

Tooth loss prosthetics by saving broken old implants: A case report

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ABSTRACT

Tooth loss is a problem that affects a lot of people of different ages and that significantly influences mastication, aesthetics, alveolar bone atrophy level and how people think about themselves. Nowadays there are a lot of ways how tooth loss can be treated, but every case is unique. This case report represents different way of tooth loss prosthetics treatment. Patient had a chief complaint about mobility of her maxillary dental bridge. She also had two implants, which had been broken 2 years ago. Treatment plan was to save old implants by preparing them as natural dental roots for posts, cores and dental crowns, and removable partial maxillary denture with hooks. A successful outcome was achieved: patients chewing effectiveness was improved, patients smile aesthetics and self-confidence returned.

Keywords: tooth loss, broken implant, prosthetics, alveolar bone atrophy.

INTRODUCTION

Tooth loss is a problem that affects older people but also it does impact some younger people too. Tooth loss causes range from poor dental care, gum diseases, poor nutrition, medication and drugs, to chronic conditions or teeth injury. Tooth loss significantly influences mastication, diets, nutrition intake, aesthetics, and food choice. Xin-Hai Yin et al (2016) had results from the meta-analysis of eight observational studies by using the random-effects model and suggested that tooth loss may be associated with increased incidence of gastric cancer [1, 2].

The number of people with missing teeth has reduced a lot over the last decades. In 1999, some 37% of adults had no natural teeth, compared with just 3,75% now. Adults age from 20 to 64 have an average of 24.92 remaining teeth. Seniors over 65 years have an average of 18.90 remaining teeth and 27.27% of seniors have no remaining teeth [3].

The most common cause of bone loss is tooth loss left unreplaced, especially multiple teeth. Jawbone is preserved through the pressure and stimulus of chewing. When that is removed through tooth loss, the bone resorbs into the body. In the first year after tooth extraction 25% of bone is lost, and this bone loss continues on [4, 5, 6]. Replacing teeth with full or partial dentures doesn't solve the problem as the dentures exert a very small amount of chewing pressure on the bone compared to natural teeth, as low as 10% or less [7]. Bone loss can be prevented by giving the

jawbone a replacement tooth with a root that can exert the same or similar pressure as natural teeth. This is done immediately after extraction by replacing single teeth with dental implants, or by using a fixed implant-supported bridge or denture[8]. A single-tooth implant or a dental bridge with three to four teeth supported by two implants provide a chewing power of 99% of natural bite force[9].

Another consequence of tooth loss is that people experience greater degrees of social avoidance and being perceived as possessing negative personality characteristics [10]. A qualitative study into the emotional effects of total tooth loss revealed a wide range of reactions. The main themes identified in relation to tooth loss were: bereavement, loss of self-confidence, concerns about appearance and self-image, tooth loss as a taboo subject which could not be discussed with other people, keeping tooth loss secret, the need for prosthodontics privacy, behavior change, premature ageing, a lack of preparation for the loss of teeth [11] and a feeling of having lost part of one's self [12]. D. M. Davis et al (2000) study had shown that people's reactions to tooth loss are likely to be affected by their ability to wear dentures [13].

The aim of this case was to reduce as slow as possible the inevitable maxillary alveolar bone atrophy, return the patient to self-confidence, aesthetics of her smile and the most important to improve the chewing effectiveness.

CASE REPORT

A 63-years-old female referred to the clinic with a chief complaint of mobility of maxillary bridge, which she had first noticed more than a month earlier. She had also experienced occasional gingival swelling at this site. Besides, she claimed to have two implants in upper jaw, but they broke down many years ago.

Figure 1 shows her oral view obtained after her first visit. She had a stable and good quality combined bridge of metal and plastic from tooth #17 to #14. Mobile bridge from tooth #13 to #23 was removed with carbide crown cutters (Diaswiss S.A, Switzerland). Gingival swelling was observed around teeth #13 and #23.



Fig. 1. Oral view after first visit.

There were two old titanium implants in area of teeth #24 and #25. According to the patient, it was screwed 10 years ago in other country, the abutments and crowns of those implants cracked about 2 years ago. Implants were stable, still, asymptomatic, pain free and showed no evidence of peri-implantitis. Also there was hyperplastic gingiva around these implants. Figure 2 shows radiographic view of teeth #23, 24 and 25 area.

