Removable implant-prosthodontic rehabilitation of the edentulous mandible: five-year results of different prosthetic anchorage concepts.


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Abstract

Purpose: The present study evaluated implant and peri-implant outcomes as well as prosthodontic maintenance efforts for implant/bar-supported mandibular prostheses with different prosthesis anchorage systems.

Materials and Methods: Seventy-six patients who received two or four interforaminal implants were assigned to one of three different bar designs and subsequently to different prosthesis supporting systems. Forty-nine patients received implants and a mucosa-supported implant-retained overdenture (OD) with an ovoid bar (two implants; design 1) or multiple ovoid bars (four implants; design 2). Twenty-seven patients received four implants and a rigid implant-supported prosthesis (ISP) with a milled bar (design 3). Implant survival, peri-implant parameters (marginal bone resorption, pocket depth, and plaque, bleeding, gingival, and calculus indices), and postinsertion prosthodontic maintenance were followed over a 5-year period and compared among the different retention modalities. At the most recent follow-up examination, subjective patient satisfaction was additionally evaluated using a simplified scoring system (ranging from 1 = not satisfactory to 5 = excellent).

Results: Implant survival rates (100%) and all peri-implant parameters evaluated showed no differences among the three designs used for implant prosthesis anchorage. Prosthodontic maintenance did not differ between the different ODs (OD design 1: average of 1.04 maintenance visits/year/patient; OD design 2: 1.2 maintenance visits/year/patient), but it was significantly lower for the dentures that were rigidly stabilized with milled bars (ISP: 0.37 maintenance visits/year/patient). A high subjective satisfaction rate (range: 4.5 to 5.0) was registered at the final examination, without any differences among the designs used.

Conclusions: Rigid anchorage with milled bars on four-implant prostheses combined with a metal-reinforced framework showed a lower extent of prosthodontic maintenance issues than round bars on two- or four-implant overdentures with resilient denture stabilization. Nevertheless, implants and peri-implant structures were not negatively affected by either resilient or rigid anchorage mechanisms.
Mandibular implant-supported overdentures and oral function.

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Abstract

Objectives: Oral rehabilitation by means of implant-retained mandibular overdentures is known to improve oral function. The aim of this study was to evaluate the long-term effects of mandibular implant treatment on oral function. We quantified maximum bite force and masticatory performance 10 years after implant treatment. It was hypothesized that these outcome measures would not change in this period.

Materials and methods: Eighteen edentulous patients were scheduled for re-evaluation of their oral function 10 years after they had participated in a randomized cross-over clinical trial. In that trial, they had received two mandibular implants and a new denture with successively magnet-, ball-socket, and bar-clip attachments.

Results: At the 10-year follow-up, 14 of the initial 18 patients participated in the evaluation. As a result of the implant treatment, the average maximum bite force more than doubled, from 162 to 341 N, whereas the average number of chewing cycles to halve the initial particle size decreased from 55 to 27 cycles. No significant changes in maximum bite force and masticatory performance were observed after 10 years. However, the average maximum bite force obtained with implant-retained overdentures is still significantly lower than that of dentate subjects (569 N).

Conclusion: Maximum bite force and masticatory performance significantly increased after implant treatment and remained unaltered during the following 10-year period. Thus, implant treatment greatly improves oral function for a long period of time.

Retrospective analysis of bar-retained dentures with cantilever extension: marginal bone level changes around dental implants over time.

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Abstract

PURPOSE: The aim of this study was to retrospectively determine whether a relationship exists between the length of the distal bar extension and the amount of marginal bone loss around implants supporting cantilevered bar-retained dentures.
MATERIALS AND METHODS: This study was performed using data from patients who had been restored with implant-supported cantilevered bar-retained prostheses. Panoramic radiographs were obtained annually starting at the time of prosthetic loading of the implants; the protocol included a 4-year observation period. Vertical changes in the bone level were measured on the mesial and distal of implant sites with respect to a defined reference point per implant system, and radiographic distortions were compensated. Statistical analysis was performed with the Wilcoxon signed-rank test, the Spearman rank correlation test, and the two-factor nonparametric analysis for repeated measurements.

RESULTS: A total of 48 edentulous patients who were consecutively treated with 313 dental implants and rehabilitated with 66 bar-retained prostheses were included in the study. Implants were used to support 30 prostheses in the maxilla (172 implants) and 36 prostheses in the mandible (141 implants). These prostheses were supported by bars with distal cantilevers of up to 12 mm. Patients with bars without cantilevers served as the control group. After 4 years, mean mesial bone loss was 2.20 +/- 0.91 mm; for distal implant sites it was 2.31 +/- 1.05 mm. The number of implants inserted and implant length did not correlate with bone loss. Jaw (maxilla versus mandible) and implant system exerted a significant influence on the amount of bone lost within the first year. Cantilever length did not influence marginal bone loss.

