



COMPARATIVE EVALUATION OF TWO DIFFERENT SECONDARY IMPRESSION TECHNIQUES AND THEIR ASSOCIATED POST INSERTION ADJUSTMENTS IN COMPLETE DENTURE PROSTHODONTICS

Prosthodontics

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ABSTRACT

PURPOSE:- To compare the number of post insertion adjustment visits required by edentulous patients whose dentures were made from border-molded secondary impressions using green stick impression compound (traditional technique) with patients whose dentures were made from border-molded secondary impressions using heavy bodied vinyl polysiloxane impression material.

MATERIALS AND METHODS:- In this comparative clinical study, 15 patients were treated with the traditional technique (custom impression trays were border molded with green stick impression compound) and 15 were treated with the modified technique (custom impression trays border molded with heavy bodied vinyl polysiloxane impression material). In both techniques, definitive wash impressions were made with light-body vinyl polysiloxane impression material. Post insertion visits were quantified for 12 months after the dentures were inserted.

CONCLUSIONS:- Within the limitations of this clinical study, it was concluded that dentures made by border-molding custom impression trays with vinyl polysiloxane impression material provided similar results in terms of postinsertion visits for one year as compared to dentures made from impressions border molded with green stick impression compound.

KEYWORDS

Secondary Impression, Traditional Technique, Modified Technique

INTRODUCTION :-

Treatment of edentulous patients with complete dentures is a technically demanding task¹. Making a definitive impression is one of the most critical steps that a clinician performs in the process of fabricating complete dentures^{1,2}. The objective of the complete denture definitive impression is to accurately record the entire denture-bearing area to produce a stable and retentive prosthesis while maintaining patient comfort and esthetics and preserving the remaining tissues.³ Definitive denture impressions may be made with various materials: impression plaster, zinc oxide/ eugenol, polysulfide rubber, irreversible hydrocolloid, vinyl polysiloxane, or polyether⁴. The techniques for definitive denture impressions can be classified as mucostatic⁴, maximum displacement⁵, functional⁶, or selective pressure⁷. Chaffee et al³ recently reported a secondary denture impression technique that illustrated the use of a selective pressure placement technique³. Vinyl polysiloxane impression material was used to border- mold custom impression trays. The authors believed that using this material for border molding in a conventional fashion and using the selective pressure placement impression technique could yield predictable results in making properly extended, accurate, definitive impressions. Evidence was not presented to justify the technique, however. Due to the complexities involved in complete denture treatment, patients generally experience an adjustment phase after the dentures are inserted. Post insertion adjustments and/or scheduled follow-up appointments are necessary to ensure proper fit of the dentures to the soft tissues and optimal occlusion, and also to monitor the patients' overall response to treatment^{1,8}. Multiple unscheduled post insertion adjustment appointments can be costly and frustrating to clinicians and patients alike. Seiffert et al^{9,10} suggested that patients' personalities and their relationships with dentists play substantial roles in the overall successful adaptation to complete dentures^{9,10}. They found psychological attributes to be as important to successful adaptation as a patient's anatomical features and the clinician's skills in fabricating complete dentures. Davis et al¹¹ examined the clinical dilemma of providing dentures to patients with unrealistic expectations for new complete dentures, and found that a patient's pretreatment expectations might influence treatment outcomes; treatment failures may result from mismatched perceptions and expectations of the patient and the dentist. Lamb and Ellis¹² found that post insertion adjustments may be related to poor patient compliance/understanding. Despite the large volume of literature regarding patient satisfaction with complete denture therapy, there is no consensus among authors as to reliable predictors of denture success¹³. If a secondary impression technique could be developed that was easier to perform than conventional border-molding techniques with green stick impression compound, took less clinical time, and did not increase the number of post insertion visits to dental offices, then more dentists might elect to treat more edentulous patients with complete dentures. The purpose of this study was to compare the number of post insertion adjustments needed by edentulous patients who had complete dentures fabricated

using a traditional technique versus those with complete dentures fabricated using a modified technique.

