

Case Report

Exploring the Precision of Biofunctional Prosthetic Denture: A Case Report

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<u>ABSTRACT</u>

Introduction: The new era of dentistry demands new techniques to overcome new challenges. Biofunctional Prosthetic systems are one such solution which has ensured the longitivity, durability, sustainability and comfortability of the complete dentures.

Objective: To render a Biogenic Complete Denture (CD) to a patient with periodontally compromised malfunctioned bite.

Treatment and methods: Periodontal and prosthodontic evaluation was done with respect to upper and lower arches. Complete extraction followed by osseous recountoring was done. After 1 week the impressions were made, followed by jaw relation and teeth trial. After 1 month of the extraction the final dentures were delivered.

Discussion and conclusion: BPS dentures are considered to be modern day dentures of choice which primarily focuses on bilateral balanced articulation. The choice of specific impression material, shade specific teeth, specific detailing makes BPS a favourable treatment option for edentulous mouths. Due to the detailing and incorporation of the aesthetic characterisations BPS dentures are also preferred to be synonymously called as 'biogenic' or 'bio-functional' system of treatment.

Keywords: Dentistry; malfuctional; Para functional

INTRODUCTION

The new era of dentistry is an era of challenges which believes in constant improvement and enhancement of the existing treatment protocols for longitivity and comfortability of the treatment rendered. Especially in the field of aesthetic and restorative dentistry, the new era patients prefer a smile which is exactly resembles the originality and authenticity in all forms despite being achieved through artificial prosthesis. Hence prosthodontists and implantologists play an extremely crucial role in rehabilitating, restoring and reconstructing the lost aesthetics of an individual. For geriatric individuals, many complain of malfuctional bite and unesthetic appearance due to loss of teeth or wearing a way of teeth with age and time. Under some circumstance it could be due to the parafunctional habits inculcated by the patient during the early period of his life. Reconstructing such smiles could be a challenging plan for any dentist. Conventionally complete

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dentures were an absolute ideal treatment of choice which later down the lane was replaced by the fixed prosthetic rehabilitation which include, full mouth implant rehabilitation, full mouth veneers and crown rehabilitations. Complete dentures had been the most accepted choice of treatment in the early evolving days of dentistry which still holds their importance in patients who are ineligible and incompatible to receive implants supported dentures or fixed prosthesis. Their aim and goal would be to restore the overall oral health through preservation of the remaining alveolar bone, maintaining support, giving an excellent fit through retention and stability of the dentures. It is also inevitable to ensure the comfort, speech and aesthetic appearance of the denture user. Insufficiency and failure in achieving any of the above mentioned factors would not only lead to a disfigured appearance but would also effect the patient psychology in a negative way[1]. To avoid such negative outcomes, the recent advancements and enhancement feature in complete denture is suggested to be a Bio functional Prosthetic System (BPS) which primarily focuses on bilateral balanced articulation. Our research begins here through this case report which has enlightened the advantages and merits of BPS dentures when compared to the conventional existing denture systems [2].

CASE PRESENTATION

Background

A 60 year old male patient reported to our clinic with a chief complaint of malaligned, decayed and malfunctional bite and desired to get the teeth replaced for functional reasons. Upon examination, he complained of a clicking sound in the TMJ region and presented with numerous failing prosthesis. Periodontally, the case was diagnosed as stage 3 severe periodontitis with moderate grade of progression along with grade modifiers such as smoking. The systemic health of the individual did not present any significant disorder but a slight malnutrition was observed with respect to age and improper diet. Based on the affordability, interest and durability crirterias the patient was presented with a solution of BPS complete dentures to rehabilitate his bite and restore his smile.

