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An aftercare and cost-effectiveness assessment of 3 types of implant-retained mandibular overdentures in a cohort of 110 patients with a follow-up of 8 years

Visser, Anita; Raghoobar, Gerry M.; Meijer, Henny J.A.; Vissink, Arjan

Published in:
Journal of Dental Research

DOI:
[10.1177/154405910708601002](https://doi.org/10.1177/154405910708601002)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2007

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Visser, A., Raghoobar, G. M., Meijer, H. J. A., & Vissink, A. (2007). An aftercare and cost-effectiveness assessment of 3 types of implant-retained mandibular overdentures in a cohort of 110 patients with a follow-up of 8 years. *Journal of Dental Research*, 86(10), 919.
<https://doi.org/10.1177/154405910708601002>

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To the Editor:

Stoker *et al.* (2007) performed an aftercare and cost-effectiveness assessment of 3 types of implant-retained mandibular overdentures in a cohort of 110 patients with a follow-up of 8 years. They claimed that their observations were unique, but there are other studies on aftercare and costs of mandibular overdentures in large groups of patients, with a comparable to longer follow-up. Unfortunately, Stoker *et al.* (2007) omitted comparing their outcomes with those studies.

In considerations of overall treatment time needed for aftercare, and thus costs, there might be a pitfall. From about the eighth year after implant loading, there will be an increased need for lower denture remakes, either implant-retained or conventional. Thus, Stoker *et al.* (2007) might have underreported the need for lower denture remakes and thus underestimated the time needed for prosthetic aftercare. The time needed for aftercare might increase shortly after the end of their follow-up, making the cost-effectiveness of an implant treatment less favorable.

Moreover, Stoker *et al.* (2007) scored the aftercare in rather general terms, as has been done in many other studies (Wismeijer *et al.*, 1995; Naert *et al.*, 1997; Meijer *et al.*, 2004; Telleman *et al.*, 2006). However, to predict problems patients may encounter and to develop approaches to prevent or reduce these problems, one should score aftercare in greater detail. Detailed information is essential, since part of the aftercare may be technique-driven. We studied aftercare in greater detail over a 10-year period and, *e.g.*, already mentioned that certain types of bars or clips had to be replaced by other types because of a high occurrence of failure during follow-up (Visser *et al.*, 2006). Stoker *et al.* (2007) confirmed that abutment design and the choice of material used for the retentive part of the matrix influenced the friction grip and thus the need for aftercare. Such information becomes available to the readership only when aftercare is reported in greater detail.

— Anita Visser, Gerry M. Raghoobar,
Henny J.A. Meijer, and Arjan Vissink

Department of Oral and Maxillofacial Surgery and Special Dental Care, University of Groningen and University Medical Center Groningen, PO Box 30.001, 9700 RB Groningen, the Netherlands

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The authors reply:

The comments made by Visser *et al.* show the expertise of their group in the same field of research as ours. Nevertheless, we feel the need to reply to their letter to the Editor.

The study mentioned by Visser *et al.* (2006) was published after our paper was submitted. In our study (Stoker *et al.*, 2007) and many others, only direct costs are taken into account. We examined other studies on aftercare and costs and concluded that there are different approaches when measuring costs. Our study is based on chair-time in minutes, where others (*e.g.*, Walton *et al.*, 1996; MacEntee and Walton, 1998) estimate direct costs on fees charged by clinicians, and still others (*e.g.*, Watson *et al.*, 2002) estimate professional time by multiplying the numbers of aftercare events by the (estimated) respective time allocations. The study of Visser *et al.* (2006) belongs to the latter group.

An evaluation period is almost always too short to reveal every possible aftercare event during the lifecycle of a chosen treatment modality. Long-term evaluations in a randomized clinical trial of mandibular implant-retained overdentures are still scarce. There is no specific proof that there is an increased demand for lower denture remakes 8 years after loading, or even after 10 years. However, one may assume that this demand will increase in time and eventually present itself for every patient who lives through the lifecycle of the provided treatment modality.

In our analysis, all aftercare events that occurred were collected and taken into account. Infrequently occurring aftercare events are not mentioned in our Table 2 (Frequencies of Specific Aftercare and Treatment during the Evaluation Period of 8.3 Years), due to the limited space allowed *per* the guidelines of the *JDR*. Detailed information of any importance is discussed in the paper.

In this study, an egg-shaped Dolder bar with the original clip was used and did not show specific problems. In contrast, however, the ball attachment group showed specific problems caused by the loss of retention.

