

Patient's oral health-related quality of life and satisfaction with implant supported overdentures -a systematic review

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ABSTRACT

Purpose: This systematic review was done to find the patients oral health-related quality of life (OHRQoL) and satisfaction with implant supported overdentures (IODs) when compared to conventional complete dentures (CCDs).

Materials and methods: To identify suitable literature, an electronic search was performed using Medline/PubMed and Cochrane databases. Manual search of Prosthodontics, Gerodontology and journals related to dental implants were also done. Articles published in English and articles whose abstract is available in English were included. The search was focused on patient's oral health-related quality of life and satisfaction with IODs when compared to CCDs. Titles and abstracts were screened, and literature that fulfilled the inclusion criteria was selected for a full-text reading.

Results: Initial literature search resulted in 1803 papers, 1779 were excluded after screenings of the abstracts by the reviewers which resulted in 24 studies. 5 studies were further excluded due to not fulfilling the inclusion criteria, 2 additional articles included after hand searching, resulting in total 21 articles in systematic review. The result suggests that mandibular CCDs had less retention as compared to maxillary conventional dentures CCDs, which improved drastically with IODs and provides a better oral health-related quality of life and satisfaction to the patients.

Conclusion: Retention, stability, comfort, speech and chewing efficiency improved drastically with IODs, with enhanced patient's satisfaction and a better OHRQoL. Patients reported more satisfaction and OHRQoL with mandibular IOD when compared CCDs.

1. Introduction

Loss of complete natural teeth and resorption of alveolar bone is considered as oral health impairment and it hinders the mastication, phonetics and esthetics of the stomatognathic system. It causes the psychological and negative social effects.¹ A decrease in the prevalence of complete edentulism in many countries has been reported but still patient requiring rehabilitation with complete dentures is still much more in many countries.^{2–6} Most common treatment modalities for the rehabilitation of complete edentulous patients are conventional complete dentures (CCDs) but in today's scenario there is increased rehabilitation with implant supported overdentures (IODs), as the awareness among patient is increasing.^{2,7}

Higher occurrence of edentulism is found in individuals with poor socio-economic conditions and there is increased need to decrease the cost of rehabilitation with dentures, so that this poor patients can be

given a good treatment in a affordable cost.⁸ Patient satisfaction with the dentures depends mainly on their ability to speak, chew and get a good looking appearance after the treatment.⁹

In normal clinical conditions heterogeneous groups of edentulous patients receive the prosthodontic treatment but what would be the influence of IODs on patient's satisfaction and quality of life has to be evaluated. This systemic review was done to find out patients oral health-related quality of life (OHRQoL) and satisfaction with IODs compared to CCDs.

2. Materials and methods

2.1. Structured question

Does patients expectations with IODs were more compared to CCDs?
Does OHRQoL and satisfaction improve with IODs?

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Table 1
Risk of bias of the included study.

Study	Major criteria				Minor criteria				
	Randomization	Allocation concealment	Assessor blinded	Drop out described	Risk of bias	Sample justified	Baseline comparison	I/E criteria	Method of error
Maniewicz et al. (2019) ¹¹	Yes	Yes	No	Yes	Low	Yes	Yes	Yes	No
Amaral et al. (2018) ¹²	No	Yes	No	Yes	Moderate	Yes	Yes	Yes	No
Sharma et al. (2017) ¹³	No	No	No	Yes	High	Yes	Yes	Yes	No
Cardoso et al. (2016) ¹⁴	No	Yes	No	Yes	Moderate	Yes	Yes	Yes	No
Pan et al. (2014) ¹⁵	No	No	Yes	Yes	Moderate	Yes	Yes	Yes	No
Awad et al. (2014) ¹⁶	No	Yes	No	Yes	Moderate	Yes	Yes	No	No
Harris et al. (2013) ¹⁷	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Preoteasa et al. (2012) ⁹	No	No	No	No	High	No	Yes	Yes	No
Geckili et al. (2012) ¹⁸	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Hobkirk et al. (2009) ¹⁹	No	No	No	Yes	High	No	Yes	Yes	No
Pan et al. (2008) ²⁰	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	Yes
Allen et al. (2006) ²¹	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Heydecke et al. (2005) ²²	Yes	Yes	Yes	No	Low	Yes	Yes	Yes	No
Heydecke et al. (2003) ²³	Yes	Yes	Yes	No	Low	Yes	Yes	Yes	No
Awad et al. (2003) ²⁴	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Awad et al. (2003) ²⁵	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Thomason et al. (2003) ²⁶	Yes	Yes	Yes	Yes	Low	Yes	Yes	Yes	No
Allen and McMillan (2003) ¹	No	No	Yes	Yes	Moderate	Yes	Yes	Yes	No
Meijer et al. (2003) ²⁷	Yes	Yes	No	Yes	Low	Yes	Yes	Yes	No
Melas et al. (2001) ²⁸	No	Yes	No	Yes	Moderate	Yes	Yes	Yes	No
Allen et al. (2001) ²⁹	No	Yes	Yes	No	Moderate	Yes	Yes	No	No

