



Original Research Article

Assessment of Patient Satisfaction and Speech Clarity between Conventional Complete Dentures and Implant-Supported Overdentures

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Abstract: Background: Traditional full dentures can be linked to poor stability and comfort, and this can affect the ability to chew and phonetics, and the quality of life. Implant-supported overdentures have better retention, support, and functional efficiency, which ultimately leads to an increase in patient satisfaction and communication ability. **Objective:** The purpose of the study was to evaluate and compare patient satisfaction and speech clarity of conventional complete dentures and implant-supported overdentures. **Methodology:** A Total of 200 edentulous patients were cross-sectionally studied and divided equally into two groups, namely conventional complete denture users (n = 100) and implant-supported overdenture users (n = 100). The demographic information, patient satisfaction measured with the Oral Health Impact Program-14 (OHIP-14), and speech intelligibility measured with the Speech Intelligibility Rating (SIR) scale were all considered for data collection. Data analysis was done using SPSS version 26 and t-tests, chi-square tests, Mann-Whitney U test, correlation, and multivariate regression were undertaken. A p-value ≤ 0.05 was taken to be statistically significant. **Results:** Patients using implant-supported overdentures showed reduced OHIP-14 score, which represented superior satisfaction in all aspects ($p < 0.001$). There was also better speech clarity in this group, as indicated by higher scores on SIR ($p < 0.001$). It was found that OHIP-14 had a significant negative correlation with SIR scores ($p < 0.001$). **Conclusion:** Implant-supported overdentures exhibit significant patient satisfaction and speech articulation over conventional dentures, in favor of them as a treatment choice for edentulous patients.

Keywords: Edentulism; Conventional Complete Denture; Implant-Supported Overdenture; Patient Satisfaction; Speech Intelligibility.

INTRODUCTION

Tooth loss and total edentulism remain significant population-wide issues, with important implications for their functional, psychological, and social consequences. Total tooth loss is an affliction of hundreds of millions of individuals across the globe

and rises significantly with age; an estimated 353 million individuals were edentulous in 2021, and in some regions, an estimated 20%23% of persons aged 60 years and older have it, which is an eye-opener to the ongoing heavy burden of severe oral disease [1,

2].

Complete dentures (traditional complete removable dentures, CDs) have been the traditional prosthetic device that has always been used in the edentulous patient. CDs are restorative of facial support, masticatory function, and aesthetics, as well as an available alternative for many patients. Nevertheless, traditional dentures (particularly mandibular dentures) tend to be connected with the issues of retention and stability, impaired masticatory performance, and dysfunctional restrictions that may adversely influence nutrition, socialization, and quality of life. These functional deficits can also affect speech articulation and clarity, which subsequently lessen the social confidence and involvement of the patients [3, 4].

Implant-supported overdentures (IODs), which are usually held by two mandibular implants, have been determined as a reliable option that significantly enhances the stability of dentures, chewing functions, and patient satisfaction with conventional dentures. In the past five years, several systematic reviews and randomized trials have provided an increased oral-health-related quality of life (OHRQoL), increased overall satisfaction and function, high implant survival, and reasonable complication profiles in medium-term follow-up in IODs compared with CDs [5-10].

A major, but a relatively underemphasized, outcome parameter in the assessment of prosthodontic treatments is speech [11]. Phonetics are influenced by denture geometry, stability, and the neuromuscular adaptation of the patient: any instability, prosthesis motion, and palatal changes may alter consonant production and vowel resonance, leading to perceptible changes in speech clarity [12]. New clinical trials and patient surveys indicate that denture stability is better with using an implant retention instead of conventional dentures, and that speech perception and comfort during communication are better with implant retention than conventional dentures, but again, results depend on the study design, assessment procedure (objective acoustic measures versus patient-rated speech satisfaction), and time after prosthesis insertion [13-15].

