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Research Article

ENHANCING THE RETENTION IN FLAT MAXILLARY PALATAL VAULT WITH UNILATERAL ALVEOLECTOMY BY INCORPORATING MULTI-MINIATURE SUCTION CH

Shilpa Sinnurkar*

Near IT Park Opp HIgh Court

A R T I C L E I N F O

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A B S T R A C T

Majority of geriatric patients suffer a great deal of discomfort as a result of loose or ill-fitting dentures. Many denture wearers simply withdraw from any type of social engagement as a result of being compelled to wear them. A significant number of these patients have ill-fitting dentures with diminished or poor function due to a variety of reasons. The increased stability and retention allow denture wearer patients to increase the force they can apply during mastication. Improving retention and stability of denture is of a considerable interest in prosthetic dentistry. Denture technology is constantly moving forward and providing denture wearers withbetter and better options for denture comfort and fit. The basic retention needs of denture wearers has led to considerable experimentation and research efforts trying to perfect dentures that compensate for natural tooth loss and to enhance retention by any means possible, such as attachments, springs, magnets, clasps, adhesive paste and powder. All have been tried with minimum success. This case report describes unique and creative option in removable prosthetic retention by use of a soft denture lining material surfaced with multiple miniature suction cups, providing an alternative to ill-fitting poorly retentive

INTRODUCTION

India features a massive geriatric population of sevent seven million comprising 7.7% of its total population. More than one-half of the population uneducated never sees a dental practitioner in their lifespan. These people who are economically poor can ignore any warning signs of dental diseases. A significant range of those patients have dentures with diminished or poor function for a range of reasons. However, the contributing physical factors includes atrophy through bony reabsorption, dilution of the superimposed gingiva and membrane, diminished or altered salivary flow and quality, soft- and hard-tissue lesions, neuromuscular challenges among others1.

Complete denture wearers may be one of the largest underserved dental patient populations; a significant number of these patients have dentures with decreased denture base support and retention of the prosthesis. While it is possible to enhance the resorbed ridge and/or place implants, not all patients are surgical candidates, especially the elderly and the medically compromised. This large group of patients must resort to improving denture retention with a variety of nonsurgical alternatives, the most common of which includes the use of denture adhesive pastes, powders and pads. The most common detrimental oral change is atrophy of the alveolar ridge, causing altered bony and soft-tissue architecture. Result of which includes fabrication of dentures with decrease in denture base support and compromised retention.

The treatment of a patient with a severely resorbed maxilla along with unilateral alveolectomy can be great challenge to the Prosthodontist. There can be difficulties in achieving adequate retention and stability with conventional prostheses and whilst dental implants can be used in some situations and be of great benefit, they are not always indicated in certain situation like uncontrolled diabetes, coronary heart diseases and other debilitating diseases. In these situations, alternative methods may have to be considered by creating a negative pressure under the denture surface area. Suction cups dentures are small suction cups made with a soft rubber that attaches gently inside the mouth without irritation.

Case Description

A 51-year-old female patient reported to theDepartment of Prosthodontics, Institute of Dental Sciences, Dharwad, India for replacement of her ill-fitting complete dentures. Past medical history was non-relevant. Past dental history revealed extraction of her remaining teeth pertaining to periodontal problems 3 years ago. Since then patient is denture wearer but was unhappy with the retention and esthetics of her existing dentures.Intra oral examination revealed completely edentulous maxillary arch with flat palatal vault and moderately resorbed mandibular residual ridge. On brief

Corresponding author:* **Shilpa Sinnurkar
Near IT Park Opp HIgh Court

history of patient explained about unilateral alveolectomy due to Endo-Perio lesions in respect to right side of the maxillary leaving no bony support for the retention of complete denture. Further more patient describes about her previous conventional complete denture which was unstable and non retentive while function and during speech for more than 6 months.

Various treatment modalities of the prosthetic rehabilitation were discussed with the patient and the patient expressed her willingness for more economical solution. Hence considering the fact a heat polymerized acrylic maxillary and mandibular dentures were planned with incorporation of multi miniature suction chambers in the maxillary denture. The expectation of this prosthesis was explained to the patient.

Procedure

Following the conventional Prosthodontic stages of primary impressions, secondary impressions and jaw registration, a tooth try-in on a cold-cure acrylic resin primary base was carried out(Fig. 1, 2 and 3). Once patient and clinician were happy with the teeth arrangement, the try-in was disinfected and returned to the laboratory. The master cast was then duplicated with duplicating silicon material and the cast which was obtained prepared for drilling trephine holes perpendicularly into it.