CONCLUSION: In this clinical study, no influence of the length of cantilever extensions on crestal bone loss was found. Within the limitations of the study, the results indicate that restorations with distal bar extensions up to 12 mm are an adequate treatment option for edentulous patients.

Immediate functional loading of dental implants supporting a bar-retained maxillary overdenture: preliminary 12-month results.

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Abstract

BACKGROUND: The present study evaluated the efficacy of a treatment consisting of placing and immediately loading implants with a bar-retained overdenture in edentulous maxillae.

METHODS: Twenty-two consecutive patients were treated with four or five implants rigidly connected with a bar, which were then loaded with a maxillary overdenture within 48 hours post-surgery. The patients were followed clinically and radiographically for 1 year after loading. The implant outcome with regard to survival and success was analyzed. Visual analog scale questionnaires were used to record patient function and satisfaction before and after implant treatment.

RESULTS: Of the 103 implants, three failed within 1 year. Two implants, although integrated, presented with marginal bone resorption (MBR) values higher than those proposed for
successful implants. Cumulative survival and success rates of implants were 97.1% and 95.2%, respectively. The average MBR after 1 year was low (0.78 +/- 0.79 mm). The main prosthetic complication was the frequent need for complete relining of the prosthesis in the initial weeks after loading (27.2%). The questionnaire revealed a significant increase in all comfort, functional, and esthetic parameters (Friedman test; P <0.0001), except in the cleaning feasibility category; a significant decrease in satisfaction was observed in this category (Friedman test; P <0.05), indicating the difficulty patients had in maintaining a high level of oral hygiene.

CONCLUSION: These preliminary results suggest that immediate loading of multiple implants supporting a bar-retained overdenture may represent a predictable treatment option for the rehabilitation of the edentulous maxilla.

Rigidly splinted implants in the resorbed maxilla to retain a hinging overdenture: a series of clinical reports for up to 4 years.

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J Prosthet Dent. 1998 Feb;79(2):156-64.

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Abstract

STATEMENT OF PROBLEM: The results of the implant overdenture treatment in the maxilla remains inferior to those in the mandible. Different reasons have been alluded to, such as bone quality and quantity, number of implants, as well as the prosthesis design.

PURPOSE: To investigate the latter, a new design for the rehabilitation of the resorbed maxillae was set up.

MATERIAL AND METHODS: Thirteen patients were selected and provided with four endosseous maxillary implants, splinted with a rigid-cast bar.

RESULTS: After a mean loading time of 3 years, six implants were lost; three at abutment and another three shortly after abutment connection, resulting in a cumulative success rate of 88.6% at year 4. A mean marginal bone loss of 0.3 mm was observed within the first year. After the first year, the marginal bone level, the attachment level, and the Periotest scores hardly changed. The main prosthetic complication was the frequent need to renew or to activate the attachments. A strong improvement in patient satisfaction was observed when compared with the old conventional denture.

CONCLUSIONS: Within the limits of this study, the outcome confirmed that, on a medium-term base, implant-retained hinging overdentures on four implants were promising.
**A 5-year randomized clinical trial on the influence of splinted and unsplinted oral implants in the mandibular overdenture therapy. Part I: Peri-implant outcome.**

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**Abstract**

Thirty-six completely edentulous patients were enrolled for a 5-year prospective study testing the treatment outcome between splinted and unsplinted implants retaining a mandibular hinging overdenture. The patients were randomized into 3 groups of equal size depending on the attachment system used such as: magnets, ball attachments or bars (reference group). Only 1 implant out of the 72 had failed at the abutment stage. Not a single implant failed during the 5-year loading period. The accumulation of plaque was significantly higher for the Magnet than for the Ball group. Bleeding on probing, as well as marginal bone level, attachment level and Periotest values did not statistically differ among the groups, neither at year 1 nor at year 5. However, the Periotest values were significantly lower at year 5 compared to year 1 for all groups, which indicates a higher rigidity at the bone-implant interface. No correlation was found between bleeding on probing and marginal bone loss.

We conclude that the connection state of 2 implants retaining a hinging overdenture did not influence the peri-implant outcome.

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**A 10-year randomized clinical trial on the influence of splinted and unsplinted oral implants retaining mandibular overdentures: peri-implant outcome.**

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**Abstract**

**PURPOSE:** This randomized controlled clinical trial aimed to evaluate the efficacy of splinted implants versus unsplinted implants in overdenture therapy over a 10-year period.

