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Improving Microesthetics in an Edentulous Patient with Cheek Plumpers: A Literature Review and Case Series

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Abstract

This case series explores two successful cases of implementation of a magnet-retained hollow cheek plumper prosthesis in the rehabilitation of a patient with sunken cheeks. The clinical evaluation, treatment planning, and prosthetic fabrication methods are discussed, accompanied by a thorough review of the existing literature on cheek plumper prostheses. The literature review encompasses historical perspectives, advancements in materials and techniques, and outcomes reported in similar cases. This combined approach provides a holistic understanding of the clinical efficacy and scientific basis underlyingthe utilization of cheek plumper prostheses in prosthodontic practice.

Keywords: Cheek plumper prosthesis, Facial rehabilitation, Prosthodontics, Aesthetic restoration, Patient satisfaction, Complete denture, Hollow Cheek Plumper.

Introduction

Facial esthetics plays a major role in the overall health and well-being of an individual, Natural Dentition supports facial musculature, thus increasing the stability and esthetics of facial features.[1] When any disturbance occurs in the dentition the facial features and hence the esthetics are affected. The disturbances could be due to aging including loss of teeth, alveolar process, lack of muscle tonicity, elasticity of skin, or an overall loss of function.[2] The role of a prosthodontist is of importance here, to restore the losses in the dentition as well as alteration of facial tissue tone.

Complete denture treatment includes the replacement of missing teeth as well as the restoration of facial appearance.[3] Conventional complete dentures with appropriate flange extensions and positioned teeth provide support to the lips and cheeks. However, in individuals with marked resorption of the alveolar process, conventional dentures are not able to provide adequate support, necessitating additional support for the cheeks.[1,3]

Cheek plumper is the prosthesis which improves the esthetics and helps to increase patient's confidence. It extends from maxillary premolar to molar region and provides support to the cheek.[4] Conventional/ fixed type of cheek plumper are fabricated by adding an extra quantity of denture base resin to plump the

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cheeks and may increase the weight of the denture. A single piece prosthesis may cause the same problem leading to discomfort for the patient.These flaws can be eliminated by using a detachable plumper prosthesis; where plumper can be detached easily from the complete denture.[2]

Magnets are a good option to retain cheek plumpers along with complete denture prosthesis.[2] Rare earth element magnets are compact in size, easily available, cheap and have strong magnetic output. Hence this clinical report illustrates the use of rare earth magnets for attaching hollow cheek plumpers to complete denture prosthesis in a completely edentulous patient with hollow cheeks.

CASE 1

A 72yearold male reported to Department of Prosthodontics, Crown and Bridges, KGMU, Lucknow with a chief complaint of difficulty in chewing and eating food. On intraoral examination, it was found that patient had completely edentulous maxillary and mandibular arches. There was no history of previous denture fabrication. On extraoral examination patient had an unesthetic appearance of the face due to sunken cheeks (Figure 1)

Figure 1: Pre-treatment picture showing the "sunken cheek appearance"

The complete case history of the patient was taken, which revealed that the patient had undergone extraction of all teeth over a period of past 5 years because of mobility and gross caries. The patient's needs like esthetics and functionwere taken into consideration when creating the treatment plan, and it was decided to provide maxillary and mandibular complete dentures, with intraoral magnet retained detachable cheek plumpers for the maxillary denture.

Clinical Procedures:

Impression material was used to create primary impressions of the maxillary and mandibular arches, and autopolymerizing acrylic resin was used to create custom trays and low fusing impression compound was used for border molding. (DPI Pinnacle, The Bombay Burmah Trading Corporation Limited, Mumbai, India) and final impression was made with lightbody addition silicone impression material (Aquasil, Dentsply/ caulk).

Maxillary mandibular jaw relation were recorded. Waxed up dentures were initially checked for occlusion and aesthetics during the try-in visit. During the same session, wax cheek plumpers were created and affixed to the upper denture that had been waxed. The trial was carried out with and without the cheek plumper and excess addition of wax was also done to compensate the sunken depressed cheek bilaterally. The patient acknowledged the drastic difference in look right away, both with and without the wax-up cheek plumper. The denture that had been waxed was detached from the plumper. After the full satisfaction of patient's esthetics, the cheek plumpers and the final prosthesis underwent independent flasking and dewaxing processes. Heat-polymerizing acrylic material (DPI, Mumbai, India) was packed into the mould space, and the curing processes were carried out in compliance with the manufacturer's instructions. For curing the cheek plumper, a thin layer of acrylic was placed in the mould and the centre part was filled with saltand covered with acrylic again.

The cured final prosthesis and cheek plumpers were removed. A hole was made at the end to dissolve the salt with water .Procedures for trimming, finishing, and polishing were carried out. The cheek plumper was then secured to the final prosthesis with a pair of commercially available magnets, measuring 5 mm in diameter and 2 mm in thickness (rare earth magnets with a chrome finish, or Magneticks) on each side (Figure 2).

