ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 04, pp.49543-49548, April, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

REVIEW ARTICLE

REMOVABLE PROSTHESIS AND QUALITY OF LIFE

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ARTICLE INFO

Article History:
Received 20th January, 2017
Received in revised form
18th February, 2017
Accepted 22nd March, 2017
Published online 30th April, 2017

Key words:

Removable prosthesis,
Partial denture,
Edentulousness,
Quality of life.

ABSTRACT

We are not normally conscious of our teeth, although we realize that they enable us to enjoy our food and to speak clearly, and that they make a contribution for better or for worse to our appearance. Patients commonly seek treatment when an edentulous space is visible or when they have difficulty in eating. There are however other indications for treatment which may lead the dentist to prescribe dentures. Successful dental prosthesis should represent the lost tissues in approximately the same amounts and in the same positions from which the tissues were lost. Although the provision of partial denture may represent the completion of course of dental treatment, the planning of the prosthetic restoration should commence with the patients first visit. There is, of course a great deal of satisfaction to be gained from restoring a mouth in the ideal manner. However, the more patients who have elaborate and time consuming programmes of treatment provided the fewer of the population will receive care. Because of the limitations in dental manpower and the high cost involved the treatment prescribed may often have to be a compromise. This however, should never result in one losing sight of the essential principles of partial denture design which must always be upheld.

Citation: Dr. Prashant A. Karni, Dr Ramesh P. Nayakar, Dr. Abhijit P. Patil, Dr. Aditya Acharya, Dr. Swapnil Shankargouda and Dr. Mallikarjun H. Doddamani, 2017. "Removable prosthesis and quality of life", *International Journal of Current Research*, 9, (04), 49543-49548.

INTRODUCTION

When someone loses all his teeth (becomes edentulous), he also loses some of the ability to perform certain activities - eating, speaking, facial expression - and his appearance is impaired. His appearance is impaired not only by the loss of the teeth themselves but also because of the loss of support for the facial tissues lying over them. When the teeth are lost, some of the bone supporting them resorbs. The artificial substitutes must not only replace the lost teeth and lost supporting bone and soft tissue, but also restore the impaired functions and appearance. Many workers have emphasized the importance of this but we must admit that when treating an edentulous patient who has no pre-extraction records the dentist makes an informed guess of what teeth should be selected, where they should be placed and how much denture base is necessary to replace the lost alveolar tissues and restore the facial contour. The success of the denture is likely to be related to the accuracy of his guess work which in turn will depend on his skill, artistry and experience. There are of course many observations of proportion and rules of thumb to direct the dentist's judgment on these matters but the edentulous mouth provides few positive features from which valid measurements can be made. New treatment modalities, materials and techniques have expanded both the dental literature and the prosthodontic treatment alternatives available to dentist and their patients. At development of new prosthodontic treatment procedures and materials combined with the explosion in the volume of dental literature and the limited scientific basis for certain forms of traditional prosthodontic treatment have vastly complicated the prosthodontic treatment planning. In this dynamic dental environment evidence-based practice is emerging rapidly as the scientific foundation for prosthodontic treatment decisions. The techniques and materials presented are based on review of dental literature, as well as fundamental clinical principles for evidence-based practice in an effort to help the dentist provides quality patient care involving removable prosthodontics. The aim this present review of literature is to provide quality of life with the removable prosthesis and patient satisfaction.

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Tooth loss and quality of life

Extension of people's life span and enhancement of their quality of life (QOL) are the main goals in medicine. Since dental care for the elderly is becoming prevalent, it is important to know whether tooth loss, general health, and