MATERIALS AND METHODS:-

In this study, all patients were treated in the Postgraduate Department of Prosthodontics, Crown & Bridge, Government Dental College & Hospital Shireen Bagh , Srinagar. A group of 15 edentulous patients were treated with the traditional technique involving custom impression trays. The impression trays were border-molded with green stick impression compound. Another group of 15 edentulous patients was treated with a modified impression technique involving custom impression trays that were border-molded with heavy body vinyl polysiloxane impression material. The patients ranged in age from 18 to 75 years. Fourteen (14) males were treated, eight (08) with the traditional technique and six (06) with the modified technique. Sixteen (16) females were treated, seven (07) with the traditional technique and nine (09) with the modified technique. All patients were edentulous and were treated with complete maxillary and mandibular dentures. Patients were followed for 1 year after insertion of the complete dentures. Post insertion adjustments to the flanges of the complete dentures were quantified by the number of post insertion appointments required for one year after insertion of the complete dentures. The data for this study were taken from clinical patient records. Only those denture adjustments that involved the height or thickness of the denture flanges were quantified by the number of times that patients presented to the department for denture adjustments. The number or locations of the denture adjustments were not quantified, because there is significant variability in the clinical presentations of denture irritations. The complete dentures were fabricated according to established prosthodontic principles^{14,15}. Custom denture impression trays were taken to the mouth, and the tray borders were adjusted to have approximately 2 mm of clearance between the tray borders and the mucobuccal and mucolingual folds. The frenum notches were adjusted to provide similar clearances. The posterior extensions of maxillary trays extended 3 to 5 mm beyond the vibrating line of the soft palates. Border molding of the custom trays was accomplished with 1 of 2 impression materials and techniques. With the traditional technique, green stick impression compound was applied in increments around the periphery of the impression trays. The clinician border-molded each individual segment; the patient accomplished tongue movements and swallowing. The mouth was dried with gauze before the secondary impressions were made. Tray adhesive was applied to the impression trays, and all definitive impressions were made with light-body vinyl polysiloxane impression material. In the modified technique, tray adhesive was placed on the borders of the trays and allowed to dry. Heavy-body vinyl polysiloxane impression material was applied to the borders of the impression trays, and border molding of the maxillary trays was accomplished with one application of the heavy-body impression material. Mandibular border molding was accomplished in a similar fashion. After the labial and buccal

border molding was completed, the patient was instructed to place the tongue in contact with the anterior tray handle after swallowing. The mouth was dried with gauze before the secondary impressions were made. Tray adhesive was applied to the impression trays, and all secondary impressions were made with light-body vinyl polysiloxane impression material. Working time with this material was approximately 2 minutes. After the material had set, the impressions were removed and inspected for voids. Master casts, occlusion rims, waxed dentures, and definitive dentures were fabricated using conventional prosthodontic techniques¹⁶⁻²⁰. The 3-dimensional orientation of the maxillary casts and their relationships to the cranial structures were transferred to semi-adjustable articulators with an arbitrary face bow²¹. The casts were mounted with mounting stone. All patients were treated with acrylic resin teeth. The anterior teeth were set in positions consistent with the contours established by the maxillary occlusion rims. Posterior teeth (20° anatomical teeth) were set in posterior balanced occlusion. The trial denture with teeth arrangement done was tried in the patients mouth and evaluated for phonetics, function and esthetics. All of the dentures were processed with heat polymerized with acrylic resin following the manufacturer's instructions. The dentures were inserted, and patients were followed for at least 1 year. The number of times that patients returned for adjustments relative to thickness and the heights of the denture flanges were recorded.