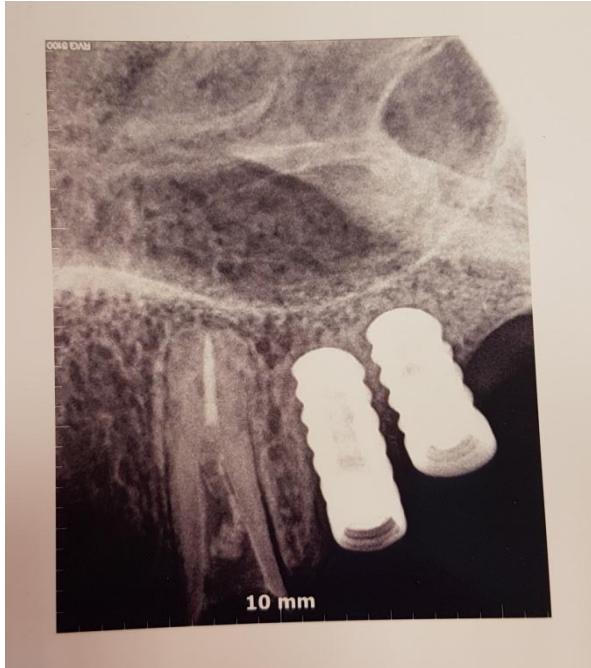


Fig. 2. Tooth #23 and two implants radiographic view.

Treatment planning

The following treatment plan was explained to the patient and informed consent obtained. The patient did not wish any surgical interventions or new implants. She had a severe nausea reflex and had been afraid of unstable denture.

1. Metal ceramics crown on tooth #13.
2. Metal post and core in tooth #23 and implants #24, 25.
3. Plastic bridge on teeth #23, 24 and 25.
4. Removable partial maxillary denture with hooks on teeth #17 and 25.

Treatment process

A detailed outline of the treatment process is shown in Table 1.

Under the anesthesia of “Ubistesin forte” 4% (3M ESPE, Germany) in area of tooth #23 and implants #24, 25, the root of tooth #23 was prepared for metal post and core. Preparation was done with stainless steel endodontic peeso reamers (VDW, Germany) size from 1 to 4 in working length of 11,5 mm. Sodium hypochlorite solution 5,25% was used for root canal irrigation. Hyperplastic gingiva around implants #24 and 25 was removed with carbide bur (Diaswiss S.A, Switzerland). Also tooth #13 metal core was prepared for metal ceramics crown.

Implants bodies were prepared with diamond bur (Diaswiss S.A, Switzerland) and water cooling. The aim of this procedure was to remove broken abutment screw from implant body and prepare a place for metal post in it. Working length was achieved 8 mm and 7 mm in implants #24 and 25 respectively (Figure 3A). Level of occlusal plane had been achieved with maxillary wax

rim, making sure that occlusal plane surface would be parallel both to Camper’s plane and in to interpupillary line. After then, the impression was taken with silicone C (ColteneWhaledent, Switzerland) for tooth #23 and implants #24, 25 metal posts and cores.

Metal post and cores for tooth #23 and implants #24, 25 have been adapted to the root and implants. Tooth #23 has been actively irrigated with 17% EDTA solution (MetaBiomed, Korea) for 1 minute and dried with paper points. Implants #24 and 25 have been cleaned with 96% spirits solution. Metal posts have been cleaned with 96% spirits solution as well. “Fuji PLUS” resin-modified glass ionomer cement (GC, Belgium) has been used for metal posts and core cementation. “Fuji PLUS” conditioner was applied in the root #23 and implants #24, 25 using a cotton pellet for 20 seconds, rinsed thoroughly, excess water has been blot away with dry cotton pallet. Cement mixed according to manufacturer's recommendations, thin layer applied to metal posts and cores and cemented in tooth #23 and implants #24, 25. Cement excess has been removed by spatula (Fig. 3B).

The impression was taken with silicone C (ColteneWhaledent, Switzerland) for tooth #13 metal ceramics crown and plastic bridge from tooth #23 to #25. The patient chose A2 color both to the metal ceramics crown and to the plastic bridge. Also teeth of partial maxillary dentures have been chosen to be the same color.

Metal ceramics crown and plastic bridge have been cemented using the same material and cementation process as mentioned above (Fig. 3C).

During checking of partial maxillary wax rim with teeth and hooks, the patient was very happy with the results, because wax rim fitted perfectly. However, after denture polymerization, there have been some variances. Primary correction has been performed. Denture plastic excess has been removed from palatal side by plastic bridge and by superior labial frenulum (Fig. 3D).

