

Functionally Generated Occlusal Device to Protect Implant Attachments and Opposing Dentition: A Case Report

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Introduction

Occlusal devices are commonly fabricated for patients with nocturnal parafunction in order to protect dentition and restorative materials. In partially edentulous patients with edentulous arches opposing natural dentition, nocturnal parafunction presents a challenge, particularly when the edentulous arch contains implant attachments used to retain a complete denture. Parafunctional habits in these patients cause premature wear of the attachment system and traumatic occlusion to the opposing dentition. A full palatal coverage device, while retentive and resistant to dislodgement, raises the concern for denture stomatitis. This case report describes an occlusal device with a functionally generated surface that is retained by the denture attachment system while incorporating principles of occlusion to create minimal dislodging forces and minimal palatal and residual ridge coverage. Such a device seeks to solve the problem of accelerated wear of implant abutments and traumatic occlusion while minimizing the soft tissue coverage of a nighttime appliance.

Case Report



Figure 1. Patient without maxillary prosthesis

A 90 Year old female presents with a chief complaint of waking up with soreness in her mandibular right cuspid. Clinical exam revealed that the pain was attributed to nocturnal parafunction. When closing without her maxillary overdenture, the only contact is between the LOCATOR abutment on implant site #7 with tooth #27 (Fig. 1).

Materials and Methods

Master Cast

A preliminary impression was made with irreversible hydrocolloid. A UDMA custom tray was fabricated with wax spacers in the LOCATOR sites to accommodate for the height of LOCATOR impression copings. The custom tray was border molded with green MPIC, LOCATOR impression copings seated, and final impression made with light body PVS. LOCATOR analogs were placed in the impression and poured in Type V Dental Stone (Fig 2).

Record Base Fabrication

A wax occlusal rim was made on a record base and a CR record was made at a decreased OVD to limit bite forces. After the mounting of the casts, an anterior stop maintained the planned vertical dimension while the posterior was left open to create space for a functionally generated wax pattern (Fig. 3). A processed clear record base with LOCATOR housings was fabricated from this wax-up via injection molding with Ivobase Hybrid Clear (Fig. 4). The result was a processed clear denture base with LOCATOR housings and an acrylic anterior stop.

