

A Comparative Study: Mandibular Overdenture Retained by Two Implant from A Crossover Clinical Trial Comparing Ball and Bar Clip Attachments

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ABSTRACT

Aim: To evaluate the crestal bone level mesial and distal side of abutment of ball and bar attachment

Materials and Method: A prospective comparatively clinical study was performed in 10 patients in 20 implant (3 female and 7 males) requiring mandibular edentulous arch followed by two implant placed each patents in each group in the Department of oral & maxillofacial surgery DJ college of dental science and research, Modinagar. This study was conducted on adults from local population requiring who were wearing conventional complete denture since 3-6 months and were not satisfied with the mandibular denture. Fulfilling all inclusive and exclusive criteria were included in this study. Patients prior to the commencement of implant surgery a detailed history of the patients was carefully recorded and patients were apprised about the potential risks and benefits and an informed consent was obtained on prescribed format.

Results: 10 patients in 20 implant (3 female and 7 males) with a mean age of 56 years available for 9 month follow-up of examination. Group with 10 implants in ball attachment and group 2 in 10 implants with bar attachments. No implant failure between the 3months to 9 months follow-up were observed. The implant stability quotient (ISQ) showed only minor changes with no significant differences between the group when compared with the 9month follow-up.

Conclusion: No significant difference were found between subjects in two groups with respect to implant survival and bone loss and patient satisfaction scores continued to be high of both groups.

Keywords: ISQ, immediate loading overdenture, stability, bar retention.

INTRODUCTION

In modern dentistry implants play revolutionary role. Implant retained overdenture can be a simple treatment option to restore the edentulous mandible¹. The placement of multiple implant for fixed prosthesis has been shown to be a predictable

method for long term treatment of edentulous patients².

limitation such as severely resorbed jaw , unfavorable jaw relation and financial restriction sometime prevent the placement of sufficient number of implant to accommodate a fixed prosthesis and therefore require an alternative for

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edentulous patients with compromised oral function .The basic concept of placing a limited number of implant to support an over denture could be such an option³.

AIMS AND OBJECTIVES

“To evaluate the crestal bone level mesial and distal side of abutment of ball and bar attachment

To Assess-

1. Crestal bone loss around abutment
2. Healing.(pain & inflammation 1day & 7th day)
3. Abutment stability after 3, 6 months and 9 months .

MATERIAL AND METHOD

A prospective comparatively clinical study was performed in 10 patients in 20 implant (3 female and 7 males) requiring mandibular edentulous arch followed by two implant placed each patents in each group in the Department of oral & maxillofacial surgery DJ college of dental science and research , Modinagar. This study was conducted on adults from local population requiring who were wearing conventional complete denture since 3-6 months and were not satisfied with the mandibular denture. Fulfilling all inclusive and exclusive criteria were included in this study. Patients prior to the commencement of implant surgery a detailed history of the patients was carefully recorded and patients were apprised about the potential risks and benefits and an informed consent was obtained on prescribed format.

Case 1 (ball supported)



Fig 1: orthopantomogram



Fig 2: incision and implant placement

SAMPLE SIZE

20 implants

Study will be conducted under two main groups namely:

- ❖ Group A-10 implant (ball)
- ❖ Group B-10 implant (bar)

Inclusion Criteria.

1. No previous implant
2. -Dissatisfaction with mandibular complete denture
3. -Bone height of 15-25 mm at mandibular symphyseal region.*
4. Willing to accept the conditions of the study and to give informed consent.
5. No radiotherapy in head & neck area before 6 months .

Exclusion criteria

1. Any systemic disease that jeopardizes surgical treatment e.g. cardiovascular diseases, neuromuscular diseases, osteoporosis, uncontrolled diabetes.
2. Psychological or psychiatric conditions that could influence the subjects reaction to treatment
3. Acute or chronic symptoms of temporomandibular disorders
4. History of radiation therapy to the orofacial region.



Fig 3: Ball supported implant.



