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TIPS FROM OUR READERS

Denture maintenance with a custom 3-dimensionally printed denture box

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Cleaning dentures is important in maintaining good oral hygiene,[1] as denture plaque can induce mucosal inflammation that can lead to denture stomatitis and angular cheilitis.[2–4] The bacteria and other microorganisms present in denture plaque can be aspirated, leading to respiratory problems such as pneumonia.[5] Two main methods of cleaning dentures are brushing with a special nonabrasive paste or soaking in chemicals.[6]

Patients with limited manual dexterity can accidentally drop their dentures during cleaning,[7] one of the most common causes of fracture or breakage.[8] This article describes a straightforward technique for fabricating a custom 3-dimensionally (3D) printed denture box. The denture box is designed to fit the shape of the denture and help stabilize it while being cleaned by a patient with limited manual dexterity. Its use may lessen the chance that a prosthesis would be fractured or deformed. A personalized denture box can also be used for storage or transportation and to protect the dentures from microorganisms while not in use. The imprint of the denture imprint can provide identification, allowing it to be matched with its owner and returned to an institution where dentures might get mislaid or misplaced. The denture box is fabricated from a thermoplastic urethane (TPU) material which is biocompatible, has good dimensional accuracy, and is easily cleaned. The denture box can be cleaned by washing it in tap water or adding a small quantity of chlorhexidine gluconate when stored.

TECHNIQUE

1. Obtain the patient's denture case because the newly printed insert should fit the existing denture case.
2. Scan the denture from different angles with a 3D scanner (POP 2 3D Scanner; Revopoint 3D) to fabricate a 3D cast.
3. Convert the 3D cast into a mold and store it in standard tessellation language (STL) format. Generate a G-code file by giving printing parameters to the slicing software program.
4. Print the denture box with a TPU (eTPU95-A; eSun 3D) using a 3D printer with fused filament fabrication technology (Ultimaker s5; Ultimaker BV).
5. Attach the newly printed denture box to the existing one with an adhesive (Loctite 401; Henkel Adhesives).
6. Instruct the patient on how to place the denture in the denture box and clean it with a brush (Fig. 1).

SUMMARY

Removable dentures require proper care and maintenance to ensure longevity and prevent infections. This article presents a method of cleaning dentures for patients with limited manual dexterity. The patient's dentures are placed in a 3D printed denture box designed to hold and secure the dentures in place while

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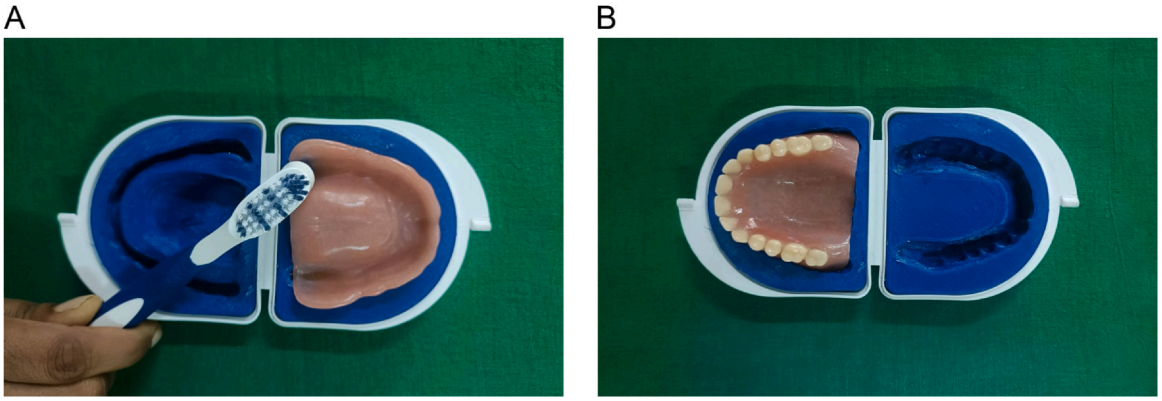

Figure 1. Three-dimensionally printed denture box. A, Intaglio surface. B, Tissue surface.

cleaning. A novel approach to an existing problem, a 3D printed denture box for patients with limited manual dexterity enables greater independence and comfort for patients who wear removable dentures.

REFERENCES

1. Baiju RM, Peter E, Varghese NO, Sivaram R. Oral health and quality of life: Current concepts. *J Clin Diagn Res.* 2017;11:21–26.
2. Bradbury-Jones C, Innes N, Evans D, Ballantyne F, Taylor J. Dental neglect as a marker of broader neglect: A qualitative investigation of public health nurses' assessments of oral health in preschool children. *BMC Public Health.* 2013;13:370.
3. Verran J. Malodour in denture wearers: An ill-defined problem. *Oral Dis.* 2005;11:24–28.
4. Gendreau L, Loewy ZG. Epidemiology and etiology of denture stomatitis. *J Prosthodont.* 2011;20:251–260.
5. El-Solh A. Association between pneumonia and oral care in nursing home residents. *Lung.* 2011;189:173–180.
6. De Souza RF, de Freitas O, Paranhos H, Lovato da Silva CH, Abu-Naba'a L, Gurgan CA. Interventions for cleaning dentures in adults. *Cochrane Database Syst Rev.* 2009;4:007395.
7. Colvenkar S, Kunusoth R, Prakash R, et al. Individually modeled 3D printed toothbrush and interproximal brush handle with name for patients with limited manual dexterity. *Cureus.* 2022;14:27097.
8. Naik AV. Complete denture fractures: A clinical study. *J Indian Prosthodont Soc.* 2009;9:148–150.

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