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Research Article

EFFICACY OF PRESURGICAL NASOALVEOLAR MOLDING WITH MODIFIED ORTHOPEDIC PLATE FOR THE TREATMENT OF UNILATERAL CLEFT LIP AND PALATE

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Abstract:

Objective: To present a modified device and treatment protocol for nasoalveolar molding before surgery in a newborn with a unilateral cleft lip and palate and determine its efficacy.

Study design: A Retrospective Study.

Location and Duration: In the Orthodontic department of Nishtar Institute of Dentistry (NID), Multan for One-year duration from July 2017 to July 2018.

Methods: This process involves the use of an orthopedic plate with acrylic nasal stent together with a sterile adhesive strip. The plate is adjusted every week for alveolar molding. For nasal casting, soft acrylic is slowly added to the nasal acrylic stool to remove cartilage of the alar dome and to mold the pressed and concave lower lateral cartilage on the affected side. Activation was performed once a week until three months of age.

Results: The plate avoided the tongue widening effect and used the functional movements of the orofacial muscle system to orient the main segment medially to its normal position. This device provided a reduction of 4.5 mm in the anterior region of the cleft gap. The shape of the cartilaginous septum, the alar tip and the medial and lateral walls were shaped to resemble the almost normal shape of these structures.

Conclusion: The technique helps to improve the projection of the nasal tip before the alveolar position, alignment of the nasal septum, nasal symmetry and repair of the lips. This device minimizes lips scar and gives the patient the aesthetic result.

Key words: unilateral cleft, nasoalveolar molding, modified orthopedic plate, acrylic nasal stent.

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INTRODUCTION:

The unilateral cleft lip and palate are associated with nasal cartilage morphology and alar base and a defect in columella asymmetry. Inferior lateral cartilage is often depressive and concave. These defects have a great impact on the aesthetic results of babies [1]. Preoperatively infantile orthopedics has been used as a complementary neonatal treatment for correction of the cleft lip and palate system since the 1950s. Some of the problems that the traditional approach does not address include nasal cartilage deformity in patients with unilateral clefts [2].

Grayson BH, Cut CBI applied a precordial nasoalveolar orthopedic molding by adding a nasal stent as acrylic to the labial flanges of the plaque in the primary correction of the nose, lip and alveolus of babies born with a unilateral cleft palate [3]. This technique of nasoalveolar molding takes advantage of the availability and the ability to sustain permanent correction of its shape in immature cartilage. The orthodontic plate is held in place in combination with the surgical and elastic bands applied to the cheeks and portions of the cleft [4]. Cho B managed a baby with a unilateral cleft, lips adhesion together with

passive nasoalveolar device placement on 3-6-week-old infants. Nasalveolar molding in the treatment of cleft lip and palate was modified from Da Silveira AC, Oliveira N, Gonzalez S, Shahani M, Reisberg D, Daw Jr. JL and others. This article describes a modified self-retaining nasoalveolar molding plate comprising a simple acrylic stent for nasal molding and a simple acrylic stent including palatal adjustment for alveolar molding in the unilateral half of the lip and palate. The aim of this preoperative surgery was to achieve a preoperative reduction in soft tissue and bone deformity; this resulted in a better surgical result with minimal lip marks and better facial and nose aesthetics [5]. In our experience, this goal was successfully accomplished.

MATERIALS AND METHODS:

This retrospective Study was held in the Orthodontic department of Nishtar Institute of Dentistry (NID), Multan for One-year duration from July 2017 to July 2018. The technique of nasoalveolar molding prior to surgery was used in a 4-day-old boy with full unilateral cleft lip and palate (Fig. 1, 2).



Fig 1: Pre-treatment front view



Fig 2: Pre-treatment lateral view

The case was treated for a period of three and a half months, with a custom-made orthopedic plate containing a nasal stent made of self-curing acrylic on the labial flange of the orthopedic plates (Figure 3, 4). Nasoalveolar orthopedic plate was self-retained

by adding soft acrylic to the palatal surface at the defect. A 1/4 x 4 inch adhesive ester strip was applied outward to bring the cleft lip and the alveolar segments closer.

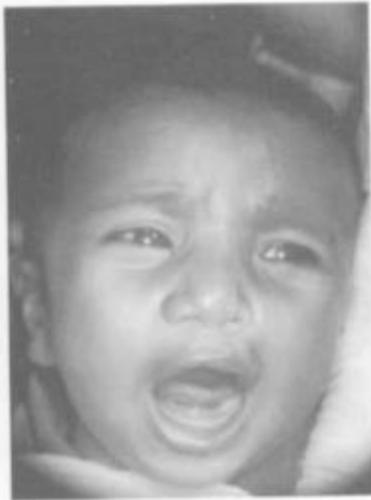


Fig 11: Post-surgical front view



Fig 12: Post-surgical lateral view

The nasal stent are adjusted weekly for a period of three months. The molding plate was adjusted by adding 1 mm hard acrylic to the palatal surface and removing approximately 1 mm of soft acrylic along the medial surface on both sides. The nasal stent was

activated by adding soft acrylic to the outer and superior surface of the stent to increase the inferior lateral cartilage level, to obtain the symmetry of the nasal base and ala, and the protrusion of the nasal tip (Figure 6).



