



COMPARATIVE EVALUATION OF RETENTION AND RESISTANCE BETWEEN SINGLE AND TWO IMPLANT RETAINED MANDIBULAR OVERDENTURE USING BALL ATTACHMENTS- AN INVIVO STUDY

Prosthodontics

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ABSTRACT

Aim Purpose of this study was to evaluate the denture retention and success rate of totally edentulous patients in single median versus two interforaminal implant-supported mandibular over-dentures on. **Material and methods** Twenty totally edentulous patients were selected in this trial. The eligible patients were allocated randomly into two equivalent groups of 10 participants each. A single-implant (G I) and two interforaminal implants (GII) were located in the mandible. Three months later, pick up of the ball attachment was performed to all implants and denture bases. Assessments of denture retention and resistance of implants were measured at the time of insertion three, and six month's follow-up assessments. **Results** Regarding denture retention, the two inter-foraminal implant group (GII) showed statistically significant differences compared to the single-implant group (GI). Concerning resistance of implants the results revealed insignificant differences between patients in both groups. **Conclusion** Single-implant mandibular over-dentures may be recommended as an alternate treatment option for the management of edentulous patients in populations with low economic status

KEYWORDS

Single Implant Overdenture, Two Implant Overdenture

INTRODUCTION

Tooth loss, which is a complex outcome reflects an individual's history of dental disease and its treatment by dental services over the life course. Tooth loss reflects not only dental disease but also patients' and dentists' attitudes, the dentist-patient relationship¹. The Complete loss of teeth has adverse effect on the general health and social lifecycle of the patients. So the prosthetic rehabilitation of totally edentulous patients is mandatory to advance their live activities.²

There are treatment alternatives that aid in increasing retention and stability when conventional denture therapy is inadequate. These include surgery to augment the alveolar ridge or increase vestibular depth, dental implants to provide anchorage for an all implant-supported prosthesis, or mucosa and implant supported overdentures. The implant overdenture is an especially attractive treatment because of its relative simplicity, minimal invasiveness, and economy. Existing complete dentures can be converted for many patients and maintain facial support with the denture flange when moderate to extreme alveolar ridge resorption is present³. Endosseous dental implant has greatly improved the condition of the edentulous mandible, for which implant success rates greater than 95% have been reported⁴. The two-implant assisted mandibular overdenture should be the first treatment option for mandibular edentulous patients⁵. McGill consensus statement suggested that an overdenture retained by two implants should be the first choice of treatment for the edentulous mandible. Single-implant-retained mandibular overdentures do not show damaging strain concentration in the bone around the only implant and may be a cost effective treatment option for edentulous patients. A third implant can be placed between the original two when patients rehabilitated by two-implant overdentures report constant and obvious denture rotation around the fulcrum line⁶. Objective measurements of retention and stability were made according to the method reported by Schmitz³.

METHODOLOGY

Diagnostic impressions were made using impression compound and were poured using dental plaster. Tentative jaw relations were made

and mounted and Inter ridge space was evaluated. Implant placement was planned using CBCT, and the single and two implants are placed in the interforaminal region. Single implant is placed in the midlabial region and two implants are placed in the lateral incisors region respectively. Overdentures are fabricated over the implants placed following conventional complete denture fabrication protocol and finally pick up of metal housing is done with autopolymerizing acrylic resin. Retention is measured with the help of force guaze by pulling vertically and resistance is measured by pulling horizontally. In single implant retained mandibular overdentures custom made hook is placed midlabially and in two implant retained mandibular overdentures custom made hooks are placed between canine and first premolar region bilaterally and the denture is pulled vertically and horizontally for the measuring retention and resistance respectively. Readings were recorded on the force guaze. For single implant retained mandibular overdenture retention force is measured in a range of 1500-1800grams and resistance force is measured in a range of 800-1200grams, and for two implant retained mandibular overdenture retention force is measured in a range of 2200-2400grams and resistance force is measured in a range of 1800-2000grams respectively.

Occlusion and articulation of implant supported complete dentures must reduce stress on the implants. For tissue-supported overdentures, balanced occlusion is suggested with simultaneous contact of the artificial teeth⁷.

