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Original Article

A clinico radiographic study of immediate loading implants in rehabilitation of mandibular ridges



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ABSTRACT

Background: Numerous studies regarding the immediate loading of splinted implants retaining/supporting mandibular dentures have reported promising results, but studies comparing splinted and unsplinted attachments for supporting overdentures with immediate loading are limited. Scientific literature is sparse comparing various attachment systems and patient satisfaction in response to immediately loaded implant supported overdentures.

Methods: A total of 30 completely edentulous patients male or female, in the age group of 54–78 years (mean age 65 years), wearing conventional complete dentures were selected and randomly divided in to two groups. A total of 60 implants were placed in the interforaminal area of the mental symphysis (two implants per patients) in 30 patients. Two types of attachment systems namely Ball for group-A and Bar for group-B were used and immediate loading done. Implants were evaluated clinically and radiographically at baseline, 1 month, 3 months, 6 months and 9 months. All clinical and radiographic parameters were subjected to statistical analysis.

Result: The implant survival rate for group-A (ball attachment) was 93.3% and implant survival rate for group-B (bar attachment) was 93.3%. The overall implant survival rate was not dependent on the attachment system. There was no significant difference in the crestal bone loss in mesial, and distal side in implants with respect to ball and bar attachment for different period of observation ($F = 0.25$; $P = 0.910$; $F = 0.07$; $P = 0.992$ respectively).

Conclusion: Overdenture supported by two implants should be the minimum gold standard in the rehabilitation of completely edentulous patients.

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Introduction

The clinical replacement of lost natural teeth by osseointegrated implants has represented one of the most significant advances in prosthetic dentistry. The long and meticulous work of Branemark and his team led to the development of the concept of osseointegration and dental implants.¹ 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. Diagnosis of the edentulous situation is very much essential in order to treat the patient with the available prosthetic options. The prosthetic options may be removable or fixed implant supported/retained overdenture. Different protocols have been described in the literature for surgical placement and prosthetic loading of implants for patients selected for implant supported overdentures. The protocols can be either a one stage or two stage procedures.^{2,3} During the last 15 years, various authors have questioned the gold standard of 'two stage protocol' recommended by Branemark et al.^{4,5} They were of the opinion that one stage protocol with immediate loading is equally effective.^{6,7}

In spite of the documentation and anecdotal claims of success of complete denture therapy using dental implants, patients and prosthodontist often disagree about what constitutes a successful denture experience. Criteria for quality standards in denture fabrication have been articulated; however these problems do not address patient-mediated factors such as patient ability to handle dentures and patient opinion about treatment outcome. Various retention mechanism have been used in implant supported overdenture like bar and clips, ball, locater, magnets and precision attachments each allowing certain degree of freedom in movement of the prosthesis.⁸ Attachments are mechanical devices for the fixation, retention, and stabilization of prosthesis. Attachment systems provide resistance to movement of the implant prosthesis and help in dissipating the load in function.

Scientific literature is sparse comparing various attachment systems and patient satisfaction in response to immediately loaded implant supported overdentures. Therefore this study was carried out to evaluate the treatment outcomes of completely edentulous patients rehabilitated with immediately loaded implant supported mandibular overdenture retained by two different attachment systems (Ball versus Bar).

Material and methods

A total of 30 completely edentulous patients (male or female), in the age group of 54–78 years (mean age 65 years), were selected. The basic inclusion criteria were edentulous patients in need of an overdenture and in whom at least one implant could be placed bilaterally. Selection was based on clinical and radiographic examination. Routine orthopantomograms and lateral radiographs were supplemented with tomographic examinations in the mandible (Fig. 1). The primary selection

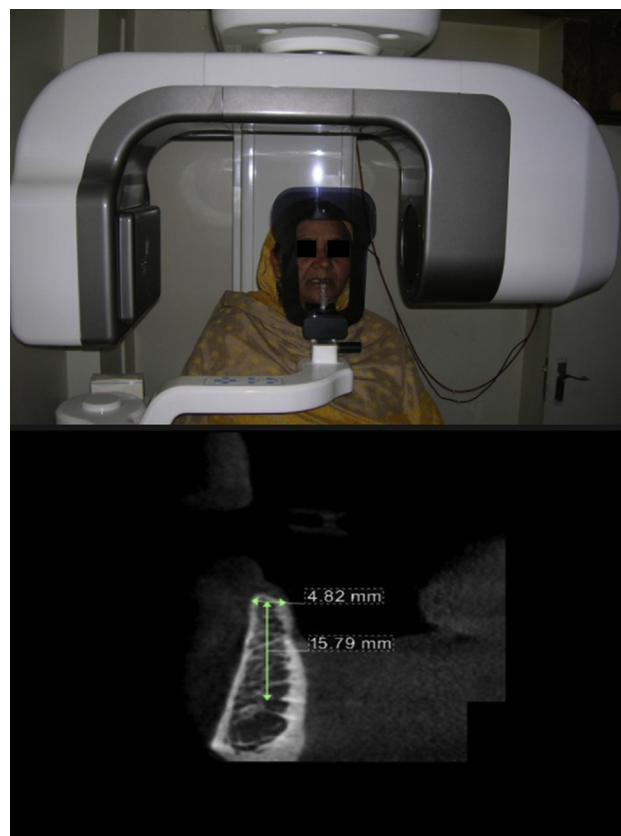


Fig. 1 – Cone beam CT evaluation.

of patients was based on an evaluation of the bone morphology according to Lekholm and Zarb. The patients selected were non-smokers, free from any systemic disease, non-bruxers, having adequate interarch space, with sufficient quality and quantity of bone and prepared to comply with the follow-up and maintenance programme. All patients received an upper and lower complete denture approximately three months before implant placement.

The implant system used in this study was Ez Hitec implants (Life Care India Private Limited). It is a tapered self thread internal hex implant with selective integrated surface. A total of 60 implants (in 30 patients) were placed in the interforaminal area of the mental symphysis (two implants per patients) and immediate loading done with implant supported overdentures. Each patient was rehabilitated with an Ez Hitec implant (3.75 × 10 mm) placed in the region of 33 and 43. Divisions into different groups (ball and bar) were based on random sampling method. 15 persons chosen by randomization had a ball attachment system (Group-A) (Fig. 2); and the remaining 15 persons a bar attachment system (Group-B) (Fig. 3).

Surgical and prosthodontic protocols for group-A: ball attachment - Prophylactic antibiotics were prescribed for all patients. All the surgical procedures were carried under strict aseptic conditions. Surgery was performed under local anesthesia (lignocaine 20 mg/ml with adrenaline 1:80,000). After achieving adequate local anesthesia, crestal incisions were placed on the site indicated for implant placement with No.12 B.P. blade. Full thickness flaps were elevated using periosteal

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