

A Simplified Approach for Hollowing and Retrofitting Distal Extension Partial Denture in a Patient with Unilateral Maxillectomy

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Abstract

The need for repairing a removable partial denture occasionally arises in clinical practice. The common causes for repair of removal partial denture include tissue changes of the residual ridge, breakage or distortion of denture components and complications that arise in the remaining teeth. Distal extension partial dentures are particularly affected as the tissue-base relationship changes over time because of residual ridge resorption. Besides, changes in the tissues supporting a maxillofacial prosthesis may be more rapid than in those supporting a more conventional prosthesis. This results in unhygienic conditions, trapping of debris beneath the denture base, and patient discomfort. Thus, periodic relining of the distal extension removable partial denture is essential. The potential drawback of relining procedure is increase in the weight of the prosthesis which may compromise its stability and retention. This article describes a clinical situation of a 45-years-old male patient presented to the Department of Prosthodontics and Maxillofacial Prosthetics with a chief complain of ill-fitting maxillary removable partial denture (RPD). A comprehensive examination revealed a maxillary defect resulting from partial resection of left maxilla. The existing RPD was heavy and had a poor tissue adaptation on the defect side and compromised appearance. The treatment plan included hollowing and retrofitting of a distal extension RPD using an altered cast impression technique.

Keywords: Retrofitting; Hollow; Altered cast; Relining; Distal extension

Introduction

A distal extension removable partial denture occasionally requires repairing as the tissue-base relationship changes over time due to residual ridge resorption [1]. Besides, tissue changes in maxillofacial defects are more rapid which results in unhygienic conditions, trapping of debris beneath the denture base, and patient discomfort [2]. Periodic relining of the distal extension RPD is essential to minimize the consequence of alveolar ridge atrophy. However, the drawback of relining is the increased weight of the prosthesis which may lead to the reduced denture bearing ability of the tissues and decreased retention and stability [3]. Light weight prosthesis decreases the leverage action and load on the residual alveolar ridge as the cantilever mechanics of suspension and overtaxing of the remaining supporting structures is reduced [4-8]. Weight reduction in dental prosthesis has been accomplished using a solid spacer, including silicone putty [7], dental stone [9], asbestos [10], or modelling clay [11].

Improving support with an altered cast impression technique is widely advocated, but not often practiced as it requires an additional step for both the dentist and the dental technician [12]. This impression technique has added benefits of reducing the number of postoperative visits, preserving the residual ridges, improving stress distribution, decreasing food impaction and decreasing the torquing of abutment teeth [13,14].

This clinical report presents a practical procedure for hollowing distal extension partial denture using thermocol and its retrofitting with altered cast impression procedure to solve the problems related to poor tissue adaptation of a distal extension RPD in a patient with unilateral partial maxillectomy.

Case Report

A 45-years-old male patient presented to the Department of Prosthodontics and Maxillofacial Prosthetics with a chief complaint of ill-fitting maxillary RPD. Patient had undergone partial resection of left maxilla following a gunshot injury and the defect was repaired with a local flap. Intraoral examination revealed a reduced alveolar ridge height on the defect side and obliterated buccal sulcus (Figure 1). The existing RPD was heavy and had a poor tissue adaptation on the defect side and compromised appearance (Figures 2 and 3). The T bar direct retainer had fractured and the palatal major connector had a perforation (Figure 3). The patient was reluctant on remaking the RPD and inquired about the possibility of retrofitting.