Sincerely,

— Geert Stoker^{1,2,3}, Daniël Wismeijer², and Rien van Waas¹

¹Free University, Department of Oral Function, Academic Centre for Dentistry Amsterdam, Dental School, Amsterdam, The Netherlands; and ²Amphia Teaching Hospital, Department of Special Dental Care and Maxillofacial Prosthodontics, Breda, The Netherlands; ³corresponding author, Hogeweg 5, NL-3212 LG Simonshaven, The Netherlands, geertstoker@wxs.nl

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To the Editor:

RE: Stoker GT, Wismeijer D, Van Waas MAJ (2007). An eight-year follow-up to a randomized clinical trial of aftercare and cost-analysis with three types of mandibular implant-retained overdentures. *J Dent Res* 86:276-280.

We read the article by Stoker *et al.* with great interest. This study is unique in the length of adequate follow-up of the cohort that has been achieved. It is therefore possible to compare three types of overdentures in various aspects.

The main conclusion of the article, however, after careful evaluation of the presented data, seems not completely in accordance with the results. The authors state that the cost-effectiveness of the single-bar attachment on two implants is better than that of the ball attachment. This conclusion is mainly based on the rather artificial division of the check-up episodes, with or without simple treatment. Simple treatment consisted, in most cases, of activation of the ball attachment, which takes a very short time. It is therefore not surprising that the total treatment time of the check-ups was not significantly different in the three groups (with the largest total treatment time in the single-bar group!). In our view, dividing the check-ups into two groups leads to incorrect conclusions and should not be done.

Total costs after 8 years were 4.5% lower in the group with ball attachments compared with the group with 2 single-bar implants. This does not seem to be a very large difference, but when taking into account the thousands of patients who receive these overdentures every year, it makes a considerable difference in Euros and should therefore be considered as an important item. Since the groups were not normally distributed, statistical significance is of lesser importance. Only when evaluated in a greater number of patients is it more likely to achieve a normal distribution of data from which firm conclusions can be drawn.

Patient satisfaction, published in an earlier report (Timmerman *et al.*, 2004), is also mentioned. Despite the fact that, after 8 years, general satisfaction was high and not dependent on treatment strategy, in the patients' opinion the ball attachment was found to be decreasing in retention and stability over the years. However, the clinical significance of this finding remains unclear and is not discussed in the article.

In conclusion, the authors are to be commended for this very important and valuable study, but the final conclusions should be considered with some care.

—J. de Lange and A.V. van Gool

Dr. J. de Lange, Isala Clinics, Dept. of Oral and Maxillofacial Surgery, Groot Wezenland 20, 8000 GM Zwolle, The Netherlands; lotte.jan@wxs.nl

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The authors reply:

The main conclusion of the article (Stoker *et al.*, 2007)—that an overdenture on 2 implants interconnected by a single bar might be the first treatment of choice, with high cost-effectiveness and efficacy and proven stability for a long-term period—is based not only on the aspects of costs but also on patient satisfaction (Timmerman *et al.*, 2004). De Lange and van Gool state that this conclusion is not in accordance with the results and is mainly based on a rather artificial division of check-up episodes.

The costs of aftercare are not different for the 3 treatment groups when analyzed in an eight-year follow-up. The difference in total cost between the groups with a single bar and with 2 ball attachments was only 4.5% due to the initial cost involving placement of the implants, and the manufacture of the denture and the suprastructure. This means that this percentage is expected to decrease in time. Thus, the differences in cost are expected to decrease and so probably will play a minor role in the choice between 2 implants with a single bar or with 2 ball attachments.

It is a misunderstanding that the groups were not normally distributed. Cost was a continuous variable, but the costs of aftercare *per* patient were not normally distributed. Despite the use of non-parametric tests, statistical significance can still be revealed.

The conclusion that the group with the ball attachments needs more check-ups with simple treatment than the group with the single bar is drawn after analysis of all data. The division in check-up episodes with and without simple treatment especially shows simple intervention by the prosthodontist—for instance, re-activation of the retentive system. All experienced prosthodontists know that when the patient lacks the retention of the lower overdenture, it takes time before the patient contacts the practice and schedules an appointment. This means, for the patient, a longer period with less retention than desired, and thus leads to annoyance and patient dissatisfaction. The finding that the group with the ball attachments scored significantly lower in satisfaction for the item of retention and stability of the lower overdenture (Timmerman *et al.*, 2004) confirms this conclusion. In this same paper, the clinical significance of this finding is discussed. In the literature, a majority of studies (*e.g.*, Chaffee *et al.*, 2002; Walton, 2003) reported that ball attachments needed more aftercare than a single bar, regardless of the implant system used.

More short visits did not result in significantly more total treatment time. This is due to the fact that a non-scheduled visit with a simple treatment often leads to a rescheduling of the next already-planned regular check-up visit. This might explain why the total number of visits during the follow-up period hardly differs.

—Geert Stoker, Daniël Wismeijer, and Rien van Waas

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