# Nasoalveolar Molding in Early Management of Cleft Lip and Palate

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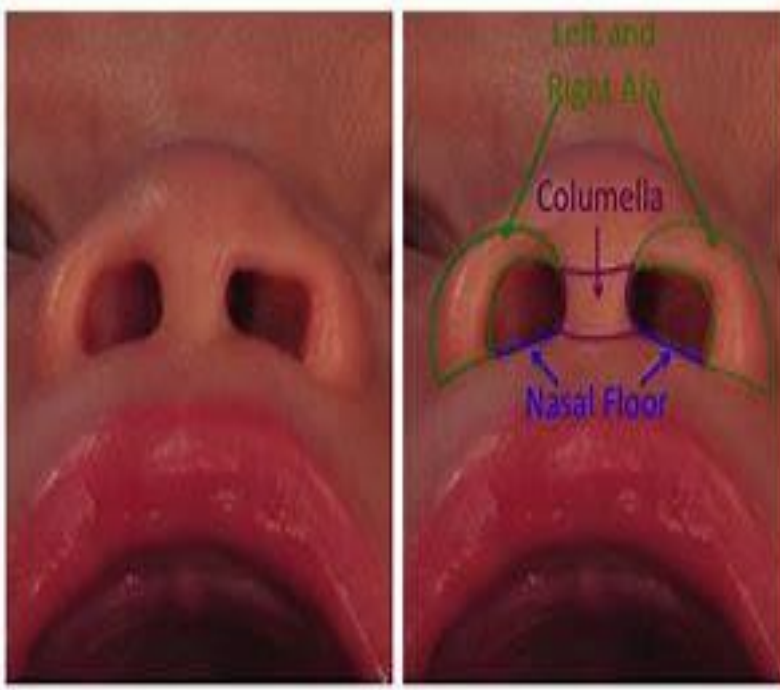
# Nasoalveolar Molding in Early Management of Cleft Lip and Palate

Cleft lip and palate patients have many defects particularly nasal deformities. The nasoalveolar molding (NAM) technique is an adjunctive treatment, which not only corrects deviated alveolar segments but also addresses nasal deformity before cheiloplasty for both UCLP and BCLP as an advance on use of the conventional pre-surgical orthopedics (CPSO). NAM technique is claimed to facilitate primary surgical correction and to provide favorable esthetic outcomes.

**Indications and contra-indications for application of**
**NAM technique**

***Indications***

- Unilateral or bilateral cleft lip with or without Nasal deformity and asymmetry
- Short and/or deviated columella
- Alveolar segments malposition
- Neonatal cleft patients
- Co-operative parents or caregivers



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***Contra-indications and disadvantages of NAM technique***

The contra-indications include[13]:
- Sick or unwell baby
- Position of lip and alveolar ridge is in close to normal position
- Patient cannot adapt to NAM appliance
- Non-cooperative parents and caregivers
- Long distance with costs for parents to bring child to clinic
- Non-availability of specialist services for preparing for and making the NAM appliance

The disadvantages include[14]:
- The appliance is complex
- Time consuming
- Expensive
- Burden on the parents and caregivers


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**Treatment objectives of NAM technique**

- To reduce severity of initial alveolar cleft deformities(11,12)
- To correct or reduce nasal deformity (nasal cartilage, nasal tip projection, alar base, position of columella and philtrum)(9)
- To increase columella length(9)
- To align and approximate alveolar segments(9)
- To facilitate surgical operation by providing minimal cleft deformity(11,12)
- To reduce the likelihood of further nasal surgery(10)
- To minimize surgical scar formation(9)
- To improve long-term nasal esthetics(10)
- To reduced need for secondary alveolar bone grafts if gingivoperiosteoplasty is included in the treatment(10)

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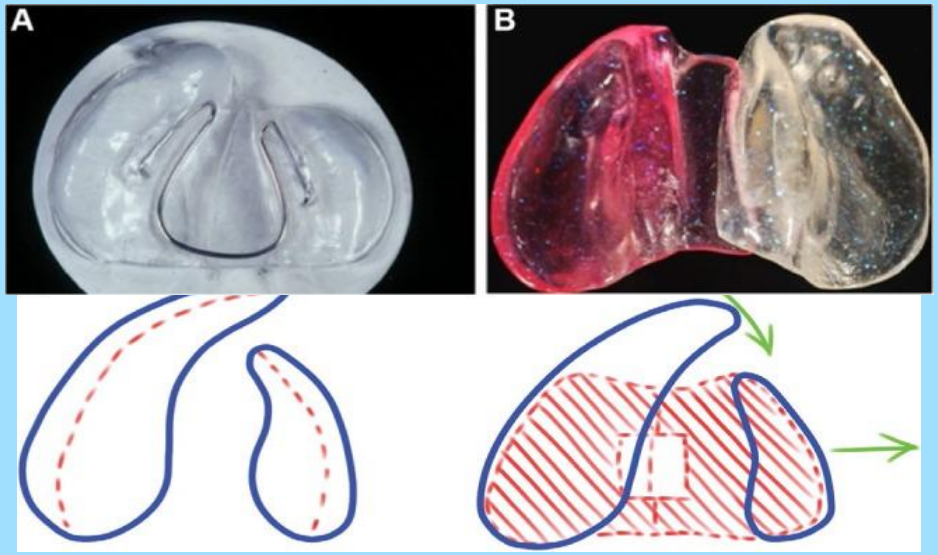
# Types of appliance

From 1950 that McNeil introduced the modern concept of presurgical maxillary orthopedics until now that nasoalveolar molding is the dominant and preferred approach, many different types of neonatal maxillary orthopedicappliances have been descr ibed in the literature.These appliances could be categorized as active,semi-active and passive devices or intra oral orextraoral appliances [3,17].

**Active appliance**s have active components such as spring or screw that apply force to alveolar segments and move them in a predetermined manner (Figure 1) [17]. Georgiade (1968) andLatham (1980) introduced two types of these appliances (Figure 2, 3) [18,19].

