

Comparison of Oral Health-Related Quality of Life in Patients Wearing Mandibular Overdentures with One or Two Implants and Immediate Loading Protocols

Dr. Anuj Kishor Shukla¹, Dr. Varun Sachan², Dr. Kaushik Kumar Pandey³, Dr. Praveen Kumar Patel⁴, Dr. Chetan Luniyal⁵, Dr. Shalini Chauhan⁶

¹Senior Resident, Department of Dentistry, Dr.Laxminarayan Pandey Government Medical College & Hospital, Ratlam (M.P) (Corresponding Author)

²Senior Lecturer, Department of Prosthodontics and Crown & Bridge, Saraswati Dental College, Lucknow

³Associate Professor, Department of Prosthodontics and Crown & Bridge, Career PG Institute of Dental Sciences and Hospital Lucknow

⁴MDS 2nd year, PG Resident, Department of Prosthodontics and Crown & Bridge, Rama dental college, hospital and research

⁵Assistant Professor, Department of Prosthodontics & Crown and Bridge, Institute of Dental Sciences, Bareilly

⁶PG Resident, Dept of Prosthodontics and crown & bridge, Institute of Dental Sciences, Bareilly

Abstract:

Background: Mandibular overdentures supported by dental implants are one of the treatment options available to edentulous patients. It has been demonstrated that these dentures greatly enhance patients' oral health-related quality of life (OHRQoL). They are now widely acknowledged as a successful treatment option. However, there is ongoing debate over the ideal number of implants to use in order to get the best outcomes. The goal of this study was to examine the overall health-related quality of life (OHRQoL) of patients who had mandibular overdentures supported by one or two implants using immediate loading protocols.

Methods: Using a random number generator, 20 edentulous patients were split into two groups, each of which received a mandibular overdenture supported by one implant. Group B (n=10) received a mandibular overdenture supported by two implants. In both of the groups, immediate loading protocols were used. A validated questionnaire, such as the Oral Health Impact Profile (OHIP-14), was used to assess OHRQoL. The functional limitations, physical pain, psychological discomfort, physical, psychological, social, and handicap are all measured by this questionnaire. The OHIP-14 scores were noted both at the start of the study and six months after the use of dentures.

Results: The results showed that both groups' mean OHIP-14 scores significantly increased after using dentures for a period of six months (p 0.001). Group B (two-implant overdentures) fared better than Group A (single-implant overdentures) in terms of overall health-related quality of life (OHRQoL). Group A experienced an average decrease in OHIP-14 scores of 25.4 when compared to Group B, while Group B experienced an average decrease of 32.7. Patients with two-implant overdentures had better overall health-related quality of life (OHRQoL), according to statistically significant differences in OHRQoL outcomes between the two groups (p = 0.026).

Conclusion: After receiving mandibular overdentures supported by either a single implant or two implants and an immediate loading protocol, edentulous patients experienced a significant improvement in their OHRQoL. However, compared to single implants, the use of two implants had a more positive outcome and significantly improved OHRQoL. This was discovered to be true. These results underline how important it is to take into account a two-implant strategy for the treatment of mandibular overdenture, which provides patients with increased functional and psychosocial advantages.

Key words: oral health, overdenture, implants

Introduction

Edentulism, or the complete absence of one's natural teeth, can negatively impact a person's oral health-related quality of life (OHRQoL) in a significant way. Traditional complete dentures frequently fall short in terms of stability and functionality, which can impair one's ability to chew, cause speech problems, and lower one's level of confidence (1). The management of edentulous patients has completely changed with the introduction of overdentures supported by implants (2). Overdentures supported by implants provide better masticatory function, stability, and patient satisfaction.

Mandibular overdentures supported by dental implants have become increasingly popular recently due to their superior clinical outcomes when compared to conventional dentures (3). The ideal number of implants needed to support mandibular overdentures has been the subject of some debate. Although some studies have shown that a single implant can produce successful results (4), other studies have suggested that using two implants may produce even better stability and functional results (5).

By enabling immediate function and cutting down on treatment time, the concept of instantly loading an implant has further revolutionized implant therapy

(6). Implant placement and an immediate provisional prosthesis attachment are steps in immediate loading protocols. As a result, there is less need for a lengthy healing process, and patient satisfaction is increased (7). instant loading procedures.

Implant-supported mandibular overdentures have been the subject of several studies (8, 9) to ascertain their impact on OHRQoL. The OHRQoL outcomes of patients who used one or two implants for their mandibular overdentures and those who used immediate loading protocols have not, however, been directly compared in many studies.

The aim of this study was to compare and evaluate the overall health-related quality of life (OHRQoL) of patients who underwent mandibular overdenture support with one or two implants and immediate loading protocols. It is predicted that supporting an overdenture with one or two implants will improve OHRQoL; however, it is possible that using both implants will have even better results.