Table 2
Quality of evidence of the assessed studies.

High risk of bias (low evidence)	Moderate risk of bias (moderate evidence)	Low risk of bias (high evidence)
If it did not record a “Yes” in three or more of the four main categories	If two out of four main categories did not record a “Yes”	If three or all the main categories recorded a “Yes”
Sharma et al. (2017) ¹³ Hobkirk et al. (2009) ¹⁹ Preoteasa et al. (2012) ⁹	Amaral et al. (2018) ¹² Cardoso et al. (2016) ¹⁴ Pan et al. (2014) ¹⁵ Awad et al. (2014) ¹⁶ Allen and McMillan (2003) ¹ Melas et al. (2001) ²⁸ Allen et al. (2001) ²⁹	Maniewicz et al. (2019) ¹¹ Harris et al. (2013) ¹⁷ Geckili et al. (2012) ¹⁸ Pan et al. (2008) ²⁰ Allen et al. (2006) ²¹ Heydecke et al. (2005) ²² Heydecke et al. (2003) ²³ Awad et al. (2003) ²⁴ Awad et al. (2003) ²⁵ Thomason et al. (2003) ²⁶ Meijer et al. (2003) ²⁷

2.2. PICO analysis

Population: Edentulous patients.
Intervention: Complete dentures.
Comparison: IODs and CCDs.
Outcome: Whether there is increased satisfaction and OHRQoL with IODs compared to CCDs.

2.3. Search strategies

The present review was based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A structured electronic systematic search without time restrictions was undertaken in June 2019 in PubMed/Medline and Cochrane databases. The protocol for this review was registered with the international prospective register of systematic reviews (PROSPERO) with the registration number CRD42019118371.

The following terms were used in the search strategy with the filter ‘article types’ selected with the item ‘abstract’.

{Subject AND Adjective}

{Subject: (complete denture OR conventional denture OR implant supported overdentures OR implant retained overdentures)}

{Object: (patient's satisfaction OR patient's expectations OR OHRQoL)}

A manual search of complete denture journals including Journal of Prosthetic Dentistry, Journal of Prosthodontics, and International Journal of Prosthodontics along with Gerodontology was also performed. Journals related to implants were also searched which includes Implant Dentistry, Clinical Implant Dentistry and Related Research, Clinical Oral Implant Research, International Journal of Oral Implantology, Journal of Periodontology and Journal of Oral Implantology.

2.4. Inclusion and exclusion criteria

Eligibility criteria included clinical human studies, either randomized or not, comparing implant supported overdentures with conventional complete dentures. Exclusion criteria included case reports, technical reports, biomechanical studies, finite element analysis (FEA) studies, review articles, animal studies and in vitro studies. Articles written in languages other than English were excluded.