Although an increasing body of evidence suggests that IODs can help to enhance numerous aspects of oral functionality, there exist some gaps, especially about issues of speech clarity: both objective speech/phonetic and validated patient satisfaction scales are underrepresented in the literature, and regional data, especially in low- and middle-income settings, are scarce. This creates incomplete information to both clinicians and patients when deciding between conventional CDs and IODs, particularly where the outcomes of priority are

speech and social communication.

It is not just a matter of restoring teeth in an edentulous patient but rather restoring a smile, voice, identity, and confidence. The implant-retained overdenture is the most reliable method to implant the prosthesis and enhance the chewing and the comfort, although the actual effect on the daily communication, the articulation of speech in a social and work environment, is not as well quantified. The targeted comparison, which integrates objective speech analysis (acoustic/phonetic measures) and the self-reported speech satisfaction and the general prosthesis satisfaction, will directly transform into improved patient counselling, individualised treatment strategy, and enhanced evidence regarding resource usage in prosthodontic care. Concisely, patients should not only eat well, smile well, but also talk well, and we should have strong, modern data to prove which method of prosthetic results in that effect to the greatest extent. The current research tried to compare patient satisfaction and speech clarity between traditional complete dentures and implant-supported overdentures in totally edentulous patients.

MATERIAL AND METHODS

The proposed research used a cross-sectional comparative design that compared the level of patient satisfaction and speech quality between traditional complete dentures and implant-supported overdentures. The study was done on the Department of Prosthodontics at Frontier Medical & Dental College, Abbottabad, for a period of six months, from 1st December 2024 to 31st May 2025. The study had its ethical approval given by the Research Ethical Committee of (Reference No: FMDC/ERC/2024/48, Date: 23/11/2024), and all participants were informed and had to sign informed consent before enrolment.

The software OpenEpi, Version 3, was used to calculate the required sample size with a confidence interval of 95%, power of 80%, and anticipated prevalence of satisfaction outcomes given in a previous study employing implant overdentures versus conventional dentures committed by Bajunaid et al. (2022) [15]. The result of the calculation was a population of 200 patients, for which the non-probability purposive sampling was used.

The inclusion criteria comprised completely edentulous patients aged 40–75 years, rehabilitated with either maxillary and mandibular conventional complete dentures or mandibular implant-supported overdentures opposing a conventional maxillary denture, and who had been using their prostheses for at least three months to allow adaptation. Exclusion criteria included patients with neuromuscular

disorders, cleft palate, speech-impairing neurological diseases, untreated oral lesions, severe psychiatric illness, or those unwilling to participate.

Data collection was carried out using two standardized instruments with open-access validation. Patient satisfaction was assessed with the Oral Health Impact Profile (OHIP-14) questionnaire, which is a validated, open-access tool widely used to measure oral health-related quality of life across multiple domains [16]. Speech clarity was evaluated using the Speech Intelligibility Rating (SIR) scale, an openly available perceptual rating system that grades speech from 1 (unintelligible) to 5 (completely intelligible) and has been previously applied in prosthodontic and speech studies. Data were collected through face-to-face interviews and standardized speech tasks recorded in a quiet clinical setting, with recordings later assessed by two blinded evaluators trained in speech analysis. Sociodemographic data, including age, gender, duration of edentulism, and duration of prosthesis use, were also recorded.

IBM SPSS Statistics version 26 was used to analyse data. The Shapiro-Wilk test was used to test the normality of continuous variables such as age, duration of prosthesis use, OHIP-14 scores, and SIR ratings. Data that were normally distributed were expressed in means with standard deviation (SD), and those that were not normally distributed were expressed in median and interquartile range (IQR). The independent t-test of continuous variables and the chi-square test of categorical variables, including gender, were used to make the group comparisons between traditional complete denture utilization and the utilization of an implant-supported overdenture. The t-test and the Mann-Whitney U test were used to compare the two groups on the basis of the data distribution, i.e., OHIP-14 scores and SIR ratings. Pearson or Spearman correlation coefficients were used to determine the correlation between patients' satisfaction and speech clarity. In order to adjust the confounding variables such as age, gender, and the duration of prosthesis use, multivariate regression analysis was done, where the results were OHIP-14 and SIR scores. A p-value ≥ 0.05 was taken as statistically significant.

