Oral Health Related Quality of Life in Pre-school Children Treated with Nasoalveolar Molding (NAM)

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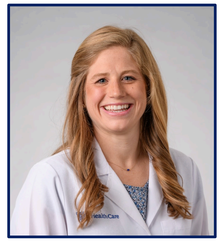

INTRODUCTION

Cleft lip and palate (CLP) is among the most common congenital craniofacial anomalies that can affect facial appearance and oral function [1,2]. Children with CLP may present with alterations affecting tooth size, number and quality [1,3]. Additionally, enamel defects on teeth adjacent to the cleft, orthodontic and other acrylic appliances, significant lip scaring, and malalignment of teeth present challenges maintaining oral hygiene and can increase the incidence of dental caries and periodontal disease [3]. Nasoalveolar molding (NAM) (Figure 1), a type of presurgical orthopedic device, that was designed to reduce the severity of the cleft lip/nasal deformity by aligning the lip, alveolar segments, and palate prior to surgery (Figure 2) [1,4,5]. Additionally, the separation produced between the oral and nasal cavities improve feeding, aiding in nutritional concerns [1,4,5]. NAM benefits include esthetic, functional, economic and psychological outcomes [3]. This treatment can positively impact the development of the primary and permanent dentition and the aesthetic and psychosocial well being of CLP patients and their families [4,5,6].

The Child Oral Health Impact Profile-Preschool Version (COHIP-PS) is a validated instrument used to assess Oral Health Related Quality of Life (OHRQoL) in preschool aged children, including positive and negative perceptions of health and its outcomes [7,8].

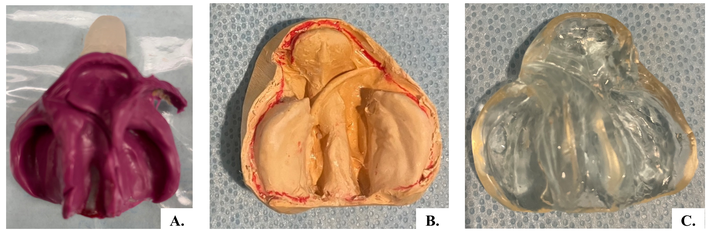

Figure 1. A: Polyvinyl siloxane (PVS) heavy body impression; **B.** Working cast used to fabricate NAM appliance; **C.** NAM appliance prior to button placement.

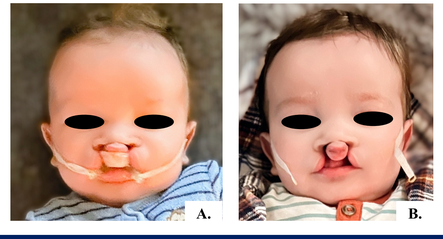

Figure 2. Active treatment with NAM 9/2/2021 - 1/4/2022. **A.** Patient with NAM; **B.** Patient without NAM.

PURPOSE

The aim of this study was to investigate the oral health related quality of life in children with cleft lip and/or palate with history of NAM utilizing the Child Oral Health Impact Profile – Pre-school version (COHIP-PS).

METHODS

STUDY DESIGN: Institutional review board (IRB) approval for this study was obtained through the University of Kentucky IRB (protocol IRB #84933). All data was collected using REDCap (Research Electronic Data Capture; Vanderbilt University), a secure, web-based application for building and managing online surveys and databases. Electronic informed consent was obtained prior to participation.

INCLUSION/EXCLUSION: The study population consisted of healthy preschool children (2-5 years of age), female/male, that received NAM treatment at the University of Kentucky Pediatric Dental Clinic located in Lexington, KY and age/gender matched controls without cleft lip and palate. Parents/Legal Guardian completed the COHIP-PS, a 10-point questionnaire, to evaluate the child's oral health related quality of life. All participants must be ASA 1, with a history of isolated cleft palate with and/or lip and no syndromes associated.

STATISTICAL ANALYSIS: Fisher's exact tests were used to assess univariate differences in these measures between patients with and without NAM. A p-value of less than 0.05 was considered significant.

RESULTS

The overall dataset summary consisted of 30 preschool aged patients from ages 2 to 5 years old, 10 NAM (33%) and 20 non-NAM (66%) age/gender matched. Table 1 summarizes respondents characteristics. Most respondents (n equals 21) were male, consistent with male predilection for CLP. An interesting finding was how similar the reported functional well being and self image categories (Figure 3) between the two groups, as function and esthetics are two concerns for CLP patients and their parents. The data supports the positive benefit and outcomes related to NAM.

Table 1: Age and gender demographics

GENDER		
	Non-NAM	NAM
Female	8	1
Male	12	9
AGE (years)		
	Non-NAM	NAM
2	3	4
3	5	1
4	3	2
5	9	3

Table 2: Survey questions with respective p-value

Survey Questions	
Question	**P-value**
Tooth pain	1.000
Discolored teeth	0.200
Bleeding gums	0.345
Difficulty eating foods	0.519
Difficulty keeping teeth clean	0.335
Felt unhappy/sad	1.000
Felt worried/anxious	0.565
Felt good about himself/herself	1.000
Enjoys smiling/photos	1.000
Felt that he/she looked different	0.251

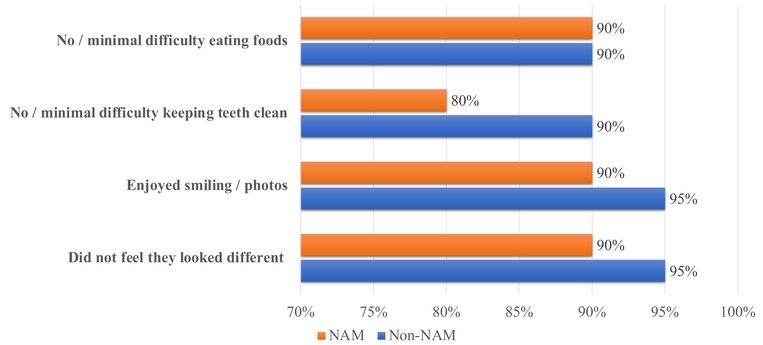

Figure 3. Percentage (%) of responses regarding functional well being and self image categories.

DISCUSSION

Within the first year of life, patients with CLP and their families endure many appointments and surgeries which can cause economical and financial strains [6]. Managing patients with CLP requires an interdisciplinary approach including pediatric dentistry, oral and maxillofacial surgery, orthodontics, plastic surgery, speech pathology, social work and many more.

The present study showed that patients treated with NAM followed by surgery achieved overall oral related quality of life comparable to patients with no history of CLP. NAM helps to guide the growth and direction of the alveolus for manipulation, reducing the severity of the initial defect [4,5,6,9] . The goal is to align the posterior lateral alveolar segment while retracting and de-rotating the pre-maxilla, mold the nasal cartilages and elongate the columella [5,6,9]. It is possible due to the increased levels of hyaluronic acid in the baby's cartilage, as a result of high level of maternal estrogen around the time of delivery [5,6,9]. The cartilage then presents sufficient elasticity and permits increased pliability and plasticity [9]. Around 6 months, this plasticity fades and the shape of the nasal cartilage can be manipulated, favoring lip closure or "cheiloplasty" [5,6,9].

NAM plays an important role in improving nasolabial esthetics and narrowing cleft gap before surgery. It could reduce the number of surgeries, treatment morbidity, and cost.

CONCLUSION

The results showed similar oral health related quality of life between CLP patients with history of NAM and age/gender match controls. This can support the positive benefits of NAM in relation to oral health, functional well being, social-emotional well being and self image of children with CLP.

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