



Oral Health Related Quality of Life in first time complete denture wearers Using Balanced, Monoplane and Group function Occlusion

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ABSTRACT

Background: Oral Health Impact profile is one of the most common methods to assess the Oral Health Related Quality of Life (OHRQoL) of the patients. The aim of the study was to assess the oral health-related quality of life of patients using different occlusal schemes ie., balanced occlusion, monoplane occlusion, and group function occlusion.

Methods: In this study, a total of 66 edentulous participants were included and divided into 3 groups, balanced occlusion, monoplane occlusion, and group function occlusion. Each group consisted of 22 participants selected using simple random sampling. OHIP-14 scores were assessed before complete denture treatment and at 6 months' follow-up.

Results: When comparison of mean OHIP – 14 among the study population across gender before and after denture insertion was done the results were statistically significant ($p < 0.05$). The difference between the follow-up scores and the scores before a denture when subjected to statistical analysis was significant for all three groups. When one-way ANOVA was done between the groups the data was statistically significant ($p < 0.05$).

Conclusions: The study conclusively showed that the OHRQoL of the patient improved significantly with complete denture prosthesis at 6 months follow-up. The difference between the three groups was also statistically significant and patients with any of the three aforementioned occlusal schemes showed improvement in their OHRQoL. The patient's scores improved the most with conventional group function occlusion, followed by monoplane and the lowest improvement was in the bilateral balanced group.

Keywords: Oral Health Related Quality of Life, OHIP-14, Complete denture, occlusion, occlusal scheme.

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Introduction

The oral health of an individual has a profound impact on their social and psychological well-being.¹ Loss of teeth can occur due to various reasons of which periodontal disease and dental caries are the most important reasons. Various systemic conditions such as diabetes mellitus can significantly predispose the individual for periodontal damage and poor periodontal parameters are often associated with patients with systemic disorders.² The prevalence of edentulous patients in developing nations has been estimated at 11.7 % with India and Mexico having over 16% of their elderly population who are edentulous.³

The Oral Health Impact Profile (OHIP) is one of the most commonly and widely used methods to assess the Oral Health Related Quality of Life (OHRQoL) of an individual. The initial OHIP was a 49-question form and this was too long and cumbersome to fill a modification to this was introduced which constitute 14 questions. This OHIP-14 was introduced to assess psychological, functional, and social disability about the oral health of a patient. This OHIP-14 is quite easy for geriatric patients to fill and avoids biased tiredness in geriatric patients.⁴⁻⁶

The OHIP-14 has been validated extensively in various languages for use on geriatric patients. There are few studies now that are available that prove that a complete dental prosthesis can help the patient improve on the OHRQoL.⁴⁻⁶ But, the most important thing that is lacking in the literature is if a particular type of occlusal scheme influences the quality of life of the patients. To overcome this shortfall this study was planned to assess the impact that various occlusal schemes had on OHRQoL. To get a better assessment of the impact on quality of life, a 6-month follow-up using the OHIP-14 was also done as part of this study. The aim of the study was to assess the oral health-related quality of life of patients using different occlusal schemes ie., balanced occlusion, monoplane occlusion, and group function occlusion. The null hypothesis for the study was that there is no difference in the OHIP scores between various occlusal schemes before and after completed denture treatment.

Materials and Methods

Ethical clearance was obtained from Institute's ethical clearance committee. (ABSM Ethics Committee,

