

Nasoalveolar Molding: Does it Benefit?

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Cleft lip and palate constitutes one of the most common congenital anomalies. It causes a range of functional as well as aesthetic problems. A cleft child's life becomes challenging with a lot of socio psychological problems and requires tremendous support, motivation and a definite treatment protocol by a craniofacial team. The team should function as an organization with a general policy for the treatment, and each member of the team should have insight into the different aspects of treatment. The dentist plays an important role in this team beginning from the cleft child's birth. All the care should be provided by the dentist with respect to the dentofacial growth from the cradle till adulthood so that the cleft patients successfully survives as a normal individual in the society.

In a complete cleft lip and palate patient, the maxillary structure will be divided in two or three segments by the cleft of the palate and alveolus and may be associated with collapsed nostrils. Presurgical infant orthopaedic treatment aims at securing a good maxillary arch form in acceptable relationship with the mandible and to restore normal oral function. It was recognized that the cartilage in the new born is soft and lacks elasticity. The high maternal level of oestrogen at the time of birth correlates with an increase in hyaluronic acid, which inhibits the linking of the cartilage intercellular matrix. This process may be necessary to relax ligaments, cartilage, and connective tissue, enabling the foetus to pass through the birth canal. The level of oestrogen begins to decline immediately after birth [1]. So, it was considered to be advantageous to utilise this molding capability of the alveolus and the nasal cartilage at the earliest using presurgical infant orthopaedics, thus reducing the deformity. The attainment of an end-to-end position of the alveolar processes before lip operation was the ultimate goal for infant orthopaedics performed by all dental practitioners in the past so that to achieve an anatomical correct position of the maxillary segments at the time of lip surgery [2,3]. It also improves the angulation of the palatal shelves to a more horizontal position [4,5].

More than half a century after its introduction by the Scottish prosthodontist Kerr McNeil, presurgical infant orthopaedics still remains a controversial part of the comprehensive care for cleft lip and palate patients [6]. However, the question remains of whether these short-term effects prior to primary surgery have any beneficial effect on overall treatment outcome in the long term. Over the years presurgical infant orthopaedics has given rise to emotional debates between advocates and opponents of the procedure. During the 8th International Congress on Cleft Palate and Craniofacial Anomalies in Singapore in 1997, a comparable debate took place, discussing the statement 'Is presurgical infant orthopaedics more a luxury than a necessity? Before and after the debates, the audiences voted equally in

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favour or against the statements. It was considered a major problem that hardly any sound research findings were available regarding the effects of neonatal maxillary orthopaedics [7]. The opponents of presurgical infant orthopaedics stated that neonatal maxillary orthopaedics is a complex and expensive therapy that is ineffective and unnecessary.

Parents are obliged to travel frequently to the treatment centre and are given the burden of compliance. Furthermore, it is stated that presurgical infant orthopaedics restricts maxillary development and influences speech negatively due to delayed surgery of the hard palate inherent to neonatal maxillary orthopaedics. Kuijpers-Jagtman and Prah Andersen conducted a randomized clinical trial named Dutchcleft in three centres, and compared infant orthopaedics and non-orthopaedics groups in relation to general, orthodontic, and cost effectiveness, as well as speech effects of these approaches. They concluded that there is no need to perform infant orthopaedics for unilateral cleft lip and palate as there was no much comparable benefits for treated cases [8]. Prah, *et al.* summarized the arguments of the proponents of the use of infant orthopaedics who state that this approach allows a more normalized pattern of deglutition, prevents twisting and dorsal position of the tongue in the cleft, improves arch form and position of the alar base, facilitates surgery, and improves outcome in general. Other alleged benefits were the reduction of posterior cleft width, prevention of initial collapse after surgery, prevention of cross bites, straightening of the nasal septum, facilitation of feeding, less danger of aspiration, better speech development, better nose breathing, better middle ear conditions, less extensive orthodontic treatment at later ages, and a positive psychological effect on the parents.

Presurgical infant orthopaedics took a new turn and the number of proponents for it increased with the introduction of nasal molding along with the usual alveolar molding, a new technique which was termed as Nasoalveolar molding (NAM). Presurgical neonatal nasal remodelling with an infant plate was first described by Dogliotti, *et al.* in 1991 [9]. The first treatment protocol for nasoalveolar molding (NAM) was described and popularized by Grayson, *et al.* [10]. Many studies started to get published with its positive effect in nasal molding [11-13]. A meta-analysis performed to study the effect of PNAM in unilateral cleft on nasal symmetry by van der Heijden, *et al.* revealed that the results of NAM were inconsistent regarding changes in nasal symmetry; however, there was a trend towards a positive effect [14]. Uzel and Alparslan concluded in their systematic review that presurgical infant orthopaedic appliances have no long-term positive effects in patients with cleft lip and palate and that more randomized controlled trials are necessary. They also added that the encouraging results on the effect of nasoalveolar molding appliances on nasal symmetry need to be supported by future randomized controlled trials [15]. Garfinkle, *et al.* compared the nasal morphology of patients treated with presurgical nasoalveolar molding followed by primary lip/nasal reconstruction with age-matched noncleft controls. A longitudinal, retrospective review of 77 non-syndromic patients with bilateral cleft lip– cleft palate was performed in 5-time points spanning 12.5 years. They were able to attain nearly normal nasal morphology through 12.5 years with only initial primary nasal reconstruction, performed at the time of their lip repair [16]. This longitudinal study was promising for the proponents of NAM.

Since cleft lip and palate treatment requires multidisciplinary approaches, outcomes may be affected at any stage of treatment. Therefore, the pure effect of presurgical infant orthopaedic appliances is very difficult to assess because of the variety in timing and sequence of treatment protocols for both surgery and orthodontics. The major difficulty when comparing different presurgical orthopaedic methods is the type of surgical technique, and whether performing sequential palatal closure (one or two stage) or gingivoperiosteoplasty, at what age, the experience of the surgeon etc [17,18]. So a well-designed long-term future studies are still required to give the right answer whether NAM is beneficial or not. As now, NAM could be purely the choice of the head of the craniofacial team keeping the pros and cons with respect to their centre.

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