

Patients' satisfaction with complete dentures: an update.

Satisfação dos pacientes com as próteses totais: atualizando os conceitos.

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ABSTRACT

Population aging is a worldwide phenomenon and, even though there is a downward trend in edentulism, the need for complete dentures is not likely to decrease in the near future. Furthermore, patients' satisfaction with their dentures is fundamental to improving oral health-related quality of life among edentulous individuals. Considering this, a search was performed for literature since 2001 on the factors that may influence patient satisfaction with complete dentures. Many factors were reported that related to technique, patient, and dentist, as well as their likelihood of influencing patient satisfaction. The factors presenting reasonable evidence of influencing patient satisfaction are the kind of therapy chosen (implant-retained overdentures rated more favorably than conventional dentures); patient personality and psychological factors; patient oral conditions; patient perception of the dentist and dental care; and patient-dentist communication issues. Several other factors that may influence patient satisfaction were not addressed in the recent literature or presented contradicting results, highlighting the need for more research in this topic.

KEYWORDS

Denture, Complete; Patient satisfaction; Oral health.

RESUMO

O envelhecimento populacional é um fenômeno mundial e, a despeito de uma tendência de diminuição dos índices de edentulismo, a necessidade de próteses totais será ainda muito comum no futuro próximo. Além disso, a satisfação dos pacientes com as próteses totais é fundamental para melhorar a qualidade de vida relacionada à saúde oral em pacientes desdentados. Desta forma, uma revisão da literatura recente (a partir do ano 2001) foi realizada quanto aos fatores que podem influenciar a satisfação dos pacientes com suas próteses totais. Muitos fatores (relacionados à técnica, ao paciente e ao dentista) foram descritos, bem como sua possibilidade de influenciar a satisfação do paciente. Os fatores que apresentaram potencial razoável de influenciar a satisfação do paciente foram: o tipo de terapia escolhido (overdentures retidas por implantes apresentaram maior satisfação que próteses totais convencionais), a personalidade e os fatores psicológicos relacionados ao paciente, as condições orais do paciente, a percepção do paciente quanto ao dentista e o tratamento odontológico, bem como a comunicação entre o dentista e o paciente. Muitos outros fatores ou não foram abordados na literatura recente ou obtiveram resultados incongruentes, o que explicita a necessidade de mais pesquisa nesta área.

PALAVRAS-CHAVE

Prótese total; Satisfação do paciente; Saúde bucal.

INTRODUCTION

In most societies worldwide, the need for complete dentures is not likely to decrease, despite a downward trend in edentulism. Although implant-retained overdentures

may be considered the best option for the oral rehabilitation of edentulous individuals, conventional complete dentures fabrication will remain an important part of oral health care for the growing elderly population due to economic reasons [1,2]. In Brazil, the delayed start of

preventive public programs for oral health combined with the booming of population aging led to a large number of edentulous people [3].

Patient perceptions are fundamental to improving health care quality, so methods for assessing patient feedback on satisfaction, care experience, and treatment outcomes are very important [4]. The same holds true for complete dentures therapy: Patients' satisfaction with their complete dentures may be considered the ultimate goal of the therapy [1], as it was strongly associated with oral health-related quality of life [5-8].

Although the vast majority of patient-centered publications on satisfaction with complete dentures have shown that patients usually present high satisfaction levels [9-11], the articles are not in consensus [12]. Additionally, there is a small number of patients that are unable to adapt to their dentures [2]. The number of patients unable to adapt, i.e. those who are not satisfied with their dentures for some reason, ranges from 3% to as high as 40% among removable partial dentures wearers [13].

Patient satisfaction with complete dentures seems to be a complex socio-cultural issue related to numerous factors, and there is abundant research on this topic currently. However, this research seems to be in a developmental phase [14,15], resulting in some confusion and highlighting the need for more standardized research to assess patient perceptions and concerns regarding complete dentures, as well as other dental treatments [16].

Considering the amount of information currently available about patient satisfaction with complete dentures and the importance of this topic to the dentist and researcher working in prosthodontics, the present paper aims to review and summarize the recent literature on the topic.