At the very least appointment the patient needed minimal denture secondary correction. Denture was only polished. Gingival swelling, redness, wounds, sores or other alterations was not observed. The denture was stable, solid, adapted and did not make the patient sick (Fig. 3EF).

Table 1. Treatment process detailed outline.

Visits	Treatment
1 st visit	Mobile bridge removal Treatment planning
2 nd visit	Tooth #23 preparation for metal post and core Gingivectomy of implants #24 and 25 Metal core of tooth #13 preparation for metal ceramics crown
3 th visit	Implants #24 and 25 preparation for metal post and core Occlusal plane orientation with maxillary wax rim Impression for tooth #23 and implants #24, 25 metal posts and cores
4 th visit	Metal posts and cores cementation in tooth #23 and implants #24, 25
5 th visit	Impression for dental crown (tooth #13) and bridge (tooth #23-25)
6 th visit	Cementation of metal ceramics crown and plastic dental bridge
7 th visit	Adaptation of maxillary wax rim with teeth and hooks
8 th visit	Primary correction of maxillary partial denture
9 th visit	Secondary correction of maxillary partial denture

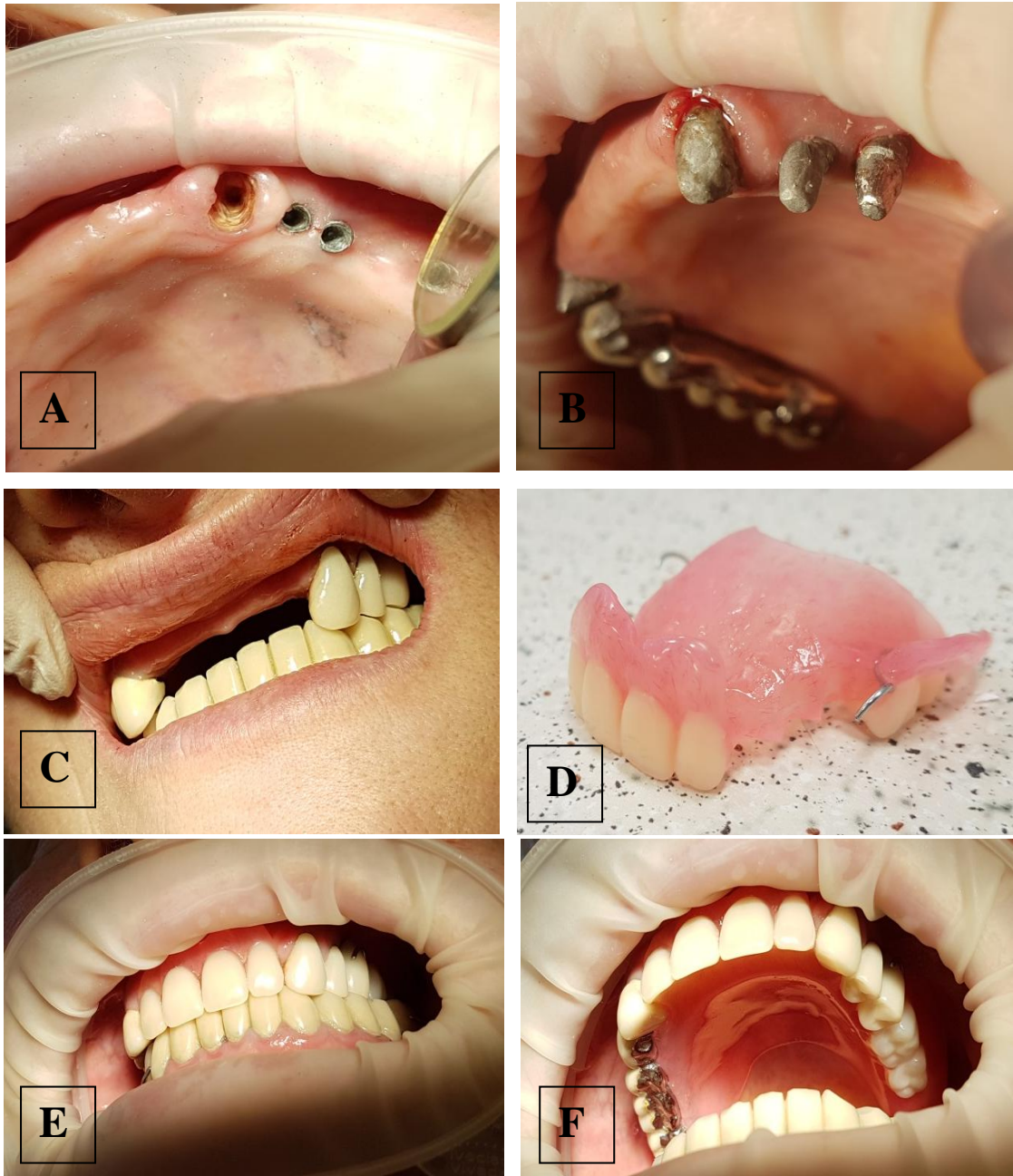


Fig. 3. Treatment process (A – preparation for metal posts and cores in tooth #23 and implants #24, 25. B – cementation of these metal posts and cores. C – cementation of metal ceramic crown of tooth #13 and plastic bridge of #23-25. D – Maxillary partial denture with hooks on teeth #17 and 25. E, F – oral view of patient last visit.)

CONCLUSIONS

This report represents that every prosthodontics case is unique. Each treatment plan must be designed to reflect the patient's needs, age and other circumstances. For example, when there is a broken old implant, extraction is not the only solution. The body of dental implant is hollow and when the abutment is removed from it, it looks like empty, enlarged root canal. Like in this case old broken implants had been prepared the same way as dental roots for post, cores and crowns. A successful outcome was achieved: patients chewing effectiveness was improved, patients smile aesthetics and self-confidence returned.

REFERENCES

1. Xin-Hai Yin, Ya-Dong Wang, Hong Luo, Ke Zhao, Guang-Lei Huang, Si-Yang Luo, Ju-Xiang Peng, Ju-Kun Song. Association between Tooth Loss and Gastric Cancer: A Meta-Analysis of Observational Studies. 2016, PLoS One, p. 11(3).
