

Comparative Study of Patient Reported Outcomes Between Immediately and Conventionally Loaded Mandibular Two Implant Overdenture

Mansi Rajput¹ Manoj Kumar Thakur^{2*}

¹Senior Resident, Department of Dentistry, Jawahar Lal Nehru Medical College & Hospital, Bhagalpur, Bihar, India.

²Senior Resident, Department of Dentistry, Nalanda Medical College & Hospital, Patna, Bihar, India.

ABSTRACT

Background: The clinical replacement of lost natural teeth by osseointegrated implants has represented one of the most significant advances in prosthetic dentistry. There are several long-term studies, which prove beyond doubt, that implant retained prosthesis improved the quality of life of an elderly individual. Evidence of biomechanical success and psychosocial satisfaction has led to an emerging consensus that a two implant overdenture should be recommended treatment in the management of an edentulous mandible. **Aim of the study:** To compare patient reported outcomes between immediately and conventionally loaded mandibular two implant overdenture.

Materials and methods: The study was conducted in the Department of Prosthodontics of the Dental institute and Hospital. A verbal and an informed written consent was obtained from the participating patients after explain them the complete protocol of the study. Patients were randomly grouped into two groups: the immediate loading group (immediate group) and the conventional loading group (conventional group). Each group had 20 patients each. The placement of implants and loading of denture was performed according to guidelines. For estimation of treatment outcome, all the participants were given a questionnaire regarding patient's self assessment of denture (PDA) which were used to analyze the efficacy of dentures.

Results: A total of 40 patients were included in the study, 20 patients each in immediate conventional implant group. We observed that PDA score for function and aesthetics and speech were significantly more in patients who had conventional implants overdenture. With respect to lower denture, the PDA score was more for immediate overdenture till 3 months, but the scores of conventional overdenture increased significantly at 6th and 12th month.

Conclusion: Within the limitations of the present study, immediate overdenture is practical treatment option for mandibular edentulous patients, however, patient's satisfaction is more with conventional implant overdenture.

Keywords: Overdenture, implants, mandibular denture.

INTRODUCTION

The clinical replacement of lost natural teeth by osseointegrated implants has represented one of the most significant advances in prosthetic dentistry. ¹ The long and meticulous work of Branemark and his team lead to the development of the concept of osseointegration and dental implants.

^{1, 2} Compared to all other dental disciplines, implant dentistry has enjoyed far more innovation and progressive developments in recent years namely in the development of new implant systems, the propagation of new and improved diagnostic procedures and the introduction of novel surgical techniques. ^{3, 4} Diagnosis of the edentulous situation

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*Correspondence Dr. Manoj Kumar Thakur.

Department of Dentistry, Nalanda Medical College & Hospital, Patna, Bihar, India.

Email: mnjkgmc@gmail.com

is very much essential in order to treat the patient with the available prosthetic options. Rehabilitation of the completely edentulous mandible using implants to either retain or support restorations is a predictable long-term treatment modality.⁵ There are several long-term studies, which prove beyond doubt, that implant retained prosthesis improved the quality of life of an elderly individual. Evidence of biomechanical success and psychosocial satisfaction has led to an emerging consensus that a two implant overdenture should be recommended treatment in the management of an edentulous mandible.⁶ Hence, the present study was conducted to compare patient reported outcomes between immediately and conventionally loaded mandibular two implant overdenture.

MATERIALS AND METHODS

The study was conducted in the Department of Prosthodontics of the Dental institute and Hospital. Before starting the study, the protocol of the study was approved from ethical board of the institute. A verbal and an informed written consent was obtained from the participating patients after explain them the complete protocol of the study. The participating patients had completely edentulous mandible and any opposing tooth condition and adequate bone volume in the anterior mandible for placement of 2 implants. Patient with uncontrolled systemic disease or having history of receiving radiotherapy to head or neck region were excluded from the study. Patients were randomly grouped into two groups: the immediate loading group (immediate group) and the conventional loading group (conventional group). Each group had 20 patients each. The placement of implants and loading of denture was performed according to guidelines. For estimation of treatment outcome, all the participants were given a questionnaire regarding patient's self assessment of denture (PDA) which were used to analyze the efficacy of dentures. The PDA questionnaire was done at post-op 1, 3, 6, and 12 months.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS

A total of 40 patients were included in the study, 20 patients each in immediate conventional implant group. Table 1 shows mean difference of PDA scores between baseline and each monthly evaluation period. We observed that PDA score for function and aesthetics and speech were significantly more in patients who had conventional implants overdenture. With respect to lower denture, the PDA score was more for immediate overdenture till 3 months, but the scores of conventional overdenture increased significantly at 6th and 12th month. (Fig 1)

Table 1: Mean difference of PDA scores between baseline and each monthly evaluation period.