Fig 4: Mandibular denture with O ring.

Case2 (bar supported)



Fig 1; Orthopantomgam.



Fig 2: implant placement



Fig 3: Bar attachment.



Fig 4: Overdenture.

Observation & Results

The present study was conducted at Department of oral and maxillofacial surgery, D J college of Dental Sciences and Research, Modinagar to evaluate the efficacy and clinical performance of Implant supported Mandibular Overdenture in comparison to complete Denture. A total of 10 edentulous patients were enrolled in the study. The age wise distribution of subjects is shown in Table . this This study was taken up to evaluate the treatment outcomes of completely edentulous patients rehabilitated with immediately loaded implant

supported mandibular overdenture retained by two O-ring attachments. Evaluation of the three clinical parameters was carried out at baseline,3month, 6 month, 9 month The results were drawn taking into consideration the three quoted parameters: Marginal bone loss, stability and implant survival

rate. All the data obtained were tabulated and statistically analyzed as shown Table 1 shows the results of marginal bone loss with respect to different periods. The base line mean marginal bone loss was significantly different statistically from the

mean marginal bone loss at the end of 3 months, 6 months, 9 months

Table 1: Marginal bone level(mm) ball.

	Base line	3 months	6 months	9 months
minimum	1.1	1.5	1.2	0.6
maximum	2.1	2.21	1.5	1.1
mean	1.7	1.98	1.33	0.88
Standard deviation	0.3823	0.3615	0.1197	0.1485

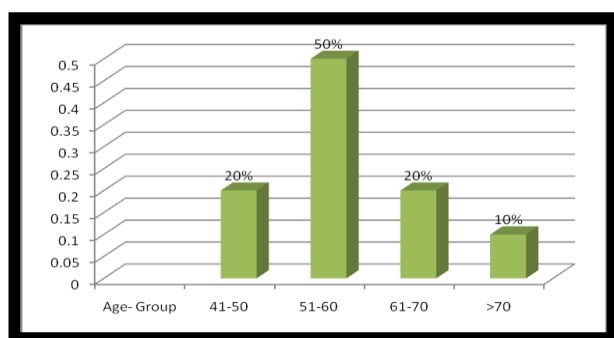
Table 2: Marginal bone level (mm) bar.

	Base line	3 months	6 months	9 months
Minimum	1.3	1.1	0.6	0.05
Maximum	2.5	2.1	1.1	0.41
Mean	1.9	1.7	0.58	0.16
Standard deviation	0.3615	0.3823	0.1485	0.13509

Table 3: Distribution of Study Subjects according to age Group.

S. No	Age Group (Years)	No of Patients	Percentage
1	41-50	2	20%
2	51-60	5	50%
3	61-70	2	20%
4	>70		10%
Total		10	100%

Graph 1: Distribution of Study Subjects according to age Group.



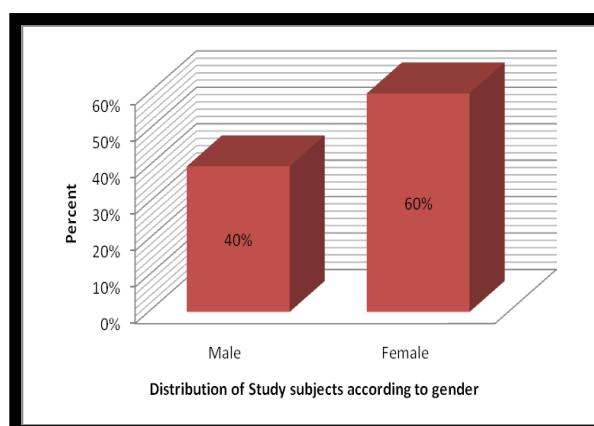
Maximum number of subjects (50%) was between 51-60 years of age. There were (20%) patients in age range 41 to 50 years. (20%) of the patients were in between the age of 61-70 years. One subject was aged above 70 years. The age of the subjects ranged from 41 to 75 years.

