

Hollow Cheek Plumper Fabricated from a 2-mm Pressure-Formed Thermoplastic Resin for Esthetic Rehabilitation of a Completely Edentulous Patient: A Case Report

Rasika Bansode^{1*} Kishor Mahale¹ Smita Khalikar¹

¹ Department of Prosthodontics and Crown & Bridge, Government Dental College, Chhatrapati Sambhajinagar, Maharashtra, India.

ABSTRACT

Background: Complete denture rehabilitation should restore not only the missing dentition but also the facial support lost after tooth loss and progressive alveolar resorption. In older completely edentulous patients, reduced soft-tissue volume and age-related decline in facial muscle tone may produce hollow or sunken cheeks that conventional denture contours do not adequately correct. Case report: A 74-year-old completely edentulous male presented with an unesthetic facial appearance associated with sunken cheeks. A conventional complete denture was planned with additional cheek support. The desired cheek contour was established clinically in wax during the trial stage. The wax form was transferred to a gypsum replica and used to fabricate a hollow cheek-plumper shell from a 2-mm hard thermoplastic resin sheet using a BIOSTAR® pressure moulding machine (SCHEU-DENTAL). The processed prosthesis incorporated a detachable magnetic retention mechanism. Result: The lightweight hollow cheek-plumper design provided the required facial fullness while avoiding the bulk of a solid cheek-plumper. The prosthesis restored cheek contour and produced a satisfactory postoperative facial appearance. Conclusion: A pressure-formed hollow thermoplastic cheek plumper is a conservative, individualized and potentially weight-saving option for completely edentulous patients with pronounced cheek hollowing. Establishing the contour clinically at the trial stage allows facial fullness to be customized before definitive processing..

Keywords: Complete denture; cheek plumper; hollow cheek; sunken cheeks; thermoplastic resin; pressure moulding; facial esthetics; magnets.

INTRODUCTION

Complete denture treatment is directed toward restoration of mastication, speech, comfort, oral function and facial appearance. Loss of teeth is accompanied by residual ridge resorption, reduction in lower facial height and alteration of the support available to the lips and cheeks. With advancing age, reduction in facial soft-tissue volume and decreased tonicity of the facial musculature may accentuate these changes, resulting in a hollow or slumped cheek contour. Such changes can make the patient appear older and may remain noticeable even after otherwise satisfactory complete denture rehabilitation.[1,2,9,10]

Cheek plumpers are prosthetic extensions designed to provide additional support to the cheek where conventional denture contours are insufficient. They may be incorporated as a fixed part of the denture or fabricated as detachable components. Detachable designs have been retained using magnets, customized attachments, push-button systems, die-pin attachments, hooks/loops and friction-lock mechanisms.[1–6,9–13] The ability to remove the plumper may improve comfort, hygiene and patient control, particularly when the additional facial bulk is not tolerated continuously.

Received: Apr 15, 2026; Accepted: May. 28, 2026

*Correspondence Dr Rasika Bansode.

Department of Prosthodontics and Crown & Bridge, Government Dental College, Chhatrapati Sambhajinagar, Maharashtra, India.

Email: rasikabansode@yahoo.com

Conventional solid cheek plumpers can, however, add considerable bulk and weight to the prosthesis. Excessive extension may interfere with the buccinator and other perioral musculature, while additional weight may adversely affect the retention and stability of a maxillary complete denture, particularly when the denture-bearing foundation is compromised.[3,10,11] A hollow design allows the external contour to be increased without filling the entire volume with acrylic resin. The present case describes a hollow cheek plumper fabricated from a 2-mm hard thermoplastic resin sheet using pressure moulding, with the contour determined clinically at the trial stage.

CASE REPORT

Patient and clinical findings

A 74-year-old male patient reported to the Department of Prosthodontics with a chief complaint of an unesthetic facial appearance. The patient was completely edentulous and demonstrated clinically evident loss of cheek fullness, producing a bilateral sunken-cheek appearance. The clinical concern was primarily facial esthetics rather than replacement of teeth alone. The patient was informed that a conventional complete denture could restore the dentition and provide some soft-tissue support, but that additional cheek support might be required to obtain satisfactory facial fullness. The proposed treatment was explained and consent was obtained for treatment and clinical photography.

