IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

ISSN PRINT 2319 1775 Online 2320 7876

Research paper **Volume 12, Iss 1, 2023**

Single Implant-Supported Mandibular Overdentures: A literature review

Bhupender KumarYadav*,Reshu Madan*, Pankaj Ritwal*, Abhishek Nagpal*, Jaiveer Yadav*, Ananya Kothe*

*** Department of Prosthodontics, Faculty of Dental Sciences, SGT University**

For Correspondence:

Dr Reshu Madan
Prosthodontics
Contact no: 9910063626
Email id: reshu.sanan@sgtuniversity.org

Abstract:

The success of mandibular dentures supported by a single implant in the midline is lacking evidence in the scientific literature and there are very few studies supporting this fact. Two implants supported Overdenture (TIMOD) is an established conceptin Implant Dentistry while a single implant-supported overdenture (SIMOD) is arelatively new concept and not much is known about its efficacy interms of its retention, chewing efficiency, and/ or bite force, especially when compared to TIMOD. This review focuses on single implant-supported overdenture and its success in clinical situations.

Introduction

One of the most difficult treatment modalities in prosthodontics is the rehabilitation of the edentulous ridges with complete dentures. Complete denture therapy necessitates a sufficient retention and stability. In order to achieve a maximal area of coverage, intimate tissue denture contact, a successful border seal, and bilateral balanced occlusion, clinical approaches are used during impression production.However, complete dentures still remain a challenge to Prosthodontists especially the mandibular complete denture which is known to be the trouble maker because of the faster rate of resorption (4 times more than maxilla) and smaller surface

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **Volume 12, Iss 1, 2023**

area coupled with the presence of a highly muscular tongue which may further lead to the displacement of the dentures. Over the year newer impression techniques and occlusal schemes have evolved to address the problems associated with problematic mandibular dentures. Inspite of all the advancements, complete dentures are still plagued with certain inherent inadequacies leading to poor oral health quality of life of the individual resulting in anunhappy, dissatisfied patient. Besides, advancements in health care facilities have led to an increase in the life expectancy leading to an increase in the number of geriatric patients seeking this treatment. A reliable long-term therapy option for totally edentulous mandible rehabilitation uses implants to either support or maintain prosthetics. This concept evolved more than 20 years ago, several studies have reported on the improved quality of life , improved chewing efficiency, better retention, improved biting force of elderly population with implant retained prostheses.Two implant supported prosthesis was the minimum that has been documented for a such a prosthesis although this minimum requirement is still debatable. Although good, the effectiveness of this therapy approach is beyond the reach of many people, notablyin a country like India where the selection of the treatment is dictated by the economics governing it.

Dentures supported by implants, whether full overdentures or hybrid prostheses, greatly enhance the quality of life for patients who are missing teeth. These dentures are increasingly frequently employed for the rehabilitation of edentulous jaws because they can improve masticatory performance, boost prosthesis retention rates, and stop future alveolar bone resorption by controlling neuromuscular adaptation. The basic minimum thought to be necessary for successfully rehabbing edentulous patients is a two-implant retained mandibular overdentures. (TIMOD) [1]. The TIMOD for edentulous patients has become the standard in this area. In 1993, Cordioli [2] presented the idea of a single-implant retained mandibular overdenture (SIMOD),

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **Volume 12, Iss 1, 2023**

and the first five-year results with an implant success rate of 100% were reported in 1997 [3]. Another randomized clinical research examined mandibular overdentures retained by one or two implants in 86 edentulous patients[4]. Single implant mandibular overdentureis becomingincreasingly popular as they are assumed to be almost as effective asdentures supported by two implants. Also, they provide a more cost-effective solution for the rehabilitation of edentulous patients, especially indeveloping countries like India. When implants with oxidized surfaces were employed, Liddelow and Henry [5] reported in 2007 that they had a 100 percent implant-survival rate after 36 months of surveillance. Through a 3-dimensional finite element analysis (FEA), Liu et al. [7] assessed the stresses &strain distribution in the abutments, peri-implant bone, and no of implants. They came to the conclusion that the number of implants has little to no impact on these variables. Simod and TIMod were shown to induce similar strain distributions in the supporting bone.The SIMOD did not exhibit a harmful stress concentration in the bone surrounding the single implant, according to Liu et al. The current review will examine the claim that, in various situations, prosthetic rehabilitation of the edentulous mandible with a single median implant will provide a non-inferior implant survival rate

Review of literature:

Amaral C. F. (2019) conducted a study to compare the effects of CDand SIOD. Twelve elders were given brand-new conventional CDs at initially, which were then upgraded to SIO. After each prosthesis had been used for two months, all variables were assessed. Elders were asked to evaluate their OSA by closing their eyes while verbally identifying test pieces made from raw carrots. Using a kinesiographic instrument, the chewing motions of a test substance were recorded (Optocal).A 3-day meal journal was used to confirm nutritional consumption using a typical Brazilian food composition table. The OSA outcomes did not vary by prosthesis type.

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **Volume 12, Iss 1, 2023**

The majority of nutrients were consumed without variation, although after SIO insertion, sodium intake reduced (P 0.05). OSA was unaffected by SIO use, although older people with shorter residual ridges had considerably improved mastication and sodium intake.