Figure 2: Positioning of magnets on cameo surface of complete denture

Using autopolymerizing resin, a space was created and magnets were positioned in the cheek plumper and the final prosthesis' flange (Figure 3). After placing the material in a pressure pot to assure complete polymerization, finishing and polishing were done. First, the plumper's attachment to the prosthesis was examined outside the patient's mouth (Figure 4). Next, the patient's mouth was examined to ensure the prosthesis and plumper were comfortable, functional, and aesthetically pleasing (Figure 5).

Figure 3: Intraoral view of patient showing cheek plumper secured to complete denture

Figure 4: Finished and polished cheek plumpers along with the complete denture

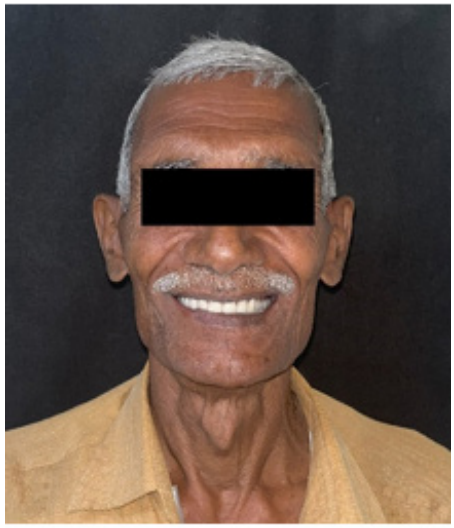

Figure 5: Post treatment extra oral photograph showing improvement in esthetics of the patient

CASE 2

A 65-year old, completely edentulous male patient reported to the Department of Prosthodontics with the chief complaint of poor aesthetics.On examination, it was observed that the patient was edentulous since last 3 years and has 2 sets of denture. Extra-oral examination revealed that patient had poor aesthetics, unsupported oral musculature leading to sunken cheeks.

Treatment plan included cheek plumper fabrication with complete denture.

The clinical procedures used were mostly similar to the previous case. In this case, the cheek was moulded and a detachable cheek plumper was created using impression compound. To create the hollow cheek plumper, salt was replaced with a gelatin mixture. In addition, a single magnet was used to secure the cheek plumpers in place on each side.

Figure 6a: First layer of heat cure acrylic resin placed in mould; 6b:Gelatin mix placed over heat cure acrylic resin; 6c: Final layer of heat cure acrylic resin placed and magnet attached over it; 6d: Cheek plumper with holes to facilitate removal of gelatin mix; 6e: Pre-treatment extraoral photograph; 6f: Post treatment extra oral photographdemonstrating the patient's improved appearance.

Review of Literature

Cheek plumpers have been described for improving esthetics and the psychological profile of patients with maxillofacial defects and facial paralysis. Patients with facial paralysis were provided extended denture flanges to improve support to the overlying facial tissues.Literature review identified twenty reported cases of cheek plumper fabrication from2010 and 2023. Table 1 outlines the different types of cheek plumpers and attachments used by various authors, along with their advantages and disadvantages.

Table 1: Describes the several kinds of cheek plumpers and attachments that authors have tried, along with their advantages and disadvantages.

Serial No.	Author	Attachment	Cheek Plumper Type	Advantages	Limitations
1.	V. Kamakshi et al , 2012 5	Iron–neodymium close-field magnets	Solid and detachable	Ease of placement, automatic reseating	Interfere with cardiac pacemakers
2.	N N Keni, 2012 [6]	Customised cobalt chromium attachments	Solid and detachable	Easy and cost-effective	Not specified
3.	Deogade et al, 2013 [2]	Magnet cobalt samarium	Solid and detachable	Small compact size, Strong attractive forces	Not specified

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4.	Prachi Aggarwal et al,2016 [7]	Push buttons	Solid and detachable	Economic	Corrosion
5.	Prem Bhushan et al,2017 [8]	Simple friction lock attachments	Solid and detachable	Reduced weight	Retention depends on number of times patient removes and attaches
6.	Venkatachalapathy et al, 2019 [9]	Neodymium close-field magnets	Solid and detachable	Reorientation comfortable, cost effective	Not specified
7.	Virdiya et al,2019 [3]	magnets (Permag Products Pvt Ltd)	Solid and detachable	Small , facilitate automatic reseating	Food accumulation Patient discomfort Corrosion
8.	Sebastian et al, 2019 [10]	Magnets (Permag Products Pvt Ltd)	Solid and detachable	Small, automatic reseating	Poor corrosion resistance
9.	Pudi et al, 2019 [11]	Double die pins	Solid and detachable	Precise fit, good strength	Not specified
10.	Tripathi et al, 2020 [4]	Push buttons	Solid and detachable	Affordable	Not specified
11.	Rewari et al, 2020 [12]	Magnets (Magfit™ DX600)	Solid and attached	Small compact size, strong attractive forces	Allergic, remove for MRI tests, poor corrosion resistance
12.	Vaishnavi Inginshetty et al, 2021 [13]	Osstem implant system	Solid and detachable	Easily available, cost effective	Not specified
13.	Ayinala et al, 2021 [14]	Hollow Denture along with Cheek Plumper	Hollow and attached	Less weight	Not specified
14.	Kaligotla Apoorva Vasundhara et al, 2021 [15]	Cobalt samarium magnet	Hollow and detachable	Less weight, cost effective and efficient	Not specified
15.	Abdelbagi et al, 2021 [16]	Magnets (cobalt-samarium, Ambika Corporation)	Hollow and detachable	Small and easy to insert	Loss of magnetism
16.	Gade et al, 2021 [17]	Neodymium NdFeB magnet having Ni-Cu-Ni protective coating	Solid and detachable	Good resistance to magnetization, corrosion resistance	High cost, loss of magnetic field over time