Table 4: Distribution of Study Subjects on the basis of Gender.

S. No	Gender	No. of Patients	Percentage
1	Male	4	40%
2	Female	6	60%
Total		10	100%

Describes the distribution of study population on the basis of gender where (40%) were males and (60%) were females.

Graph: 2 Distribution of Study Subjects on the basis of Gender.



DISCUSSION

The prosthetic management of the edentulous patient has long been a major challenge for dentistry. The classical treatment plan for the edentulous patient is the complete removable maxillary and mandibular denture, which, apart from being the most common and economical form of treatment, has several drawbacks. Stability and retention of lower complete denture is well recognized as a potentially difficult treatment to achieve. Looseness and discomfort are the most frequent complaints reported by patients. Many concepts have been put forward to increase stability and retention of mandibular complete denture

including the mechanical principles, biometric guides etc. These techniques have been challenged and found insufficient. These techniques fail to restore function, aesthetics and comfort in patient with severely atrophic mandibular ridges (Atwood's Class V).

Implant overdenture treatment (IOT) is generally considered to be an effective treatment modality in these cases. The implant-supported overdentures are recommended to overcome these drawbacks⁹. The promising results with implants encouraged development of different designs and techniques of the implants. One of the widely accepted implants, with mainstream application is an endosseous implants⁸. The most commonly used endosseous implants are the root form type and they are used both in the anterior as well as in the posterior mandibular region.

From the review of the literature, it is evident that many treatment concepts involving mandibular overdentures supported by endosseous implants based on empirical experiences, are merely opinions of members of individual centers or are short term studies. Long term comparative prospective controlled studies are needed to reach agreement on an accepted treatment concept¹¹.

In this study, clinical performance of mandibular ball supported overdentures was evaluated subjectively and objectively, in comparison with bar supported overdentures. The treatment protocol involved fabrication of new conventional complete dentures for the patient, which after 3-6 months of use was modified to implant retained overdentures. During surgery a modified mid-crestal incision¹³ was given, starting slightly distal to the canine but not crossing the midline (i.e., two mini-flaps). Its advantages include:

- ✓ Less post-operative discomfort and swelling because muscle attachment is not involved.
- ✓ Smaller flap with less resultant bone loss; and
- ✓ Smaller area for relining.

Retention of any prosthesis is of great importance for the patient's satisfaction. Several studies evaluated the ball and bar attachments regarding the retention force and prosthetic complications. **Sadowsky** reported that solitary ball attachments appear to be less costly and less technique sensitive.

However, ball attachments seem to be less retentive than the bar design. **Naert** and colleagues reported that single attachments provide lower retention than do bars for fixation of overdentures⁹.

In a multicenter study on overdentures which were splinted with 2 implants, the need of clip activation was reported in 62% of the study group and clip fracture was reported in 33% of the patients. Walton and colleagues evaluated the prosthetic outcomes with implant overdentures, and reported that approximately 84% of the patients with ball-attachment dentures needed at least 1 repair; versus 20% of those with a bar-clip mechanism needed repair. On the other hand, **Karabuda** and colleagues reported that there was no difference in prosthetic complications for the ball and the bar attachment systems⁹.

CONCLUSION

- Bar supported overdenture is more clinically efficient in comparison to ball supported overdenture.
- Subject patients were more satisfied with experience of bar supported overdenture. This is accomplished by increase denture retention and stability, increase chewing ability, increased speech and overall increase denture comfort. The bar supported overdenture also resulted in increase in overall patient confidence and satisfaction.
- The objective measurements, the retention, stability and bite force of bar supported overdenture found to be significantly improved than ball supported overdenture.

Since the clinical success and superiority of bar supported overdenture relative to ball supported overdenture treatment is evident from the result of this study. It is highly likely that the use of bar for retention and stability may provide the better state-of-the-art results for all the complete dentures when a patient is amenable to the additional procedure involved. The literature also supports the concept that the bar supported overdenture has significantly more retention, stability.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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