Clinical and laboratory procedure

Primary impressions were made and poured to obtain diagnostic casts. Definitive impressions were subsequently made and poured to obtain master casts. Conventional jaw-relation procedures were completed, followed by arrangement of artificial teeth. The trial denture was evaluated intraorally for vertical dimension, centric relation, phonetics, tooth position, lip support and overall facial esthetics.

Establishing the cheek-plumper contour

At the trial stage, modelling wax was incrementally added to the buccal aspect of the maxillary trial denture in the region requiring additional cheek support. The wax was contoured and evaluated

directly on the patient. The thickness and extent were modified until the cheeks showed improved fullness and a harmonious transition from the denture to the facial tissues. Particular attention was given to avoiding overcontouring, interference with the buccal sulcus and restriction of functional cheek movement. This clinical trial stage was important because the ideal amount of cheek support is individualized and cannot be reliably determined from cast anatomy alone.

Fabrication of the hollow thermoplastic cheek plumper

After the desired cheek contour had been established, the wax pattern was duplicated to obtain a rigid working form. A 2-mm hard thermoplastic resin sheet was adapted over the replica using a BIOSTAR® pressure moulding machine (SCHEU-DENTAL, Germany). BIOSTAR® is a pressure moulding unit designed for dental thermoforming and operates with controlled heating and compressed air pressure; the manufacturer's system is intended for pressure-forming dental sheets.[7] In the present technique, the sheet was heated and pressure-adapted over the cheek-plumper form, producing a thin-walled shell that reproduced the external facial contour while maintaining a hollow internal chamber.

After cooling, the formed shell was carefully removed from the replica and its margins were trimmed and rounded. The shell was inspected for incomplete adaptation, sharp margins and irregularities. The resulting component provided the required external volume without the mass of a solid acrylic block. The maxillary and mandibular trial dentures were then processed using conventional flasking and heat-polymerization procedures.

Attachment and processing

Following dewaxing and processing, the hollow cheek-plumper components were positioned on the processed denture according to the contour established during the trial stage. Magnetic retention was incorporated to permit attachment and removal of the cheek-plumper component. The attachment was positioned so that the plumper remained stable during function while allowing removal for cleaning and maintenance. The internal

hollow chamber and external junction were inspected to ensure that no sharp margins or exposed irregularities remained.



Figure 1. Preoperative extraoral photograph demonstrating reduced cheek fullness and a sunken-cheek appearance.



Figure 2. Primary and definitive impressions and corresponding casts.



Figure 3. Jaw relation and trial denture evaluation with wax buildup for cheek support.



Figure 4. Wax buildup, impression of the finalized wax contour and gypsum replica used to fabricate the hollow component.



Figure 5. Pressure-formed hollow cheek-plumper shells from 2-mm thermoplastic resin and flasking.

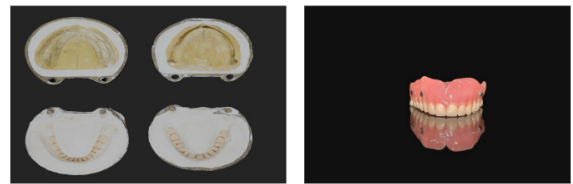


Figure 6. Dewaxing and processed prosthesis with magnetic retention.

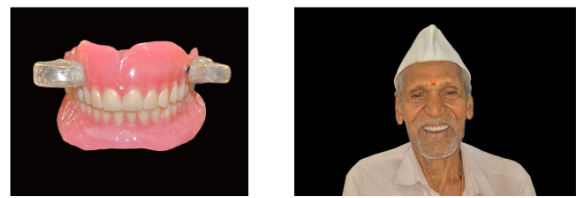


Figure 7. Final hollow cheek-plumper prosthesis and postoperative extraoral appearance.

