Impressions in Cleft Lip and Palate – A Novel Two Stage Technique

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Though the field of presurgical orthopedics for the management of children with cleft Lip and Palate (CLAP) has made great advances over the past few decades, little is found in literature regarding the imressions required to fabricate these appliances. The purpose of this paper is to describe a novel two stage technique utilizing greenstick compound and addition silicone impression material to provide a safe, economical and accurate method for recording impressions in children with cleft lip and palate.
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INTRODUCTION

The management of children with cleft lip and palate (CLAP) has made great advances over the last fifty years. The field of pre-surgical orthopedics has been no exception to these advances. From simple appliances such as feeding plates and obturators to active devices such as Zurich plates and Latham devices, the field has seen many changes. The use of pre-surgical nasoalveolar molding (NAM) appliances has become routine in several cleft centers around the world.[1] While all the above mentioned devices require an accurate impression for fabrication, little is found in dental literature about impression procedures for children with cleft lip and palate.

Impression making in cleft lip and palate presents certain challenges to the pediatric dentist. The young age of the patient and the limited access can often be a barrier to conventional impression making.[2] Furthermore the presence of a communication between the nasal and oral cavities can be a significant risk factor for aspiration of the impression material and respiratory distress.[1] This has often lead to the impression being made in the operation theatre after the airway has been secured by endotracheal intubation[3] greatly increasing the time and cost involved in making an impression.

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The use of wax based impression materials in cleft lip and palate is not new to dentistry. Low fusing compound (Greenstick compound) offers a safe and effective means to make an impression in the neonate. The high compressive strength and rigidity of the material mean that the material is unlikely to tear,[4] thus greatly reducing the chance of aspiration. The poor flow of the material however, limits the accurate reproduction of details.

Addition silicone impression materials on the other hand have excellent recording properties. Their high tensile and shear strength makes them the ideal material for impressions in cleft lip and palate. Their use is only limited by their high cost and the fact that they require to be placed in thin sections, necessitating the fabrication of a special tray.[5]

The combination of greenstick compound with addition silicones has been used in prosthodontics for impressions for cast partial dentures.[6] Through the following cases we would like to highlight the potential of this technique in cleft lip and palate.

TECHNIQUE

Impression in edentulous arch

Step 1 – Positioning the patient

The patient is held upright in the mother's arms while the dentist stabilizes the head for the insertion of the impression material (Figure1).

Step 2 –The Primary Impression

A small piece of softened greenstick compound(DPI™ Dental Products of India, Mumbai, India) is placed in the infant's mouth and molded and allowed to set to obtain the primary impression which will also serve as the special tray. A handle for the special tray is also molded at an angle of 45º to facilitate easy insertion and removal and also to help orient the tray for the secondary impression (Figure 2).

Figure 1.

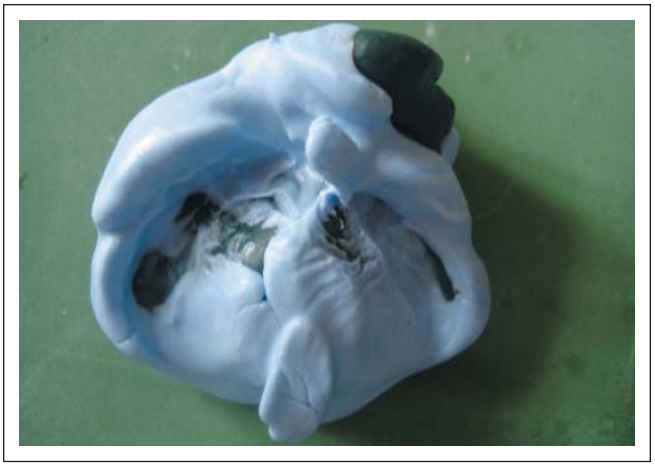

Figure 2.

Figure 3.

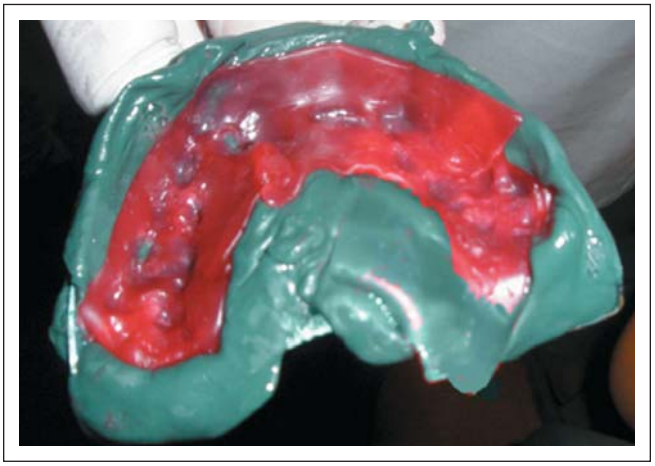

Figure 4.