dental treatment have an impact on the individual's QOL. Recently, it has become clear that oral health in older people is an integral part of general health that contributes to, and is influenced by, health-related QOL at the biologic, psychologic, and social levels. Increasingly, QOL assessment is regarded as an essential component for assessing health care outcomes, including outcomes for public health programs. Since general health is related to oral health and general health is related to QOL, tooth loss could have an impact on quality of life. The context of increasing life spans and evidence from various national dental health surveys in industrialized countries indicate that the proportion of edentulous people will continue to decline and that more people will retain more teeth into old age. Projections based on data from such surveys suggest a decline in tooth loss but an increased need for management of partial edentulisrn in patients with compromised oral or general health status. This trend of age-related increased tooth retention suggests that partially edentulous cohorts will be older than before and probably less disposed than younger people to such treatment with extensive tooth- or implant-supported fixed partial dentures. Consequently, socioeconomic factors and population trends suggest increased future treatment needs with different partial prostheses. The present review is based on the hypothesis that the decision to prescribe a removable partial denture (RPD) is mainly based on a subjective mix of professional, functional, cultural, and economic considerations rather than on compelling scientific evidence. Therefore, the authors sought to identify evidence-based indications for RPDs.

Quality of life and patient satisfaction

A significant proportion of prescribed RPDs are not used. In this context, it must be clearly recognized that practical problems with RPDs (food retention, pressure spots, etc) are common and may be the reason so many patients stop wearing their RPDs. Patient satisfaction increases when the RPD adds a significant number of occlusal units to the dentition. However, the improved perceived function gained by an RPD replacing only a few teeth does not compensate for the discomfort of wearing the RPD. There is a reported superiority of FPDs with respect to patient satisfaction, but this does not in all aspects clearly favour FPDs over RPDs.

Aim of removable prosthodontic treatment

Successful dental prosthesis should represent the lost tissues in approximately the same amounts and in the same positions from which the tissues were lost. Many workers have emphasized the importance of this but we must admit that when treating an edentulous patient who has no pre-extraction records the dentist makes an informed guess of what teeth should be selected, where they should be placed and how much denture base is necessary to replace the lost alveolar tissues and restore the facial contour. The success of the denture is likely to be related to the accuracy of his guess work which in turn will depend on his skill, artistry and experience. There are of course many observations of proportion and rules of thumb to direct the dentist's judgment on these matters but the edentulous mouth provides few positive features from which valid measurements can be made. As we believe that successful complete denture should replace the lost tissues we prefer to think of the denture space as 'that space in the mouth which was formerly occupied by the teeth and the supporting tissues which have since been lost'. Dentures which fill the denture space are adequately retained and are in balance with the oral musculature these are two of the four essentials for the efficient functioning of the complete denture. These four essentials are support, retention, muscle balance, occlusal balance.

Current practice in the management of partial tooth loss involves consideration of various types of prostheses. Each type of prosthesis requires use of various remaining teeth and/or tissues, and consequently demands appropriate application of knowledge and critical thinking to ensure the best possible outcome given the patient needs and desires.

Objectives of removable prosthodontic treatment

(1) The elimination of oral disease to the greatest extent possible.
(2) The preservation of the health and relationships of the teeth and the health of oral and paraoral structures, which will enhance the removable partial denture design.
(3) The restoration of oral functions that are comfortable, esthetically pleasing, and do not interfere with the patient's speech.

It is critically important to emphasize that the preservation of health requires proper maintenance of removable partial dentures. To provide a perspective for understanding the impact of removable partial denture Prosthodontics, a review of tooth loss and its sequelae, functional restoration with prostheses, and prosthesis use and outcomes is in order.

Sequelae of edentulism

When individuals lose some of their teeth, the remaining teeth and periodontium, muscles, ligaments and temporomandibular joints may also be affected. This in turn may create functional problems. The consequences of partial loss of the natural dentition are numerous and varied and include (Zarb, 1980);

1. Esthetic alteration
2. Decrease in masticatory efficiency
3. Tipping , migration and rotation of remaining dentition
4. Extrusion of teeth and residual ridges
5. Loss of support for the teeth
6. Deviation of the mandible
7. Teeth depression and attrition
8. Loss of vertical occlusal dimension and shortening of the morphologic face height
9. TMJ dysfunction
10. Loss of alveolar bone and reduction of the residual ridges.

Removable prosthesis

A **Removable partial denture** is a prosthesis that replaces some teeth in a partially dentate arch, and can be removed from the mouth and replaced at will. An RPD as its name implies is a prosthodontic restoration that supplies teeth and associated structures to a partially edentulous arch and can be removed and inserted by patient. In general, an RPD is made from a combination of several common dental materials. The basic substructure or framework for an RPD is fabricated from one of several commercially available dental alloys such as gold, aluminum or the more popular chromium-cobalt alloy.