DATA SOURCES

The PubMed database was searched using the key words "patient satisfaction," "complete denture," "satisfaction," and "denture" (this last one also resulted in articles about removable partial dentures [RPD]). Search results for combinations of key words are shown in Table 1 for occurrences on July 15, 2014. Searches were limited to Portuguese, Spanish, and English languages only. No hand searches were performed.

Table 1 - PubMed search results for articles using the key words "patient satisfaction," "complete denture," "satisfaction," and "denture"

Key words	Number of articles	Number of review articles
Denture and patient satisfaction	1,219	93
Denture and satisfaction	1,437	98
Complete denture and patient satisfaction	667	49
Complete denture and satisfaction	774	54

Titles were screened to include review and experimental articles since 2001 related to patient satisfaction with complete dentures. The explicit purpose was to summarize the more recent literature on the topic. Experimental articles were not restricted to any kind of experimental design. The search led to a total of 113 articles whose abstracts warranted review. From these, 78 articles dealt with the central issue of patient satisfaction with conventional complete dentures (and/or compared this therapy to other prosthodontic therapies using patient satisfaction as one of the evaluated outcomes). Three articles dealing with patient satisfaction with RPD were also included, and then explicitly cited as being RPD-related throughout the text. Table 2 presents the number of articles in each category.

Table 2 - Number of articles in each category

Article category	Final number
Clinical trials	49
Randomized Clinical Trials	12
Systematic reviews	5
Review articles	8
Opinion articles, technique descriptions, and others	4
Total	78

Considering that there are numerous factors influencing patient satisfaction with complete dentures, the present review divided the factors into three main groups: technique-related, patient-related, and dentist-related.

TECHNIQUE-RELATED FACTORS

Technique related factors include those related to the kind of therapy chosen (mainly implant-retained overdentures versus conventional complete dentures), fabrication techniques, influence of impression techniques, occlusal schemes, artificial teeth chewing surface designs, esthetics-related procedures, dentures maintenance and follow-up, number of post-delivery appointments. and denture quality.

Therapy choice

When selecting a therapy for edentulism, many factors should be taken into consideration. Many of these factors are related to patients' general and oral health conditions as well as socioeconomic status. However, the dentist should also keep in mind the best evidence available regarding outcomes for different therapies. In this regard, it is important to highlight the considerable amount of evidence showing that implant-retained overdentures receive superior patient satisfaction ratings compared to conventional dentures [17-20]. For this reason some authors state that implant-retained overdentures might be the standard of care for edentulism [2]. This conclusion is especially true for the lower arch, where the dissatisfaction rates are higher, as discussed

below under *Patient-related factors*. Additionally, maxillary complete dentures rated similarly to maxillary implant-retained overdentures, whereas mandibular implant-retained overdentures rated higher than mandibular conventional complete dentures [16].

Fabrication techniques

Regarding the conventional complete dentures whole fabrication technique, there are four articles [21-24] included in this review that presented similar results between a so-called "simplified" technique and a more "comprehensive" technique.

In the first article [21], the traditional technique was included two impressions, jaw relations registered using a facebow, try-in, delivery, adjustments, and remount. The simplified technique included just one alginate impression, occlusal registration (without facebow transfer), try-in, delivery, and adjustments. The authors observed no significant differences between the groups regarding both patient satisfaction ratings and prosthodontists' ratings of denture quality.

In the second article [22], the differences between the two techniques were basically in recording the jaw relation (the simplified technique did not use a facebow transfer) and type of teeth (the simplified technique used anatomical teeth with premolar/canine guidance while the traditional technique used semi-anatomical teeth in lingualized occlusion). The authors concluded that the use of a complex jaw relation recording procedure and lingualized teeth did not improve patients' perceived chewing ability.

The third article [23] tested a simplified technique that avoided facebow usage and had premolar/canine guidance, in contrast to a comprehensive technique using a facebow and tracings for jaw relation recording and a lingualized and balanced occlusal scheme. The authors concluded that the comprehensive technique did not positively influence patient

satisfaction with their dentures when compared to a simplified technique.