Treatment methodology

The placement and position of the teeth were evaluated with the help of an OPG which revealed drifting and severe bone loss. As per periodontal evaluation and opinion, the posteriors presented with a hopeless prognosis whereas the anteriors had a failing bridge with grade 2 mobility determing the prognosis to be questionable (**Figure 1**). Hence, a full mouth extraction was planned towards the same. The Vertical Dimension at Occlusion (VDO) the vertical dimension at rests was recorded to be 57 mm and 60 mm respectively. This recorded data was used in determining the jaw relation in the later stages. During the extraction a lot of buttress bone and bony protuberances were observed in both maxilla and mandible and hence osteotomy and re-contouring of the bone was done to eliminate the bony spicules. Socket preservation was done using xenograft to prevent the collapse of the alveolar ridges post healing phase. A modified interrupted continuous suturing pattern was preferred towards approximation of the tissue and containment of the graft. A healing period of 2 weeks was advised to the patient towards the efficient healing of the tissues.



Figure1: Treatment methodology.

Post 2 weeks the sutures were removed and bony contour was checked by the Prosthodontist for denture evaluation. The ridges showed a bit of discontoured tissue flabby in nature which was rectified using a laser for gingival contouring and photobiomodulation. A primary impression was made on the same day towards the fabrication of BPS Complete Denture. The BPS recommends impression making in accordance to the principles of mucostatic method that minimally compresses tissues, using various irreversible hydrocolloids impression materials. A low-density impression material was used along with high-density hydrocolloid in an occlusal centric tray and inserted into the patient's mouth to get the initial vertical dimension. This vertical dimension was then used for mounting the master casts obtained from secondary impressions, taken with Accu-trays which are different from conventional denture trays with an added extra flange to cover the vestibular areas along with an extended distal part to cover the retromandibular pad area more efficiently. These recordings would help in the achievement of retention and stability in the final denture. Custom trays were made on the primary casts. The Gnathometer tracing device was attached to the casts, which facilitates the clinical procedures of secondary impression making, face-bow record and jaw registration.

After 3 days a master cast was prepared with trial custom trays and the occlusal rims. The fabricated occlusal rims were then used to record the jaw relation where the vertical dimension was recorded at 21 mm and sent to lab for trial denture fabrication. Ivoclar teeth were used in the setting and the dentures were cured using injection moulding technique.

During the trial the patient's speech was tested along with his comfortability with the dentures in terms of retention and stability. Post adjustments the trial dentures were sent to the lab and made into final dentures (Figure 2).



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Figure2: Exploring the precision of bio functional prosthetic denture.

A checkup was made hence forth every month to train and guide the patient into the bite and help him achieve the centric bite comfort and evaluate his speech. The smile design was recorded during the same (Figure 3). No occlusal disharmony or sore spots were observed and the patient was very much satisfied with his new prosthesis and showed his gratification for the comfortable prosthesis and a younger look.



Figure 3: The choice of specific impression material, shade specific teeth, specific detailing.

DISCUSSION

A Systematic review by J Stoma [3] in 2019 highlights 3 studies which put forth the advantages and merits of BPS dentures. This review also highlights a case control study by Xhajhank et al. [2] done in the year 2017 which was conducted for 6 years and finally concluded that BPS dentures are more favourable over conventional dentures in terms of aesthetics, comfort and function [4-7]. In his study he went ahead to also conclude that the residual ridge resorption was less when compared to the conventional dentures. The choice of specific impression material, shade specific teeth, specific detailing makes BPS a favourable treatment option for edentulous mouths [8]. Due to the detailing and incorporation of the aesthetic characterisations BPS dentures are also preferred to be

synonymously called as 'biogenic' or 'bio-functional' system of treatment [9].

CONCLUSION

The preferred dentures of today are thought to be BPS dentures, which emphasize bilateral balanced articulation above everything else. BPS is a good treatment option for edentulous mouths due to the selection of specialized impression material, shade-specific teeth, and specific details. Owing to its intricate design and integration of aesthetic elements, BPS dentures are also favourably referred to as "biogenic" or "bio-functional" treatment systems.

LIMITATIONS AND SCOPE OF THE REPORT

This case report aims to become a part of many more case reports which have been published in regards to the use of BPS dentures. A lot of research is still required to study the BPS denture in detail and understand its advancements with incorporation of various elements in aim to increase the material strength, durability, sustainability and comfortability. The digital versus conventional fabrication of such dentures are yet to be analysed and studied to make BPS denture a role model in fixed and removable prosthodontics.

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