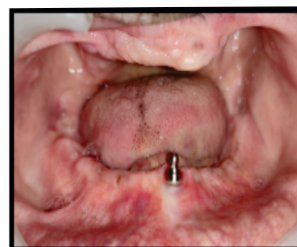


Fig.1 Placement of ball attachment over single implant

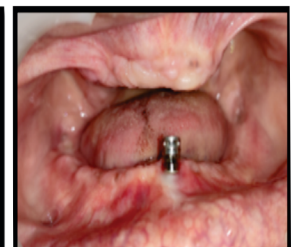


Fig.2 Metal housing placed over ball attachment

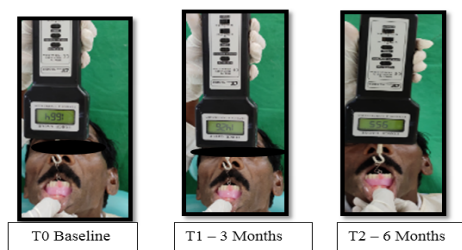


Fig.3 Measurements of retention with force guaze of single implant overdentures

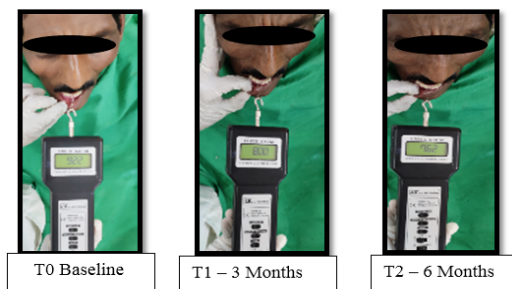


Fig.4 Measurements of resistance with force guaze of single implant overdentures

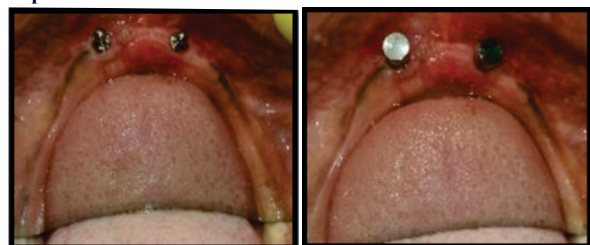


Fig .5 placement of ball attachments over two implants

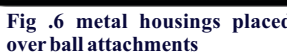


Fig .6 metal housings placed over ball attachments



Fig.7 Measurements of retention with force guaze of two implant overdentures

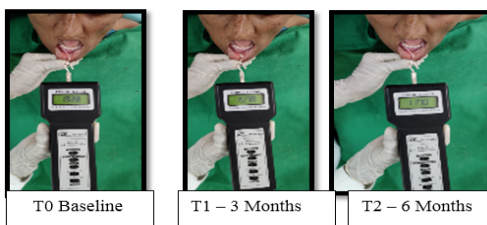


Fig.8 Measurements of resistance with force guaze of two implant overdentures

RESULTS

The readings which were obtained were entered into Microsoft excel 2007 and subjected to statistical analysis using statistical package for social sciences. The quantitative data was summarized using means and standard deviations, and the statistical test used were independent sample T test. . In this study the mandibular overdenture retention, and resistance had greater values at time of insertion, and decreased gradually in the following three and six months. Assessing the two groups throughout the whole study period, the results of this study displayed a statistically significant difference between single and two-implant overdentures groups for mandibular denture retention at the time of insertion and 3 months interval, and no statistically significant

difference in retention at 6 months interval and in resistance between single and two implant overdenture groups.

CONCLUSIONS AND DISCUSSION

The study was conducted to measure the retention and resistance between single and two implant retained mandibular overdentures using ball attachments with the help of force guaze.

Considering the limitation of this study, the following conclusions can be drawn.

- Better retention of two-implant retained mandibular overdenture was statistically significant than the single-implant overdentures groups.
- Single-implant mandibular overdentures increase the retention of totally edentulous patients.
- Statistically significant difference in the retention in the single and two implant overdenture groups at the time of insertion and 3 months interval period, and no Statistically significant difference is at 6 months interval time period.
- No statistically significant difference in the resistance in the single and two implant overdenture groups.
- Success rate of implant mandibular overdentures are high in both single and two- implant overdentures.

Consequently, Single-implant mandibular overdentures may be considered as a treatment modality for rehabilitations in the edentulous mandible, particularly for geriatric patients and those with low economic level.

This study was planned to examine the assumption that there is non-inferiority of the retention, and resistance force and implant success for single implants group compared to that of two-implant supported overdentures. This could be attributed to wearing of plastic cap of locator attachment². Both groups demonstrated a reduction in retention and resistance over time. The benefit of implants with attachments significantly increases denture retention as a direct result of improved support and stability. The results in the current study show that in the overall success rate there are no statistically significant differences between patients in both groups, demonstrating that the use of single implant to retain a mandibular overdenture might be regarded as a substitute to the two interforaminal implant overdentures. This finding is in agreement with a previous study performed by Cordioli G (1997)⁸, A.A.Alsourori (2018)³, S.R.Bryant (2014)⁹, Sonke Harder (2011)¹⁰, Yoshinobu maeda (2008)¹¹, Mahrookar.S (2016)¹². The single implant overdenture could be used as a solution for edentulous patients especially for the geriatric ones and those belonging to a low socioeconomic status. But these results preliminary 6 months outcome. Proper assessment of implant success or failure rate requires longer follow up periods. Furthermore, this method may show an economical advantage for the healthcare policy makers, particularly for elderly patients who require less invasive solutions

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