In the last article [24] in this series, the traditional technique, used two impressions, facebow transfer for semi-adjustable articulator mounting (with average settings), bilaterally balanced occlusion teeth, try-in, delivery, and adjustments. The simplified technique consisted of only one alginate impression, an arbitrary semi-adjustable articulator mounting (without facebow transfer), bilaterally balanced occlusion teeth, try-in, delivery, and adjustments. The authors concluded that both techniques led to similar outcomes.

In addition to these findings, no association was found between accuracy of jaw relation recording and patients' satisfaction with their dentures in a three-year period study with 600 patients [25]. However, another study with 723 patients [26] observed a strong association between accuracy of reproduction of jaw relationship and patient satisfaction with new dentures. Differences in study observation periods and methods of jaw relation recording verification may be possible factors influencing the divergence between these studies.

The technique consisting of two impressions and the use of a facebow (with some variation in details) is the most-taught technique in the world but is not evidence-based [1,2]. Therefore, simplified techniques may be considered, reducing the costs of denture fabrication and making this therapy more accessible to edentulous individuals.

Impression techniques

Regarding the impressions, there is no evidence that the use of two impressions (a preliminary impression with stock trays and a final impression with custom trays) improves denture quality and/or patients' satisfaction with their dentures [27]. The same holds true for different border molding techniques [28].

As there are few articles directly related to the topic, more research is needed to deepen

the current knowledge on this issue, and it is important that future research on the topic includes patient-centered outcomes.

Occlusal schemes

Before the current knowledge on temporomandibular dysfunction (TMD) reduced the emphasis on occlusion as a potential causal agent [29,30], some authors employed specific occlusal schemes and accurate jaw relationship recording in order to avoid TMD. Likewise, different occlusal schemes have been proposed to ensure denture stability and improve patient comfort while chewing. Despite the long discussion and controversy on the topic, recent research remains inconclusive.

A recent randomized clinical trial (RCT) comparing patient satisfaction among fully-balanced bilateral occlusion, lingualized occlusion, and buccalized occlusion demonstrated higher patient satisfaction rates with balanced occlusion [31]. A similar result was achieved by another study [32] comparing balanced occlusion to canine guidance, though using a different methodology.

Conversely, in a six-month follow-up study [33], lingualized occlusion provided higher patient satisfaction rates compared to balanced occlusion. In the same study, lingualized occlusion increased masticatory performance and maximum voluntary contraction, as measured by electromyography.

In a recent systematic review on the topic [34], the authors concluded that currently there is no evidence to support one occlusal scheme over another. It is, however, important to highlight that more research is also needed to provide evidence for clinical practice. For now, dentists may consider that many of the proposed occlusal schemes can be used, and none can claim superior results.

Chewing surface designs

In a systematic review published in the Cochrane Database in 2005 [35], the authors

concluded that there was no sufficient evidence to support the use of anatomic surfaces on denture teeth compared to cusplless teeth. However, they also stated that few well-designed studies were published on this topic and more well-conducted trials should be done in order to further elucidate this issue.

More recently, two reports [36,37] on an RCT about posterior occlusal forms were published by the same authors as the abovementioned review. In this RCT, the authors found that patient satisfaction and self-perceived chewing ability was higher for dentures with lingualized or anatomic occlusal surfaces when compared to zero-degree (cusplless) teeth.

Esthetics-related procedures

Previous research has shown unequivocally that the majority of denture patients are seeking esthetic improvement, among other demands (mastication, comfort, etc.). Esthetic expectations are usually very high among complete denture [11,38,39] and RPD [13] patients. Patients also expressed their desire to have more information and discussion with their dentists about tooth selection [40].

Furthermore, patients' satisfaction was strongly correlated to their perception of denture esthetics in several studies [41-44]. However, dentists' efforts to produce more esthetic dentures do not always improve patient satisfaction [45], which may be due to different perceptions dentists and patients have about dentures, as previously demonstrated [39].

In this literature search, esthetics was usually cited as a patient requirement and a dentist concern, and several articles [41-44] highlighted the importance of achieving dentures that patients perceive as having good esthetics. However, there is almost no empirical testing on current procedures used by the dentists to achieve esthetic dentures and their impact on patient satisfaction, except for one pilot study [45]. Considering the huge difference among patients and dentists in evaluating the dentures [39], there is a clear need for more research on

how to achieve dentures each individual patient would consider esthetically adequate.