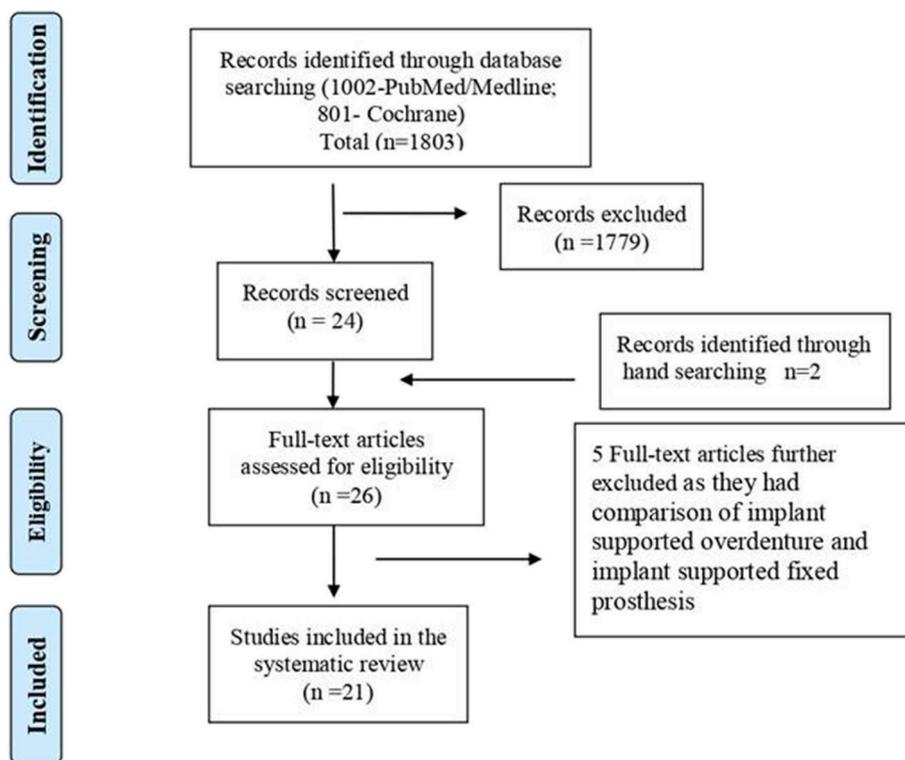


Fig. 1. Flow chart presented the screening of articles related to the patient's oral health-related quality of life and satisfaction with implant supported overdentures and conventional complete dentures.

2.5. Study selection

The titles and abstracts of all reports identified through the electronic searches were read independently by two reviewers and any disagreement regarding the inclusion or exclusion of the selected articles was resolved by a discussion between reviewers.

2.6. Data extraction

From the studies included in the final analysis, the following data were extracted (when available): Author, year of publication, type of study, purpose of study, number of subjects, age, follow up, number of implants supporting overdentures, study summary, outcome and inference.

2.7. Quality assessment

The quality of the studies included in the review was evaluated by described method in the Cochrane Handbook for Systematic Reviews.¹⁰ (Higgins and Green. Cochrane reviewers handbook 2009). The domains evaluated were presented in Table 1. Each domain was classified as having a high, moderate or low risk of bias and presented in Table 2.

3. Results

The study selection process is summarized in Fig. 1. Initial literature search resulted in 1803 papers, 1779 were excluded after screenings of the abstracts by the reviewers which resulted in 24 studies. 5 studies were further excluded due to not fulfilling the inclusion criteria, 2 additional articles included after hand searching, resulting in total 21 articles in systematic review. Detailed data of the 21 included studies are listed in Table 3^{1,9,11–29} with comparative studies on OHRQoL and satisfaction with IODs compared to CCDs. Results showed that expectation is usually more than satisfaction with CCDs. Usually mandibular CCDs have less retention as compared to maxillary CCDs which improved drastically with mandibular IODs.

3.1. Study characteristics

The age groups included in the studies were in range of minimum age of 35 years and maximum age as 92 years. Follow up done in studies after denture insertion were for minimum of 4 weeks to maximum follow up of 10 years. Twelve studies had sample size of less than 100 subjects with minimum 12 subjects in study by Amaral et al.¹² whereas other nine studies had sample size more than 100 subjects with maximum 256 subjects in study by Pan et al.²⁰ All the comparative studies used mandibular IODs retained with two implants except study by Amaral et al.¹² used one implants, Pan et al.¹⁵ used four implants to retain mandibular IODs and other study by Preoteasa et al.⁹ where they used 4–6 implants to retain mandibular IODs. All studies used mandibular IODs opposing to maxillary CCDs to do comparison with CCDs in both arches. But only study by Preoteasa et al.⁹ used maxillary and mandibular IODs for comparison with CCDs in both arches.