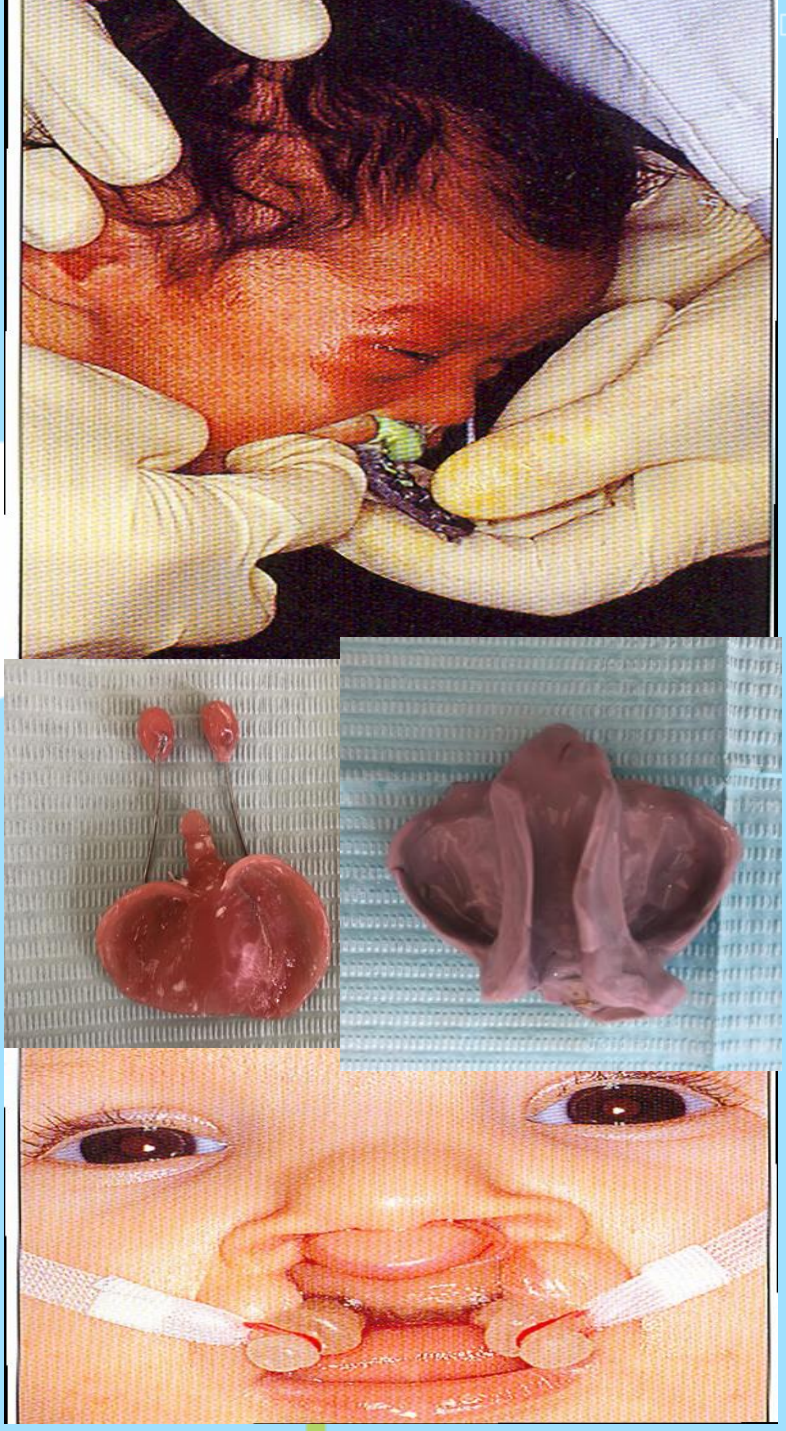
**Semi-active appliances** are constructed by sectioning the dental cast, and reorienting the maxillary segments in a more favorable position.The plate is fabricated on the constructed cast and forces the palatal segments in a predetermined direction when placed in oral cavity (Figure 4) [17].

And finally, **passive appliances** are supposed to induce arch alignment during growth by grinding away acrylic material in certain areas of the palate,to ensure proper spontaneous development of the segments and also to prevent collapse of the cleft segments (Figure 5) [17,20].The nasoalveolar molding appliances consist of an intraoral molding plate with nasal stents to mold the alveolar ridges and nasal cartilage concurrently. The stent is inserted into the affected nostrils at night during baby sleep to apply atraumatic pressure on the nasal tissues inorder to reshape, expand and reposition the external nasal structures. Besides, intraoral plate can reposition and realign the palatal segments(Figure 6) [20].