To this underlying RPD framework are attached the supplied replacement teeth, usually fabricated from acrylic resins, dental porcelain or combination of acrylic resin and dental gold alloy. The replacement denture teeth are affixed either chemically to the RPD framework by means of acrylic resin or dental cement. Great majority of patients are satisfied with their RPDs (Burns et al., 1995). However, even if the RPDs are constructed according to all accepted criteria, some patients will still be dissatisfied (Burns et al., 1995). Satisfaction with RPDs seems to have a multicausal character (Van Waas, 1984, 1990; Watson et al., 1986; Van Waas et al., 1994). In addition to the patient's satisfaction, the patient's attitude towards a RPD prior to receiving one appears to play an important role. Those who thought negatively were more often dissatisfied (Vervoorn, Duinkerke & Luteijn, 1988, 1991). However, very important factors are the influence of the patient's personality, the patient's attitude towards a RPD and the patient's motivation for wearing it (Merelie & Heyman, 1992). For some patients, the satisfaction with his or her RPDs relates primarily to the comfort and ability to masticate (Kay, 1993). The aesthetics and retention also seem to be important (Hakestam et al., 1997). According to Frank et al. 1998 & 2000, the dissatisfaction related to the RPDs was higher in those patients who have had no prior experience with them, in those patients who had been wearing opposing RPDs, in the patients younger than the age of 60, and in the patients in poor health. The most common reasons for the patient's dissatisfaction with RPDs are the condition, the number and the alignment of the abutment teeth, the gingival, the periodontal and the mucous tissues health, the type of construction and the denture support, the material and the denture base shape (type of major connectors) (Zarb & MacKay, 1980a,b; Vigild, 1987; Weinstein, Schuchman & Lieberman, 1988; Cowan et al., 1991 Libby et al., 1997; Jokovic & Locker, 1997; Reifel, Rana & Marcus, 1997; Steele et al., 1997; Windchy & Morris, 1998; Elias & Sheiham, 1999).

The success of the RPD treatment, however, is often judged differently by dentists and patients (Elias & Sheiham, 1999). The dentists consider the RPDs to be successful when they meet certain technical standards, whereas the patients evaluate them from the viewpoint of their personal satisfaction (Elias & Sheiham, 1998). The knowledge about the patients' use of a RPD would be helpful to both the dentists and the patients, as they make their decisions about a prosthodontic treatment. The studies have been done to assess the patients' satisfaction with their RPDs in general, as well as to assess their satisfaction with the retention, speech, aesthetics, chewing and the comfort of wearing the RPDs and also assessment was done to check the influence of various factors, such as socio-economic factors, classification, construction, material, denture base shape, denture support and the number of missing teeth on the level of the patient's satisfaction.

Benefits of RPDs

The potential benefits of RPDs which will be considered are the following.

- Esthetics
- Phonetics: The loss of maxillary anterior teeth may prevent the clear reproduction of certain sounds, particularly the 'F' and 'V' which are made by the lower lip contacting the edges of the maxillary incisors. The replacement of missing maxillary anterior teeth will make a significant contribution to the quality of speech.

- Mastication: With modern foods and methods of preparation it is unlikely that a patient will suffer from malnutrition even though a large number of teeth are missing. However, the gaps that arise through the loss of posterior teeth reduce the efficiency of mastication: the bolus of food is allowed to slip into the edentulous areas and thus escape the crushing and shearing action of the remaining teeth. An RPD will prevent this escape of the bolus and thus contribute to efficient mastication.

- Maintaining the health of the masticatory system:

Preventing undesirable tooth movement: When teeth are lost from a dental arch the teeth adjacent to the edentulous space may tilt and move into that space. This drifting of teeth opens up further spaces which increase the opportunity for food impaction and plaque formation, encouraging inflammation of the periodontal tissues and decalcification of the proximal surfaces of the teeth. Inevitably, the longer such spaces remain unrestored, the greater the chance of tooth movement. When teeth are lost from an opposing arch over-eruption may occur with similar deleterious effects on the oral health. However, if tooth movement has not occurred in spite of the teeth being lost some years previously, it can be assumed that it is not going to occur subsequently. The long-term absence of antagonists has resulted in over-eruption of maxillary and mandibular teeth. The teeth are virtually contacting the opposing edentulous ridges creating major problems if RPDs have to be provided.

