Marginal bone loss and survival rate of immediately loaded mandibular 2-implant overdentures retained by magnetic attachments: 3 years follow-up

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Introduction

In these days, several studies have shown that IOD provide adequate denture stability and retention and improve patients' quality of life (QoL) and lead to higher denture satisfaction, including better function, speech, and comfort [1]. The McGill consensus suggested that a two-implant overdenture (2-IOD) should become the first choice of treatment for the edentulous mandible [2]. Immediate loading of IOD treatment has been attempted to shorten the healing period and to allow earlier use of dentures than conventional loading.

Objective

The aim of this study was to compare marginal bone loss and survival rate, between immediately and conventionally loaded mandibular two-implant overdentures retained by magnetic attachments.

Materials and Methods

Fig1 shows the clinical procedures of this trial. This study was a randomized unblinded parallel-group trial to compare immediately loaded mandibular 2-IODs retained by magnetic attachments with conventionally loaded mandibular 2-IODs. Participants with a completely edentulous

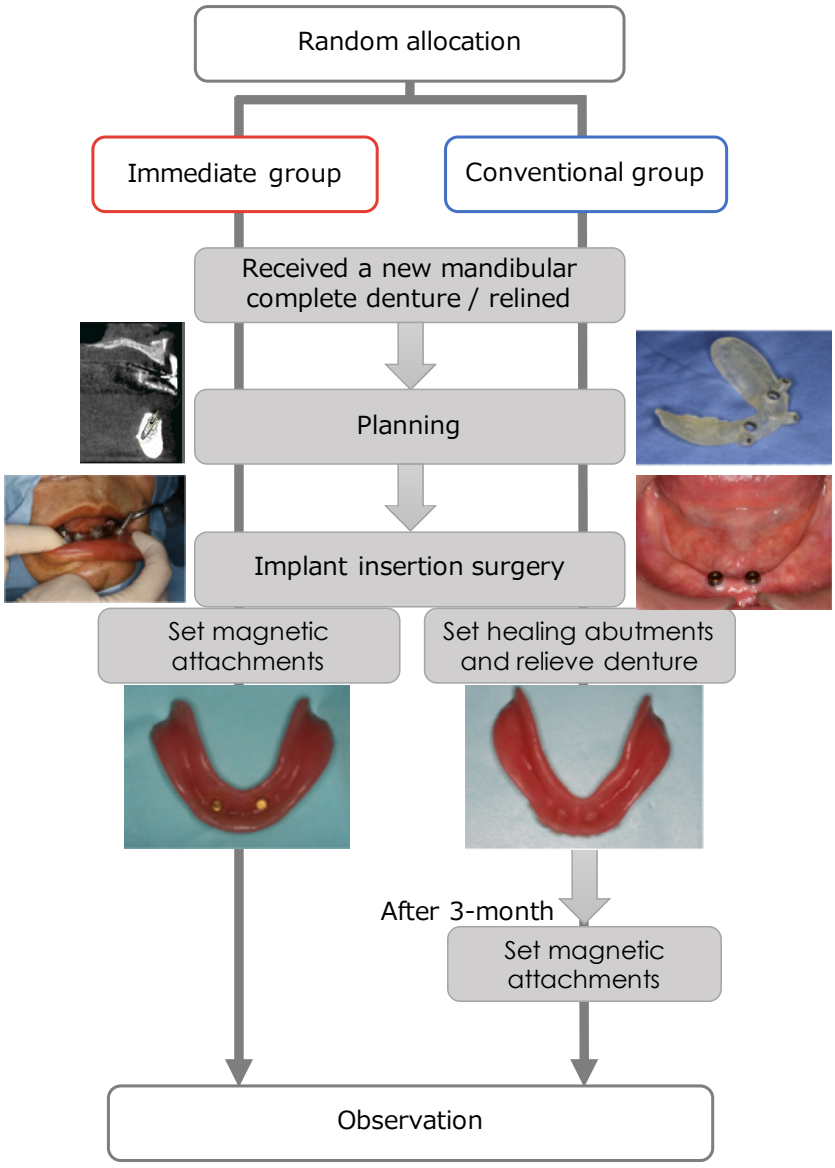


Fig1 Clinical procedures

mandible and any opposing maxillary remaining tooth condition were recruited, and randomly assigned equally into two groups: the immediate loading group (immediate group) and the conventional loading group (conventional group).