Insertion and outcome

The completed dentures were inserted and evaluated for retention, stability, occlusion, phonetics and facial appearance. The cheek-plumper contour was checked during smiling, speaking and functional cheek movements to ensure that the appliance did not impinge on the buccal musculature. The patient was instructed regarding insertion, removal, cleaning and maintenance of the detachable component. The final prosthesis restored cheek fullness and produced an improved facial contour compared with the preoperative appearance.

Why cheek plumpers are useful in completely edentulous patients

In completely edentulous patients, loss of teeth and progressive alveolar resorption reduce the denture's underlying skeletal and dental support for the cheeks. Although the buccal flange of a complete denture can be appropriately contoured to support the soft tissues, severe cheek hollowing may exceed what can be achieved by conventional flange contouring alone. Cheek plumpers provide additional support in the buccal region and can restore facial fullness without surgical intervention.[1-4]

The clinical objective is not simply to make the cheeks appear larger. The plumper should reproduce a natural facial contour, maintain freedom for functional muscle movement and avoid excessive pressure on the tissues. In older patients, this is particularly relevant because reduced facial muscle tone and changes in soft-tissue volume can make the cheeks appear unsupported even when the denture itself is otherwise satisfactory.[1,3] A detachable plumper also permits the patient to remove the additional support when desired and facilitates cleaning of the component.

Table 1: Methods and techniques for fabrication and attachment.

Approach	Fabrication / retention	Main considerations
Conventional fixed cheek plumper	Buccal flange is overcontoured or extended within physiologic limits as an integral part of the denture.	Simple and non-detachable; excessive bulk can increase weight and may affect retention, stability or muscle comfort.

Advantages of a hollow cheek plumper

- Reduced prosthesis mass compared with a solid cheek plumper of equivalent external volume.
- Ability to provide substantial external cheek support without filling the entire augmented volume with acrylic resin.
- Potentially less effect on maxillary denture retention and stability than a similarly sized solid plumper, particularly when extensive facial augmentation is required.

Detachable acrylic cheek plumper with magnets	Separate acrylic plumper fabricated on a duplicate/wax pattern and retained with paired dental magnets.	Allows removal and cleaning; retention depends on magnet positioning and long-term magnetic performance.[1,4]
Customized attachment systems	Plumper retained using customized attachments, push-button systems or other mechanical components.	Provides detachable support and allows individualized positioning.[2,5]
Die-pin precision-type mechanical retention	Plumper fabricated as a separate component and engaged with pin-based mechanical retention.	Can provide positive positioning; requires accurate laboratory fabrication and adequate space.
Friction-lock attachment	Separate cheek-plumper component engages the denture through a friction-lock mechanism.	Provides detachable retention and can be designed to minimize visible hardware.[6]
Hollow acrylic cheek plumper	A hollow chamber is created within a processed acrylic component using a two-shell/flasking approach.	Reduces weight compared with an equivalent solid volume but may involve more laboratory steps.
Pressure-formed thermoplastic hollow plumper	A thermoplastic sheet is pressure-adapted over a duplicate of the clinically approved wax contour to form a thin-walled shell.	Rapid contour transfer, low material volume and lightweight design; requires careful finishing and secure attachment to the denture.

- Reduced material consumption and the possibility of a thinner, more controlled facial contour.
- Individualized contour can be established clinically during the trial stage before definitive processing.
- Detachable magnetic retention allows removal for cleaning, maintenance and patient comfort.
- Pressure-forming permits relatively reproducible adaptation of a thermoplastic sheet over a selected contour.