RESULTS

The study involved 200 patients (100 patients in each group) who underwent rehabilitation using conventional complete dentures and implant-supported overdentures. The two groups were similar in the baseline as there were no significant differences in terms of age ($p = 0.721$), gender ($p = 0.672$), years of edentulism ($p = 0.587$), or years of prosthesis use ($p = 0.623$). (Table 1)

Table 1. Baseline Demographic and Clinical Characteristics of Participants (n = 200)

Variable	Conventional Denture (n = 100)	Implant-Supported Overdenture (n = 100)	Test statistic	p-value
Age (years), mean $\pm$ SD	62.4 $\pm$ 8.7	61.9 $\pm$ 9.1	t = 0.36	0.721 ^a
Gender, n (%)			$\chi^2 = 0.18$	0.672 ^b
Male:	48 (48%)	51 (51%)		
Female:	52 (52%)	49 (49%)		
Duration of edentulism (years), mean $\pm$ SD	9.8 $\pm$ 4.5	10.2 $\pm$ 4.1	t = -0.55	0.587 ^a
Duration of prosthesis use (months), mean $\pm$ SD	7.5 $\pm$ 2.4	7.7 $\pm$ 2.1	t = -0.49	0.623 ^a
Values are expressed as mean $\pm$ standard deviation (SD) or frequency (%).				
^a Independent t-test; ^b Chi-square test.				

Patients who were rehabilitated using the implant-supported overdentures showed a higher level of satisfaction in all the OHIP-14 domains than did those in the conventional complete dentures. There were significant changes in functional limitation, physical pain, psychological well-being, and social participation, with the means of the implied support of overdentures being lower in all cases. The overall OHIP-14 score was also lower in implant-supported overdenture ($p < 0.001$) and indicates a better overall oral health-related quality of life. (Table 2)

The speech clarity, as assessed by the SIR scores, was much greater in the patients who had an implant-supported overdenture than it was in those who had conventional dentures. The mean and the median values showed better intelligibility in the implant group, and statistical tests proved the highly significant differences ($p < 0.001$). This result shows the beneficial effect of implant support on speech performance. (Table 3)

Table 2. Comparison of Patient Satisfaction Scores (OHIP-14) Between Groups

OHIP-14 Domains	Conventional Denture (mean $\pm$ SD)	Implant-Supported Overdenture (mean $\pm$ SD)	Test statistic	p-value
Functional limitation	3.1 $\pm$ 1.2	2.2 $\pm$ 1.0	t = 5.74	<0.001 ^a
Physical pain	3.4 $\pm$ 1.1	2.1 $\pm$ 0.9	t = 9.13	<0.001 ^a
Psychological discomfort	3.2 $\pm$ 1.0	2.3 $\pm$ 0.8	t = 6.89	<0.001 ^a
Physical disability	3.0 $\pm$ 1.3	2.1 $\pm$ 0.9	t = 5.55	<0.001 ^a
Psychological disability	3.3 $\pm$ 1.1	2.2 $\pm$ 0.8	t = 7.89	<0.001 ^a
Social disability	3.0 $\pm$ 1.2	2.1 $\pm$ 0.9	t = 5.76	<0.001 ^a
Handicap	3.5 $\pm$ 1.0	2.2 $\pm$ 0.8	t = 10.02	<0.001 ^a
Total OHIP-14 score	22.5 $\pm$ 6.8	15.2 $\pm$ 5.7	t = 8.43	<0.001 ^a
OHIP-14 = Oral Health Impact Profile-14; higher scores indicate poorer quality of life. ^a Independent t-test.				