Each participant received two implants in the interforaminal region with flapless surgery. In the immediate group, each implant was connected to each keeper and loaded with mandibular overdentures on the same day as implant placement. In the conventional group, the implants were connected to healing abutments. The inner aspects of the denture base around the healing abutments were relieved. 3 months after surgery, the healing abutments were replaced with keepers and loaded with overdentures.

Digital X-rays were taken at immediate, 6-month, 1-year, 2-year and 3-year after implant placement. The marginal bone loss was measured by the difference of marginal bone level between immediate after implant placement and each observation period. To compare the marginal bone loss of two groups, Mann-Whitney U test was performed. To compare the survival rate of two groups, log-rank test was performed to the 3-year accumulate survival rate.

The study protocol was approved by the Ethics Committee at Tokyo Medical and Dental University (Number: 693) and registered with the UMIN Center (UMIN-CTR Clinical Trial, Unique trial Number: UMIN000009889).

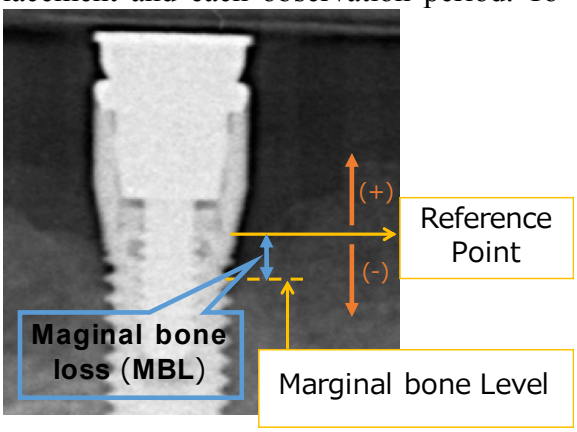


Fig2 Measurement of marginal bone loss

Results

The participants were randomly allocated into the immediate group (n = 10) and the conventional group (n = 9). One patient in the conventional group withdrew 1 month after implants placement because of implant failure.

Fig4 shows the results of marginal bone loss. The medians of 3-year marginal bone loss are 1.17mm for immediate group, and 1.43mm for conventional group. There is no significantly difference between marginal bone loss at every evaluation time. One patient in the conventional group withdrew 1 month after implants placement because of implant failure. Therefore the 3-year accumulate survival rate is 100% and 89% for immediate group and conventional group respectively [Fig5], and there is no significantly difference between the groups.

