**Split-frame implant prosthesis designed to compensate for mandibular flexure: a clinical report.**

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**Abstract**

When an edentulous mandible is restored with 4 or more implants connected by a metal bar and retained with screws, mandibular flexure may cause screw loosening and unnecessary stresses and strains on the prosthesis and implants. Separating the prosthesis at the midline can relieve these stresses and strains. This article describes the separation of a hybrid mandibular denture at the midline.

**Practical clinical guidelines to prevent screw loosening.**

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**Abstract**

The use of a screw-retained prosthesis on an osseointegrated implant is a popular treatment modality offering relative ease in the removal of the restoration. One of the complications associated with this modality is the loosening of the abutment and coping screws. Loosening of the screws results in patient dissatisfaction, frustration to the dentist and, if left untreated, component fracture. There are several factors which contribute to the loosening of implant components which can be controlled by the restorative dentist and the lab technician. This article addresses the contributory factors and offers solutions which can be easily incorporated in the treatment.
Screw loosening for standard and wide diameter implants in partially edentulous cases: 3- to 7-year longitudinal data.

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Abstract

Screw loosening is considered to be a common problem with both screw-retained and cemented implant restorations. A wider abutment platform, as well as using a torque driver to tighten specifically designed screws may help prevent this loosening. However, there has been no clinical study evaluating either of these. To longitudinally compare the frequency of screw loosening in standard diameter, (3.75 and 4.0 mm) implant supported prostheses to that of wide diameter, (5.0 and 6.0 mm) implant supported prostheses that were hand tightened, and to evaluate whether using a torque driver would minimize or prevent this problem, if screw loosening occurred. A total of 213 dental implants in 106 patients were included in this prospective longitudinal study. Of the implants 68 were wide diameter and 145 were standard diameter implants. Wide diameter implants showed 5.8% screw loosening, while standard diameter implants showed 14.5% screw loosening after insertion with only hand torquing. When these loose screws were tightened with a torque driver, there was no more loosening of screws. Within the limitations of this study, the wide diameter implants tested showed less screw loosening than the standard diameter implants when hand torqued. Additionally, within the scope of our study, using a torque driver to tighten the screws with the recommended force prevented this loosening from reoccurring in all cases.

Implant screw mechanics.

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Abstract

Osseointegrated implant support of dental restorations continues to be a popular option for the contemporary patient with missing natural dentition. This article focuses on the two most frequently used methods for attaching final prostheses to endosseous implants. The authors offer practical solutions for minimizing implant screw loosening and describe the factors involved in maintaining stable screw joint assembly.
The influence of bar design (round versus milled bar) on prosthodontic maintenance of mandibular overdentures supported by 4 implants: a 5-year prospective study.

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Abstract

PURPOSE: The aim of the present study was to evaluate the prosthodontic maintenance required for mandibular overdentures supported by 4 implants and splinted with either a round bar and resilient overdenture anchorage or a milled bar with rigid anchorage over a 5-year period.

MATERIALS AND METHODS: In a randomized prospective trial, 51 edentulous patients received 4 mandibular interforaminal implants to support an overdenture and maxillary complete dentures. For the implant-supported overdentures (IODs), bar architecture and denture stabilization were chosen randomly; 25 patients received round bars (group 1) and resilient anchorage and 26 patients received milled bars (group 2) and rigid anchorage. The prosthodontic maintenance required for the IODs and opposing dentures were evaluated during a 5-year follow-up period and compared between the 2 retention modalities used for IODs.

RESULTS: Forty-six patients (22 in group 1, 24 in group 2) were available for a 5-year follow-up (dropout rate: 9.8%). Prosthodontic maintenance efforts were significantly greater (P < .01) with the round bar design (group 1) than with the overdentures stabilized with milled bars (group 2). In group 1, prosthetic maintenance efforts were more frequent in the early phase of use (1 to 2 years), as compared with an evenly distributed incidence over the 5-year period with the rigid milled bar system. Major prosthetic complications (IOD remaking, bar fracture) were only seen in cases without metal-reinforced frameworks (group 1).

CONCLUSION: When 4 interforaminal implants are used to anchor mandibular overdentures, the design of the anchorage system will significantly affect prosthodontic maintenance efforts and complication rates. Rigid anchorage using milled bars and a metal-reinforced denture framework required less prosthodontic maintenance, ie, for clip activation/fracture, than resilient denture stabilization using multiple round bars without a rigid denture framework.
Within-subject comparison of two rigid bar designs connecting two interforaminal implants: patients' satisfaction and prosthetic results.