**MATERIALS AND METHODS:** The study sample comprised 36 completely edentulous patients, 17 men and 19 women (mean age 63.7 years). In each patient, 2 implants (Brånemark System, Nobel Biocare, Göteborg, Sweden) were placed in the interforaminal area. Three to 5 months after placement, they were connected to standard abutments. The patients were then rehabilitated with ball-retained overdentures, magnet-retained overdentures, or bar-retained overdentures (the control group). Patients were followed for 4, 12, 60, and 120 months post-abutment connection. Group means as well as linear
regression models were fitted with attachment type and time as classification variables and corrected for simultaneous testing (Tukey).

RESULTS: After 10 years, 9 patients had died and 1 was severely ill. Over 10 years, no implants failed. Mean Plaque Index, Bleeding Index, change in attachment level, Periotest values, and marginal bone level at the end of the follow-up period were not significantly different among the groups.

DISCUSSION: The annual marginal bone loss, excluding the first months of remodeling, was comparable with that found around healthy natural teeth.

CONCLUSION: The fact that no implants failed and that overall marginal bone loss after the first year of bone remodeling was limited suggested that implants in a 2-implant mandibular overdenture concept have an excellent prognosis in this patient population, irrespective of the attachment system used.

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**Comparing bar and double-crown attachments in implant-retained prosthetic reconstruction: a follow-up investigation.**


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Abstract

OBJECTIVES: A removable implant-retained dental prosthesis in an edentulous mandible can use telescopic crowns or a bar superstructure as anchorage elements for an overdenture. The aim of this study was to compare the clinical results for bar-anchored and telescopic crown-retained overdentures in implant prosthetic treatment of the toothless lower jaw with two or more implants placed in the intraforaminal region.

MATERIAL AND METHODS: A clinical and radiographical comparison was made of the telescope vs. the bar method for removable prosthetic rehabilitation treatments in patients with an edentulous mandible. For evaluation of the clinical data, the sulcus fluid flow rate, Periotest values, and the peri-implant bone loss were recorded.

RESULTS: In the follow-up examinations, 19 implant losses were reported between insertion and review of 328 implants. The frequency distribution of the observed loss rates showed no treatment-specific trend. In the group with bar-treated implants, failure led to 'group loss' of the whole prosthetic superstructure. Failure of one of the double-crown-stabilized full dental prosthesis could usually be adapted so that the overdenture remained usable even without re-implantation.

CONCLUSIONS: After comparing all the clinical parameters evaluated, no significant difference between the stabilization of full dentures via conus and telescopic crowns and bar-anchored dentures could be found. The choice of one particular method remains the decision of the professional treating the patient.
Über 20jährige Erfahrung mit der sofortigen funktionellen Belastung von Implantatstegen in der Regio interforaminalis

Ledermann PD.


Zusammenfassung:

Summary:
In the past 23 years the author’s efforts were focus-sed on optimizating functional implant therapy by improving marketed and developing new implants, instruments and concepts. This included the development of improved implant materials (1973 — 1976) and designs as well as the refinement of the micro- and macromorphology of intra- and extraosseous implant surfaces (1976 - 1985) and finally the development of prefabricated microprecision superstructures. This paper intends to present, evaluate and discuss the experience and long-term results achieved with these improvements and developments, based on four examples of different implant types used for specific indications. In a consecutive series 1523 screw implants connected with immediate bar constructions were integrated into the edentulous mandibles of 411 patients between October 1975 and October 1995. The implants -were continuously documented, the data entered in an implant database and evaluated. Of the 1523 screw implants 1414 are successful (= 92%) until today, and 109 implants had to be retrieved (= 7.2%). The oldest screws have been in functions for 20.41 years, the youngest ones for three months. In chronological sequence the following implant types were placed in 250 female and 101 male patients: 31 CBS, 898 TPS, 363 NLS and 321 Ha-Ti. The implants were splinted with a bar on the day of implant insertion and subjected to functional loads via an overdenture.
Zusammenfassung:

Implant supported restorative treatment concepts for the edentulous upper and lower jaw.

Summary:
Several implant supported restorative treatment concepts for edentulous patients are presented. Naturally, the type of restoration depends on the number of implants placed. Five cases are described to provide a critical overview: a bar retained overdenture on four Frialoc implants with immediate loading; telescopic denture in the lower jaw, overdenture on six implants with a custom milled bar, fixed cemented bridge on implants; tooth by tooth restorative concept using 10 root shaped immediate implants and four temporary implants. A survey of the surgical procedures, the overlay denture concepts and some dental laboratory aspects are discussed.