RESULTS:-

Table 1:- Comparison of denture adjustments with two different Impression technique in completely edentulous patients

	Traditional technique	Modified technique
Total number of adjustments in 12 months	40	38
Average adjustments per patient 12 months post insertion	2.66	2.53
Patients with 5 post insertion adjustments	4	3
Patients with 4 post insertion adjustments	6	8
Patients with 3 post insertion adjustments	8	6
Patients with 2 post insertion adjustments	8	7
Patients with single post insertion adjustments	14	14

Denture adjustments (height or thickness of denture flanges) within the first 12 months after the dentures were inserted ranged from 2.660 with the traditional technique and 2.53 with the modified technique. (Table 1). The data was compared using the Student t test. There was no significant difference in the number of adjustments required for patients whose dentures were made with either technique ($t_{(0.000, p = 1.00)}$).

DISCUSSION:-

Secondary complete denture impressions are believed to be one of the critical factors in determining success or failure for patients wearing complete dentures¹⁵. The secondary impression appointment is generally considered to be one of the more time consuming and technically difficult appointments in the traditional treatment sequence for complete dentures^{15,22,23}. If green stick impression compound is used as the border molding material, then clinicians must heat the compound, apply the softened material to the impression tray, temper the tray, and place the tray into the patient's mouth. Border molding is accomplished with the clinician moving the tissues in a manner consistent with function. Irreversible hydrocolloid may be used as the final impression material with or without border molding. However, irreversible hydrocolloid impressions are generally overextended. Clinicians may realize a significant time savings with the irreversible hydrocolloid impression technique, because border molding is accomplished at the same time as the definitive impression. However, this may result in ill-fitting dentures that need extensive modification after the dentures have been inserted⁷. Denture adjustments are multifactorial, affected by the amount of residual ridge resorption, health of the soft tissues covering the edentulous jaws, adaptability of patients to complete dentures, skills of the clinicians involved in the treatment, jaw relationships, denture occlusion, and other factors.

There were no significant differences in terms of post insertion adjustments between the patients treated with either impression technique in this study. However, this does not mean that either technique should be taken as the final method of fabricating secondary complete denture impressions, because of several limitations in the design of this study: The total number of patients is too small to make conclusions for all edentulous patients; some patients can better adapt to dentures than other patients; and anatomical variations among patients and the author's clinical experience may not be representative of other clinicians. There were also differences among patients relative to fit of the dentures, vertical dimension of occlusion, and other factors. Moreover, the relationships that existed between the author and the patients may also have had a bearing on an individual patient's need to return for denture adjustments^{9,10}. The number of post insertion adjustments for complete denture patients is a complex phenomenon. One patient required five (5) post insertion adjustment visits. Certainly other factors (eg, occlusion, denture fit, diet) played important roles in the need for post insertion adjustment visits required by this patient as compared with the number of visits required by the other complete denture patients who did not need to return for post insertion adjustments. Although border-molding and secondary impression techniques are important in fabricating successful complete dentures for edentulous patients, it is unlikely that border-molding techniques and materials are solely responsible for the number of post insertion adjustments in complete denture patients.

The present study included 30 patients, with varying amounts of bone resorption and different levels of denture experience. The conclusions from the present study would have a greater degree of validity if there were more patients and if these patients had been classified more specifically. The secondary impression technique described in this study may not be applicable for all clinicians. Because complete denture prosthodontics is both an art and a science, some of the results described in this article may be attributed to the clinical skills and knowledge of the author. Clinicians with limited/ different experiences and biases in complete denture prosthodontics may not experience the results that have been described herein. Further research with a larger group of patients is warranted to establish a correlation between the modified impression technique described in this study and the number of post insertion adjustment visits needed by complete denture patients.

CONCLUSIONS:-

Within the limitations of this study, there was no significant difference in the number of post insertion appointments required for patients with dentures fabricated using the traditional technique (border-molding with green stick impression compound) and those with dentures fabricated using the modified technique (border-molding with heavy body vinyl polysiloxane) for definitive impressions.

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