These were placed approximately 1.5 mm apart, were 1 mm deep and had a diameter of 2 mm. The entire alveolar ridge and palatal denture supporting areas were prepared in this way, leaving 2 mm at the denture borders and frenal attachment sites.(Fig. 5) At this stage, a new 1.5 mm thick aluminum spacer was placed over the area sufficient space for the addition of Ufi-Jel soft liner at a later stage required to receive on original master castHeat-cured acrylic resin dough was packed over the teeth in the conventional way and covered with a thin aluminum sheet (Fig. 4) process the denture in convention technique and final denture trimming and polishing was carried out. (Fig. 6)

The polished denture was then tried and verified on the duplicate cast for the fitting. Aluminum foil was then removed followed by mixing of Ufi-Jel soft liner and applied over surface intend to receive. Complete pressure was applied to secure the denture along with the duplicating cast and allowed to set the Ufi-Jel soft liner. Once the silicon material sets completely, the tissue bearing surface was then examined and excess was trimmed with BP blade.

The denture was then fitted. The patient found it very comfortable to wear and reported increased retention compared to her previous conventional prosthesis. The patient was to be followed up for any deleterious soft tissue changes. However, in the previously published case report,2 no soft tissue changes were recorded. The patient did not seek any further treatment 12 months after the maxillary denture was fitted.

Fig 1 Primary impression

Fig 2 Border molding & final impression

Fig 3 Try in procedure

Fig 4 Aluminum spacer

DISCUSSION

It is seemingly that the most important reason for the severe loss of alveolar height and width during this case was the history of multiple unsuccessful implants that were removed. Peri-implantitis ends up in the loss of bone immediately surrounding implants and could be a comparatively common complication. Fransson reported that out of 662 patients World Health Organization had received implant treatment, progressive bone loss was known in 184 (27.8%).9 several older studies don't offer adequate knowledge on the prevalence of peri-implantitis. Hutton *et al*. Incontestable that during a population treated with implant over-dentures, several implant failures perceived to cluster in specific people, rather then

being equally distributed throughout the studied population[1].

A basic concern of associate degree edentulous patient is retention of their dentures. This has result in the growth of a very massive "Denture Adhesive" industry. the essential retention desires of denture wearers, has led to appreciable experimentation and analysis efforts making an attempt to excellent dentures that complete natural tooth loss, and to reinforce retention by any means that possible. Attachments, magnets, clasps, etc., have all been tried with token success. the utilization of a soft material denture lining, surfaced with multiple miniature suction cups, satisfies the necessities of retention and stability[2]. The concept of multiple little suction cups incorporated into the intaglio surface of denture isn't a revolutionary plan. Incredibly, 3 United States of America patent, 2 in 1885 and one in 1907, were granted for complete dental plate styles supported such an inspiration[3].

The chief indication for a denture with multiple suction cups is that the patient's desire for additional retention and stability of his or her dentures. several patients have extremely resorbed ridges and cannot master the utilization of dentures, not to mention retain these prosthetic appliances in their mouths. the use of a suction cup to assist retention is a well-known physical principle. The flexible suction cup is applied to a surface, forcing the air within the suction cup to be expelled. once the user stops applying a force to the suction cup the elastic properties of the material cause it to return to its original form. This will increase the degree, lowering the pressure within the suction cup, compared to atmospheric pressure. it's this pressure differential that creates the retention.

Clinical Indications for Dentures with multiple small suction cup: (a)Resorbed and uneven ridge morphology alveolar ridges. (b)Undercuts. (c)Salivary dysfunction. (d)Neurological disorders. (e)Partially or wholly paralyzed oral musculature. (f)Resective surgery. (g)Traumatic changes of the oral cavity. (h)A history of head and neck irradiation.(i) long-term denture wear.

However, this is not recommended for patients with flabby gum tissue or dry mouth conditions The suction cups can be processed during the fabrication of new dentures or in the relining of existing dentures. The dentures, with a maxillary denture having up to 200 suction cups and a mandibular denture with more than 150. suction cup liner can be applied to both upper and lower

CONCLUSION

This case report explains a simple technique for enhancing the retention and stability of complete dentures. These suction cups grip the oral tissue, providing an increased surface area for enhanced retention and a suction force for increased resistance. Flat denture-bearing surfaces offer greater suction cup retention compared to well rounded ridges. The amount of retention provided by suction cup adhesion is proportionate to the area covered by the denture, there is a definitive advantage in maximizing the surface area. The follow-up was done for the first 6 months and complaints were not reported by the patient.

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