Improving distribution of occlusal load: The loss of a large number of teeth puts an increasing functional burden on the remaining teeth. In this example there is existing periodontal disease. The increased functional load has hastened the destruction of the periodontal attachments of the maxillary anterior teeth, which have become increasingly mobile and have drifted labially. If the periodontal attachments of the remaining teeth are healthy, the increased load may result in excessive tooth wear or may cause damage to existing restorations. The restoration of gross loss of tooth substance, as in this example, is likely to involve complex and prolonged treatment.

- Maxillofacial defects.
- Preparation for complete dentures: The treatment of patients who are expected to retain their remaining natural teeth for a considerable number of years, thus allowing the RPD to be regarded as a long-term restoration. But we should remember those patients whose remaining teeth carry a relatively poor prognosis and for whom, in due course, complete dentures are inevitable. If simple acrylic RPDs are provided, the patient is able to serve a prosthetic 'apprenticeship' with appliances which receive some stability from the few remaining teeth. In the fullness of time these transitional dentures become more extensive as further teeth are extracted and the patient is gradually eased into the totally artificial dentition. This form of transitional treatment can be of considerable benefit, especially for the elderly patient.

Rationale for removable partial dentures

As stated by Dr M. M. DeVan, the primary purpose of removable partial denture therapy must always be *"the preservation of that which remains, and not the meticulous replacement of that which has been lost"*. After it has been determined that this purpose can be satisfied, one should consider the additional purposes of removable partial denture therapy: maintaining or improving phonetics, establishing or increasing masticatory efficiency, stabilizing dental relationships, and developing the required esthetics. If, on the other hand, it is determined that the health of all or part of the remaining oral structures will be compromised, alternative forms of treatment must be considered. For too many years, removable partial dentures were considered stepping stones on the road to complete dentures. With the materials, equipment, and techniques currently available, this type of thinking must be relegated to the past. Removable partial denture therapy is an acceptable form of treatment that provides an increased spectrum of restorative options.

Conditions which militate for the removable Partail denture

In general, the removable partial denture is prescribed when the fixed type of prosthesis cannot be employed or when the attributes of the removable partial are considered advantageous in a particular set of circumstances. Advantages of the removable partial denture are:

1. The fewer number of appointments needed
2. The lessened amount of intraoral instrumentation required
3. The lower cost
4. The fact that it is possible for the patient to maintain a very high order of oral hygiene

The Distal Extension Base

Although a small pontic is sometimes cantilevered distally from the crown of terminal abutment tooth most edentulous spaces not bounded at both ends by teeth suitable as fixed partial denture abutments are best restored by a removable prosthesis.

Long Span or Less than Ideal Abutments

When the edentulous span is so long that Ante's rule cannot be satisfied the removable partial denture should be prescribed. For example a span from third molar to cuspid is too long for a fixed prosthesis because it places too much buccolingual stress on the abutment teeth. Generally, when the edentulous space "turns the corner of the arch" the removable partial denture is prosthesis of choice.

For Children and Adolescents

The removable partial denture is often the prosthesis of choice for the youthful patient whose pulp chambers are typically large hence unusually vulnerable to injury from instrumentation.

For Cross Arch Bracing

When the two side of a removable partial prosthesis are connected across the midline with rigid connector all of the teeth involved receive support from the prosthesis as well as from each other. The result is mutual sharing of stress which is beneficial to all of the structures that play a role in supporting, stabilizing or retaining the prosthesis. Hence the removable partial denture may offer advantages over the fixed type of the prosthesis when periodontally weakened teeth must be stabilized by splinting. Splinting by fixed methods stabilizes the teeth well in a mesiodistal direction, but is not nearly as effective in stabilizing them buccolingually.

