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A modified flasking technique for complete denture base processing with sandy acrylic resin

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Abstract

The major breakthrough in the annals of modern dentistry was the advent of acrylic resins in 1937. Their recognition and acceptance in prosthodontics are indeed incredible as they are found to be easy to manipulate, more esthetic both in the clinic as well as in laboratory. A uniform denture base plate wax pattern was made on each stone cast with a 3 mm thickness. The teeth necks were grinded from palatal or lingual toward buccal surface to allow more space for the flow of acrylic. The volume of the definitive casts must be reduced as much as possible, flaked in the lower part of the traditional brass flasks and fill with dental plaster class II covering the buccal, labial, incisal and occlusal surfaces of the teeth to give more support and prevent teeth migration. After curing cycle, the denture base was carefully deflaked, the excess trimmed and the denture surface polished. The resultant dentures processed with this procedure provides good retention and esthetic, more hygienic and comfortable for the patient than those processed with the conventional method.

Keywords: Fluid acrylic resin, new flasking, complete denture base

1. Introduction

Dentistry as a branch of science, has witnessed a continuous search for a new materials and techniques, ever since its evolution, to improve the quality of treatment service. The practice of dentistry, in particular prosthetic dentistry is at an interface delicately balancing technology and science on one side and patient oriented service on the other [1]. The advent of acrylic resins in 1937 is a major breakthrough in the annals of modern dentistry. Their recognition and acceptance in prosthodontics is indeed incredible as they are found to be more esthetic, easy to manipulate both in the clinic and in the laboratory [2]. Acrylic resin has been applied in dentistry since 1946, commonly as a denture base material and mostly consisting of methacrylates, especially methyl methacrylate (MMA) [3]. Owing to their acceptable physiological and chemical characteristics in addition to ease of handling, good esthetic and low cost. These resin has been considered as a suitable material to be use in the oral environment and has been widely applied [4]. Polymethyl methacrylate and methyl methacrylate are the most common materials used for fabricating removable partial and complete dentures. Although its popularity and satisfy esthetic demands is not ideal in fulfilling the mechanical requirements of such appliance [5]. The use of pour-type (fluid) resins is increased markedly over the past decade for the fabrication of denture bases. The dimensional change that occurs during polymerization shrinkage is the critical factor in the retention and stability of the complete denture [6]. This change may be partially compensated by absorption of water [7] the gingival mucosa resiliency [8] and the saliva film formed between the soft supporting tissue and the denture base [9, 10].

Despite relatively well fitting dentures are produced with easy manipulation at a low cost, the current denture base materials, in every aspect, are not ideal. This is acknowledged in 1943 itself by Skinner and Cooper [11] who found that at least two unavoidable dimensional changes which are active in every acrylic denture like shrinkage, which occurs during processing, and subsequently expansion, which occurs upon water immersion. One of the successful prosthesis of the clinical criteria is its accurate adaptation the denture bearing area. Investing and processing procedures were developed, such as direct and trial pack techniques, dry and wet curing, pour techniques and injection techniques.

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However little research has been conducted on the influence on the type of dental stone used to fabricate the cast [12]. Functional problems associated with edentulous such as loose dentures and diminished chewing efficiency had been reported by many authors. The consequences of edentulous include disability to speak and eat, reduction of social contact and inability of the residual ridge and its overlying tissues to withstand masticatory forces [13].

2. Procedures

After making primary and final impressions for maxilla and mandible, stone casts were poured in class III dental stone (Hi-Japanese stone) using a ratio of 30 ml water to 100 g powder. A uniform denture base plate wax pattern was made on each stone cast with a 3 mm thickness. The teeth neck was grinded from the palatal or lingual toward buccal side to allow more space for the flow of acrylic. The volume of the definitive casts was reduced as much as possible (Fig1), the casts were flasked in the lower part of the traditional brass flasks and fill with dental plaster class II with covering the buccal, labial, incisal and occlusal surfaces of denture teeth to give more support and prevent teeth migration (Fig 2). The plaster was painted with a petroleum jelly as a separating medium in the lower part of the flask after setting. The top part of the flask was placed over the bottom part, and fill with plaster. After 1 hour, the flasks were placed in a boiling water to soften the base plate wax. The flask parts were separated, the wax removed, and the stone cleaned with boiling water and liquid