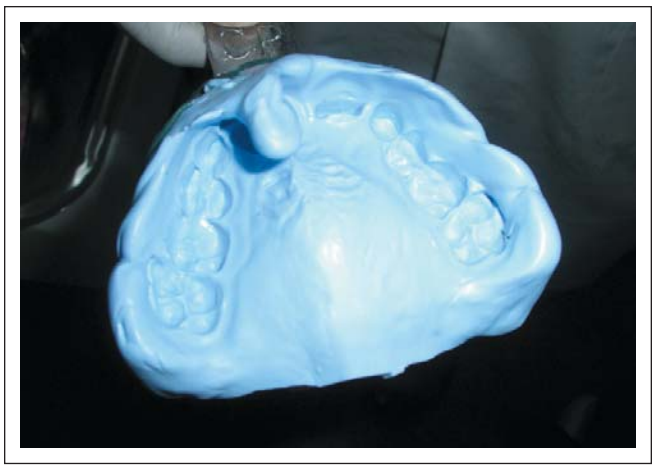

Figure 5.

Figure 6.

Step 3 – The final or 'wash' impression

Putty consistency addition silicone impression material (Aquasil™ Dentsply-Detrey Konstanz Germany) is manipulated and loaded onto the primary impression and inserted into the infant's mouth and molded. The secondary or 'wash' impression is thus obtained (Figure 3). [Note: Impression material should be mixed without gloves or with plastic gloves as any contact with latex can delay the setting of the material.]

Impression in dentate arches

The teeth are covered with a wax spacer (Figure 3) and then the primary (Figure 4) and secondary (Figure 5) impressions are made.

Figure 7.

Figure 8a.

Case 1 – Impression for Nasoalveolar Molding Appliance
An impression for the fabrication of a Nasoalveolar Molding Appliance was made for a 3 day old infant with unilateral cleft lip and palate was referred from the Nitte Meenakshi Institute of Craniofacial Surgery (Figure 7). The primary impression was recorded with greenstick compound followed by a wash impression of addition silicone (Figure 3). The accurate details obtained greatly improved the retention of the appliance.

Case 2 – Impression in a child with microstomia
An impression was made for a 5 year old child with cleft palate with Rubenstein Taybi Syndrome was referred from the Nitte Meenakshi Institute of Craniofacial Surgery for the fabrication of cast for record purposes. The microstomia associated with the syndrome made the insertion of a custom tray difficult (Figure 8). The molding of the greenstick special tray within the patient's mouth enabled us to overcome this problem. The details of the cleft were then recorded using the wash impression (Figure 8a).

Case 3 – Impression in a child with a palatal fistula
A 12 year old child with a palatal fistula was referred from the Nitte Meenakshi Institute of Craniofacial Surgery for the making of an impression and fabrication of obturator to assist in speech. The teeth were covered with a wax spacer (Figure 4) and the primary impression was made using greenstick compound loaded onto a stock tray (Figure 5). The details of the fistula were obtained using an addition silicone wash impression (Figure 6).

DISCUSSION

The role of an impression in the success of any appliance cannot be overemphasized. Not only does an accurate impression enhance the recording of detail, it also greatly improves the retention and comfort of an appliance. The advent of presurgical orthopedics in most cleft centers around the world has led to an increased need for accurate impressions. The precise nature of these appliances along with the increased retention demanded by them has meant that an increasing number of cleft centers are moving from the conventional alginate to rubber based impression materials,[1] however the high cost of the material greatly limits their use. Addition silicone impression materials are an accurate and safe means of recording impressions. The high shear strength of these materials makes them resistant to tearing on removal and greatly improves the safety of the material. There are, however, a few drawbacks of the material. Apart from the high cost, the material needs to be used in thin sections necessitating the use of a special tray. In the absence of a properly adapted special tray the material will distort on setting and thus reduce the accuracy of the impression.[4]

Debate exists as to the ideal position of the child during the impression procedure. While the conventional approach has been to hold the child upright[7, 8] some authors have suggested holding the child upside down so as to minimize the chances of aspiration.[9] The protocol at our center has been to hold the child upright and we have found this to be a safe and effective position.

The use of greenstick or low fusing compound is not new to dentistry. It has long been used by prosthodontists for border molding impressions for complete dentures. Mc Cord and Grant have shown that a primary impression of greenstick compound is a suitable tray material for 'wash' impressions to record the distal extensions of removable partial dentures.[6]

The use of low fusing compound as a primary impression material offers several advantages. The low fusion temperature of the compound is readily tolerated by the child. The high rigidity of the material allows close adaptation with little chance of breakage. The lack of elasticity, however, makes it impossible to record undercuts or finer details. The combination of greenstick compound with addition silicone greatly reduces the amount of addition silicone required while enhancing the quality of details recorded. The above cases illustrate the different settings under which this technique may be used; providing a safe, economical and accurate method for recording impressions in children with cleft lip and palate.

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