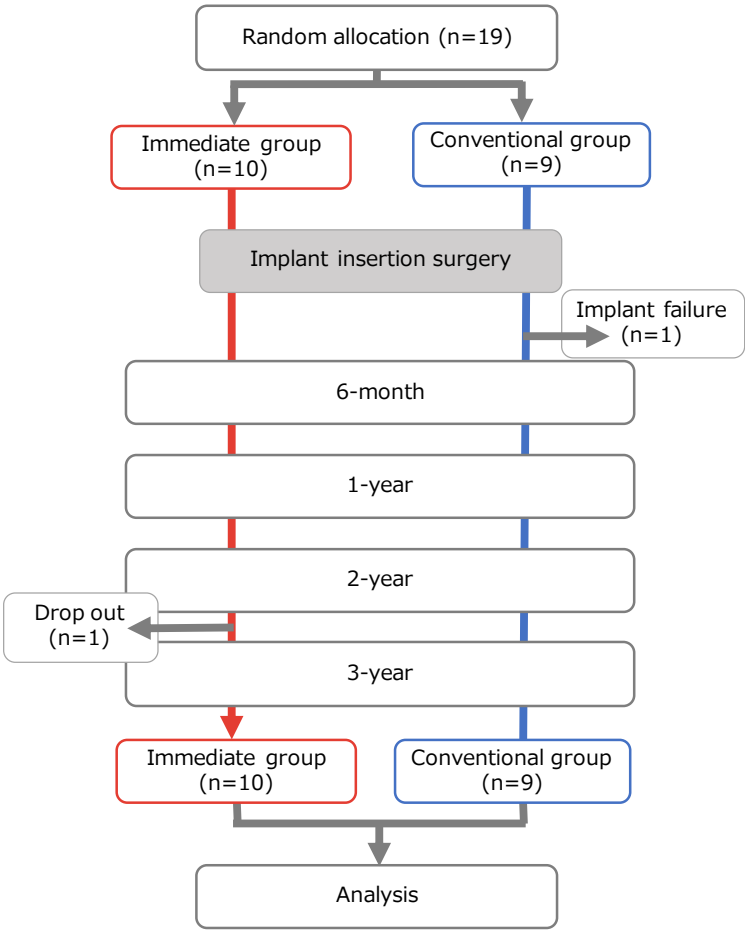


Fig3 Study flow

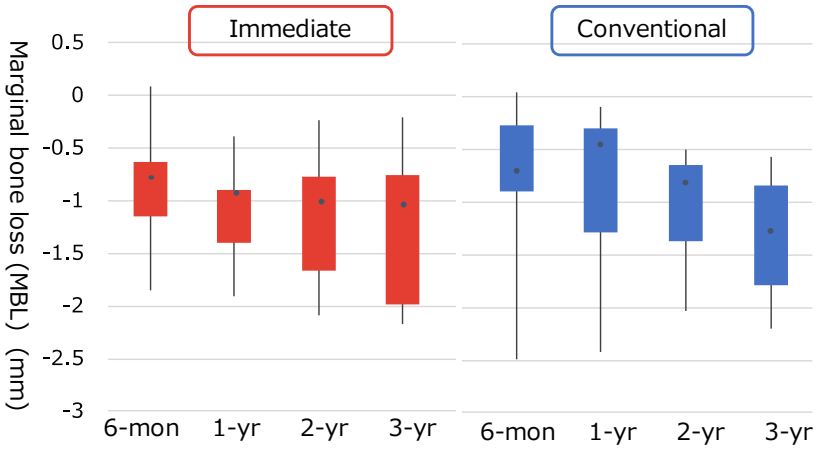
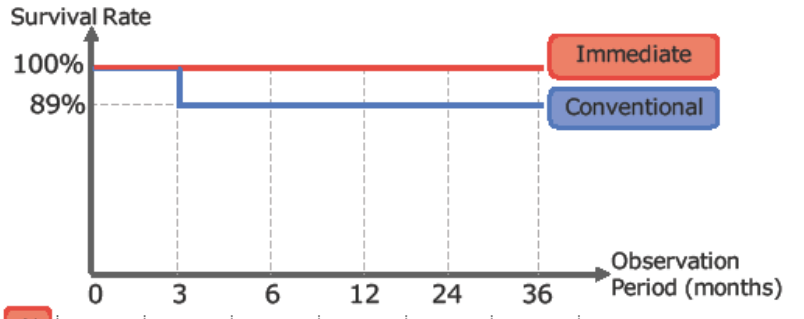


Fig4 Marginal bone loss (MBL)



	0	3	6	12	24	36	
Immediate	20/20	20/20	20/20	20/20	20/20	18/18	Remaining implants/ Total implants
	100	100	100	100	100	100	Survival rate (%)
Conventional	18/18	16/18	16/18	16/18	16/18	16/18	Remaining implants/ Total implants
	100	89	89	89	89	89	Survival rate (%)

Fig5 Accumulate survival rate

Discussions

Elsyad et al. concluded that immediately loaded two implants supporting a ball-retained mandibular overdenture are associated with more marginal bone resorption when compared with conventionally loaded implants after 3 years. [3] On the other hand, in this study, significant difference of marginal bone loss was not observed. This might be because, with regard to retention mechanisms, magnetic attachments appear to reduce lateral force to the implants.

Conclusions

However the tendency to have more marginal bone loss could be observed in immediate loaded group, there is no significantly difference in both marginal bone loss and survival rate between two groups.

References

[1] Thomason JM, Heydecke G, Feine JS, Ellis JS. How do patients perceive the benefit of reconstructive dentistry with regard to oral health-related quality of life and patient satisfaction? A systematic review. Clin Oral Implants Res 2007;18:168–88.

[2] Feine JS, Carlsson GE, Awad MA et al. The McGill consensus statement on overdentures. Mandibular two-implant overdentures as first choice standard of care for edentulous patients. Montreal, Quebec, May 24–25, 2002. Int J Oral Maxillofac Implants 2002;17:601–2.

[3] Elsyad MA, Al-Mahdy YF, Fouad MM. Marginal bone loss adjacent to conventional and immediate loaded two implants supporting a ball-retained mandibular overdenture: a 3-year randomized clinical trial. Clin Oral Implants Res 2012;23:496–503.