The principal clinical problem in this case was not simply tooth loss but loss of facial support. Deogade described magnet-retained detachable cheek plumpers as a means of improving support for sunken cheeks, while emphasizing the importance of follow-up because magnet performance and corrosion can influence long-term service.[1] Keni et al. demonstrated customized attachments for a detachable cheek plumper,[2] while Kamakshi et al. reported iron-neodymium closed-field magnets as another detachable retention option.[5] Ingishetty et al. further described an individualized cheek-plumper attachment approach for complete denture esthetics.[3]

Virdiya et al. highlighted that age-related loss of facial muscle tonicity and alveolar resorption may produce sunken cheeks and that conventional cheek plumpers can become bulky and heavy. Their report described detachable maxillary and mandibular plumpers with different attachment mechanisms and noted the value of removability for patient comfort.[4] Pudi et al. described stainless-steel double die-pin retention, demonstrating another method of achieving precise mechanical positioning of a cheek plumper.[10] Bhushan et al. subsequently described a friction-lock attachment designed to provide detachable cheek support while maintaining integration with the complete denture.[6] Natarajan et al. specifically reported a hollow buccal cheek-plumper design, making their work particularly relevant to the weight-saving concept used in the present case.[11] Abdelbagi et al. also demonstrated a detachable lip and cheek plumper retained by magnets in a patient with facial disfigurement, supporting the broader maxillofacial principle that detachable plumpers can provide facial contour restoration while permitting removal.[8]

The present technique was useful because it addressed the major limitation of a conventional solid cheek plumper—unnecessary weight and bulk—by creating a hollow shell from a pressure-formed thermoplastic sheet. This rationale is consistent with the hollow buccal cheek-plumper technique described by Natarajan et al., in which hollow construction was used specifically to provide cheek support while limiting the weight and bulk associated with a conventional

plumper.[11] The contour was first developed directly on the patient using wax. This sequence is clinically important: facial fullness was judged under functional and esthetic conditions before the definitive component was manufactured. Consequently, the thermoplastic shell reproduced a contour that had already been clinically validated rather than relying only on a laboratory estimate.

Another advantage was the use of the BIOSTAR® pressure moulding system for adaptation of the 2-mm thermoplastic sheet. The clinical literature supports establishing the desired cheek fullness at try-in with wax before final fabrication, as described in detachable cheek-plumper techniques.[5,9–11] The device is specifically designed for pressure moulding of dental thermoplastic materials and uses controlled heating and compressed air to adapt a sheet closely to a working model.[7] In this case, pressure adaptation allowed the external cheek contour to be reproduced as a thin-walled shell. This approach differs from hollow acrylic techniques in which the hollow space must be created during acrylic processing. It therefore offers a potentially simpler route to a lightweight component, although the long-term bond or attachment between the thermoplastic shell and denture base remains an important consideration.

The use of magnetic retention in the present case provided a practical means of making the plumper detachable. This is particularly useful because the amount of cheek support required may vary with comfort, function and the patient's tolerance of facial bulk. The component can also be removed for cleaning, reducing the difficulty of maintaining hygiene around a bulky buccal extension. Nevertheless, magnetic systems require adequate space, accurate alignment and periodic evaluation for retention and material integrity.[1]

An important limitation of this report is that it represents a single clinical case. No quantitative measurement of cheek volume, muscle activity, denture retention or patient-reported esthetic outcome was performed. In addition, the mechanical strength, long-term dimensional stability, surface characteristics and attachment durability of the particular thermoplastic resin should be evaluated before broad clinical recommendations are made. The technique should therefore be regarded as a clinically useful

fabrication option rather than as a universally superior method.

The literature therefore supports several clinically established strategies for restoring deficient cheek support, including fixed hollow plumpers,[12] magnet-retained detachable plumpers,[1,9,13] customized attachments,[2,3] die-pin retention,[10] friction-lock mechanisms,[6] and other mechanical attachment designs.[4] The present report adds to this body of evidence by combining a clinically validated cheek contour with a thin 2-mm pressure-formed thermoplastic shell, thereby retaining the facial-support objective while limiting the amount of material incorporated into the plumper.

