

(CASE REPORT)



## Initiation to the management of a case of cleft lip and palate in Madagascar: Naso-Alveolar Molding

Mariette Rakotoson <sup>1,\*</sup>, Nirina Adrien Jean Vivier Mandrano <sup>2</sup>, Njarasoa Charlette Randriamalala <sup>3</sup>, Hery-Zo Rakotoharinivo <sup>1</sup>, Ndimby Nomenjanahary Andrinjakarivony <sup>1</sup>, Florian Adèlis Andriniaina <sup>1</sup>, Tahina Ratsirarisoa <sup>1</sup>, Marie Olga Rasoanirina <sup>1</sup> and Henri Martial Randrianarimanarivo <sup>1</sup>

<sup>1</sup> Department of Dento-Facial Orthopedics, Institute of Tropical Odonto-Stomatology of Madagascar, University of Mahajanga, Madagascar.

<sup>2</sup> Department of Surgery, University of Antananarivo, Madagascar.

<sup>3</sup> Department of Conservative Odontology Endodontics, Institute of Tropical Odonto-Stomatology of Madagascar, University of Mahajanga, Madagascar.

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### Abstract

**Introduction:** Cleft lip and palate represent the most common facial anomaly in the world, with a prevalence of 4.66‰ in Madagascar in 2016. These malformations constitute aesthetic, functional and social damage. Pre-surgical orthodontic management has not yet been applied in Madagascar. The objective of our study was to report the case of a patient with a cleft lip and palate treated pre-surgically by "Naso-Alveolar Molding".

**Observation:** This is a 3-month-old male child with a bilateral nasolabio-alveolar cleft associated with a total secondary cleft. The initial exo-buccal examination revealed 15mm (left) and 16mm (right) nasal cleft widths, 6mm (left) and 5mm (right) lip cleft widths. The intraoral examination showed 3mm (left) and 4mm (right) of alveolar cleft widths. The treatment consisted of the placement of "Naso-Alveolar Molding". The evolution having been favorable after a month marked by the reduction of the width of the slits and an aesthetic improvement exo-buccal.

**Discussion:** Pre-surgical orthodontics is performed in infancy to facilitate feeding, reduce cleft width, and reposition deformed nasal cartilages and alveolar processes; to lengthen the deficient columella in the neonatal period. The main objective being to minimize the extent of surgery that would have to be performed. The malleability of the nasal cartilage at the infantile stage indicates the orthodontist to its conception and to ensure a favorable prognosis.

**Conclusion:** The treatment of cleft lip and palate consists of a multidisciplinary approach including Dento-Facial Orthopedics.

**Keywords:** Cleft palate; Treatment; Orthodontics; Madagascar

### 1. Introduction

The cleft lip and palate is the consequence of a defect of partial or total fusion of the constituent buds of the upper facial mass involving the lip, the upper jaw (alveolar banks and palatal vault), as well as the soft palate; they are total or partial, unilateral or bilateral [1].

The average worldwide incidence is estimated at 1 in 700 births [2].

\*Corresponding author: Rakotoson Mariette

Cleft lip and palate present a range of problems such as feeding difficulties, speech impairment, malformations, as well as psychosocial stigma [3].

The hospital prevalence was 4.66‰ in Madagascar in 2016. These malformations constitute aesthetic, functional and social damage [4].

Naso-Alveolar Molding (NAM) is a non-surgical method of grinding the gumline and lip together by redirecting the growth forces of nature. It also allows the correction of nose flattening before surgery and facilitates nose repair at the time of lip repair [5].

Naso-Alveolar Molding (NAM) was developed by orthodontist Barry Grayson in 1993 [6].

It is an acrylic resin plate with a rigid base and a more flexible surface whose shape will be regularly adapted by creating expansion chambers in it in order to guide the alignment of the maxillary segments while stabilizing them in the direction transverse and anteroposterior before surgery [7].

The objective of our study was to report a case of a patient with a cleft lip and palate treated pre-surgically by Naso-Alveolar Molding.

