Short Communication

Mandibular Implant-Retained Overdentures with 2 Different Prosthetic Designs: A Retrospective Pilot Study on Maintenance Interventions

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This retrospective study aimed to investigate whether a mandibular implant-retained overdenture designed to counteract the rotation of the denture might influence the clinical outcome, as evaluated through the prosthetic maintenance interventions. The amount of repairs and relines of the mandibular and maxillary dentures required in an experimental group (6 patients wearing an implant-retained overdenture with a metal frame counteracting the rotation) and a control group (6 patients wearing an implant-retained overdenture allowing the rotation) was compared. Both mandibular and maxillary dentures needed few repairs or relines. The 2 types of dentures showed a similar number of maintenance interventions. *Int J Prosthodont 2006;19:557–559.*

The denture design and location of implants can allow the free rotation of the denture on the axis connecting the implants during function. In the literature, it has been suggested that this rotation may have an influence on the success rate,[1–3] while other studies showed that position and retention mechanisms of mandibular implants retaining an overdenture have little influence on the clinical success.[4]

This study aimed to investigate whether and how a mandibular implant-retained overdenture design that counteracts the free rotation of the denture may influence its success, as evaluated through the prosthetic maintenance interventions.

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Materials and Methods

The experimental group (6 patients) included edentulous patients at the Department of Prosthodontics of the Hospital S. Giovanni Battista-Molinette from 1993 to 2005 who presented caruncolae (excretory ducts of the submandibular salivary glands) very close to the edentulous ridge (Table 1). These patients requested an economic and functional overdenture without the lingual flange interfering with the caruncolae. A mandibular implant-retained overdenture with a metal frame[5] and precision attachments (ball attachments, 2.25 mm; titanium-alloy cap, 2.25 mm; Nobel Biocare) was used (Figs 1a and 1b). Thanks to this design, the lingual and, generally, buccal resin flanges are absent in the anterior region (Fig 2). The denture was retained by ball attachments and its rotation counteracted by the metal frame resting on the implant abutment (Fig 1b).

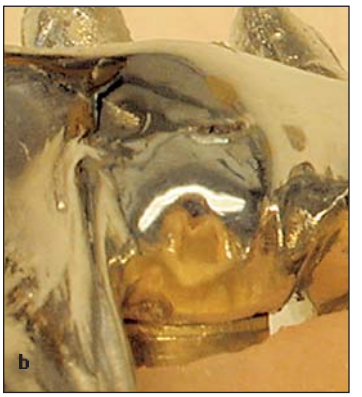
The 6 patients from the control group were drawn from 103 patients treated in the same department during the same period and were chosen according to a paired sampling (Table 1). These patients were treated with a traditional design of a mandibular implant-retained overdenture retained with ball attachments without a metal frame (O-ring, 4 mm; Nobel Biocare).

In this retrospective clinical case series, patients were followed up for a mean period of 8 years (range: 4 to 12 years).

Table 1 Baseline Characteristics of Patients in the Experimental and Control Groups

	Patient					
	1	2	3	4	5	6
Experimental group						
Age (y)	61	63	60	55	59	62
Follow-up (y)	9	8	8	4	12	7
Antagonist	CD	CD	CD	RPD	CD	FP
Control group						
Age (y)	61	64	63	70	70	67
Follow-up (y)	9	8	11	5	8	8
Antagonist	CD	CD	CD	RPD	CD	FP

CD = complete denture; RPD = removable partial denture; FP = fixed prosthesis.



Figs 1a and 1b **(a)** Matrices cemented onto the metal frame. **(b)** Detail: the metal framework sitting on the implant abutment.

Fig 2 Absence of the lingual and vestibular flaps.

The amount of relines of mandibular and maxillary dentures and attachment repairs of the 2 groups during the follow-up period was compared. Implant survival was considered at the final assessment.

Results

The results are shown in Table 2. Four patients of the experimental group and 3 of the control group needed a reline of the maxillary denture. In the experimental group, no relines of the mandibular dentures were necessary, whereas 2 relines were necessary in the control group.

The mandibular dentures needed few repairs. In 4 patients of the experimental group, the matrices of the attachments required replacement 3 to 5 years after placement, and in 1 case, 1 of the springs required replacement. In the control group, the attachments were replaced for 2 patients.

At the time of the final assessment, no implants were lost.

Table 2 Results of the Longitudinal Study for the Experimental and Control Groups

	Patient					
	1	2	3	4	5	6
Experimental group						
Maxillary maintenance intervention	Reline	Reline	Reline	–	Reline	–
Overdenture relines	–	–	–	–	–	–
Type and time of attachment replacement	–	1 matrix (after 3 y)	1 matrix (after 5 y)	–	2 matrix (after 4 y)	1 spring (after 4 y)
Control group						
Maxillary maintenance intervention	Reline	–	Reline	–	Reline	–
Overdenture relines	Reline	–	Reline	–	–	–
Type and time of attachment replacement	1 matrix (after 4 y)	–	1 ball (after 4 y)	1 matrix (after 3 y)	–	1 matrix (after 2.5 y)

Discussion

In both the experimental and control groups, relines of the maxillary dentures were required in some cases. The absence of relines for the mandibular dentures in the experimental group may be considered a sign of good structural prophylaxis of the alveolar ridge.[1]

Attachment-maintenance interventions in the experimental group were likely related to the attachment type and morphology.[3] The first of a very limited number of repairs occurred after 3 years of function. The wear of this type of matrices can be considered a physiologic event[3] and not a result of the different denture design. The eventual wear of the balls does not influence the rotation of the denture. The counteracting action is determined by the contact between the metal framework and the implant abutment, not by the attachment itself (Fig 1).

Implant survival was 100% in both groups.

The duration of prosthetic components and the prophylaxis of the residual structures with hinging and nonhinging overdentures are discussed in the literature. Different clinical results and interpretations have been proposed.[3]

Conclusion

This pilot study was conducted using 6 patients followed up for 4 to 12 years. The results show comparable levels of longevity between the 2 rehabilitations used. The results are in agreement with other studies[4] and suggest that the absence of free rotation of implant-retained dentures may allow implant survival, a good bone prophylaxis of the edentulous mandibular ridge, and maintenance interventions similar to the traditional design.

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