CONCLUSION

A hollow cheek plumper fabricated from a 2-mm hard thermoplastic resin sheet by pressure moulding provided a conservative method of restoring cheek support in a completely edentulous patient with sunken cheeks. The contour was individualized clinically during the trial stage, transferred to a working replica and reproduced as a hollow thermoplastic shell using a BIOSTAR® pressure moulding machine. Similar clinical reports have emphasized determining the cheek contour during the wax try-in stage before processing the definitive plumper.[5,9–11] Magnetic retention allowed the component to remain detachable. The principal clinical benefit of the technique was the ability to obtain the desired facial volume while minimizing the additional mass associated with a solid cheek plumper. Further clinical and laboratory studies are required to evaluate long-term mechanical integrity, attachment durability, hygiene and patient-reported outcomes.

Patient consent

Written informed consent should be obtained from the patient for treatment, clinical photography and publication of the case and accompanying images. The authors should confirm that the final submitted manuscript complies with the requirements of the target journal and the institutional policy on case-report publication.

REFERENCES

1. Rewari A, et al. Esthetic rehabilitation using magnet-retained cheek plumper prosthesis. Case

Rep Dent. 2020;2020:2769873. doi:10.1155/2020/2769873.

2. Colvenkar S, Pathipaka S, Babu DSS, Kumar KV, Prakash R. Enhancing facial esthetics in a complete denture patient having sunken cheeks with a hollow fixed cheek plumper: a case report. Cureus. 2022;14(7):e27539. doi:10.7759/cureus.27539. PMID: 36060379.

3. Natarajan P, Kumar SM, Natarajan S, Raza FB. Management of shrunken cheeks by hollow buccal cheek plumper prosthesis. J Pharm Bioallied Sci. 2021;13(Suppl 1):S875-S877. doi:10.4103/jpbs.JPBS_688_20. PMID: 34447220.

4. Pudi S, Kota S, Karthik KVGCh, Kaladi SR, Gade RR. An innovative technique using a stainless steel double die pin retained cheek plumper in complete denture esthetics: a case report. Cureus. 2019;11(11):e6197. doi:10.7759/cureus.6197. PMID: 31886088.

5. Abdelbagi NF, Ismail IA, Awadalkreem F, Alhajj MN. Detachable lip and cheek plumper for rehabilitation of facial disfigurement. Case Rep Dent. 2021;2021:6668737. doi:10.1155/2021/6668737. PMID: 34094605.

6. SCHEU-DENTAL. BIOSTAR® pressure moulding technique. Manufacturer's technical information. Available from: <https://www.scheu-dental.com/> [Accessed 17 September 2026].

7. Bhushan P, Aras MA, Coutinho I, Rajagopal P, Mysore AR, Kumar S. Customized cheek plumper with friction lock attachment for a completely edentulous patient to enhance esthetics: a clinical report. J Prosthodont. 2019;28(1):e1-e5. doi:10.1111/jopr.12591.

8. Kamakshi V, Anehosur GV, Nadiger RK. Magnet retained cheek plumper to enhance denture esthetics: case reports. J Indian Prosthodont Soc. 2013;13(3):378-381. doi:10.1007/s13191-012-0200-3.

9. Viridiya NM, Palaskar JN, Wankhade J, Joshi N. Detachable cheek plumpers with different attachments for improving esthetics in a conventional complete denture: a clinical report. J Prosthet Dent. 2017;117(5):592-596. doi:10.1016/j.prosdent.2016.08.021.

10. Ingishetty V, Ghumare SB, Rana N. An innovative and customized cheek plumper attachment to enhance esthetics in the complete denture patients. *Int J Prosthodont Restor Dent*. 2021;11(2):97-99.
11. Keni NN, Aras MA, Chitre V. Customised attachments retained cheek plumper prosthesis: a case report. *J Indian Prosthodont Soc*. 2012;12(3):198-200. doi:10.1007/s13191-012-0132-y.
12. Deogade SC. Magnet retained cheek plumper in complete denture esthetics: a case report. *J Dent (Tehran)*. 2014;11(1):100-105. PMID: 24910682; PMCID: PMC4037258.