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## 2. Observation

This is a 3-month-old male child with a bilateral nasolabio-alveolar cleft associated with a total secondary cleft. No particular medical history. The child presents a notion of false food path during his food intake. Our patient is underweight with a weight of 5kg 500g and a height of 41cm. It is located in the infantile period according to the growth curve of Björk; living in the Vakinakaratra region of Madagascar (central highlands).

The initial exo-buccal examination revealed 15mm (left) and 16mm (right) nasal cleft widths, 6mm (left) and 5mm (right) lip cleft widths.



(Source: Rakotoson Mariette)

**Figure 1** Frontal exo-buccal photograph

Endo-oral examination showed 3mm (left) and 4mm (right) slit alveolar widths.



(Source: Rakotoson Mariette)

**Figure 2** Intra-oral photographs

The treatment consisted of making and installing a device called “Naso-Alveolar Molding” (NAM), installing a “Lip taping” and improving nutrition.



(Source: Rakotoson Mariette)

**Figure 3** NAM application

The recommendations sent to the parents were strict, namely: exo-buccal hygiene by washing with warm water followed by drying; strict intra-oral hygiene by cleaning all oral surfaces with a compress soaked in lukewarm water with chloroxydine; and daily cleaning of the device with neutral soap.

The evolution was favorable on the aesthetic level by the reduction of the widths of the nasal fissures (Left: 10mm, Right: 11mm) and labial (Left: 2mm, Right: 2mm); improvement of nasal aesthetics (nasal straightening). Assessed functionally by normalizing the child's weight (6kg) and growth; feeding by resuming breastfeeding from the mother.

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### 3. Discussion

Naso-Alveolar Molding is a passive pre-surgical orthopedic appliance [6]. The treatment period is 2 to 3 weeks, it must be started at birth because the level of hyaluronic acid is higher at birth and decreases at 6 weeks. Hyaluronic acid allows the degradation of the intercellular matrix allowing the plasticity (molding) of tissues and bone. The device helps reduce the size of the intra-oral alveolar cleft; reduction in the extent of surgery, scarring; improving nasal aesthetics [8].

Wearing this device would limit the lingual interposition in the cleft, the cause of some of the above-mentioned deformities, and would allow the acquisition of a normal lingual motor representation by its centering, as well as a better acquisition of the language [9], thus promoting maxillary growth [10]. It would limit nasal regurgitation and irritation of the nasal mucosa, as well as the effort to feed by allowing more effective sucking movements and faster bottle-taking. The plate would be used as a guide for maxillary growth and positioning of the 2 segments using

expansion chambers, with the large segment being progressively re-oriented medial and the alveolar ridges more harmoniously aligned while reducing the space between them. This would thus facilitate the surgical procedure [11].

Complications can present in the form of tissue ulceration, pain, failure to maintain the device, irritation and over-stretching of the skin [12].

The prevalence of cleft lip and palate in Madagascar was 0.48‰ in 2011. It is higher in the highlands where the number of lighter-skinned populations is greater. A particularity is observed in the Vakinakaratra region where this prevalence is double that of the other regions due to the existence of very high doses of radioactivity in certain areas of this region [13].

The majority of parents do not seek prenatal consultation for financial reasons and because they are away from the health center [4].

The management of cleft lip and palate in Madagascar was mainly based on surgical treatments often carried out by non-governmental organizations (NGOs) but presents an increased risk of loss of sight.

The NGO Smile Train is an international charity that provides comprehensive cleft lip and palate care to children in over 90 countries including Madagascar. It provides a sustainable and multidisciplinary treatment, which currently includes Dento-Facial Orthopedics [14].

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#### 4. Conclusion

Cleft lip and palate is a congenital malformation with aesthetic and functional risk. The presurgical Naso-Alveolar Molding (NAM) device is an orthopedic therapy made in the pre-surgical period. Initiated in Madagascar to ensure a good prognosis thus improving public health. Our perspective would be to continue the practice of Naso-Alveolar Molding (NAM) in Madagascar as well as to evaluate on a longitudinal study.

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#### Compliance with ethical standards

##### *Acknowledgments*

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##### *Disclosure of conflict of interest*

No conflict of interest to declare.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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