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Abstract

BACKGROUND: There is evidence for the superiority of two-implant overdentures over complete dentures in the mandible. Various anchorage devices were used to provide stability to overdentures. The aim of the present study was to compare two designs of a rigid bar connecting two mandibular implants.

MATERIALS AND METHODS: Completely edentulous patients received a new denture in the maxilla and an implant-supported overdenture in the mandible. They were randomly allocated to two groups (A or B) with regard to the bar design. A standard U-shaped bar (Dolder bar) was used connecting the two implants in a straight line. For comparison, precision attachments were soldered distal to the bar copings. Group A started the study with the standard bar (S-bar), while group B started with the attachment-bar (A-bar). After 3 months, they had to answer a questionnaire (visual analogue scale [VAS]); then the bar design was changed in both groups. After a period of another 3 months, the patients had to answer the same questions; then they had the choice to keep their preferred bar. Now the study period was extended to another year of observation, and the patients answered again the same questionnaire. In vivo force measurements were carried out with both bar types at the end of the test periods. The prosthetic maintenance service carried out during the 6-month period was recorded for both bar types in both groups. Statistical analysis as performed with the SPSS statistical package (SPSS Inc., Chicago, IL, USA).

RESULTS: Satisfaction was high in both groups. Group B, who had entered the study with the attachment bar, gave slightly better ratings to this type for four items, while in group A, no differences were found. At the end of the 6-month comparison period, all but one patient wished to continue to wear the attachment bar. Prosthetic service was equal in groups A and B, but the total number of interventions is significantly higher in the attachment bar. Force patterns of maximum biting were similar in both bar designs, but exhibited significantly higher axial forces in the attachment bar.

CONCLUSIONS: Both bar designs provide good retention and functional comfort. High stability appears to be an important factor for the patients' satisfaction and oral comfort. Rigid retention results in a higher force impact and appears to evoke the need for the retightening of occlusal screws, resulting in more maintenance service.
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.
Treatment of edentulous patients with temporomandibular disorders with implant-supported overdentures.

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Abstract

Treatment of edentulous patients who have temporomandibular disorders is difficult because of the poor stability of their conventional complete dentures. With an implant-supported bar and a clip-to-bar overdenture, mandibular dentures can be stabilized. The results of a prospective clinical study of 10 edentulous patients with temporomandibular disorders and treatment with implant-supported overdentures in mandibles are presented. Before and after 3 years of wearing the implant-supported overdentures, patients were interviewed and a clinical functional analysis was taken. Patients with displacement of the articular disc or bone destruction of the joints had a decrease in pain, an enhanced mobility of the mandible, and a decrease in temporomandibular joint sounds. Patients with pain of muscular genesis as a result of bruxism suffered after 3 years from the same pain and did not show an improvement of muscle or joint sensitivity.

Implant-supported overdenture therapy: a retrospective study.

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Abstract

All patients (n = 46) treated with implant-supported overdentures at the Department of Prosthetic Dentistry, Dental and Medical Health Centre, Halmstad, Sweden, from 1986 to 1993 were studied. The clinical examination was completed in 1994. The material was divided into two subgroups: Group A had been initially treatment planned for an implant-supported overdenture, and Group B had been planned for fixed prostheses but because of loss of implants before loading, treatment with a fixed prosthesis was not possible. The authors present their experience and patient reactions to overdenture therapy in two defined groups of patients. The implant failure rate before loading for Group A (n = 12) was 15% (six implants out of 39), and the rate before loading for Group B (n = 29) was 43.6% (68 implants out of 156). After prosthodontic treatment in Group A, the implant success rate after loading was 87.9%, and the overdenture stability was 84.6%. In group B, 17 implants placed in the maxillae were lost after overdenture therapy, which resulted in an implant success rate of 79.3%. A total of eight overdentures, all of which had been placed in the maxillae, were lost, resulting in an overdenture stability of 73.3%. In this study "change of retentive clips" was the predominant prosthodontic complication related to the overdentures, especially in Group B. Most of these complications (62%) occurred in patients with clinical signs of bruxism. Patient reactions to treatment with an overdenture were positive regarding esthetics for both groups.
More negative views were recorded in Group B than in Group A in response to function and retention of the overdenture.