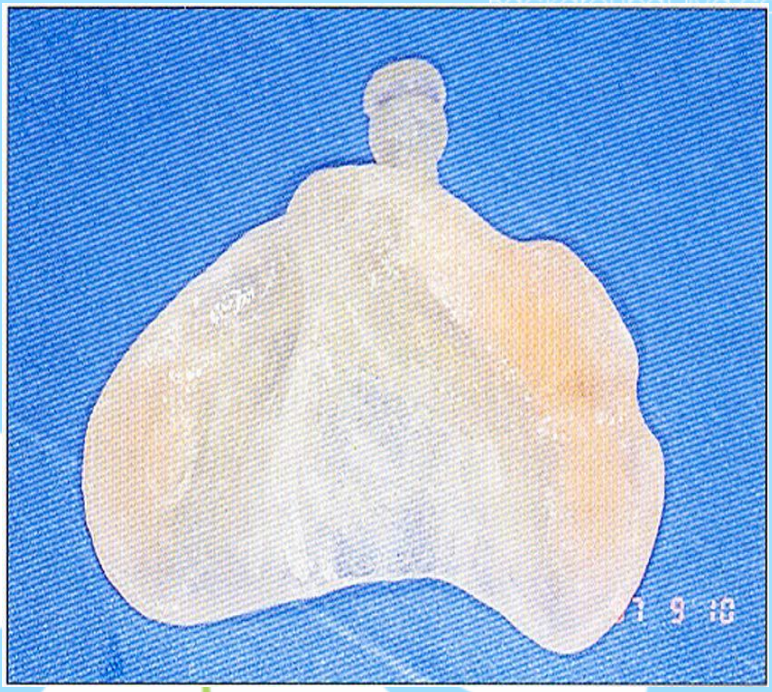


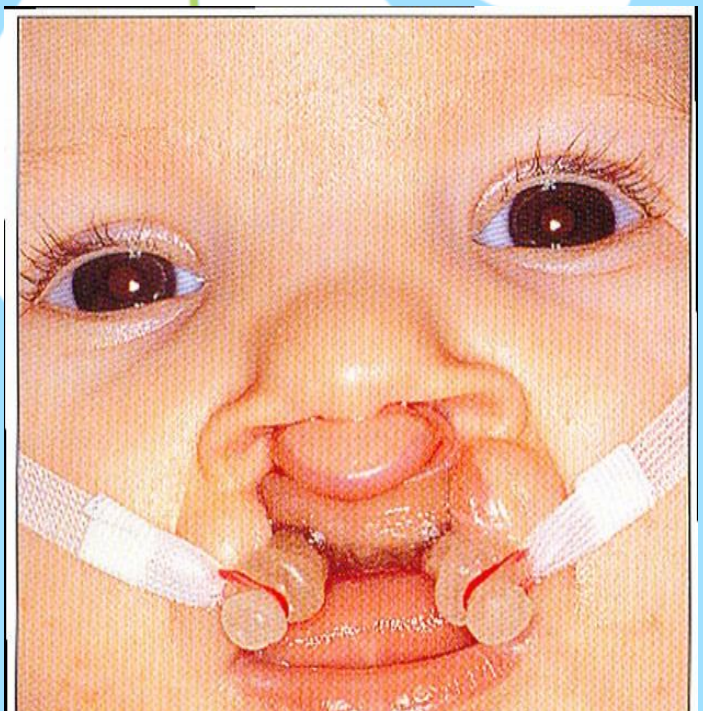

# Fabrication of NAM

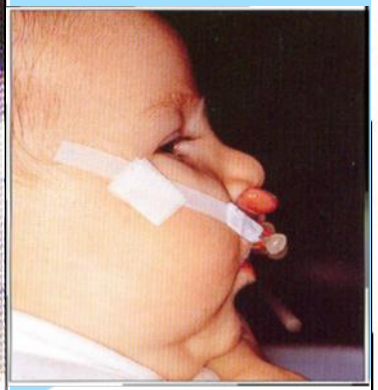
- Impression face down position , pournig
- Block out the under cut
- Use heat cure or sprinkle on method
- An extra- oral retentive bottons is utilized to secure the retentive lip tape and elastic bands
- The retentive botton should facing downward at 45 degree to the occlusal plane .
- At delivery appointment the app. should be well adapted and fairly self retentive ,it must be not fitted too tightly or fail to be retentive
- No acrylic material projected into the cleft
- The infant should be easily suckle
-