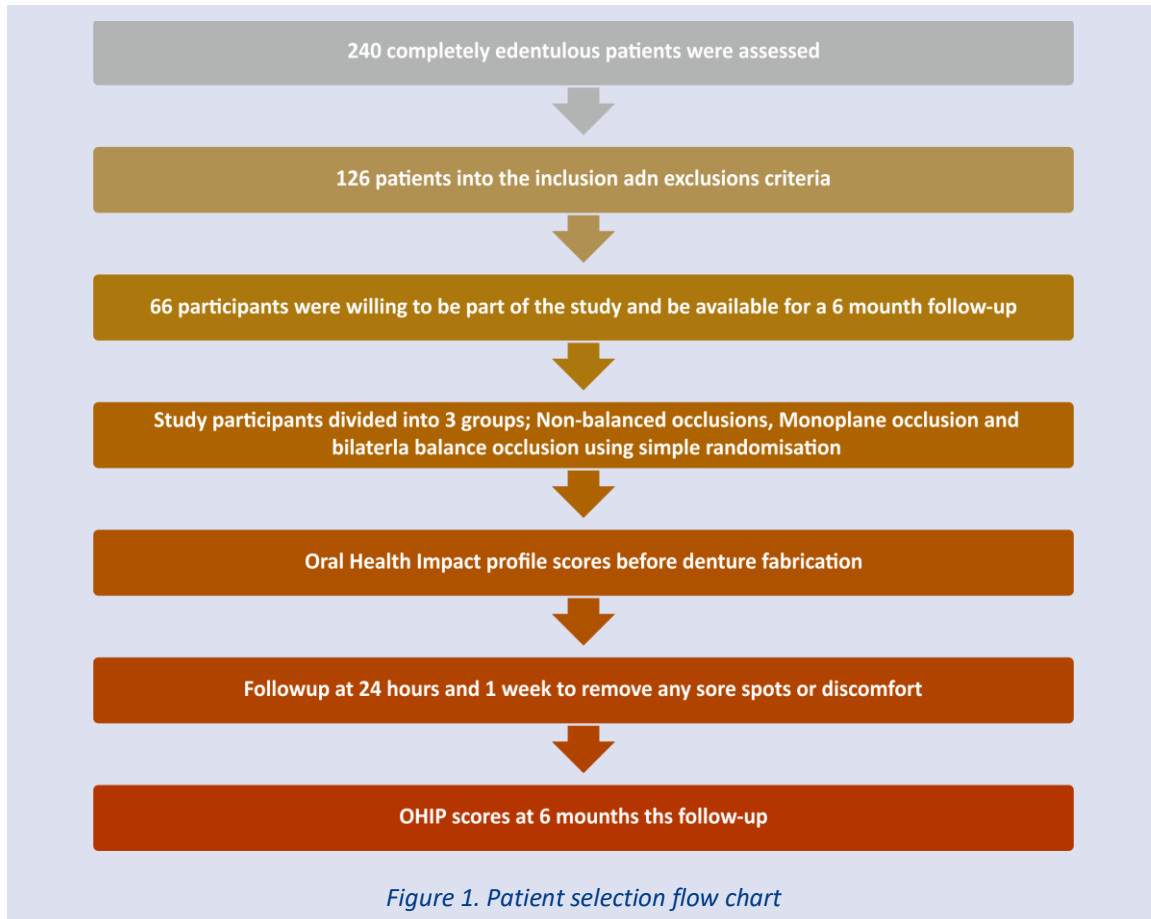
ABSM/EC52/2020 on 10th December 2020) In this study, a total of 66 edentulous participants were included. The sample size was calculated based on a 5% level of significance, 80% power, and an effect size of 0.8. The sample size of 66 was calculated using the G* Power sample size calculator. The patients were allocated using simple random sampling into one of the three occlusal schemes.

A total of 240 completely edentulous patients were examined for this study and only 126 patients were eligible for the study. Only 66 patients were willing to give written consent and hence 66 participants were included in this study [Figure-1]. The participants were divided into 3 groups using simple block randomization. The three groups included the balanced, monoplane, and group function occlusal schemes. The patient population included patients who are completely edentulous and were first-time denture wearers with a period of edentulousness of greater than 6 months. The patients were segregated into one of the 3 occlusal schemes using sealed envelopes. The study participants were blinded to the type of occlusal scheme. The study compared the three occlusal schemes in a group of 22 patients each.

For the study, the patient must be completely edentulous with high well-rounded ridges, with an age range of 40 to 80 years, with an inter-arch distance of at least 20 mm, and must be willing to give written consent. Patients who had a history of neuromuscular disorders suffered from uncontrolled diabetes mellitus or systemic

hypertension were excluded from the study. A total of 240 completely edentulous patients were screened for this study and only 66 fit the inclusion and exclusion criteria hence, these patients were included in the study. The participants were given an OHIP-14 questionnaire prior to beginning of complete denture fabrication. The questionnaire was devised as a five-point Likert scale ranging from very likely to never [Figure-2]. The same questionnaire was given to the patient again 6 months after completion of treatment and the data were tabulated.

The complete denture fabrication was performed by initially making a primary impression using irreversible hydrocolloid material and a stock metal tray. Following this casts were poured with Type III gypsum product (Kalabhai, India) and the base for these casts was made using Type II gypsum product (Kalabhai, India). Specially customized trays were made on each of these arches with self-cured acrylic resin. Border molding was done using a green stick impression compound and a wash impression was made using zinc oxide eugenol impression paste (Dental product of India (DPI), Mumbai, India). The impression was beaded and boxed and poured with type III gypsum product (Kalabhai, India). Heat cured acrylic denture base was made to support the maxillary and mandibular occlusal rims. Following this, maxillomandibular jaw relation was recorded and the casts were mounted.



The mean age of the study population was 62.34 ± 11.04 years. Among the study participants, 44 (66.7%) were male and 22 (33.3%) were female. When a comparison of mean OHIP-14 among the study population across gender before and after denture insertion was done the results were statistically significant ($P < 0.05$). The results showed a significant decrease in both male and female participants. [Table-1] When the pre and post-insertion scores were compared among all the study participants it was noted that there was a significant decrease in OHIP-14 score before and after complete dentures and this data was statistically significant ($P < 0.05$) [Table-2].