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17.	Rathee et al, 2021 [18]	Nd-Fe-B magnets Press button with male and female counterpart of same dimension	Solid and detachable	Automatic reseating, easy cleaning	Corrosion and loss of magnetism
18.	Rathee et al, 2021[19]	Lingual Sheath and stainless steel wire	Solid and detachable	Readily available, cost-effective, less weight	Difficulty in angulation of components, breakage of wire
19.	Bansod et al, 2022 [20]	Hooks and loops	Solid and detachable	Easy insertion and removal Easy to clean	Reduced denture stability Increased weight
20.	Kunusoth et al, 2023 [1]	Button magnets (Rare Earth Magnet, Permag Products Pvt. Ltd	Solid and detachable	Lightweight	Allergic to metal MRI tests cause damage

Discussion

Teeth loss, accompanied with sunken cheeks and lips, can have a crippling psychological impact on an individual personality, specially in patient with vigor personality and male.[8] Wrinkles, creases, and sagging in the face can be minimised with proper support for the facial muscles. When teeth are missing, cheek plumpers can provide the muscles with sufficient support. The retention of the dentures is compromised by the unscrewable cheek plumper as it makes the dentures heavier and bigger. Moreover, individuals with microstomia cannot have their dentures inserted due to an excessive mediolateral breadth in the cheek plumper area.[3]

A lot of advantages are offered by detachable cheek plumpers, including ease of insertion and removal, a lower profile, minimised muscular strain, and easier cleaning. If muscular tiredness develops, the patient can wear the dentures even without cheek plumpers.[4,6,12] It is possible to employ a variety of attachments, including press buttons, double die pins, and personalised attachments. The manufacture of customised attachments takes longer and involves more laboratory stages. Press buttons fit snugly and are inexpensive, but they are not corrosion-resistant. When utilising double die pins, the patient must exercise caution because if the pins are not put correctly, they may harm and rip the mucosa. Because they are lightweight, cheek plumpers with magnets may be worn discreetly and effortlessly and while eating, the plumpers can be taken out of the mouth with ease.[9]

A few notable drawbacks with this assembly should be mentioned. Magnet surfaces are subjected to saliva, which can cause corrosion and tarnish. This might result in the magnets' protective covering being disrupted, which could have some deleterious effects. Therefore with time, it can cause the retentive force to diminish. Hence, keeping up regular recalls and changing the magnets as soon as corrosion appears might be crucial to the appliance's longevity and functionality. Also, rare earth magnets pose a risk in patients with artificial pacemakers and defibrillators.[15-17]

The buccal flange of the maxillary full denture is thickened to provide the traditional cheek lifting appliances, however this thickening compromises stability and retention. Muscle spasm may result from such denture's constant straining of the reduced cheek muscles. More often than not, patients utilise adjustable cheek plumbers, which make it easier for them to remove cheek plumpers, position themselves, and maintain them.

Conclusion

Both surgical and non-invasive techniques can be used to treat sunken or hollow cheeks. Reconstructive cosmetic surgery and botulinum injections to the face muscles to lessen facial wrinkles and spasms are examples of invasive techniques. However, these procedures are costly, time-consuming, and have a transient effect with increased risk of recurrence, scarring from surgery, allergic responses, and skin irritation. The easiest non-invasive way to address sunken cheeks is with removable cheek plumpers. The attachments should be durable, affordable, and resistant to plumper movement at rest and during function. Additionally, it will strengthen and enhance the appearance and functionality of the sagging facial muscles. This case report discussed the different cheek plumper attachments that are available, their advantages and disadvantages, and an innovative cheek plumper fabrication technique that for improving patient comfort, appearance, and confidence in social settings.

Patient's informed consent was taken. Ethical clearance was not required as per our institution's guidelines as no invasive procedure was performed. No funding or sponsorship was taken. There was no conflict of interest.

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