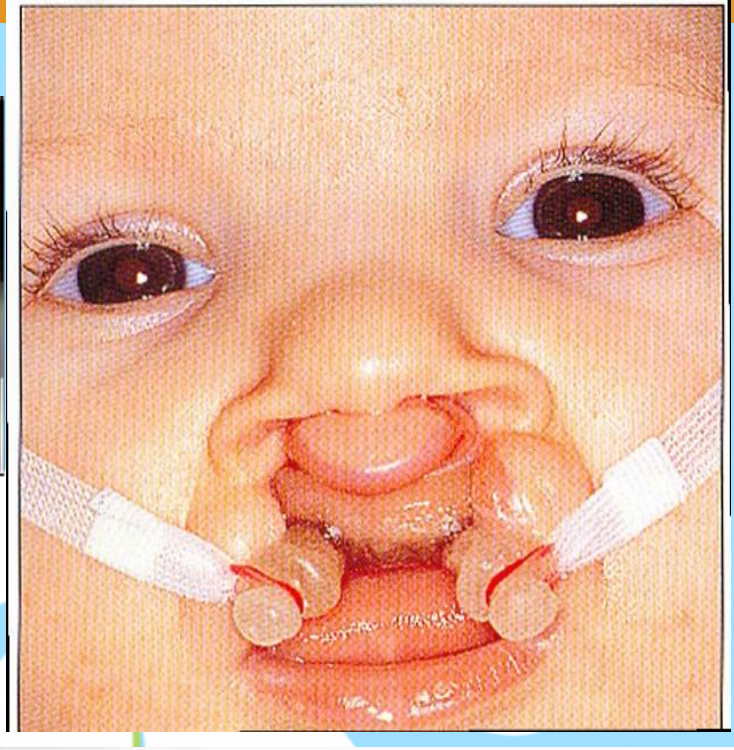


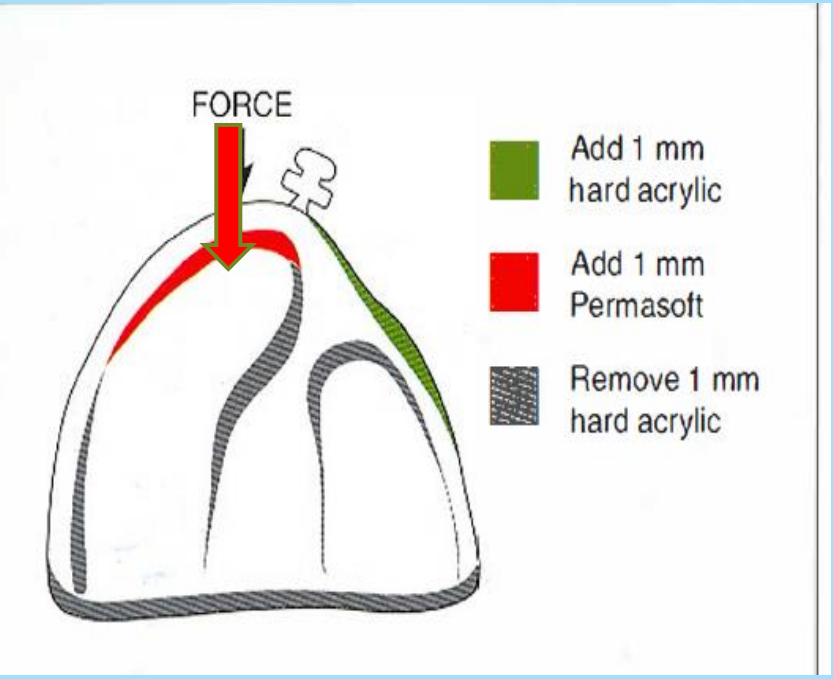
f NAM

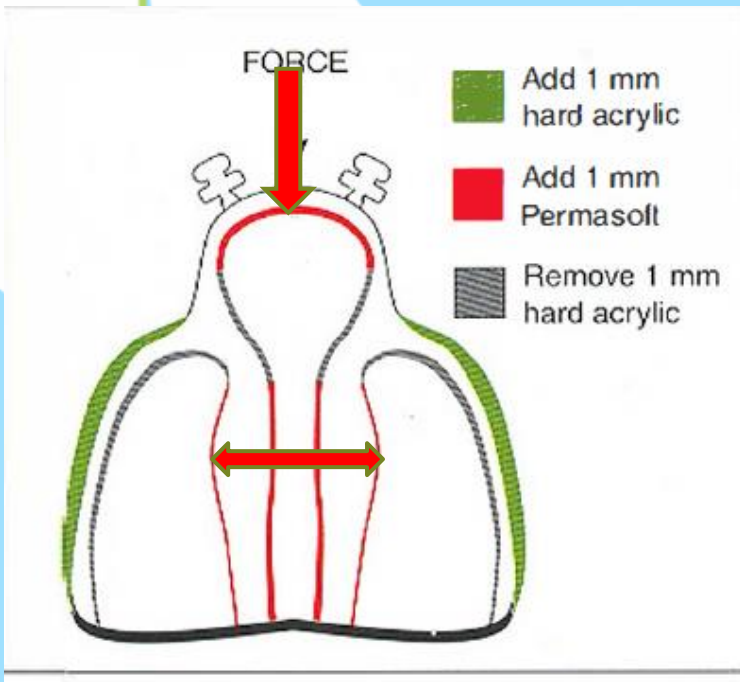









FORCE
Add 1 mm hard acrylic
Add 1 mm Permasoft
Remove 1 mm hard acrylic


FORCE
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Remove 1 mm hard acrylic

Enough **retentive force** has been exerted when the elastics have been pulled to twice their original length.

The correct **force vector** on the retentive tapes and elastics should be directed posteriorly and superiorly.

The **Strips** and elastic bands are changed as needed to allow continuous retention of the appliance.

The **base tapes** should remain in place for a longer period of time, while the thin tapes may require replacement.

The taping of the cleft lip segments also serves to improve the alignment of the nasal base region by bring them closely

Fig 5-12a Unilateral molding plate secured in the infant's oral cavity with surgical tapes and elastics.

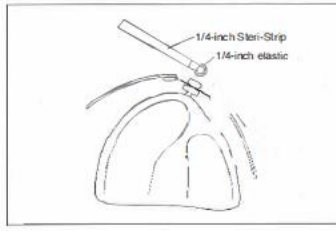



Fig 5-12b Arrangement of narrow retentive tapes and loops.

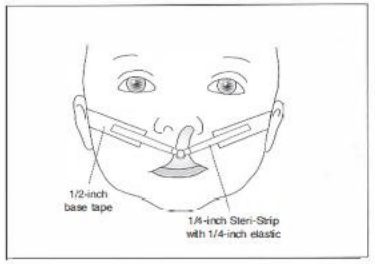
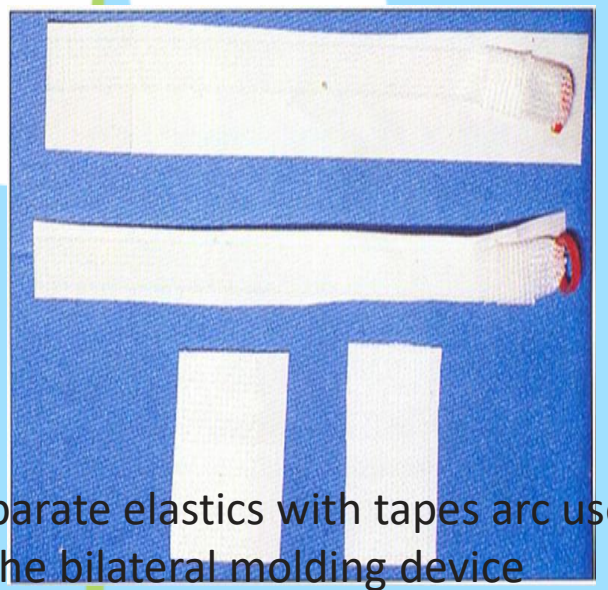



Fig 5-12c Wider tapes on the cheeks provide a foundation for retentive narrow Steri-Strips with elastic loops.