Figure 1: Intra oral occlusal view



Figure 2: Intra oral evaluation of the prosthesis



Figure 3: Evaluation of the prosthesis

The RPD was checked intra-orally for precision of fit. Accurate pick up impression was made with alginate (Zelgan; Dentsply Intl) which is a must for quality relines and repair [15,16]. The cast was sectioned, the distal extension portion removed and grooves prepared on remaining segment of the cast (Figure 4). Functional impression of defect side was made with tissue conditioner (Permasoft; DentsplyInt) employing the prosthesis itself as custom tray as has been suggested (Figure 5) [16]. The patient was instructed to bite in maximum intercuspation and apply slight occluding force to minimize the changes in the vertical dimension. There is little chance for RPD to be displaced during impression procedure as it is steered accurately into place by the clasps [17]. The impression was then transferred on the sectioned master cast and the entire assembly sealed with utility wax (DPI Model Cement; DPI). Beading and boxing was done and the impression poured with type III dental stone (Kalstone; Kalabhai) (Figure 6). Surveying of the master cast was done and the fractured 'T' bar direct retainer was replaced with the modified wrought wire 'Y' bar clasp adapted to the designated survey line on the abutment and fitted into the resin. For resurfacing of the stained polished surface of the RPD, acrylic was trimmed on the labial surface and wax up done (Figure 7) and verified clinically for esthetics.

The putty elastomer (Elite HD+; Zhermack) was adapted over the framework and the flasking procedure completed in the usual manner (Figure 8). The palatal acrylic portion of the RPD was trimmed to make space for thermocol, such that the spacer occupies the area between the shim of 2 mm thickness and teeth with 3 mm of denture base as has been suggested [18]. Thermocol (Thermocol; Nagmagic; KKNag Pvt Ltd) was placed in the prepared cavity and heat cure acrylic resin dough (Trevalon; Dentsply Intl) packed over it (Figure 9). The processing of partial denture was done in a conventional manner (Figure 10).

At the denture insertion stage, partial dental prosthesis was checked for retention, stability and esthetics. Post insertion instructions were given and recall check-up was done after 24 hours, 1 week, first, third and sixth months with satisfactory results.

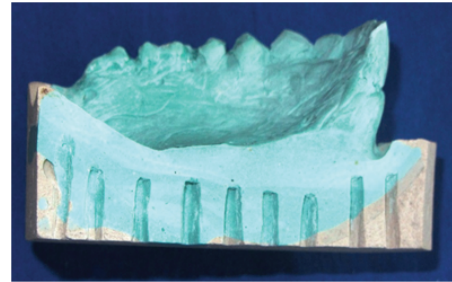


Figure 4: Grooving of the master cast

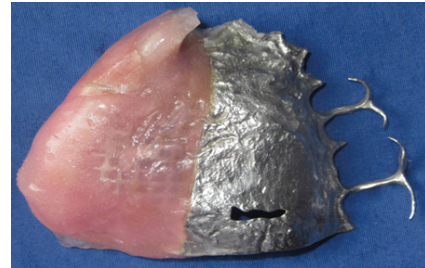


Figure 5: Functional impression made with tissue conditioner



Figure 6: Altered Cast



Figure 7: Waxing and carving



Figure 8: Putty index for flasking



Figure 9: Hollowing with thermocol technique



Figure 10: Retrofitted hollow partial dental prosthesis

Discussion

Maintenance therapy must address problems related to inevitable consequence of alveolar ridge atrophy. Repair, relining, replacement or modification of the components of the accustomed framework may be the only feasible and cost effective solutions to the reluctant patient avoiding the time consuming clinical hours involving the remake of the prosthesis.

Comfort and function of distal extension RPDs are affected by lack of distal abutment and the need for soft tissue support [12,13]. Indirect laboratory relining procedure, generally employing the prosthesis itself as customized tray, is better than chair side relining due to its technique, durability, material employed, greater detail reproduction, proper flow and low porosity [19]. Relining procedures may result in a heavy dental prosthesis with compromised retention and stability [3]. Reduction in the weight of the prosthesis is beneficial for decreasing the leverage action and load on the residual alveolar ridges [4-10]. A previously described method [19] used three sections of a denture flask for the fabrication of the hollow section of the prosthesis. This tedious double flasking procedure can be eliminated using thermocol technique. Thermocol being a light weight material can be left in the denture without compromising the integrity of the denture, avoiding the tedious effort to remove the spacer material from the denture. This technique is simple to execute and allows control of spacer thickness [18].

This novel method of hollowing and retrofitting has several benefits which includes decreased chair side time, treatment cost and increased patient satisfaction. The technical sensitivity and the period that the patient is without denture are its drawbacks.

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