3.2. Primary outcome

The primary outcome for assessment in the systematic review was considered as patient's satisfaction with IODs, meeting their entire expectations when compared to CCDs. Eight studies evaluated OHRQoL in patients with IODs.^{1,14,16–18,21,24,28} One study evaluated sex difference in denture satisfaction.²⁰ One study evaluated effect of denture on social and sexual activities.²² One study evaluated difference in denture satisfaction rating by prosthodontist and patients.²³ Thirteen studies evaluated patients satisfaction with IODs.^{9,12–15,18,19,24–29} Eight studies evaluated improvement in masticatory or chewing efficiency with IODs.^{9,11–13,18,24,26,28}

3.3. Secondary outcome

Study by Heydecke et al.²³ found that patients' ratings of treatment success are very poorly correlated to clinician ratings of the same variable. Study by Pan et al.²⁰ found that females are less satisfied with

Table 3
Comparative studies on patients oral health-related quality of life and satisfaction with implant supported overdentures and conventional complete dentures.

Author's Year/Type of study	Purpose of the study	Number of Patients (Available for follow up)	Age (years)	Follow Up/ Number of Implant supporting Over denture	Study summary	Study outcome	Inference
Maniewicz et al. (2019) Randomized control trial ¹¹	Masticatory efficiency (ME) was evaluated with conventional denture and implant-supported overdenture	32(30)	CCDs 76–96; IODs 74–92	3months-7years/ 2	n = 14 mandibular conventional dentures; n = 16 mandibular implant supported overdentures	No significant long-term changes in ME within/between groups	Edentulous patients receiving mandibular IODs do not seem to apply an increased bite force during habitual chewing, despite the available capacity to do so Mandibular implants supported over dentures improved significantly the patient's satisfaction and masticatory efficiency
Amaral et al. (2018) Clinical trial ¹²	Satisfaction, masticatory ability and masticatory efficiency in elderly people before and after oral rehabilitation by a single-implant overdenture.	15(12)	68.66 ± 5.22	2 months/1	n = 12 mandibular conventional dentures; n = 12 mandibular implant supported overdentures	Increased satisfaction with stability and masticatory efficiency however, satisfaction with esthetics decreased with implant overdenture.	Mandibular implants supported over dentures improved
Sharma et al. (2017) Prospective study ¹³	Chewing efficiency, masticatory performance and patient satisfaction with conventional denture and implant-supported overdenture	15 (12)	60–75	4 weeks/2	n = 12 mandibular conventional dentures; n = 12 mandibular implant supported overdentures	Chewing efficiency for implant retained overdenture increased significantly than that of conventional denture.	Mandibular implants supported over dentures improves oral function and quality of life for edentulous patients
Cardoso et al. (2016) ¹⁴ Prospective study	Evaluated the oral health-related quality of life (OHRQoL) and masticatory efficiency of patients rehabilitated with dentures	50(47)	44–75	3 months/2	n = 25 mandibular implant supported overdentures; n = 25 conventional complete denture	Fewer OHRQoL problems and significant improvement in masticatory efficiency in patients wearing mandibular implant supported overdentures	Mandibular overdenture retained by implants provides better masticatory efficiency and OHRQoL than mandibular conventional dentures
Pan et al. (2014) ¹⁵ Retrospective study	Patients' satisfaction with implant-retained mandibular overdentures compared to conventional complete dentures	85(75)	40–79	2–6 years/4	n = 60 implant supported mandibular over denture; n = 25 conventional complete dentures (Control)	Experimental group showed significant difference in responses to the questionnaires in comparison to control group.	Implant supported overdenture increased the comfort and self confidences of patients
Awad et al. (2014) Prospective study ¹⁶	Oral health-related quality of life (OHRQoL) in patients with mandibular implant overdentures and conventional dentures	203 (102)	68.8	6months/2	n = 50 implant supported mandibular over denture; n = 50 conventional complete dentures	Cultural differences were observed in the impact of implant overdentures on the different domains of the OHIP-20	OHRQoL was improved more with implant supported overdentures
Harris et al. (2013) ¹⁷ Prospective study	Compared implant overdentures (IODs) with conventional complete dentures (CCDs) with Oral Health Impact Profile-49 (OHIP-49) and denture satisfaction questionnaire	140 (122)	64	3–6 months/2	Patients were initially given CCDs for 3 months and assessed. Random assignment of patient to CCDs (CC group) or IODs(CI group) and reassessed after 3months.	CI group showed significant additional improvements at 3 months following IODs on the scales of OHIP-49 and on 10 of the 11 scales of the denture satisfaction questionnaire	IODs increased patient satisfaction, dental function and quality of life over and above CCDs.
Preoteasa et al. (2012) ⁹ Prospective study	Patient satisfaction with conventional dentures and implant anchored overdentures	36	50–85	1 month/4-6	n = 18 conventional denture; n = 18 implants supported maxillary and mandibular overdenture	Chewing ability was satisfactory in all subjects in overdenture group whereas 28% reported impaired masticatory functions in conventional denture group	Increased retention and stability, improved masticatory efficiency and comfort with implant supported overdenture
Geckili et al. (2012) ¹⁸ Prospective study	Patient satisfaction, quality of life (QoL) and bite force with mandibular IODs and CCDs	100	67.86	4 years/2	n = 50 implant supported mandibular overdenture; n = 50 conventional complete dentures	Bite force and patient satisfaction scores with IODs found to be significantly higher	Similar QoL scores found in IODs compared to CCDs
Hobkirk et al. (2009) ¹⁹ Prospective study	Treatment with implant retained mandibular overdentures (IROs) versus conventional complete dentures(CDs)	60(31)	36–75	7years/2	n = 30 IRO; n = 30conventional CDs.	Implant-supported overdenture treatment provide better subjective function.	Patients' satisfaction with implant-stabilized mandibular dentures was greater.