Table 3. Comparison of Speech Clarity (SIR Scores) Between Groups

Variable	Conventional Denture (n = 100)	Implant-Supported Overdenture (n = 100)	Test statistic	p-value
Mean SIR score $\pm$ SD	3.2 $\pm$ 0.7	4.1 $\pm$ 0.6	t = -9.78	<0.001 ^a
Median SIR score [IQR]	3 [3-4]	4 [4-5]	U = 2310	<0.001 ^b
SIR = Speech Intelligibility Rating; higher score = clearer speech. ^a Independent t-test; ^b Mann-Whitney U test				

Correlation analysis found that the association between OHIP-14 total scores and SIR scores was negative and statistically significant (-0.52, p < 0.001). This shows that patients with better articulation were more satisfied and had a better oral health-related quality of life, and functional and psychosocial outcomes are interdependent as far as prosthetic rehabilitation is concerned. (Table 4)

Table 4. Correlation between Patient Satisfaction (OHIP-14 Total Score) and Speech Clarity (SIR Score)

Variable	Correlation Coefficient (r)	Test statistic	p-value
OHIP-14 total vs SIR score	-0.52	t = -8.41	<0.001
Pearson's correlation test applied; a negative r indicates higher clarity associated with better satisfaction.			

The regression model revealed that the denture type was the only predictor factor that was significant in both patient satisfaction and speech clarity. Currently, OHIP-14 scores were significantly lower and SIR scores were higher in patients with implant-supported overdentures than in patients with conventional dentures (p < 0.001), despite the age, gender, and duration of use of the prosthetic. Conversely, age, gender, and the duration of prosthesis use did not indicate any significant differences in either outcome, which implies that the nature of prosthesis makes the most critical contribution in enhancing the quality of life and speech performance. (Table 5)

Table 5. Multivariate Regression Analysis of Factors Associated with OHIP-14 and SIR Scores

Dependent Variable	Predictor Variable	β Coefficient	95% CI	p-value
OHIP-14 total	Age	0.08	-0.05 to 0.21	0.232
	Gender (Male)	-0.34	-1.1 to 0.42	0.375
	Duration of prosthesis use	-0.11	-0.28 to 0.06	0.195
	Denture type (IOD vs CD)	-6.3	-8.4 to -4.2	<0.001
SIR score	Age	-0.02	-0.06 to 0.02	0.297
	Gender (Male)	0.09	-0.08 to 0.26	0.312
	Duration of prosthesis use	0.04	-0.01 to 0.09	0.123
	Denture type (IOD vs CD)	0.88	0.65 to 1.12	<0.001
OHIP-14 = Oral Health Impact Profile-14; SIR = Speech Intelligibility Rating; CD = Conventional Denture; IOD = Implant-Supported Overdenture. Multivariate linear regression applied.				

DISCUSSION

In this study, implant-supported overdentures produced substantially better patient-reported oral health-related quality of life and clearer speech than conventional complete dentures; denture type remained the strongest independent predictor of both OHIP-14 and SIR outcomes after adjustment for age, gender, and prosthesis duration, and clearer speech correlated moderately with better overall satisfaction ($r = -0.52$). These results align with multiple recent investigations that report superior patient satisfaction and functional outcomes with implant-retained/-supported overdentures. For example, population-level and clinical studies have consistently shown higher proportions of patients reporting improved speech, comfort, and overall satisfaction with overdentures compared with conventional dentures [15, 17].

Our finding that implant support improves speech intelligibility echoes reports in the literature that increased prosthesis stability reduces articulatory disruption and facilitates faster functional adaptation. A number of clinical trials and systematic reviews have shown that implant overdentures tend to yield better perceptual ratings of speech or reduced learning by intelligibility compared to conventional removable dentures, especially with mandibular stability. Nonetheless, systematic reviews highlight the variability of methods of perception (perceptual) and acoustic (acoustic) and non-homogeneous results of different studies, which converges with the mixed magnitude of the speech improvement that we have observed. This heterogeneity can serve as an explanation as to why residual articulation problems are still reported by some patients even with improved stability [18, 19].