When the data was analyzed for participants below and above the age of 60 years the data was statistically significant ($P < 0.05$) [Table-3]. When the data was subjected to pairs t-test for before and after for different types of occlusions, there was a significant reduction in OHIP scores across all three occlusal schemes and this

data was statistically significant [Table-4]. The mean scores of OHIP-14 were compared before and after complete denture prosthesis there was the largest reduction in the scores were noted in the group function group of 15.636 followed by monoplane occlusion with a score reduction of 10.045 and the least difference was noted in the balanced occlusal scheme group with a value of 8.909. The difference between the follow-up scores and the scores before a denture when subjected to statistical analysis was significant for all three groups ($P < 0.05$). When one-way ANOVA was done between the groups the data was statistically significant ($P < 0.05$). When multiple comparisons post-hoc test were made between monoplane occlusion and group function occlusion and between group function and balanced occlusion the data was statistically significant ($P < 0.05$). While the data was not statistically significant when comparison was made between monoplane occlusion and balanced occlusion.

Table 1. The comparison of mean OHIP – 14 among the study population across gender before and after denture insertion.

Gender*	OHIP - 14 (Mean \pm SD)*		t - value	Df	p - value
	Pre - Denture	Post -Denture			
Male	37.61 \pm 12.93	26.45 \pm 7.86	11.34	43	<0.05
Female	41.91 \pm 12.71	29.64 \pm 9.09	8.96	21	<0.05

*Paired Samples t – test

Table 2. The comparison of mean OHIP -14 among the study participants pre and post denture insertion.

Denture*	N	Mean \pm SD*	t- value	Df	p - value
Pre- Insertion	66	39.05 \pm 12.90	14.49	65	<0.05
Post- Insertion		27.52 \pm 8.36			

*Paired Samples t – test

Table 3. The comparison of mean OHIP – 14 among the study population across age groups, before and after denture insertion.

Age*	OHIP - 14 (Mean \pm SD)*		t - value	Df	p - value
	Pre - Denture	Post -Denture			
\leq 60 years	37.84 \pm 13.09	26.48 \pm 7.82	9.32	30	<0.05
\geq 61 years	40.11 \pm 12.82	28.43 \pm 8.82	11.03	34	<0.05

*Paired Samples t – test

Table 4: Mean, standard deviation and statistical comparison between before and after OHIP-14 scores among various types of occlusion

Type of Occlusal Scheme	Number of Participants	Before denture (Pre), After denture (post)		Mean	Standard Deviation	Std. Error Mean	P-value
		Pre	Post				
Monoplane Occlusion	22	Pre	32.45	11.505	2.453	<0.05	
		Post	22.41	5.114	1.090		
Group function occlusion	22	Pre	50.09	6.240	1.330	<0.05	
		Post	34.45	5.804	1.237		
Balanced occlusion	22	Pre	34.59	12.250	2.612	<0.05	
		Post	25.68	8.682	1.851		

Discussion

The present study compared the impact of various occlusal schemes on OHIP-14 scores in completely edentulous patients before and after complete denture prosthesis. In the current study two-thirds of the participants were males and one-third were females. This gender distribution is similar to studies done by Shrestha *et al.*⁷ while it was contrary to the results of Montero *et al.*⁸,

and Postic *et al.*⁹ This difference in gender distribution can be attributed to the different geographic gender ratios and profiles in these different studies. The mean age of the present study was 62.34 ± 11.04 years which was similar to results obtained by Montero *et al.*⁸, and Shrestha *et al.*⁷, while Postic *et al.*⁹, reported a slightly higher average age of the participants 72.70 ± 9.04 years in men and 73.10 ± 6.73 years in women. This can be attributed to the age restriction in this study where patients above the age

of 80 years were not included and hence the average age might have been lower than the Postic *et al.* study.

This study showed that the OHIP-14 scores were higher in participants with age above 60 years and lower for participants below 60 years. This result is contrary to results obtained by Shrestha *et al.*⁷ and John *et al.*¹⁰ where participants with increasing age had lower scores. This difference can be attributed to the fact that patients in our study were first-time denture wearers.

In the present study, there was a statistically significant drop in the overall score for the OHIP-14 post denture insertion and this difference was statistically significant. This reduction in the scores posts denture insertion was similar to the results obtained by Kaushik *et al.*¹¹ Shrestha *et al.*⁷ in their study also showed an improvement in OHRQoL in patients after a follow-up period was 8 weeks and their data was statistically significant. Jenei *et al.*¹² in their study on patients with various prosthetic rehabilitation assessed the Hungarian version of the OHIP-49 questionnaire. A subset of patients in this study was completely edentulous and they reported a reduction in the scores of patients to post denture insertion.