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Table 3 (continued)

Author's/Year/Type of study	Purpose of the study	Number of Patients (Available for follow up)	Age (years)	Follow Up/ Number of Implant supporting Over denture	Study summary	Study outcome	Inference
Pan et al. (2008) ²⁰ Prospective study	Satisfaction of patients with new mandibular implant overdentures (IODs) and conventional dentures (CDs)	256(230)	72.3	6–12 months/2	n = 128 mandibular IODs; n = 128 conventional CDs	Ratings of satisfaction with IODs were significantly higher than with CDs. Males and females in the IOD group equally rated their general satisfaction and all six subcategories	Females are less satisfied with conventional dentures than males with regards to aesthetics and ability to chew, but equally satisfied with implant overdentures
Allen et al. (2006) ²¹ Prospective study	Comparison of implant-retained mandibular overdentures and conventional complete dentures	118 (79)	66.5	3months/2	n = 62 implant supported mandibular overdentures; n = 56 conventional complete dentures	Significant improvement in oral health related quality of life and denture satisfaction was reported in both groups	Oral health impact profile(OHIP) change scores was greater for implant patients than for those who refused them
Heydecke et al. (2005) ²² Prospective study	Impact of mandibular implant overdentures or conventional complete dentures on leisure and sexual activities	102	35–65	2months/2	n = 54 mandibular -implant overdentures; n = 48 conventional complete denture	Significant improvements in the IOD group for looseness when eating, speaking, kissing and yawning	Mandibular overdentures provide greater improvement in of unease in intimate activities than new conventional mandibular dentures.
Heydecke et al. (2003) ²³ Prospective study	Prosthodontic evaluation and patient ratings of mandibular conventional and implant prostheses	60	65–75	2months/2	n = 30conventional dentures and n = 30 mandibular implant overdenture	Prosthodontist rated mandibular IODs significantly better than conventional dentures regarding general satisfaction, stability, speech, and esthetics.	Patients' ratings of treatment success are very poorly correlated to clinician ratings of the same variable
Awad et al. (2003) ²⁴ Prospective study	Patients' satisfaction with mandibular implant overdentures and conventional dentures	60	65–75	2 months/2	n = 30conventional dentures; n = 30mandibular implant overdenture	Group treated with mandibular implant overdentures reported better satisfaction along with having good comfort, stability, mastication	Mandibular two-implant overdentures provide better function and oral health-related quality of life than conventional dentures
Awad et al. (2003) ²⁵ Prospective study	Relative efficacy of mandibular overdentures compared with conventional dentures	102(100)	35–65	2months/2	n = 48 mandibular conventional denture; n = 54 mandibular implant overdenture	Implant group had significantly higher ratings for prostheses comfort, stability, and ease of chewing	Implant supported denture was more satisfactory treatment than conventional dentures
Thomson et al. (2003) ²⁶ Prospective study	Patients satisfaction with mandibular implant overdentures and conventional dentures	60	65–75	6months/2	n = 30conventional dentures; n = 30mandibular implant overdenture	General satisfaction were higher in the implant group than in the conventional denture group by 36% approx	Higher rating for comfort, stability and ability to chewing by Implant group