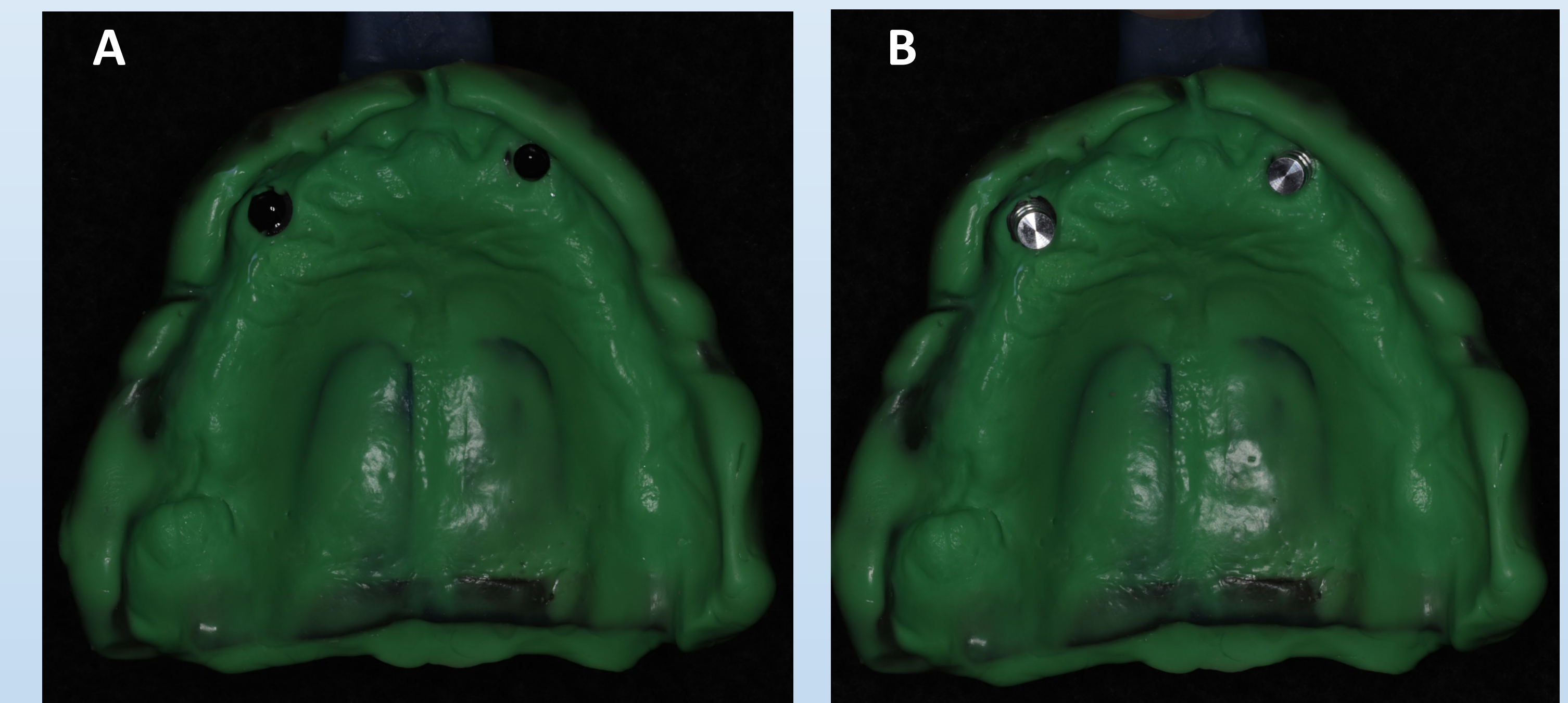


Figure 2. Maxillary final impression: (A) Impression after removal, (B) Impression with LOCATOR lab analogs in place

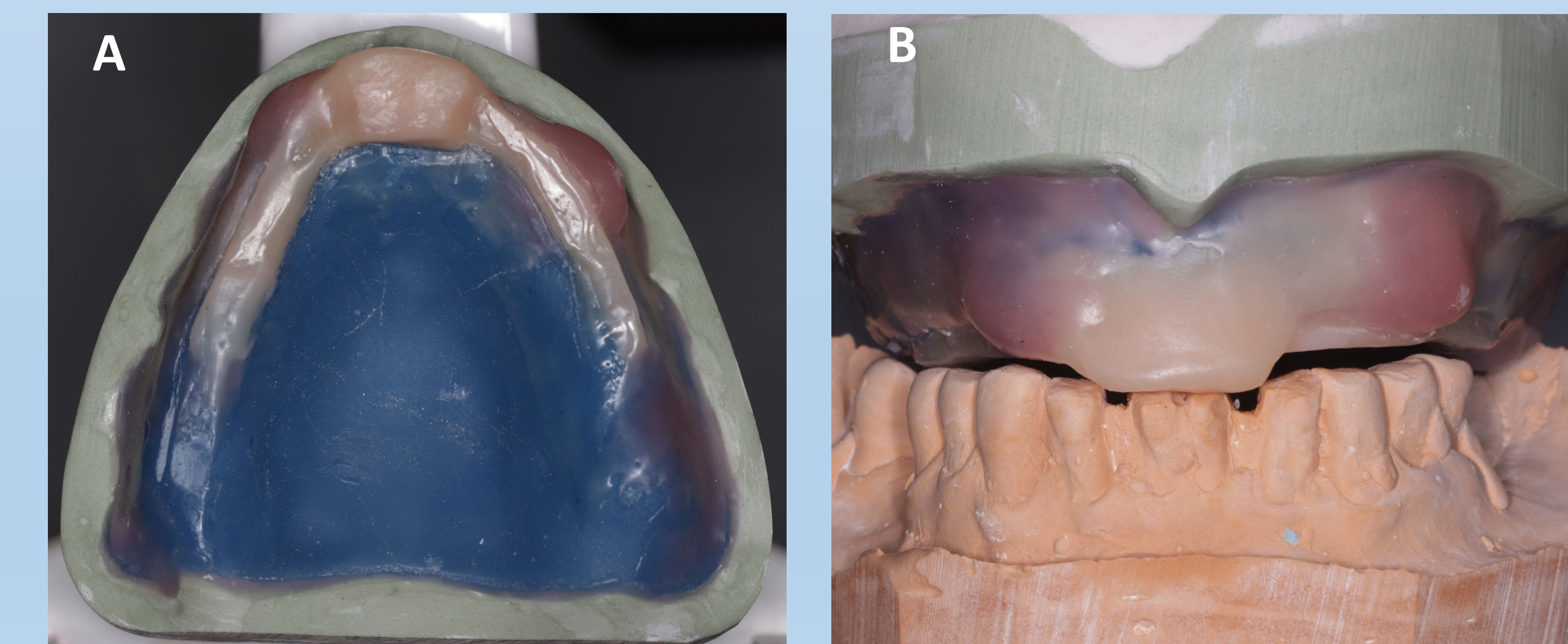


Figure 3. Wax-up of initial processing of record base: (A) Occlusal view, (B) frontal view

Materials and Methods

Functionally Generated Occlusion

Class I baseplate wax was added to the posterior segments of the processed base to regain centric stops across the arch. The attachments and the complete denture extension of the processed record base were used to stabilize the base while fabricating an intraoral wax pattern. Using the anterior stop, the patient was able to carve a functionally generated pattern in the baseplate wax by performing protrusive, laterotrusive, and mediotrusive movements (Fig. 5). Investing the record base for a second processing of the wax pattern via injection molding generated the acrylic occlusal surface. The final product was adjusted for bilateral balance. After balance was obtained, all flanges and palatal coverage were removed to result in a prosthesis that resisted dislodgement with minimal tissue coverage during nocturnal wear while protecting the implant abutments and remaining dentition (Fig. 6).

