effect on the prognosis.

## Conclusions

- Abutment teeth used for 3 different telescopic abutment retainers (friction parallel telescope, conical double crown, and resilience telescope) demonstrate acceptable and comparable survival.
- Abutment teeth with root canal treatment can be used for telescopic retainers, since 89% were still in service after 5 years. However, an increased risk of abutment tooth loss should be considered.

#### References

- Wenz HJ, Hertrampf K, Lehmann KM. Clinical longevity of removable partial dentures retained by telescopic crowns: Outcome of the double crown with clearance fit. Int J Prosthodont 2001;14:207–213.
- Rehmann P, Weber A, Wöstmann B, Ferger P. Clinical evaluation of teeth fitted with telescope crowns for retaining a partial denture. Dtsch Zahnarztl Z 2007;62:99–103.
- Widbom T, Lofquist L, Widbom C, Soderfeldt B, Kronstrom M. Tooth-supported telecopic crown-retained dentures: An up to 9-year retrospective clinical follow-up study. Int J Prosthodont 2004;17:29–34.
- Wegner PK, Freitag S, Kern M. Survival rate of endodontically treated teeth with posts after prosthetic restoration. J Endod 2006; 32:928–931.
- Eisenburger M, Gray G, Tschernitschek H. Long-term results of telescopic crown retained dentures—A retrospective study. Eur J Prosthodont Restorative Dent 2000;8:87–91.

Literature Abstract

#### Vertical ridge augmentation with guided bone regeneration in association with dental implants: An experimental study in dogs

The aim of this study was to evaluate the result of using guided bone regeneration with titanium-reinforced membranes for augmentation of the alveolar bone in chronic defects with inserted implants. Three dogs were used in this experiment; they were made edentulous in the posterior mandible bilaterally with the ridge reduced and left to heal for a period of 4 months before 3 implants were placed in each site. Four sites were randomly allocated to be the test sites and the remaining sites as controls. The implants were placed in such a way to expose about 4 mm of the coronal section of the 10-mm implants. The test sites were treated with titanium-reinforced membrane stabilized with fixation tacks, with the space filled with venous blood. The control sites were just sutured over. The animals were left to heal for 6 months prior to sacrifice. One test site was exposed and results were discarded. Histomorphometric analysis showed a considerable amount of new bone formation at the test sites as compared with the control group, but the bone was mainly lamellar. Also, the new bone generally was not in direct contact with the implants and, in most cases, a band of dense connective tissue was interposed between the implant surface and the bone. This study showed that guided bone regeneration treatment resulted in considerable augmentation of the alveolar ridge, but a lack of bone-to-implant contact (BIC) was observed at the grafted sites. The authors recommended further research into factors that are essential for improving BIC.

Simion M, Dahlin C, Rocchietta I, Stavropoulos A, Sanchez R, Karring T. Clin Oral Implants Res 2007;18:86–94. References: 24. Reprints: Prof Massimo Simion, Reparto di Parodontologia clinica Odontoiatrica, Via della Commenda, 10 20122 Milano, Italy.—Y L Seetoh, Singapore Copyright of International Journal of Prosthodontics is the property of Quintessence Publishing Company Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.