International Journal of Dentistry Research

Technique

IJDR 2017; 2(1): 1-2

www.dentistryscience.com

A technique to preserve spacer thickness during custom tray fabrication with autopolymerizing polymethylmethacrylate

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Abstract

A precisely fabricated custom tray is imperative for impression accuracy and proper application of desired pressure/relief on edentulous arches. Although custom impression tray fabrication has been greatly simplified with the use of light polymerizing resin material; autopolymerizing polymethylmethacrylate (PMMA) with baseplate wax as spacer, still remains a commonly used combination for edentulous custom tray fabrication. However, heat of polymerization released during exothermic setting reaction of autopolymerizing PMMA resin during tray fabrication frequently results in wax softening/ melting, causing dimensional distortion, tray contamination and discrepancy in predetermined thickness of the wax spacer that can jeopardise its very objective. This article describes a simple technique to prevent change in desired thickness of wax spacer during custom tray fabrication with autopolymerizing PMMA.

Keywords: Custom tray, Autopolymerising PMMA resin, Cellulose acetate sheet, Wax Spacer.

INTRODUCTION

Despite advances in computer-aided design/computer-aided manufacturing (CAD/CAM) [1, 2] technologies, conventional dental impressions [3] are still most commonly used for fabrication of complete dentures. There are various impression techniques and spacer designs for making definitive impressions of edentulous arches with custom trays.[4] A precisely fabricated custom tray is essential for impression accuracy and implementation of chosen impression technique.[5] Though custom impression tray fabrication has been simplified with the use of light polymerizing acrylic resin material,[5,6] autopolymerizing acrylic resin with baseplate wax as spacer[5-7] still remains commonly used for fabrication of custom tray. However, heat of polymerization released during the exothermic setting reaction of autopolymerizing resin during tray fabrication frequently results in wax softening/ melting, [5-7] causing dimensional distortion, tray contamination and discrepancy in predetermined thickness of wax spacer that may jeopardise the very objective of a spacer. Although techniques[5-7] have been described to preserve spacer thickness during tray fabrication with light polymerizing acrylic resin material, no such technique has been documented for custom tray fabrication with autopolymerizing polymethylmethacrylate resin (PMMA). This article describes a simple technique to prevent change of thickness of wax spacer during custom tray fabrication with autopolymerizing PMMA.

Technique

1. Make a preliminary cast of the edentulous arch conventionally and mark outline of spacer and impression tray on cast with a wax pencil/marker.[4,6]

2. Adapt desired thickness and extension (as applicable according to specific impression technique being followed) of baseplate wax on the preliminary cast to serve as a spacer,[7] to accommodate the final

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impression material (Fig.1). Place tissue stops as needed.

3. Adapt a thin cellulose acetate sheet (.001 inch) (Grafix Plastics; Futaba Chemical Co. Ltd.), one mm short of wax spacer all around using a thin layer of water soluble adhesive as shown in Figure 2. This clearance area will allow for adhesion between wax and resin.

4. Apply a thin uniform layer of separating media on the areas of plaster cast that are not covered by wax spacer.

5. Fabricate the custom tray with autopolymerizing PMMA by sprinkle-on method. Do not use dough method as it may cause displacement of cellulose acetate sheet.

6. Finish, polish and border mold the tray conventionally.[4]

7. Remove wax spacer and cellulose acetate sheet prior to making definitive impression and measure its thickness with Iwanson's gauge to confirm that no discrepancy in thickness occurred (Fig.3).

Figure 1: Adapted wax spacer on preliminary cast

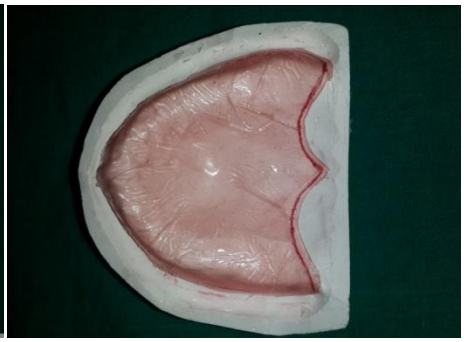

Figure 2: Cellulose acetate sheet adapted I mm short of wax spacer

Figure 3: Wax spacer removed and its thickness measured with Iwanson's gauge

DISCUSSION

The heat of polymerisation in autopolymerizing PMMA ranges from 71^0 C to 91 ^{0}C varying with thickness.[4] The spacer wax used in custom tray fabrication has a melting temperature of approximately 45^0C. Therefore heat of polymerization leads to obvious distortion of wax, resulting in an inaccurate custom tray. Cellulose acetate sheet[8] used in the described technique has a melting point of 110^0 C and acts as an insulating layer interfering with transmission of heat of polymerization from autopolymerizing PMMA resin to wax spacer.

CONCLUSION

A simple technique using cellulose acetate sheet to preserves thickness of wax spacer during custom tray fabrication with autopolymerizing PMMA resin has been described.

Conflict of interest: None.

Financial support and sponsorship: Nil.

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