two separate elastics with tapes arc used retain the bilateral molding device

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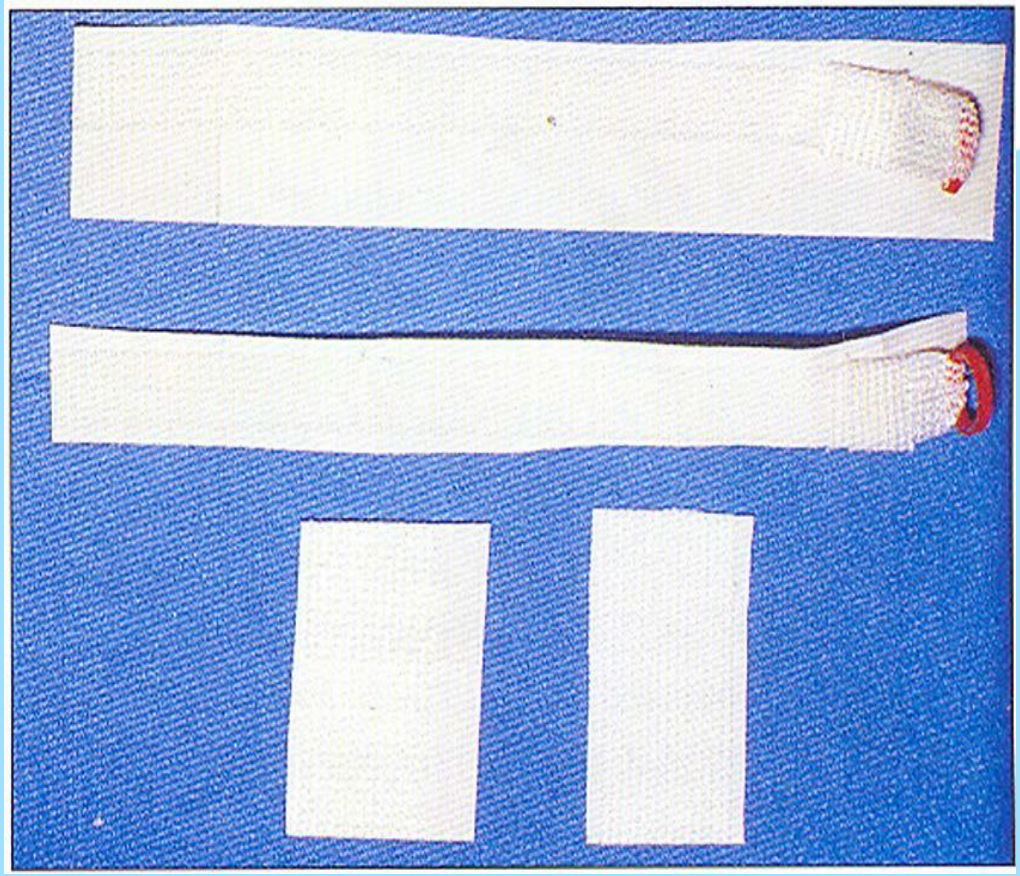
Strip advantages
1.For retention
2. used to gently draw the lip segments together across the lip cleft once the molding plate has been inserted and taped into place.



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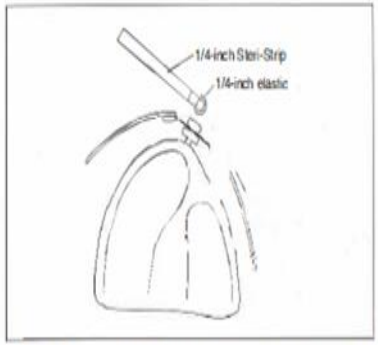


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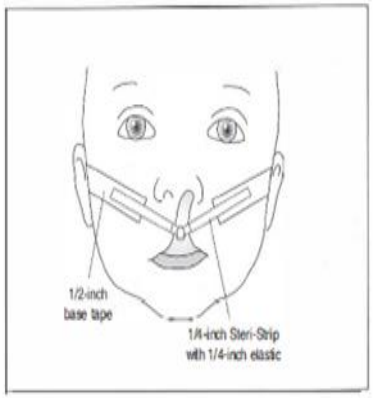


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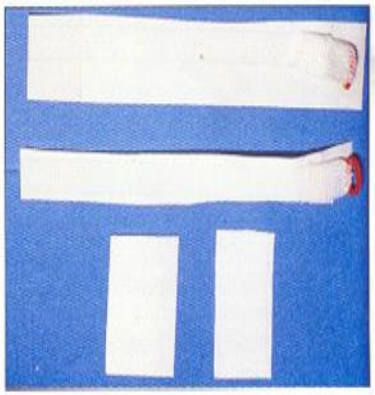
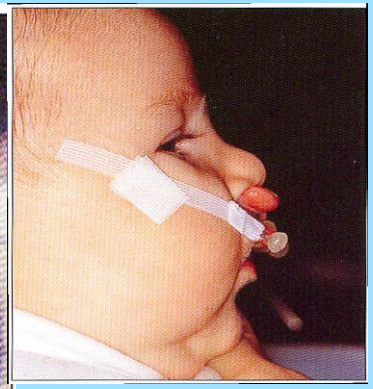
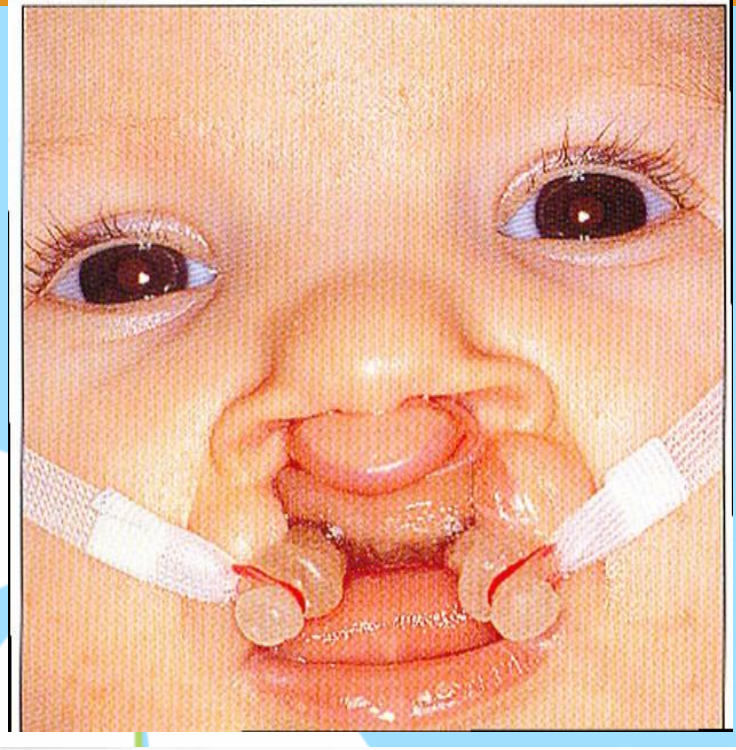
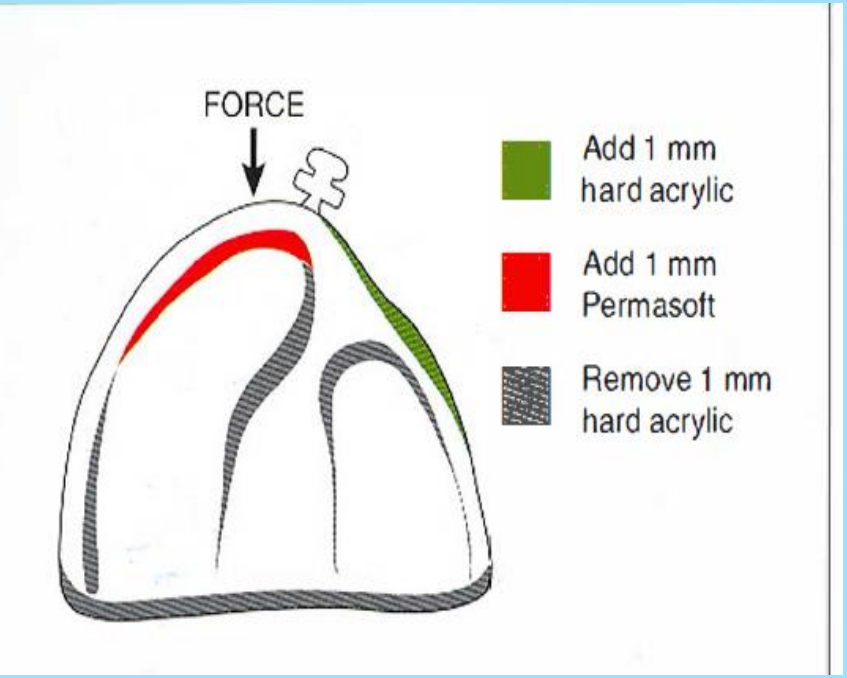