Although our OHIP-14 findings indicate clinically significant and statistically significant differences between implant overdentures and control groups, other recent cross-sectional studies have found smaller or non-significant differences in domains, indicating that the benefits of implant overdentures are contextually dependent (attachment type, number and position of implants, maxillary vs mandibular rehabilitation, techniques used to fabricate prostheses). As an example, a cross-sectional investigation in the form of a detailed cross-sectional study of maxillary overdentures has demonstrated better OHRQoL but has reported that articulation disorders might remain in place, especially when there is a high palatal coverage or complicated maxillary prostheses. On the same note, 2024 analyses that compare the various forms of overdentures and new forms of fabrication (such as 3D-printed prostheses) indicate an improvement in satisfaction but inconsistent gains in the domain in

question, again indicating that the design of such prosthetics and clinical protocols has an impact [19-21].

Cost, technical complexity, and patient expectations remain important considerations. Economic and comparative effectiveness work highlighted that implant-retained solutions incur higher upfront costs and clinician time, although they often yield better patient-reported outcomes. Our regression analysis, showing denture type as the dominant predictor, suggests that when resources permit, implant overdentures provide measurable benefits in both function and communication. Nevertheless, patient selection (medical status, anatomy, manual dexterity, and expectations) and careful counselling about potential residual speech changes remain essential [5, 17].

Some recent studies offer nuances that temper a uniformly positive interpretation. A 2024 survey and cohort reports described subgroups in which OHIP-14 differences were modest or domain-dependent (for example, gender differences in social-disability reporting), and a contemporary clinical review stressed anatomical and palatal design factors as key modulators of speech outcome. These observations correspond with our finding that demographic covariates (age, gender, duration of prosthesis use) did not independently predict outcomes in multivariable models, implying that prosthesis characteristics and clinical execution probably explain more variance than patient demographics per se [8, 11].

Strengths of our work include concurrent, standardized assessment of both patient satisfaction (OHIP-14) and speech clarity (SIR) in a well-matched cohort, and the demonstration of a moderate correlation between the two constructs, supporting the clinical view that communication ability is an important component of oral-health quality of life. Limitations mirror those reported in the literature: our cross-sectional design precludes causal inference and adaptation effects over time; speech assessment relied on perceptual ratings rather than combined acoustic and perceptual analyses used in some specialty studies; and we did not stratify outcomes by implant attachment system or by maxillary versus mandibular site, which other studies have shown to influence results.

The present study's findings are broadly consistent with recent high-quality evidence showing that implant-supported overdentures improve patient satisfaction and often enhance speech clarity compared with conventional complete dentures, while also underlining persistent variability that depends on prosthetic design and measurement

approach. Future prospective, randomized, or longitudinal studies using mixed speech assessment methods (perceptual + acoustic), cost-effectiveness analyses, and subgroup analyses by attachment type and arch rehabilitated are recommended to refine clinical guidelines and optimize prosthesis design for both function and communication.

Strengths and Limitations

The relatively large sample size ($n = 200$) with equal group distribution enhances the power and reliability of the findings. Also, speech assessor blinding minimized evaluator bias, and multivariate regression enabled the adjustment of the main confounders, age, gender, and the length of prosthesis use. Nonetheless, some constraints should be admitted. The cross-sectional design does not support the ability to make causal decisions and does not consider the long-term adaptation and changes in satisfaction over time. Perceptual ratings were used to determine speech clarity without involving any acoustic analysis that could have offered more objective data. Besides, the research failed to stratify findings according to implant attachment mode, arch (maxillary or mandibular), and the features of prosthesis design that have been shown to affect patient outcomes. Lastly, the data collected were in a single-center environment, so the external validity of the findings could be questionable.

CONCLUSION

The use of implant-supported overdentures has led to higher satisfaction and clarity in speech than traditional complete dentures. They improve oral health-related quality of life by giving them better stability and functionality, which in turn enhances the overall effectiveness with which patients can communicate, a not-so-visible aspect of prosthetic success. The high connection between the enhanced speech clarity and the increased satisfaction highlights the comprehensive advantages of the implant-based rehabilitation. Considering these results, implant-supported overdentures may be taken as the treatment choice in cases of using the treatment with edentulous patients, in case it is possible, and the treatment provides a significant benefit to both functional results and overall quality of life.

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