Cleft lip & palate

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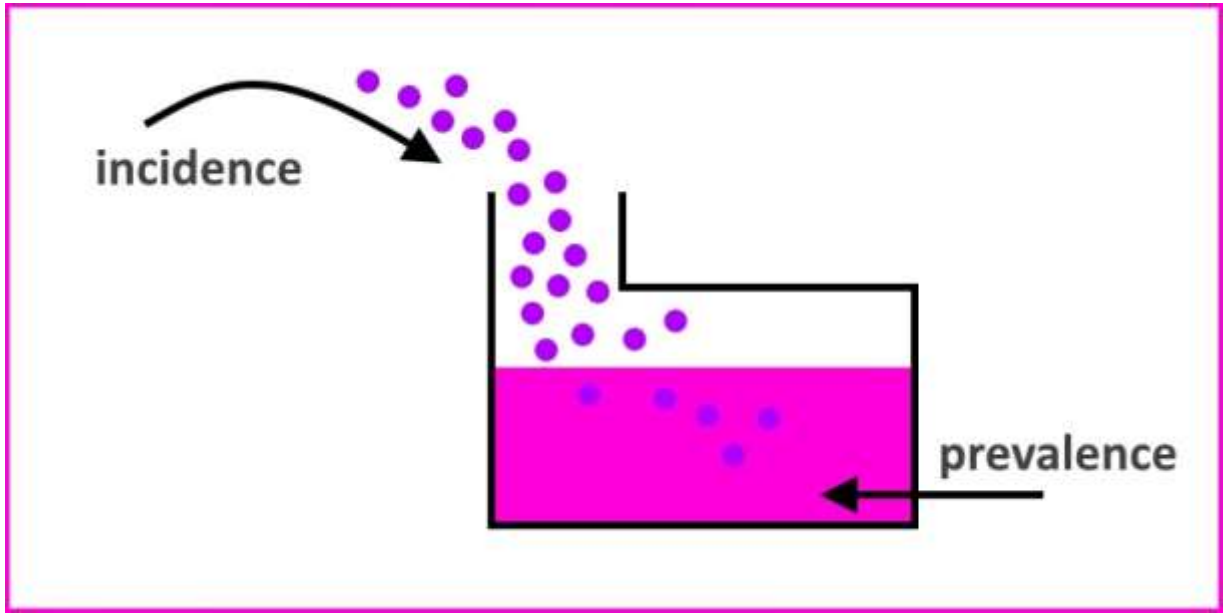
Baby with cleft lip

Baby with cleft palate

A **cleft lip** occurs when there is a split opening in the lip. This opening can be small or large enough to connect the upper lip and nose. A **cleft palate** occurs when the roof of the mouth does not close properly during a baby's early development. The is made up palate of two parts, either of which can be cleft-the hard palate the soft palate. The hard and palate is a bony portion in the front of the roof of your mouth. The soft palate is located at the back of the mouth and is made up of soft tissue.

Incidence of cleft lip and palate varies widely and ranged from 1 to 2 per thousand living births.

Unilateral clefts account for nearly 80 percent of all clefts seen, while bilateral clefts account for the remaining 20 percent. Among the unilateral clefts, clefts involving the left side are more common (70% of cases).



Pathogenesis of Cleft Lip and Cleft Palate

Cleft lip and palate occur when mesenchymal connective tissues from different embryologic structures fail to meet and merge with each other. The common form of cleft lip is a result of failure of fusion of the medial nasal process with the maxillary process.

Cleft lip may be unilateral or bilateral and may extend into the alveolar process. Cleft palate is the result of failure of the lateral palatine shelves to fuse with each other, with the nasal septum, or with the primary palate. Cleft lip and cleft palate are distinct and separate congenital abnormalities, but they often occur concomitantly.