Fig 5-13 Retentive tapes and elastic loops.






FORCE
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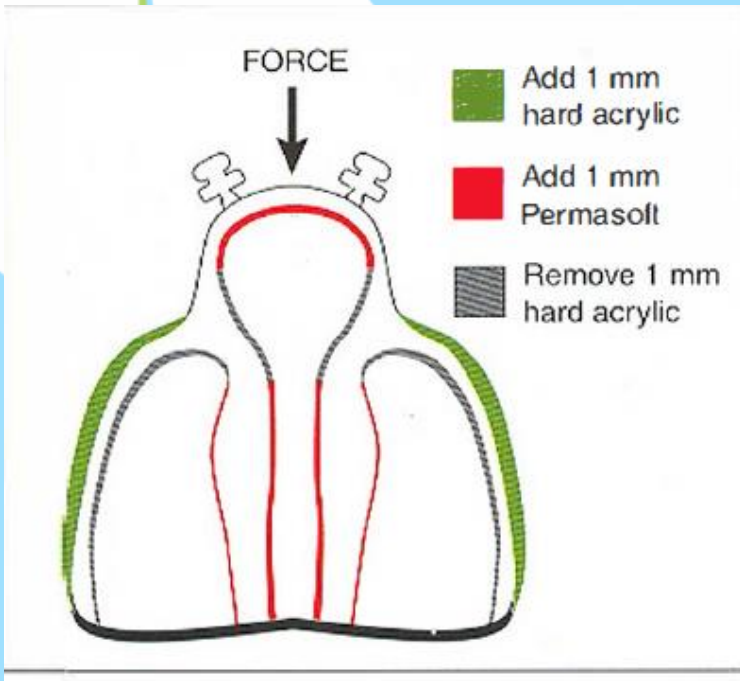
Add 1 mm Permasoft
Remove 1 mm hard acrylic


FORCE
Add 1 mm hard acrylic
Add 1 mm Permasoft
Remove 1 mm hard acrylic

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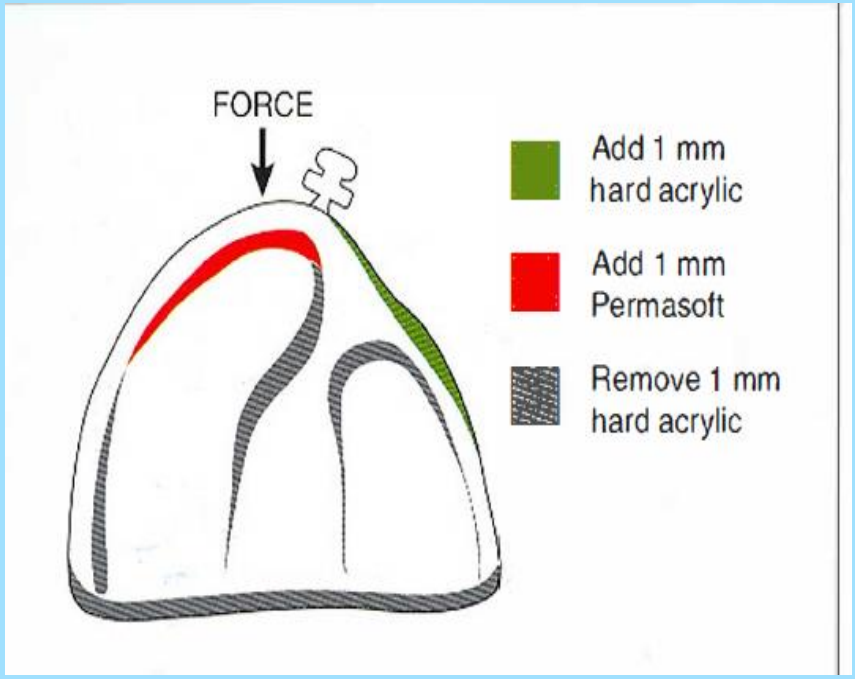
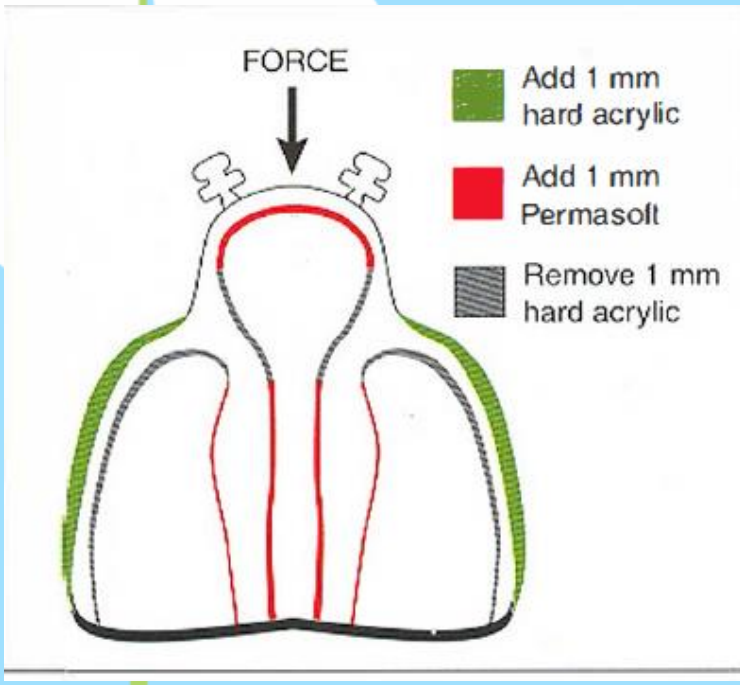
# Follow up

