

Analysis of Impressions used for the fabrication of indirect fixed restorations.

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Abstract

Objective:

The main purpose of this study was to know about the materials and techniques used by the dental practitioners of Kathmandu for the fabrication of indirect fixed restorations.

Materials and Methods:

A total of 275 impressions made for the fabrication of indirect fixed restorations were collected from six dental labs in Kathmandu over a period of one month. The impressions were analyzed by observing the type of impression material used, the type of trays used and also the impression techniques used by the dental practitioners of Kathmandu.

Results:

The result shows that all the impressions collected were made using Elastomeric Impression Materials. 68.72% of the impressions were made on stock trays, 3.47% were made using custom fabricated trays and 27.79% were made on sectional disposable trays. The most common Impression technique used was double mix double impression technique which was used in 82.23% of the impressions. The most common material used was Addition polysilicone impression material.

Conclusion:

The impressions sent to the labs by the practitioners of Kathmandu for the fabrication of indirect fixed restorations are the ones which are recommended and the ones which tend to be more accurate. However, while using the other less preferred methods, the practitioners in Kathmandu should be aware of the short comings of the material, trays and techniques.

Keywords:

Double mix impressions, impression techniques, putty wash impressions, single mix impression.

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Introduction:

Prosthodontics as a speciality has evolved abundantly in the past few years. Materials and techniques keep changing and with such changes the quality of prosthodontic restorations are also becoming better and accurate. Accuracy of an impression is an important factor for the success of all types of prosthesis and the elastomeric impression materials are considered more accurate. Since different impression materials and techniques have their own advantage and disadvantages and also have specific uses, it is very important for the practitioner to know when and where to use the different types of materials and techniques. Clinically different types of impression technique are used like double mix technique (with custom tray), putty wash technique, single mix technique, auto mixing technique, machine mixing technique and copper band and resin tray technique. Among these techniques, the most commonly preferred technique by the practitioners is double mix technique, putty wash one step and two step techniques and single mix technique.

This study was done to evaluate the different types of impression materials, impression techniques and the impression trays used by the dental practitioners of Kathmandu, Nepal for the fabrication of indirect fixed restorations.

Materials and Methods:

The maximum number of indirect fixed restorations done by the practitioners of Kathmandu, Nepal are fabricated in the dental labs of Kathmandu itself, and nowadays the all ceramic restorations and implant crowns are also being fabricated by the dental labs in Kathmandu. In this study only the elastomeric impression materials used for the fabrication of indirect fixed restorations were analyzed. These impressions which are otherwise discarded by the labs once the restorations are fabricated, were collected from six different dental labs in Kathmandu. These six labs were the most commonly preferred dental labs by the

practitioners of Kathmandu. The impressions sent to these labs over a period of one month were collected and analyzed for the type of material, type of trays and the type of impression technique used. The elastomeric impressions were first differentiated depending on the type of trays used, namely stock trays, custom trays and disposable plastic trays (Fig. 1).

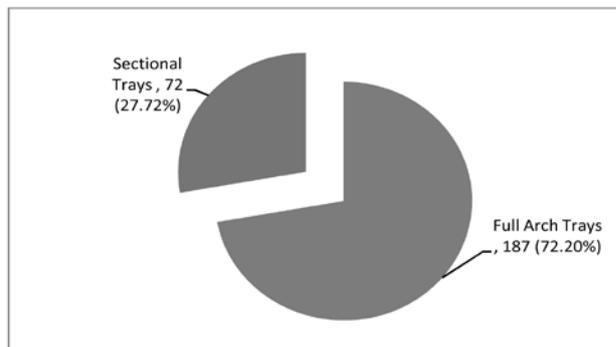


Fig. 1 : Distribution of the type of impression trays used.

The trays were also differentiated depending on full arch impressions and sectional dual arch impressions (Fig. 2).

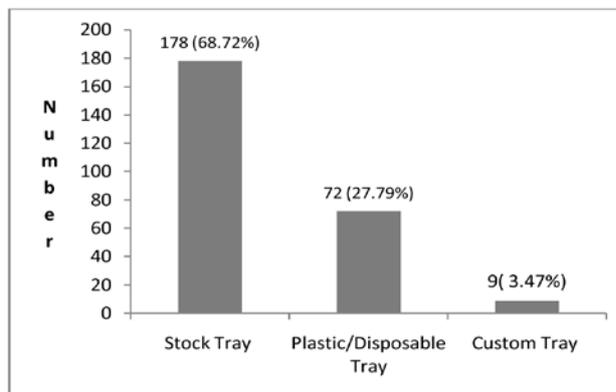


Fig. 2 : Distribution of full arch versus sectional trays

Then the trays were analyzed for the impression techniques by differentiating whether single mix technique, double mix technique or one step putty wash or two step putty wash techniques were used (Fig. 3).