Dentures maintenance and follow-up

After denture delivery, the maintenance phase of the treatment starts. Patients should be mindful to keep their dentures adequately clean, to return for follow-up exams regularly, and to check for denture adaptation and oral mucosa condition [3]. Patients have also expressed that they would like to have more information about denture care [40], meanwhile a previous study showed that a majority of Brazilian patients declared receiving no information about denture care [46].

Regular maintenance and relining seemed to improve patient satisfaction with complete denture therapy in recent studies [47,48], as well as in RPD therapy [49]. Those studies focused on the relining procedure; however, further research is needed to evaluate how regular check-up visits and patient education about denture maintenance influence patients' satisfaction with their dentures.

The provision of new dentures usually results in increased patient satisfaction and quality of life [50,51], even when pre-existing dentures are merely duplicated [50], demonstrating that patient satisfaction and its impact on quality of life are not related to the denture fabrication technique.

Number of post-delivery appointments

The number of post-delivery appointments may influence patient satisfactions with their complete dentures in many ways. It may be considered an indication of quality, as the better the denture the fewer appointments needed. It also may be considered a burden for the patients to return to the office for adjustments. However, some patients consider the adjustment as considerate care from their doctors and appreciate the adjustments.

In a recent study among RPD wearers [38], no association was found between the number of

adjustments and patient satisfaction. In a sample of complete denture wearers [11], however, the number of post-delivery adjustments correlates negatively with patient satisfaction rates. Both studies were done among Brazilian patients. Considering the differences among the samples, no conclusions should reliably be drawn.

Denture quality

Finally, denture quality as a whole has demonstrated a controversial impact on patient satisfaction. Some authors have observed that most of denture quality criteria do not correlate with patient satisfaction [52,53]. In another study [54], patients were satisfied with their dentures despite technical problems, but satisfaction increased as denture quality improved, mainly regarding retention and stability. Other studies firmly presented a strong correlation between denture quality and patient satisfaction [55,56].

Some of the methodological issues that preclude a direct comparison of the studies are differences in criteria to define denture quality, population diversity of the samples, different sample sizes, and different methods for measuring patient satisfaction. This issue is still open to discussion, and well-designed multi-centric clinical studies may help to elucidate this topic in the future.

It is also very important to highlight that dentists should not be inhibited in their efforts to make the best dentures possible, despite the lack of evidence about the impact of denture quality and fabrication process. One technique is hardly superior to another, and usually different methods produce similar final results. Considering that, practitioners may choose less time-consuming techniques and less expensive materials to make complete dentures accessible to a larger population.

PATIENT-RELATED FACTORS

Patient-related factors include a huge number of variables, including age, gender, educational level, socioeconomic status,

personality and psychological factors, previous denture experience, expectations before denture fabrication, and oral conditions.

Age

Dentists usually associate patients' age with their ability to cope with new dentures, and this association was based on a common assumption that older patients take longer to adapt to dentures. None of the articles evaluated for the present review confirm this association, however. A reasonable number of studies found no association among complete dentures [11,26,57,58] or RPD [38], patients' age, and patient satisfaction.

Gender

It is usually taken for granted that women are more demanding about esthetics than men, and so women are usually less satisfied with their dentures. Although one can argue that such cultural thinking is more suitable to old-fashioned macho mentality, some modern articles [59-61] have observed significant differences between genders regarding patient satisfaction with dentures.

One such article is an RCT specially designed to elucidate gender differences in denture satisfaction [60] and deserves further attention. It tested if there are differences between men and women ($n = 256$) regarding satisfaction with implant-retained overdentures and conventional dentures 6 and 12 months after denture delivery. There was no difference between genders among implant-retained overdentures recipients; but among conventional complete denture recipients, females were less satisfied with their dentures than males regarding esthetics and ability to chew.

In contrasting studies, there was no significant difference between genders in patient satisfaction, both among complete dentures [26,57,58] and RPD [38] patients.