The palatal (tissue) surface of the appliance is again modified through selective grinding of acrylic and lining with additional soft liner material to further reduce the size of the cleft.



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# Follow up

First , the infant is examined to assess the **effectiveness of the taping** by the parents.

The **retention of the appliance** is also evaluated.

Palatal mucosa ,skin of cheek

The Suture-Strip tape is removed and the oral cavity is examined for any possible **sores**. The change in the size of the cleft between the alveolar segments can be measured

Before beginning any adjustments, the appliance is cleaned with soap and water.

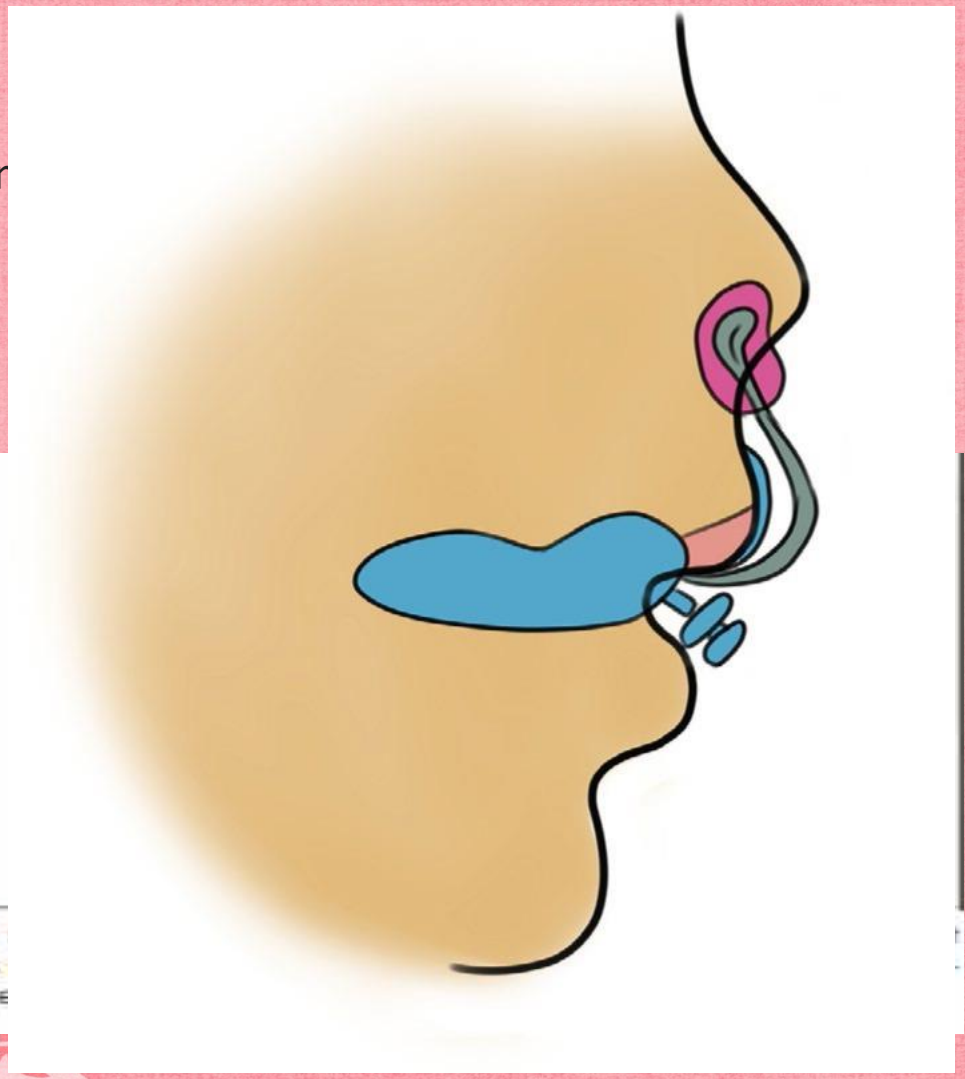
The palatal (tissue) surface of the appliance is again **modified** through selective grinding of acrylic and lining with additional soft liner material to further reduce the size of the cleft.