Etiology of Cleft Lip and Palate

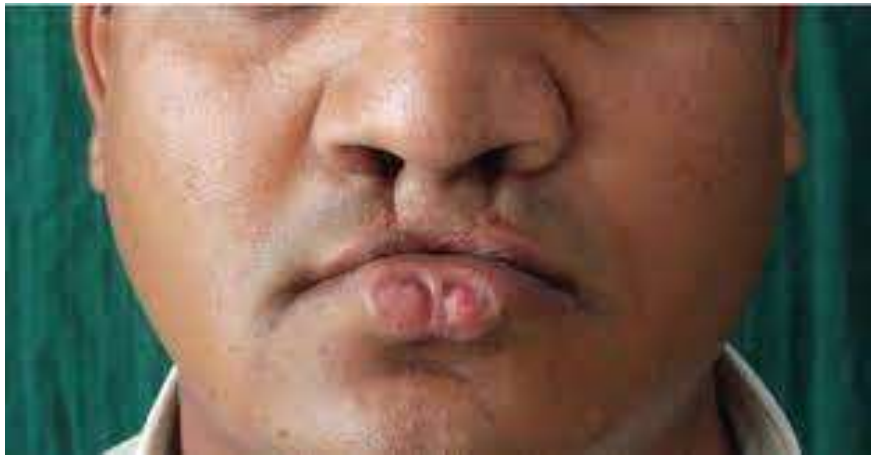
The cause of cleft palate and lip isn't known, but doctors believe that the defects occur because of both genetic and environmental factors.

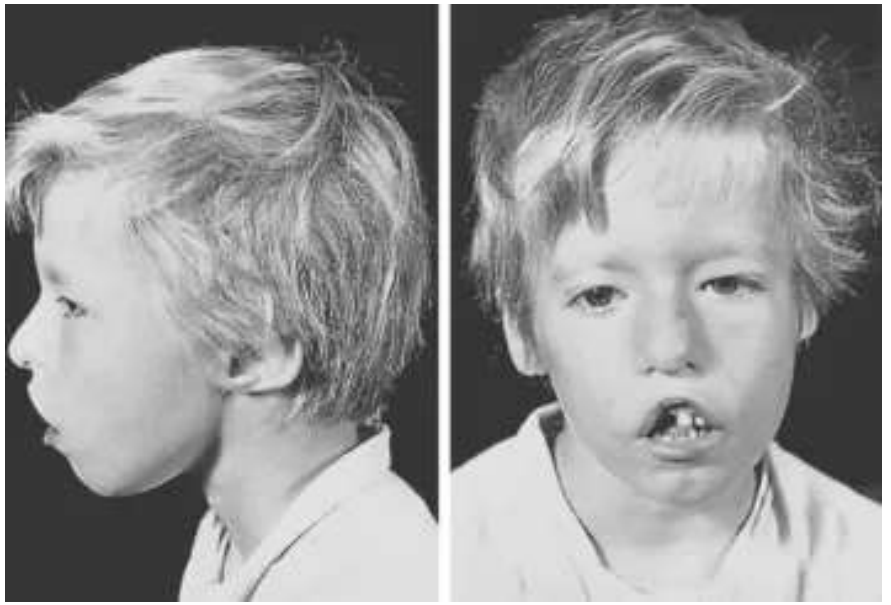
Genetics : can play a role in the development of clefts if one or both parents pass down a gene that makes a cleft palate or lip more likely.

Factors that scientists believe may cause a cleft to develop during pregnancy include

- **Cigarette Smoking**
- **Drinking Alcohol :** may give birth to a child with foetal alcoholic syndrome which may be associated with cleft palate
- **Drugs :** for allergy such as carbon monoxide or morphine over dose cause acute may hypoxia which followed by birth of malformed child
- **Infection:** like Rubella, influenza, Toxoplasmosis, etc
- **Diet:** not getting enough prenatal vitamins, like folic acid.
- **Being Diabetic**

A cleft can occur as an isolated birth defect or as part of a larger genetic syndrome, such as van der woude syndrome or velocardiofacial syndrome, which are both genetic malformation disorders