To Obturate a Palatal Cleft

When an opening in the palate communicates with the nasal cavity it can best be closed by either the denture base or the major connector of a removable partial denture. This draws attention to the fact that when there are natural teeth remaining in the mouth with a palatal cleft they should be salvaged if at all possible, because they can make an invaluable contribution to the support, stability and retention of a prosthesis. The prosthesis retained by the clasps is far superior to the complete denture because of the difficulty in obtaining adequate retention and stability with the latter. By any reckoning natural teeth are the finest retentive aids that a cleft palate patient can possess and they should be retained for as long as it is possible to do so.

To Restore Facial Contour

A removable prosthesis can be used to provide a bulk of acrylic resin in order to compensate for bone loss which has occurred as a result of an accident or from excessive resorption. Such a requirement is encountered most frequently in the anterior part of the mouth where a bulk of acrylic resin is needed so that the anterior prosthetic teeth can be brought out labially to align them better with the remaining natural teeth. In addition the flange provides needed support for the lips so that it can drape naturally over the replacement teeth thus restoring a pleasantly natural appearance.

As a Transitional prosthesis

A removable partial denture may be best for the patient who because of age or systemic illness does not possess the physical stamina to undergo the replacement or the oral surgery needed for complete dentures. Similarly, the removable partial denture may provide a solution for the individual who, for psychological reasons, cannot face with equanimity the loss of the rest of his natural teeth even though it might be the treatment of choice from a clinical standpoint. A partial denture may enable such an individual to make the transition to complete edentulousness with a minimum of psychic trauma.

Shortened Life Expectancy

The removable partial denture may be the most suitable prosthetic service for the patient whose normal expectancy has been drastically curtailed because of a systemic illness such as leukemia. The overriding objective in such an instance is to provide the patient with a prosthesis with which he can eat and function comfortably in the present and immediate future.

Alteration of Vertical Dimension

When an increase in the vertical dimension of occlusion is contemplated as a part of the overall treatment, the removable

partial denture may play an important role in determining the exact amount of vertical opening that the patient requires. It is usually advisable to accomplish an alteration in the vertical dimension in not less than two steps. A temporary removable prosthesis is first made in which the vertical dimension is increased a tentative amount and then the patient is closely observed for signs or symptoms of either over or under closure. If the increased opening proves to be a satisfactory amount, a more permanent type of prosthesis, fixed or removable may be constructed at a later date.

Unblemished Abutments

The patient with a caries free mouth may strenuously object to the mutilation of unblemished teeth for the sole purpose of serving as abutments for a fixed prosthesis. The removable partial denture may be the preferred treatment under the circumstances.

The Diabetic Patient

The diabetic patient, even though controlled by diet and drugs may experience an immoderate amount of difficulty in wearing any oral prosthesis with comfort. This is due in large measure to the increased susceptibility of the mucosa to traumatic injury, and its propensity for delayed healing. Such a patient will probably fare better with a prosthesis that is least partially stabilized and supported by natural teeth than with a complete denture.

The Extreme Atrophic Residual Ridge

The patient with an extremely atrophic residual mandibular ridge may fare better with as few as two natural teeth to stabilize, retain, and help support a removable partial denture, than he would with a complete denture. If the teeth are healthy and reasonably stable their use as abutments should be considered, even on a pro tem basis, in preference to extraction, because a complete denture will in all probability be more difficult for the patient to wear comfortably.

The Patient with a Previous Unsatisfactory Prosthetic Experience

The patient who has had an unsuccessful experience with a removable partial denture may have acquired a strong aversion to this type of prosthesis and may insist that the remaining natural teeth be extracted and a complete denture inserted. If this course of action is clearly not in his best interests an effort should be made to ascertain the reason for the dissatisfaction with the rejected prosthesis.

Conclusion

The RPD is associated with an increased risk of caries and, to a lesser extent, periodontal disease, especially in the long term and in patients with poor oral health maintenance. Prophylactic oral health treatment with an RPD is questionable. The presence of sound abutment teeth in a well-maintained mouth strengthens the indication for a RPD. If provision of a conventional FPD is not possible because of extensive loss of teeth and implant treatment is not realistic, the clasp-retained RPD is a valid alternative. The application of optimal biologically related design principles may reduce RPD-related risks. The risk of low patient acceptance of an RPD must be considered. Economic considerations are strong indications for RPD treatment.

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