# Nasal stent

When the cleft gap has been reduced to approximately 6 mm or less, a nasal stent may be added to the appliance and the phase of active nasal cartilage molding may begin. The nasal stent is a projection of acrylic that is formed by the addition of small amounts of cold-cure acrylic resin  and covered by soft material until the stent is positioned. inside the nasal dome on the cleft side

# Nasal stent

The nasal stent may also be fashioned from 0.036-inch stainless steel wire secured to the labial flange of the appliance



# Nasal stent

When the cleft gap has been reduced to approximately 6 mm or less, a nasal stent may be added to the appliance and the phase of active nasal cartilage

The most common cause for the development of a mega-nostril is addition of the nasal stent before the size of the cleft gap is adequately reduced. Especially in unilateral cleft

Premature stenting places excessive force against the nasal tissues leading to excessive expansion

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## Complications Associated with Presurgical Nasoalveolar Molding and Columellar Elongation

*The Locked-out Segment*
*Nostril over expansion*
*Tissue ulceration*
*Fungual infection*
*Failure to retain the appliance*
*Failure to tape lip segment*
*Exposure of permenant teeth*

*ComplicationsThe most common problem with the NAm therapy is irritation of the oral mucosa (vestibule,oral side of premaxilla and cheeks), gingivaltissue and nasal mucosa. These problems are probably caused by applying too much force by the appliance [21]. Therefore, we suggest that careful examination and proper adjustment of theappliance would prevent these side effects. Fungal infection is another complication that canoccur because of poor oral hygiene and fullt the molding plate. This can be treated bylocal Nystatin or systemic Amph*

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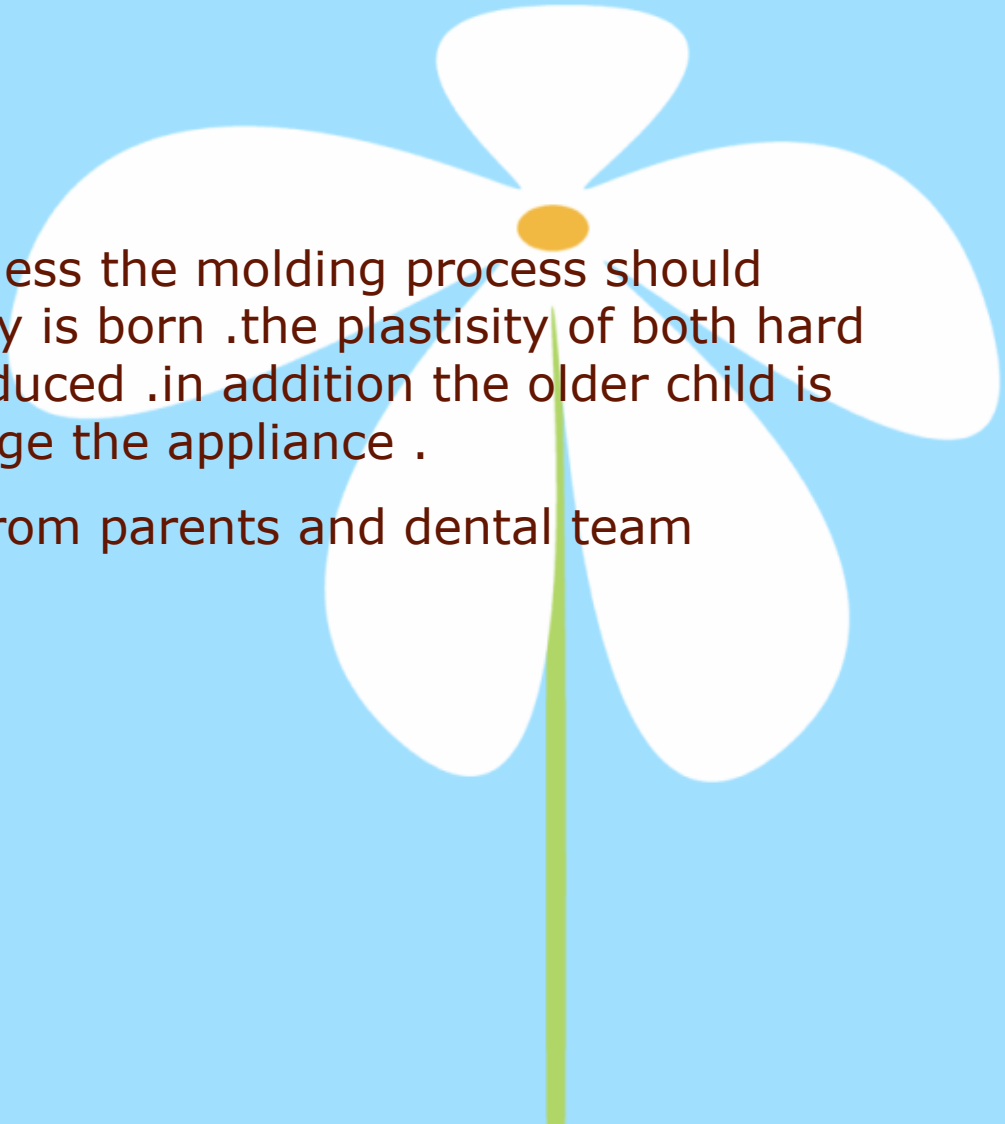
# Limitations



- For optimal effectivness the molding process should begins after the baby is born .the plastisity of both hard and soft tissue is reduced .in addition the older child is more likely to dislodge the appliance .
- Need commitment from parents and dental team

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# CONCLUSION

Nasoalveolar molding can be useful adjunct for treatment of cleft lip nasal deformity. It is possible to incorporate presurgical NAM at centers where basic plastic surgery services and support of orthodontist/prosthodontist is present. It can prove to be a cost-effective technique by reducing number of future surgeries in cleft patients. Studies with wider patient base and longer follow-ups are needed for definitive results.

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## BILATERAL CLEFT LIP SPECTRUM

BILATERAL INCOMPLETE CLEFT LIP

MICROFORM RIGHT & COMPLETE LEFT CLEFT LIP

INCOMPLETE RIGHT & COMPLETE LEFT CLEFT LIP & ALVEOLUS

BILATERAL COMPLETE CLEFT LIP & PALATE

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