Cultural differences in education for men and women vary worldwide, and these

differences should help to clarify this divergence among different studies. Qualitative research methods may be useful to capture those cultural differences [62].

Educational level

Education is an important component of the cultural package of any individual, and it is no different for denture wearers. Considering that, it is a typical belief in Brazil that more educated patients are more demanding and usually less satisfied with their dentures. A Croatian study [55] confirmed this common assumption: it found a negative correlation between educational levels and patient satisfaction for esthetics, speech, and comfort.

In contrast, a Turkish [57] and two Brazilian [11,58] studies did not find any differences among educational level groups regarding denture satisfaction. Considering that education may be in conjunction with other confounding variables, multiple regression models may be more suitable for this analysis than the statistical methods employed by the aforementioned studies. Besides, in a study where structural equation modeling was applied [26], educational level was not considered.

Socioeconomic status

Two studies [55,59] have considered socioeconomic status as a possible factor influencing denture satisfaction. Both of them revealed a correlation between socioeconomic status and denture satisfaction ratings: the lower the socioeconomic status, the higher the denture satisfaction. Due to the small number of studies dealing with socioeconomic status, future research should also consider socioeconomic status as an interfering variable.

Personality and psychological factors

Although some personality tests were not able to disclose any relationship with patient satisfaction with dentures, as happened with locus of control [10] and the Eysenck short scale personality test [26], it seems clear

that neuroticism negatively affects patient satisfaction with dentures [63-65].

Another study disclosed a relationship between Type A Behavior Pattern Test and patient satisfaction in a sample of 239 patients. In this study, the lowest levels of denture satisfaction were achieved among Type A patients. Type A patients are very anxious, ambitious, and rigidly organized [66].

Other psychological issues, as depression [67], general anxiety [61], and emotional aspects related to tooth loss [68], negatively correlate with patients' satisfaction with their dentures. Given these results, it is not surprising that a recent study [69] showed that psychoeducation provided by specialists significantly improved patient satisfaction.

Previous denture experience

Dentists tends to believe that patients' previous experience with dentures, if positive, may help them adapt to new dentures; if negative, previous experience can have a negative effect on adaptation. Furthermore, time of denture usage was associated with higher satisfaction rates [57].

Recent research on the topic presented ambivalent results. In a sample of 100 denture wearers [11], patients' previous experiences with dentures presented positive but weak correlations with both patients' expectations and satisfaction regarding new dentures. In contrast, in a sample of 104 denture wearers, patients' perceptions of complete denture therapy were not influenced by previous denture experiences, [58]. Although these two samples are comparable regarding size and origin, the methodologies applied are different and the results may not be directly comparable; further research is needed to clarify this issue.

Expectations before denture fabrication

It is often cited that patients' expectations about their dentures should impact their reaction to new dentures and consequently affect their

satisfaction. However, there is little research about patient expectations regarding complete dentures therapy.

An earlier study [10] found no significant correlation between expectations and satisfaction ratings for both esthetics and function, although satisfaction ratings were significantly higher than expectation ratings. In a contrasting sample of complete denture wearers [11], patients' expectations were significantly higher than satisfaction for chewing ability, phonetics, and comfort, but not for esthetics. In this latter sample, patients' expectations were influenced by both previous experience with complete dentures and patient educational level.

In a sample of RPD wearers [38], however, patients' expectations correlated to patient satisfaction for phonetics and esthetics, but not for chewing or comfort.

Future studies may explore factors that influence patients' expectations with their dentures, as well as how those expectations influence denture satisfaction. The presented studies worked with relatively small sample sizes and should be complemented by further research.

Oral conditions

Poor oral conditions may lead to dentures that are more difficult to wear which, consequently, reduces patient satisfaction. The influence of oral conditions on patient satisfaction has been reported [6,8]. The most influential factor seems to be the mandibular ridge; the poorer the ridge, the lower the satisfaction [26,65,70,71].

A consequence of the resorbed mandibular ridge is poorly-rated existing mandibular dentures. Low satisfaction with existing mandibular dentures showed to be a good predictor of dissatisfaction with new mandibular dentures [72], and mandibular dentures have reduced satisfaction rates and negative impact on quality of life [73].