Allen and McMillan (2003) ¹ Prospective study	Assessed the impact of oral implant therapy on the psychosocial well-being of subjects	103(98)	58.7–65.1		(IG): an implant group, edentulous in one jaw and requested and received implants; (CDG1): edentulous in one jaw requesting implants but received conventional dentures; (CDG2): replacement by conventional means; Dentate subjects requiring routine treatment.	IG group reported a significant improvement in satisfaction and health-related quality of life, as did the CDG2 group.	Subjects who requested implants, but received conventional dentures (CDG1), reported little improvement in denture satisfaction and only modest improvement in their quality of life.
Meijer et al. (2003) ²⁷ Prospective study	Compared implant-retained mandibular overdentures with complete dentures	121(69)	56.9–57.8	10 years/2	n = 61 implant-retained mandibular overdenture(IRO); n = 60 complete denture (CD)	Survival rate in IRO- group was 93%. In the CD group, 24 patients (40%) chose an IRO between 1 and 10 years. Patients of the IRO-group were more satisfied	Implant retained mandibular overdenture have a high survival rate after 10 years. The mean satisfaction score of the CD-group was lower than of the IRO-group

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Table 3 (continued)

Author's/Year/Type of study	Purpose of the study	Number of Patients (Available for follow up)	Age (years)	Follow Up/ Number of Implant supporting Over denture	Study summary	Study outcome	Inference
Melas et al. (2001) ²⁸ Retrospective study	Patients satisfaction with implant-supported overdentures (IODs) and with conventional complete dentures (CCDs)	90(83)	63.7–69.6	Post insertion/2-4	n = 44 conventional dentures; n = 46 mandibular implant overdenture	Patients with IODs were more satisfied with the comfort, chewing efficiency and had less impact on daily life compared to CCDs	It was advised to consider implant-stabilized overdentures in the treatment of edentulous patients
Allen et al. (2001) ²⁹ Prospective study	Impact of implant-stabilized prostheses on the health status of complete denture wearers using an Oral Health Impact Profile (OHIP) and a validated denture satisfaction scale	75	55.79–65.06	3months	IG:an implant-stabilized prosthesis group; and 2 groups received new conventional complete dentures (CDG1 and CDG2).	Complete dentures satisfaction before treatment was low in all 3 groups. Subjects who received their preferred treatment (IG and CDG2 subjects) reported a much greater improvement than CDG1 subjects.	Subjects who received implants (IG) that replaced conventional complete dentures reported significant improvement after treatment, as did subjects who requested conventional replacement dentures (CDG2).

CCDs than males with regards to aesthetics and ability to chew.

3.4. Risk of bias

The risk of bias of the studies included in this review is summarized in Tables 1 and 2. Out of twenty one studies which met eligibility criteria, eleven studies have low risk of bias, seven studies had moderate risk of bias, and three studies had high risk of bias. The main risk of bias associated with these studies had no randomization; assessors were not blinded and unexplained allocation concealment.