Fig 6: Approximation of cleft lip segment with steri strip

The patient was referred to the maxillo-facial plastic surgeon for the first repair of the lips. Excellent postoperative results were obtained with minimal lip scar and improved nose and facial aesthetics.

To record linear and angular measurements, photocopies were taken before and after the procedure. These measurements were recorded to see the approximation of the alveolar cleft segments. Between linear measurements, the area of intermolar width, interchain width, and anterior slit was

recorded. Angular measurements were obtained from the mean sagittal plane used as the reference line and the line separating the reference line from the front of the labial segment, ie, from the labial brake. Angular measurements were made to record the misalignment or rotation of the large alveolar cleft segment.

RESULTS:

The results for the nasoalveolar molding therapy were based on measurements of pre-casting and post-

surgical molds. Linear measurements were recorded

in Table I).

TABLE 1: LINEAR MEASUREMENTS FROM THE CAST PHOTOCOPIES.

I.M.W				I.C.W				Anterior cleft gap.		
Pre treat	Post molding	Post surg	Diff	Pre treat	Post molding	Post surg	Diff	Pre treat	Post molding	Post surg
32	32	32	0	19	19	17	2	9.5	8.6	4.5

Intermolar width was 32 mm at the pretreatment stage and remained at 32 mm after nasolabial molding and surgical repair of the lip. The width of the intercanine was 18 mm before and after molding, where it was reduced to 17 mm after cleft lip surgery.

The anterior separation of the cleft was initially 9.5 mm and was reduced to 8.6 mm after nasolabial molding and to 4.5 mm after surgical repair of the lip. Angular measurements were made to record the rotation of the larger alveolar cleft segment (Table II).

TABLE 2: ANGULAR MEASUREMENTS FROM THE CAST PHOTOCOPIES.

Pre treat	Post molding	Post surg	Difference
14	25	11	3

Initially, the nasolabial was raised to 25 degrees after molding and moved to 11 degrees to obtain a 3 degree correction of the larger slit section.

DISCUSSION:

The purpose of pre-surgical nasolabial molding is to align the alveolar segments, as well as nasal cartilage correction and soft tissue deformity. This nasolabial matrix dic plate utilizes the high degree of plasticity and the lack of elasticity in neonatal cartilage due to high levels of hyaluronic acid, a component of the intracellular matrix of proteoglycan [6]. As the estrogen level increases, the cartilage flexibility is reduced. With the highest levels of neonatal maternal estrogen immediately after birth, the plasticity period gradually disappears in the first month of postpartum life. Active soft tissue and cartilage molding were most successful during the first 2-3 months after birth [7-9]. A further benefit of the nasolabial orthopedic plate prior to surgery is that the operation of the lips is easier, more precise and less tight to allow the lip pieces to be close when the anterior cleft segments approach. Our technique of using the nasolabial molded orthopedic plate to measure an acrylic nasal stent with a sterile strip is, in part, used an acrylic nasal stent attached to the

vestibular shields [10-11]. Compared to the modified technique applied by Suri S5, our method was very simple. Suri used a 0.032-inch stainless steel wire embedded in the plate and bent to measure to form a nose stent and adjusted to remove the wire from the emergency dome slowly from the cartilage [12]. In our experience, the basic purpose was simple manufacturing, easy operation and cost-effective treatment. The orthopedic nasolabial molding plate used in our technique was self-permanent. The soft acrylic attached to the palatal surface on the leg surface of the plate is used as a holding device. There was no need for additional oral accessories compared to the NAM technique used by Grayson, where the orthoson plate was held together with surgical and elastic bands applied to the cheeks and side parts for reasons of arrest [13]. To assign the cleft lip sections, we used an ester strip applied to the cheek and lip sections, similar to the Suri Graysoning nasal mold, replacing the tires of the belt with a continuous section on the slit lip. A surgical tape, when appropriate, preserves the effect of a non-surgical lip adhesion [15]. Similarly, Grayson used ribbons and surgical tires to accommodate the 8 cleft lips' sections [14]. Then, the larger alveolar segment is guided by the applicator, while the smaller alveolar segment

prevents collapse.

CONCLUSION:

The nasoalveolar orthopedic plate was used in newborn infants for three and a half months on the left side of the full unilateral cleft lip and palate. Successful results were obtained with this device. Based on these results, the following results were omitted.

- 1 The Nasoalveolar molding plate improves the alveolar position, ie approximation of the alveolar segments of clefts.
- 2 Nasal symmetry, alignment of the nasal septum and projection of the nasal tip are achieved.
- 3 The device is self-retentive and comfortable to carry.
- 4 No extra accessories required.
- 5 Simplify the function.
- 6 Makes the first repair of the lips more sensitive and tension-free.

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