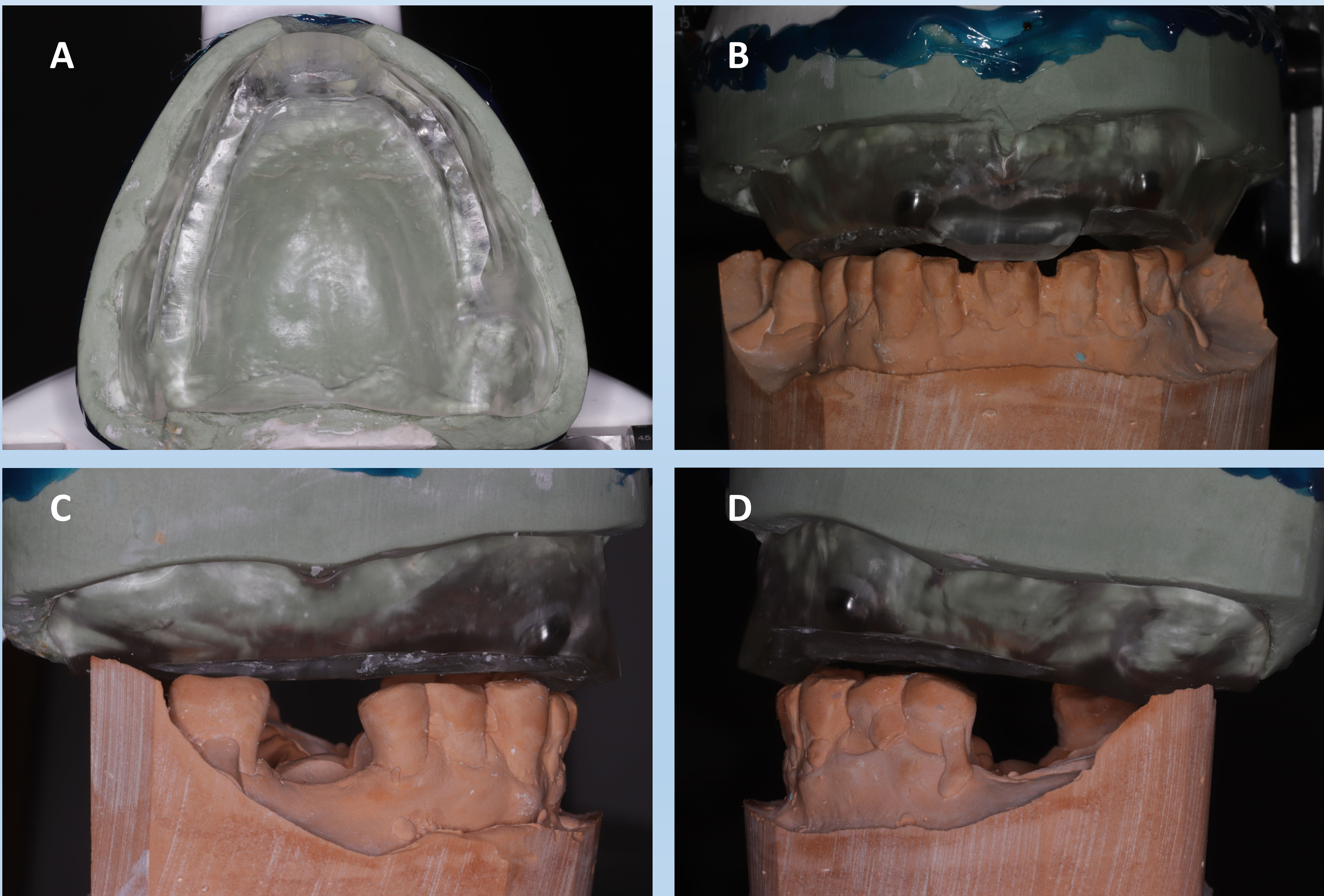


Figure 4. Processed base for occlusal guard: (A) Occlusal view, (B) Frontal view, (C) Right view, (D) Left view



Figure 5. Functionally generated wax pattern frontal views: (A)Centric, (B) Protrusive, (C) Right Laterotrusive, (D) Right Mediotrusive

Discussion

When patients present with nocturnal parafunction, the first line treatment is often an occlusal appliance to protect the dentition and restorations. However, it presents a challenge to the clinician when a patient has an edentulous arch with implant attachments opposing dentition. One method of protecting the attachments and dentition is a duplicate denture. In such a solution, one might be concerned with the patient having a full palatal coverage both during the day with their denture, and at night with their occlusal appliance. By utilizing the denture attachments as retention and a functionally generated occlusal surface as resistance against tipping, the palatal coverage of a nighttime appliance can be greatly reduced while ensuring stability of the prosthesis.



Figure 6. Final occlusal appliance: Frontal view (A) Centric, (B) Protrusive, (C) Right Laterotrusive, (D) Right Mediotrusive, (E) Right centric, (F) Occlusal, (G) Left Centric

Conclusion

A functionally generated occlusal surface on an occlusal device allows for resistance against dislodgement while being retained by implants. This allows the device to forgo the flanges and palatal coverage in an edentulous nighttime appliance without compromising its retention and resistance. The reduced tissue coverage of a nighttime appliance allows for the soft tissue to recover while still protecting the remaining dentition and limiting wear of the implant attachments.