detergent (Fig 3). Separating medium was used as a mould separator (Fig 4). When the flask parts have cooled, polymethyl methacrylate (Classico Dental Products, Sao Paulo, SP, Brazil) was used with a monomer: polymer ratio of 1:3 (by volume) according to the manufacturer instructions for flask pressing. The prepared liquid mixture was packed immediately after mixing according to the conventional packing methods. The flasks were placed in a traditional metallic clamps (Fig 5) after final pressing was performed using a hydraulic press with a load of 1.250 kg for 5 min (Fig 6). The flasks were transferred to a flask carrier and immersed in water according to the post-pressing times and maintained (Cured by using short curing cycle 90 min. at 74 °C followed by 30 min. at 100 °C). After the curing cycle, the flasks were removed and allowed to bench cooling at room temperature. The denture base was carefully deflasked without damaging the stone cast, the resin excess was trimmed and the denture surface was polished (Fig 7). Dentures were fixed onto their corresponding casts placed on the ridge crest of the stone cast. Selective grinding of the dentures teeth were done on an articulator before insertion it inside the patients mouth for checking the mandibular movements. Retention, support, stability and dentures extension checked carefully inside of the patient mouth in addition to the appearance and face profile of the patient. The vertical dimension was measured and centric occlusion determined by measurement of the distance between two tattoos on the tips of nose and chine.



Fig 1: Reduce the volume of the cast



Fig 2: Covering surfaces of denture



Fig 3: Waximation teeth with dental plaster



Fig 4: Application of separating medium



Fig 5: The flasks placed in clamps



Fig 6: Hydraulic press by brush



Fig 7: Finishing dentures after polishing the denture surfaces

3. Discussion

The dentures polymerized with this procedure were free of porosity, free from flash and easy to trim and polish. As with the polished surfaces, the unpolished internal surfaces were smooth, easy to clean, and not conducive to retention and impaction of secretions. These observations have led us to conclude these dentures processed with this procedure are more hygienic, it is comfortable for patient (thin and light weight) provides a good retention and esthetic (not bulky) than those processed with the conventional method. Rapid pouring of fluid acrylic resin material may enhance the flow into the fine details of the mold. Further research into the magnitude of their effects on the detail reproduction and mechanical properties of the fluid resins would be invaluable in establishing guidelines for the use of material [14]. Advantages of fluid resins include, decreasing of processing time, easy and simple procedures of flasking and deflasking and decreasing of time required for finishing and polishing the cured prostheses [15]. However, the anatomical regions are different for the maxillary and mandibular arches, both denture bases showed similar patterns of adaptation. May be, this occurrence is due to the fact that the maxillary arch shows a region with best retention (anterior) and another with worse retention (posterior palatal seal), while the mandibular arch presents region with best (anterior) and worse (posterior with free ends) retentions. Thus, when the denture bases were considered as a whole, they showed similar patterns of adaptation in each region for both bases of dentures [16]. The tested study, which tooth displacement could be adversely affected by the flask closure method and post pressing time association, was in part accepted. Careful measurement has been taken to overcome denture inaccuracies, such as base distortion and displacement of artificial teeth. These factors are responsible for loss of stability and retention of the denture, and increase the tooth displacement causing difficulty in the occlusal adjustment procedure. Under clinical conditions, these dimensional changes could also modify the planned vertical occlusion dimension, and cause traumas in the mucosa and loss of bone [17]. This evidence is also approved by [18] as he said that absence of porosities were found in the conventional resin in uniform thin denture base which explain the risk of porosities in a thick (more than 3mm thickness) specimens and this finding in agreement with others (references).

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