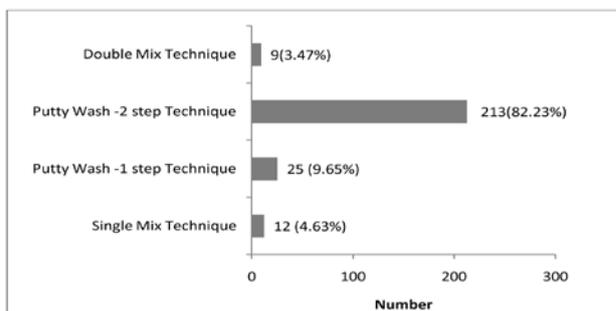


Fig. 3 : Distribution of type of impression techniques.

Finally the trays were differentiated depending upon the materials used by analyzing the color, texture and flexibility of the material.

Results :

A total of 259 used impressions were collected from the six dental labs over a period of one month. Out of these 259 impressions 178 (68.72%) impressions were made on stock trays, 9 (3.47%) were made on custom trays and 72 (27.79%) were made using plastic disposable trays (Fig.1). Among the trays used 187 (72.20%) were full arch trays and 72 (27.72%) were sectional dual arch trays (Fig.2). Out of the 259 impressions 12 (4.63%) were made using single mix technique, 9(3.47%) were made using double mix technique, 25 (9.65%) were made using one step putty wash impression technique and 213 (82.23%) were made using two step putty wash impression technique(Fig.2). All of the impressions analyzed in our study were made using addition polysilicone impression material.

Discussion:

The double mix technique is one of the most commonly used impression in fixed prosthodontic restoration^{1,2,3}. In this technique full arch custom tray is fabricated and a combination of low viscosity syringe material and higher viscosity tray material is simultaneously used to make impressions. In our study only 9 (3.47%) double mix impressions using custom trays were seen. The reason for this could be the extra appointment required and the added costs for the fabrication of the custom trays. The putty wash technique is more popularly used with addition silicone materials¹. According to Johnson and Craig ¹, the putty materials were originally developed to act like a custom tray with the material providing the bulk. However, this technique showed problems because of the pressure applied to the setting putty material when simultaneous technique is used, and also with the set material in two stage techniques^{4,5}. A study done in the United Kingdom by Randall et al ⁶, found that single mix full arch impression using stock trays was more commonly taught in the dental schools, followed by full arch impressions using custom

trays. A study by Nissan et al ⁷ showed poly vinyl silicone 2 step, 2mm relief putty wash technique was the most accurate impression technique. In another study by Carrotte et al ⁸ done in the United Kingdom, it was found that metal trays and rigid plastic trays gave greater accuracy in the putty wash silicone twin mix impression technique compared with flexible plastic trays. In our study also it was seen that stock full metal trays were more commonly used than custom trays, plastic or disposable trays and sectional trays.

In a study conducted by Cox et al ⁹, on the dimensional accuracy of double arch and complete arch impression, it was found that plastic double arch tray loaded with heavy viscosity addition polysilicone and low viscosity wash material produced the least accurate casts, and it was suggested that more rigid trays/impression material combinations more accurately replicated stone dies. In our study the maximum number of impression were made on stock trays using viscous putty material. Out of the 72 dual arch trays analyzed in our study, all of the trays were flexible plastic trays and also a combination of putty and light viscosity wash material was used. According to Cox et al ⁹, this combination of flexible trays and high viscosity materials may produce inaccurate dies. Another study by Nissan et al ¹⁰, on full arch impression techniques, showed that poly vinyl siloxane impression materials were extremely popular because of the excellent physical properties, handling characteristics and dimensional stability. In our study, the most preferred material of choice by the practitioners of Kathmandu was also polyvinyl siloxane. However in his study, the one step impression with high viscous material was the least accurate impression method ¹⁰ as also suggested by Cox et al ⁹. But Nissan also found that the two step technique due to the complete control of the wash bulk and thickness produced the most accurate impressions ¹⁰.

It was evident in our study that the two step putty wash technique was the most preferred method which was seen in 213 (82.23%) impressions, suggesting that the impression made by the

practitioners of Kathmandu are also the methods and materials commonly preferred by the dental practitioners of other countries.

However, another similar study by Hung et al ¹¹ where the accuracy of one step putty wash technique was compared with two step putty wash impression techniques, and it was suggested that the accuracy of putty wash one step impression technique and putty wash two step impression technique produced were not different. In a similar study of putty wash one step versus two step technique by Idris, Houston and Claffey ¹², it was shown that there was no clinically important/significant differences between the two techniques.

In the two step putty wash impression technique, the wash stage is carried out after the putty has set and contracted and it serves as a custom tray. The controlled wash bulk compensates for the contraction with minimal dimensional changes according to the study by Nissan et al ⁷ in 2002.

Conclusion:

It was found that the most preferred material by the practitioners of Kathmandu for the indirect fixed restoration was addition silicone impression material. Among the techniques, full arch putty wash two step technique was the most commonly used method and with the evidence from other previous studies, it can be said that this technique was more accurate and also the more preferred for fabrication of fixed restorations.

It can therefore be said that the impression sent to the labs before fabrication of indirect fixed restorations are the ones which are recommended and the ones which tend to be more accurate. However, while using the other less preferred methods, the practitioner in Kathmandu should be aware of the short comings of the material, trays and techniques.

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