A careful explanation about therapy limitations and possibilities may help pave

the way for the patients to understand what their dentures will look like and better adapt to their dentures, as discussed below under *Communication issues*.

DENTIST-RELATED FACTORS

Dentist-related factors include dentist experience, patients' perception of the dentist and dental care, and communication issues.

Dentist experience

In a sample of 74 patients randomly assigned to an experienced dentist (>10 years of experience) or an inexperienced dentist (<3 years of experience), the experienced dentist received higher satisfaction ratings [74]. This is not surprising, as more experienced professionals usually can integrate all the information discussed here in order to understand patients' expectations and communicate better to ensure adequate understanding. Experts usually do this very intuitively and can hardly explain how they gather the information or how they present the necessary information in order to bring patients' expectations down without frustrating them. One of the problems in explaining this process is that it is customized for each patient. However, how can a dentist teach this skill set to an apprentice in such a systematic way that the apprentice can apply it immediately and continuously improve? Further research is needed to address this issue, too.

Patients' perception of the dentist

Patients' perceptions of the dentist influence their likelihood to trust the dentist which builds a relationship in which the dentist's explanations are fully considered and directions given by the dentist are fully followed. In addition, patients also feel free to ask questions and present their feelings regarding procedures or conditions, helping the dentist to identify possible issues.

There is reasonable evidence to support this common sense assumption. In a sample of RPD wearers, there are higher patient

satisfaction ratings when patients reported that their dentists gave a more complete explanation [38]. In a qualitative study, patients expressed that their relationships with their dentists are of great importance to achieving good results, and the fact that dentists are more open to dialogue today is considered a huge improvement [62]. Another qualitative approach [75] showed that patients value caring dentists, as well as dedicated dental teams.

Communication issues

It was shown that patients and dentists have different expectations and satisfaction ratings regarding the same denture [39]. Therefore, the importance of establishing good communication with the patient cannot be overstated. Several articles [13,76-79] have reinforced that effective communication and ensuring patients' understanding of denture limitations before starting are essential for achieving success with complete denture therapy, as well as with RPD [49].

There is a very good report about communication skills in recent literature [80]. Although communication skills may help improve the patient-dentist relationship, the fundamental rule is to treat your patient the way you would like to be treated: with kindness and genuine consideration.

CONCLUSION

Despite the limitations of this review (including research only from the last 14 years, using a single database, restriction to only 3 languages, no hand search, etc.), it was possible to identify several factors that may influence patients' satisfaction with their dentures. These factors were evaluated in the recent literature and are summarized in Table 3. Table 3 also presents the likelihood of each factor to influence patient satisfaction according to the available literature.

Other factors that are likely to influence patient satisfaction have not been assessed yet (such as denture payments/co-payments and cultural issues), and some of the listed factors still need more research to elucidate their role.

Table 3 - Factors investigated to have possible influence on patient satisfaction in the recent literature and their available evidence of influence rating

Possible influencing factors	Available evidence of influence
Technique-related factors	
Type of therapy chosen	(+)
Fabrication techniques	(-)
Impression techniques	(±)
Occlusal schemes	(±)
Artificial teeth chewing surface designs	(-)
Esthetics-related procedures	(±)
Dentures maintenance and follow-up	(±)
Number of post-delivery appointments	(±)
Denture quality	(±)
Patient-related factors	
Age	(-)
Gender	(±)
Educational level	(±)
Socioeconomic status	(±)
Personality and psychological factors	(+)
Previous denture experience	(±)
Expectations before denture fabrication	(±)
Oral conditions	(+)
Dentist-related factors	
Dentist experience	(±)
Patient perception of the dentist and dental care	(+)
Communication issues	(+)

(+) Reasonable evidence of influence; (±) Not enough evidence, more research is needed; (-) No evidence of influence.

Among the factors evidenced to influence patient satisfaction, a dentist can alter the dentist-related factors in his own practice to improve patient satisfaction. The factors in this category that showed higher likelihood to influence patient satisfaction are communication skills and patient perception of the dentist and

dental care (which also depends on dentists' communication skills). This highlights that improving dentist-patient communication is the most useful strategy to improve patients' satisfaction with their dentures.

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