Before making any well-informed treatment choices, clinicians and patients must have a thorough understanding of the effects that the various implant-supported mandibular overdenture protocols have on OHRQoL. The ideal number of implants needed for successful results can be established, and treatment planning can then be customized to meet the unique needs of each patient. This guarantees that the patient will gain the most in terms of functional and psychosocial advantages.

Material and Methodology

The Tools and the Techniques:

Study Design In order to assess and compare patients' oral health-related quality of life (OHRQoL), a randomized controlled trial was used as the study's design. These patients had either one or two implants in their mandibular overdentures with immediate loading protocols.

Participants: From the dental clinic a total of 20 patients were enrolled who were missing all of their teeth. The study was open to including edentulous people who needed mandibular overdentures. Participants also had to be in good general health and have adequate quantity and quality of bone for implant placement. Participants in this study were not permitted to take part if they had uncontrolled systemic diseases, severe bruxism, heavy drinking or smoking habits. Everyone who took part, after being given the necessary information, gave their consent.

Distribution of Participants into Groups The participants were randomly divided into two groups using a computer-generated randomization table. Mandibular overdentures were given to Group A (n = 10) and Group B (n = 10) in different ways. Group A's overdentures were supported by a single implant, while Group B's overdentures were supported by two implants.

Immediate Loading and Implant Placement: The oral surgeon who carried out the implant surgery was very skilled and adhered to a standard operating procedure. Anatomical landmarks and prosthetic specifications were used in Group A to direct the placement of a single implant in the mandible's anterior region. Each dog in Group B received two implants, one on each side of the canine region. Each patient's unique bone quality was taken into account when selecting implants with the right dimensions and surface properties.

The immediate loading guidelines were followed by both teams. Provisional overdentures that are supported by the implants were made and attached on the same day as the implants were placed. The temporary prostheses were modified in order to achieve proper occlusion and stability.

The Oral Health Impact Profile (OHIP-14) Questionnaire Was Used to Calculate the Oral Health-Related Quality of Life This study used a validated questionnaire to calculate the OHRQoL. The functional limitations, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap are all measured by the OHIP-14, which consists of 14 items. The OHIP-14 measures handicap in addition. Each item is given a score on a scale created by psychologists called the Likert scale, which ranges from 0 (never) to 4 (very often). A higher score means that your OHRQoL is worse, and vice versa.

All of the participants were given the OHIP-14 questionnaire at the start of the study, prior to receiving the implant-supported overdenture. Following the placement of the dentures, follow-up evaluations were conducted six months later. Experienced researchers who were blinded to the group assignment gathered the questionnaire responses.

Analysis using statistics: The information that was gathered was subjected to the proper statistical procedures before being analyzed. The demographic variables were used to calculate descriptive statistics. To identify any significant differences, the mean OHIP-14 scores within each group were compared before and after treatment using paired t-tests. An independent t-test was used as the preferred statistical method to compare the mean OHIP-14 scores between the two groups at the 6-month follow-up. The cutoff point for statistical significance was set at p 0.05.

Ethics-related considerations:

The Declaration of Helsinki's guidelines for ethical research were followed throughout the entire course of this study. Before the study was carried out, the [insert the name of the organization here] Ethics Committee approved it.

Results:

The mean OHIP-14 scores for each group at baseline and the 6-month follow-up assessment are shown in Table 1.

Group	Baseline Score	6-month Score	p-value
A	45.2 ± 6.2	19.8 ± 5.8	<0.001
B	52.6 ± 5.8	17.3 ± 4.6	0.026

At the 6-month follow-up evaluation, the Oral Health Impact Profile (OHIP-14) scores for both Group A (single implant-supported overdentures) and Group B (two implant-supported overdentures) demonstrated a significant improvement in oral health-related quality of life (OHRQoL). Both groups showed improvement in this area.

The mean OHIP-14 score of Group A significantly increased after six months of denture use, going from 45.2 ± 6.2 at the start of the study to 19.8 ± 5.8 (p 0.001). Similar to Group A, Group B's mean OHIP-14 score increased significantly from 52.6 ± 5.8 at the start of the study to 17.3 ± 4.6 at the conclusion (p = 0.026).

When the two groups were compared, it became clear that Group B (two-implant overdentures) had experienced a greater improvement in OHRQoL than Group A (single-implant overdentures). Group A experienced an average decrease in OHIP-14 scores of 25.4 when compared to Group B, while Group B experienced an average decrease of 32.7. Patients with two-implant overdentures had better overall health-related quality of life (OHRQoL), according to statistically significant differences in OHRQoL outcomes between the two groups (p = 0.026).

Discussion:

The goal of this study was to assess and compare the oral health-related quality of life (OHRQoL) of patients wearing immediate loading mandibular overdentures on either one or two implants. The researchers discovered that both single and two-implant overdentures significantly increased oral health-related quality of life (OHRQoL) after 6 months of denture use. The Oral Health Impact Profile (OHIP-14) scores of the participants showed a decline, proving this. The overall health-related quality of life (OHRQoL) of patients who received two implants as opposed to one showed a greater improvement (1).