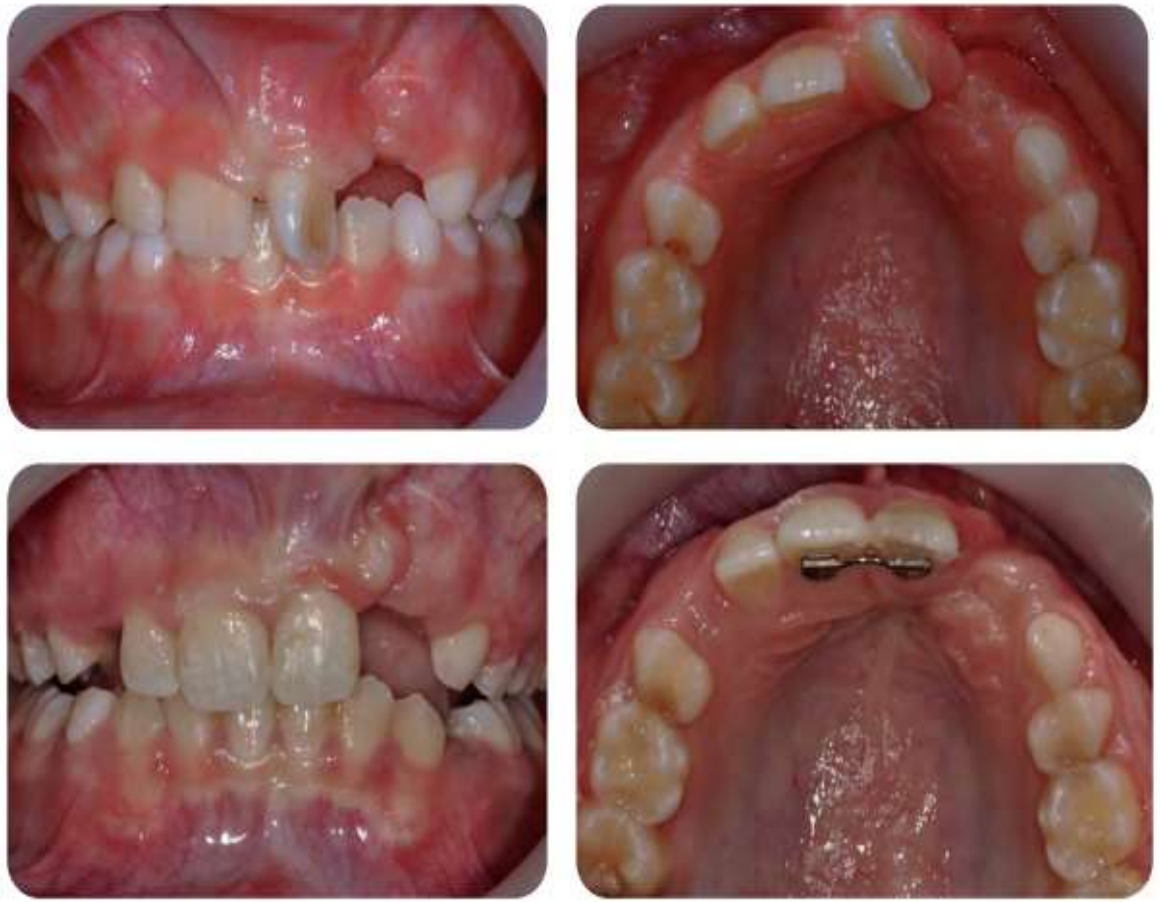
Features frequently associated with VWS include hypodontia, narrow arched palate, congenital heart disease, heart murmur and cerebral abnormalities, syndactyly of the hands, polythelia, ankyloglossia, and adhesions between the upper and lower gum pads

Velocardiofacial (DiGeorge) syndrome, Associated conditions include kidney problems, schizophrenia, hearing loss and autoimmune disorders such as rheumatoid arthritis or Graves' disease.