4. Discussion

Among edentulous subjects, OHRQoL can be improved by improving patient's satisfaction to their dentures. Several *in-vivo* studies were done assessing patient satisfaction regarding speech, mastication, chewing efficiency, post insertion appointments required with IODs and CCDs and their role in improving OHRQoL. Effects of different factors like technique used, type of denture, psychological status of patient, patients expectations, denture retention and stability were studied for patients satisfaction and the most important determinant for patient's expectation and satisfaction with dentures found are the clinically stable mandibular denture.^{1,9,11–29}

Cultural and international differences may usually affect the different aspects of OHRQL in performance of IODs.¹⁶ Subjects if requested IODs, but received CCDs, reported little improvement in denture satisfaction and only modest improvement in their quality of life.¹ Improvement in patient satisfaction in OHRQoL with CCDs usually improves further with IODs.^{17,21} Mandibular IODs play an important role in improvement of retention, stability, comfort and masticatory efficiency when compared to CCDs.^{9,11–14,18,26} Instability of the CCDs affects the social and intimate activities of an individual due to looseness of the denture. Leisure and sexual activities improved with mandibular IODs.²²

Patient satisfaction oral health impact profile (OHIP) scores increases with mandibular IODs when compared to CCDs.¹³ IODs reported significantly fewer problems than the CCDs in the physical pain domain of the 49-item OHIP scale. Treatment with IODs provide additional gains in all OHIP domains¹⁷ but OHIP summary scores indicate that receiving implants in one jaw only did not satisfy the patients completely.¹

Patients should be informed about IODs and its benefit, prior to treatment because simply offering IODs treatment to patients seem to be more expensive and may not yield a significant psycho-social benefit to patients who were willing to accept CCDs.²¹ Patients with lower levels of education and less income were more satisfied with aesthetics, phonation and chewing ability of denture with both IODs and CCDs. This may be due to the fact that these patients had fewer expectations regarding the outcome of the treatment.⁹

Masticatory ability for different types of food improves significantly with mandibular IODs in comparison to patients wearing CCDs. Patients were able to chew hard and tough food better, and were more satisfied compared with the CCDs. The mean bite force of subjects wearing IODs was more than twice as much as those wearing CCDs.²⁷

Males and females rated their mandibular CCDs differently, with females having overall satisfaction lower than males, particularly for the aesthetics and ability to chew. Males had lower chewing ability with conventional treatment compared to females. This may be due to physical or psychological differences between the sexes.^{9,20}

Patients ratings for treatment success are very poorly correlated to prosthodontist ratings for the same variable. Prosthodontists take into consideration clinical variables and might rate a relatively unstable denture as successful because of difficult circumstances. This is unlikely to impress the patient who has to live with a dysfunctional prosthesis.²³

The benefits of an IODs includes preservation of residual alveolar bone, improvement in masticatory efficiency, increase in retention and

stability of denture, and increased satisfaction to patients. Many patients showed little interest in implant treatment, the reason for this may be due to fear of surgical intervention and the cost factor related to implants. Subjects had high expectations with implant-stabilized prostheses due to the information they received about implants. It may be the reason for their less satisfaction with CCDs and their decreasing hope for any significant improvements in their existing dentures. It is important to explain the limitations of IODs to make aware the patients and control their excessive expectation levels.

Quality assessment of the articles showed that among nineteen clinical trials eleven studies have low risk of bias, seven studies had moderate risk of bias, and three studies had high risk of bias. The results of this study must be read cautiously as almost all the articles except one were on mandibular IODs and maximum studies had follow up of less than one year. However maximum studies had low risk of bias, but more randomized clinical trials were needed with both maxillary and mandibular IODs to come to an exact conclusion.

5. Conclusion

Retention, stability, comfort, speech and chewing efficiency improved drastically with IODs, with enhanced patient's satisfaction and a better OHRQoL. Patients reported more satisfaction and OHRQoL with mandibular IOD when compared CCDs. This systematic review recommends more studies with long randomized trials involving both maxillary and mandibular IODs to draw an exact conclusion.

Conflicts of interest

None.

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