Schwindling F et al. (2018) conducted a study on single implant overdentures. At baseline, the mean scores were comparable which decreased after 4 months showing a considerably improved quality of life following therapy.The QOI was marginally better in the group that experienced delayed loading whereas for immediate loading, the results were insignificant. The idea of a single mandibular implant was linked to improved quality of life. However, there was no evidence of a statistically significant impact.

In order to determine if early loading compromises the longevity of a single implant **Kern M. (2018)** conducted a experiment. Different prosthesis problems between the loading principles were secondary outcomes. They concluded that immediate loading in single implant retained overdentures results in a lower success rate when compared to delayed loading of implants and is not indicated.

In a randomised trial, **Paleari A (2018)** conducted a study to assess success of one versus two implant OD. Implant attachment were placed four months after they were placed, and matrix attachments were affixed to the bottom full dentures. At baseline, 3, 6, and 12 months following the treatment, masticatory performance wasevaluated. At the 12-month follow-up, two implants outperformed thesingle implant MOD in terms of masticatory performance & patient satisfaction.

In order to comprehensively assess the literature on single implant retained overdentures, **Mahoorkar S. (2016)** conducted a literature reviewon mandibular single implant overdentures.

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **Volume 12, Iss 1, 2023**

The majority of studies endorsed the SIROD idea. Regarding surgical, prosthetic, functional, and patient satisfaction success outcomes were discussed. In investigations, the primary implant stability was assessed in 65% of cases, and the marginal bone loss was measured in 50% of cases over the course of a year. 45 percent of studies used the outcome of the prosthesis as a criterion for assessing the success rate. The SIROD technique has been shown to be effective and cost-effective. However, it is necessary to look into clinical criteria including masticatory efficiency, biting force, retention, and stability.

Swarup S (2016)did a study on the effect on the quality of life of two attachment systems with single implant overdentures**.** For the study, 12 patients who had never worn dentures before and were fully edentulous were chosen. For each patient, a brand-new set of traditional full dentures was created. The masticatory performances were evaluated using the sieve method and the Oral Health Impact Profile-49 questionnaire at various intervals. They concluded that ball attachments have a favorable result with One implant-supported mandibular overdentures.

Discussion:

Millions of people in India still live with the dependence on detachable dentures. Wearers of traditional complete dentures deal with a variety of issues every day, including unstable mandibular dentures, difficulty chewing, diminished self-confidence, a decline in quality of life, and decreased social interaction and happiness. The creation of new technology that solves these widespread issues need to be one of the main objectives of health promotion. Although implant therapy has been found to improve patient-based results in recent years, there are still some drawbacks to this treatment option, with cost being the main one.Since implant procedures are expensive for both the patient and the prosthodontist, it is imperative in many clinical scenarios to find ways to employ resources more effectively in order to provide better results at a lesser

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **Volume 12, Iss 1, 2023**

cost. The new research will be very helpful in creating single implant-assisted overdentures as a low-cost treatment option that will benefit our older population by enhancing both their general and dental health in the contemporary Indian context.

A single implant-supported prosthesis in the mandible is a new concept that has evolved recently. Besides being cost-effective a single implant-supported is said to be almost as effective as two implant-supportedoverdenture however not much literature is available documenting this treatment modality. This treatment if found viable can be the answer to the problems associated with complete dentures.

Conclusion:

A single Implant supported mandibular dentures may be the answer to all the problems associated with conventional dentures. With advancements in Medical field and increasing life expectancy of the patients, implant supported overdentures may provide the solution to loose, unstable dentures thereby, improving the quality of life of individuals and at the same time being cost effective for the patient as opposed to a conventional TIMOD.

References:

1) F.S. Schwindling et al. The single mandibular implant study – Short-term effects of the Loading protocol on Oral Health-related Quality of Life. Journal of prosthodontic research 2018;62: 313–316

2) Kern M et al. Survival and Complications of Single Dental Implants in the Edentulous Mandible Following Immediate or Delayed Loading: A Randomized Controlled Clinical Trial. Journal of Dental Research 2018;97(2): 163–170

ISSN PRINT 2319 1775 Online 2320 7876
Research paper **© 2012 IJFANS. All Rights Reserved**, **Volume 12, Iss 1, 2023**

3) Paleari A G et al. One-year prospective clinical study comparing patient satisfaction and masticatory performance of mandibular overdentures supported by one versus two implants. J Appl Oral Sci. 2018;26:20160628

4) Camilla Fraga do Amaral1 et al. Sensorial Ability, Mastication and nutrition of single Implant Overdentures Wearers Brazilian Dental Journal 2019;30(1): 66-72

5) Nogueira et al. Cost-effectiveness analysis of the single-implant mandibular overdenture versus conventional complete denture: study protocol for a randomized controlled trial. Trials 2016;17:533

6) de Souza et al. Single-implant overdentures retained by the Novaloc attachment system: study protocol for a mixed-methods randomized cross-over trial. Trials (2018) 19:243

7) Emami et al. Impact of implant support for mandibular dentures on satisfaction, oral and general health-related quality of life: a meta-analysis of randomized controlled trials. Clin. OralImpl. Res. 2009;20: 533–544

8) Mahoorkar S, Bhat S, Kant R. Single implant supported mandibular overdenture: A literature review. J Indian Prosthodont Soc 2016;16:75-82

9) Swarup S, Padmanabhan TV, Kumar V A. Evaluation of patient satisfaction and masticatory performance between complete dentures and single implant-supported overdentures with locator and ball attachments. J Dent Implant 2016;6:22-8