2. Ramin Shakeri, Reza Malekzadeh, Arash Etemadi, Dariush Nasrollahzadeh, Behnosh Abedi Ardekani, Masoud Khoshnia, Farhad Islami, Akram Pourshams, Michel Pawilta, Paolo Boffetta, Sanford M. Dawsey, Farin Kamangar, Christian C. Abnet. Association of tooth loss and oral hygiene with risk of gastric. 477–482 : *Cancer Prev Res (Phila)*, 2013.
3. National Institut of Dental and Craniofacial Research. [Online] 2004. <https://www.nidcr.nih.gov/research/data-statistics/tooth-loss/adults>.
4. Schropp L., Wenzel A., Kostopoulos L., Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: a clinical and radiographic 12-month prospective study. *Int J Periodontics Restorative Dent*, 2003, Vol. 23. 313-23.
5. Stig Hansson, Anders Halldin. Alveolar ridge resorption after tooth extraction: A consequence of a fundamental principle of bone physiology. *J Dent Biomech*, 2012.
6. Chul Eui Hong, Ju-Youn Lee, Jeomil Choi, Ji-Young Joo. Prediction of the alveolar bone level after the extraction of maxillary anterior teeth with severe periodontitis. 45 : *J Periodontal Implant Sci*, 2015. 216-222.
7. Carl F. Driscoll, Radi M. Masri. Single maxillary complete denture. 48 : *Dent Clin N Am*, 2004. 567–583.
8. Botticelli D, Berglundh T and Lindhe J. Hard-tissue alterations following immediate implant placement in extraction sites. 31 : *J Clin Periodontol*, 2004. 820–828.
9. Chang HS, Hsieh YD, Hsu ML. Long-term survival rate of implant-supported overdentures with various attachment systems: A 20-year retrospective study. 10: *J Dent Scien*, 2015. 55–60.
10. Newton J T, Fiske J, Foote O, Frances C, Loh I, Radford D R. A preliminary study of the impact of loss of part of the face and its prosthetic restoration. 82 : *J Pros Dent*, 1999. 585–590.
11. Fiske J, Davis D M, Frances C, Gelbier S. The emotional effects of tooth loss in edentulous people. 184: *Br Dent J*, 1998. 90-93.
12. Fiske J, Davis D M, Frances C, Gelbier S. The emotional effects of tooth loss. 21 : *The Proceedings of the European Prosthodontic Association*, 1997. 24.
13. D. M Davis, J. Fiske, B. Scott, D. R. Radford. The emotional effects of tooth loss: a preliminary quantitative study. 188 : *British Dental Journal*, 2000. 503–506.