	Function		Lower denture		Aesthetics and speech	
	Immediate	Conventional	Immediate	Conventional	Immediate	Conventional
T1 - T0	4	5	22	1	11	6
T3 - T0	9	7	24	10	10	8
T6 - T0	12	15	27	31	14	18
T12 - T0	12	15	32	36	16	25

DISCUSSION

The present study showed that although immediate overdenture is comparable to conventional overdenture in patient satisfaction, but conventional overdenture provides more satisfaction to patient with respect to aesthetics, speech and function. The results are consistent with previous studies. Omura Y et al compared patient-reported outcomes between immediately and conventionally loaded mandibular two-implant overdentures retained by magnetic attachments. Nineteen participants with edentulous mandibles were randomly assigned into either an immediate loading group (immediate group) or a conventional loading group (conventional group). Each participant received 2 implants in the interforaminal region by means of flapless surgery. Prostheses in the immediate and conventional groups were loaded using magnetic attachments on the same day as implant placement or 3 months after surgery, respectively. All participants

completed questionnaires, the patient's denture assessment [PDA], and general satisfaction) before implant placement (baseline) and 1, 2, 3, 4, 5, 6, and 12 months after surgery. The immediate group showed slightly lower OHIP-EDENT-J summary score at 1 and 3 months than the conventional group ($P=0.09$). In the lower denture domain of PDA, the immediate group showed a statistically higher score at 3 months ($P=0.04$). There was no statistically significant difference in general satisfaction between the two groups. Based on this preliminary study, immediate loading of mandibular two-implant overdentures with magnetic attachments tends to improve oral health-related quality of life and patient assessment earlier than observed with a conventional loading protocol. Zygogiannis K et al determined the stability and the magnitude of the effect of converting patients' conventional mandibular dentures to implant overdentures (IODs) on their satisfaction and oral health-related quality of life (OHRQoL). The IODs were retained either with two immediately loaded interconnected standard-diameter implants or with four immediately loaded mini dental implants (MDIs). Fifty completely edentulous subjects complaining about insufficient retention of their mandibular dentures were randomly assigned to two groups; 25 patients received IODs retained with four MDIs and 25 patients received IODs retained with two standard-sized tissue level (STL) interconnected implants. All IODs were opposed by conventional maxillary dentures. Patients rated their satisfaction on a 100-mm visual analog scale (VAS) and their quality of life on a denture-specific short version of the oral health impact profile (OHIP-20) before assignment, and after 3 and 12 months. A two-way mixed analysis of variance was conducted to assess the change in time and its interaction with treatment mode on patients' overall satisfaction ratings, the total OHIP-20, and their specific domain scores. Immediate loading was possible for all the patients who received the MDIs. By contrast, the immediate loading protocol could be followed for only 15 of the patients allocated to the STL implant group. For the remaining patients, a delayed loading protocol was applied. There was a significant improvement in patients' general satisfaction between baseline and 3 months and between baseline and 12 months postoperatively. This increase did not differ between the treatment groups. The results also showed a decrease in mean

overall OHIP score between baseline and 3 months and between baseline and 12 months postoperatively, indicating a higher level of OHRQoL. In addition, patients scored lower 3 and 12 months after treatment than at baseline for all seven domains. This decrease did not differ between the treatment groups. The results suggested that in terms of patient-based outcomes, mandibular overdentures retained by immediately loaded MDIs can offer an improvement of equal magnitude with that achieved by overdentures retained by standard-sized implants.^{7,8}

Kanazawa M et al assessed patient general satisfaction with mandibular single-implant overdentures and complete dentures. This study is a randomized crossover trial to compare mandibular single-implant overdentures and complete dentures in edentulous individuals. Participant recruitment is ongoing at the time of this submission. Twenty-two participants will be recruited. New mandibular complete dentures will be fabricated. A single implant will be placed in the midline of the edentulous mandible. The mucosal surface of the complete denture around the implant will be relieved for 3 months. The participants will then be randomly allocated into 2 groups according to the order of the interventions; group 1 will receive single-implant overdentures first and will wear them for 2 months, followed by complete dentures for 2 months. Group 2 will receive the same treatments in a reverse order. After experiencing the 2 interventions, the participants will choose one of the mandibular prostheses, and yearly follow-up visits are planned for 5 years. The primary outcome of this trial is patient ratings of general satisfaction on 100mm visual analog scales. Assessments of the prostheses and oral health-related quality of life will also be recorded as patient-reported outcomes. The secondary outcomes are cost and time for treatment. Masticatory efficiency and cognitive capacity will also be recorded. Furthermore, qualitative research will be performed to investigate the factors associated with success of these mandibular denture types. Clinical outcomes, such as implant survival rate, marginal bone loss, and prosthodontic complications, will also be recorded. The results of this randomized crossover trial clarified whether mandibular single implants and overdentures for edentulous individuals provide better patient general satisfaction when

compared to conventional complete dentures. Sanda M et al compared marginal bone level changes (MBLCs) of immediately- and conventionally-loaded implants supporting a mandibular implant overdenture (IOD). Both electronic (MEDLINE, PubMed, and The Cochrane Library) and manual searches were conducted for all relevant studies published from 1 January 2000 to 1 November, 2017. Randomized controlled trials (RCTs) and prospective studies with a minimum follow-up of 12 months were selected. Studies which utilized implants narrower than 3 mm were excluded from analysis. Four studies met the criteria, with two evaluating horizontal bone loss. There were 70 patients in the test group (immediate loading) and 60 in the control group (conventional loading). Follow-up lasted 6–36 months, with MBLCs being interpreted from standardized periapical x-rays, panoramics or cone beam computed tomography. Each patient was given 2–3 implants. After 6 and 12 months, the differences in MBLCs were 0.04 mm and 0.00 mm respectively. Subgroup analysis of RCTs with 2 implants revealed group differences in MBLCs as 0.13 mm and that in horizontal bone loss as 0.04 mm. No statistically significant differences were identified. They concluded that the MBLCs of immediately-loaded implants for mandibular IODs seems comparable to those of conventional loading.^{9,10}

CONCLUSION

Within the limitations of the present study, immediate overdenture is practical treatment option for mandibular edentulous patients, however, patient's satisfaction is more with conventional implant overdenture.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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