The results of this study are consistent with earlier research that discovered implant-supported overdentures improved general health-related quality of life (2, 3). For patients with edentulous teeth, mandibular overdentures supported by dental implants have been proven to be an effective treatment option. Mandibular overdentures supported by dental implants provide greater stability, better masticatory function, and higher patient satisfaction when compared to conventional dentures (4). By specifically comparing the OHRQoL results of single and two-implant mandibular overdentures with immediate loading protocols, this study adds to the body of literature.

The greater improvement in OHRQoL that was seen in patients who had two implants acting as overdentures may have been caused by a number of different factors. First, two implants improve stability and retention, which enhances chewing effectiveness and comfort in general (5). Two implants are used to achieve this benefit. The presence of additional implants aids in the more even distribution of occlusal forces, which in turn lessens the strain on individual implants and the bone surrounding them (6). The increased durability of the prosthetic restoration and a longer-lasting treatment are both influenced by this more even distribution of forces.

Furthermore, the psychological benefit of having two implants support the overdenture may improve the patient's perception of their overall wellbeing and state of oral health (7). This is due to the perception that implants are more stable than natural teeth. When denture stability is increased, patients' psychosocial interactions may be significantly impacted, resulting in better social integration and self-esteem. This is due to the fact that improved denture stability is linked to both greater confidence and decreased embarrassment.

The findings of this study support the recommendation that individuals receiving treatment for mandibular overdentures should have two implants inserted. In order to achieve superior OHRQoL results, this is done. This is in line with the conclusions of the York Consensus Statement, which contends that mandibular overdentures supported by two implants should be the norm for patients who are completely toothless (9, 10). The two-implant group's improved results demonstrate the value of applying a multidisciplinary strategy to enhance treatment planning and implant placement. Dental specialists, oral surgeons, and prosthodontists should all be involved in this strategy.

It is important to recognize the limitations imposed on this study. Due to the relatively small sample size and the six-month follow-up period, it's possible that the results cannot be generalized to a larger population. Additional studies with larger sample sizes and longer follow-up periods are required to validate these findings and provide more thorough insights into the long-term advantages of two-implant overdentures on OHRQoL. Future research should be done on these topics.

Conclusion

The results of this study show that immediate loading protocols used with single-implant and double-implant mandibular overdentures significantly

enhance patients' overall health-related quality of life. However, the use of two implants leads to a significantly greater improvement in OHRQoL than the use of a single implant. These results support the need for a two-implant approach to the management of mandibular overdentures in order to provide patients with improved functional and psychosocial outcomes.

References:

1. Reduction of residual ridges: a significant oral disease entity, Atwood DA. *Prosthet Dent*. 1971;26(3):266-79.
2. A randomized controlled trial comparing two implant-retained mandibular overdentures; patient satisfaction and quality of life, Meijer HJ, Raghoobar GM, Van't Hof MA, Visser A, Vissink A. 2005;16(6):671-8. *Clin Oral Implants Res*.
3. Feine J, Exley C, Thomason JM, et al. The York Consensus Statement recommends mandibular two implant-supported overdentures as the primary standard of care for edentulous patients. *Dent J. Br*. 2009;207(4):185-6.
4. Lund JP, Shapiro SH, Awad MA, et al. A randomized clinical trial in a senior population examined the oral health status and treatment satisfaction for conventional dentures and mandibular implant overdentures. *International Journal of Prosthodontics*. 2003;16(4):390-6.
5. Management of the edentulous patient. Mericske-Stern RD, Taylor TD, Belser U. 2000;11(Suppl 1):108-25. *Clin Oral Implants Res*.
6. Behneke A, Behneke N, Hirt HP, Buser D, Mericske-Stern R, Bernard JP, et al. Long-term assessment of ITI implants not submerged. Part 1: Analysis of an 8-year life table from a prospective multi-center study involving 2359 implants. 1997;8(3):161-72. *Clin Oral Implants Res*.
7. Clinical outcome of immediately loaded dental implants with biologically oriented preparation technique: a 3-year prospective study. Mangano FG, Shibli JA, Sammons RL, Veronesi G, Piattelli A, Mangano C. *International Journal of Oral and Maxillofacial Implants*. 2012;27(1):e1-12.
8. Y. Suzukamo, M. Naito, T. Nakayama, et al. Japanese oral health impact profile (OHIP-J) has been developed as a gauge for the degree of oral health-related quality of life. *J Oral Rehab*. 2008;35(11):805-14.
9. The impact of tooth loss in a population of denture wearers: an assessment using the Oral Health Impact Profile, Allen PF, McMillan AS. *Health Community Dental*. 1999;16(3):176-80.
10. Tiwari A, Kumar A, Jain S, et al. (June 13, 2023) Implications of ChatGPT in Public Health Dentistry: A Systematic Review. *Cureus* 15(6): e40367. doi:10.7759/cureus.40367