In a randomized control trial by Kawai *et al.*¹³, it was noted that the bilateral balanced group had improvement in their OHRQoL scores but the difference was statistically not significant. This result is contrary to the results of our study where the difference between pre and post-insertion was statistically significant in the Balanced occlusion group. This difference can be attributed to the use of two different methods to assess OHRQoL in the studies.

The present study also assessed the impact of monoplane occlusion on OHRQoL of the patients and there was a statistically significant difference before and after complete denture prosthesis. The result, when compared to bilateral balanced occlusion, was not significant while it was significant when it was compared to conventional group function occlusion. From our literature search, there were no studies that have compared these three types of occlusions and hence comparison with other studies was not done for the monoplane group. The overall OHRQoL improved for all patients in this study with the maximum improvement in OHIP scores was noted for conventional group function occlusion, followed by monoplane and least improvement in Bilateral balanced occlusion. Although, all three data were statistically significant. The present study showed that there was a difference in OHIP-14 scores between monoplane occlusion, group function occlusion and balanced occlusion. Hence, the null hypothesis was rejected for the study.

Conclusions

The study assessed the impact of the various occlusal scheme on OHIP-14 scores in the patient. The study conclusively showed that the OHRQoL of the patient improved significantly with complete denture prosthesis at 6 months follow-up. The difference between the three groups

was also statistically significant and patients with any of the three aforementioned occlusal schemes showed improvement in their OHRQoL. The patient's scores improved the most with conventional group function occlusion, followed by monoplane and the lowest improvement Was in the bilateral balanced occlusion group.

References

1. Nordenram G, Davidson T, Gynther G, Helgesson G, Hultin M, Jemt T, et al. Qualitative studies of patients' perceptions of loss of teeth, the edentulous state and prosthetic rehabilitation: A systematic review with meta-synthesis. *Acta Odontol Scand.* 2013;71:937–951.
2. Parak MK, Kasi A, Ayyappan V, Prabhu S. Knowledge and awareness of oral manifestations of diabetes mellitus and oral health assessment among diabetes mellitus patients- a cross sectional study. *Curr Diabetes Rev.* 2019; 16: 156–164.
3. Peltzer K, Hewlett S, Yawson, AE, Moynihan P, Preet R, Wu F, et al. Prevalence of loss of all teeth (edentulism) and associated factors in older adults in China, Ghana, India, Mexico, Russia and South Africa. *Int J Environ Res Pub He.* 2014; 11: 11308–11324.
4. DeSouza RF, Terada AS, Vecchia MP, Regis RR, Zanini AP, Compagnoni MA. Validation of the Brazilian versions of two inventories for measuring oral health related quality of life of edentulous participants. *Gerodontology.* 2012;29:e88-95.
5. Castrejón-Pérez RC, Borges-Yáñez SA. Derivation of the short form of the Oral Health Impact Profile in Spanish (OHIP-EE-14). *Gerodontology* 2012; 29:155- 158.
6. Allen F, Locker D. A Modified Short Version of the Oral Health Impact Profile for Assessing Health-Related Quality of Life in Edentulous Adults. *Int J Prosthodont.* 2002; 15:446-450.
7. Shrestha B, Basnet BB, Adhikari GA. A questionnaire study on the impact on oral health-related quality of life by conventional rehabilitation of edentulous patient. *BDJ Open.* 2020; 6: 1-5.
8. Montero J, Macedo C, López-Valverde A, Bravo M. Validation of the oral health impact profile (OHIP-20sp) for Spanish edentulous patients. *Med Oral Patol Oral Cir Bucal.* 2012;17:e469-e476.
9. Postic SD, Kučević E, Halilović-Asotić A, Asotić A, Asotić B, Džanan D. The OHIP-EDENT B&H Questionnaire: Translation and Psychometric Properties in Treatment of Acrylic Complete Denture Wearers. 04 December 2020, PREPRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-117922/v1>]
10. John, M. T. et al. Demographic factors, denture status and oral health-related quality of life. *Community Dent. Oral. Epidemiol.* 2004; 32: 125–132.
11. Kaushik K, Dhawan P, Tandon P, Jain M. Oral health-related quality of life among patients after complete denture rehabilitation: A 12 month follow-up study. *Int J App Basic Med Res.* 2018; 8:169-173.
12. Jenei A, Sándor J, Hegedűs C, Bágyi K, Nagy L, Kiss C et al. Oral health-related quality of life after prosthetic rehabilitation: a longitudinal study with the OHIP questionnaire. *Health Qual Life Outcomes.*2015; 13:99.
13. Kawai Y, Ikeguchi N, Suzuki A, Kuwashima A, Sakamoto R, Matsumaru Y et al. A double blind randomized clinical trial comparing lingualized and fully bilateral balanced posterior occlusion for conventional complete dentures. *J Prosthet Res.*2017; 61:113-122.