Problems Associated with Cleft Lip

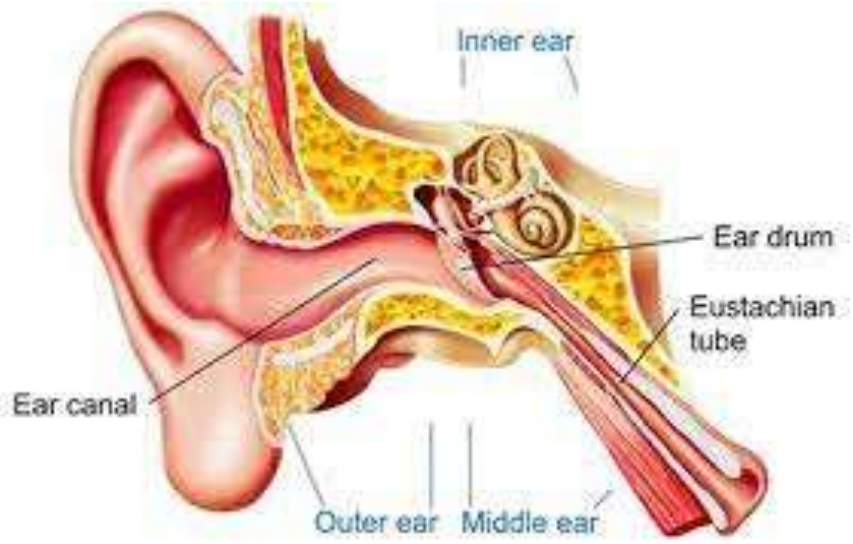
1. Dental Problems

Children with cleft lip or palate tend to have more dental problems than other children. The ridge of bone that supports the teeth and (alveolar ridge) might not upper gums develop properly. The child may need orthodontic treatment (dental braces). Tooth decay is more common among children with cleft lip and or palate. Good oral hygiene can help reduce the risk of decay and dental problems



2. Speech and Hearing

Cleft lip and palate have definite speech problems. These are sometimes associated with infections of middle ear, since speech is learned by the art of limitation, if hearing is compromised so is the speech. Also, if the maxilla is underdeveloped for maneuverability of tongue get decreased and speech is likely to get affected. A speech-language pathologist can help solve speech problems. The child may need surgery, such as pharyngeal flap surgery or augmentation pharyngoplasty to reduce the amount of air that escapes through the nose when the child speaks. The speech therapist may also help the child correct pre-operative speaking habits

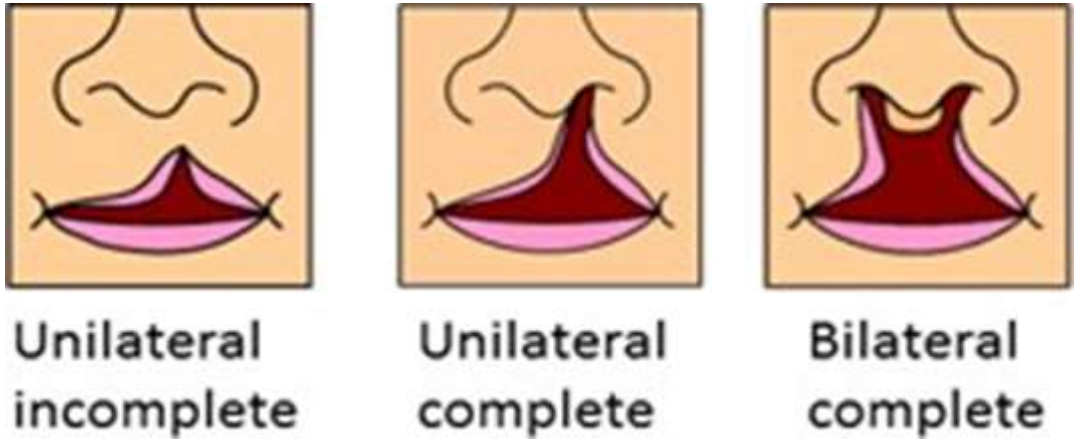


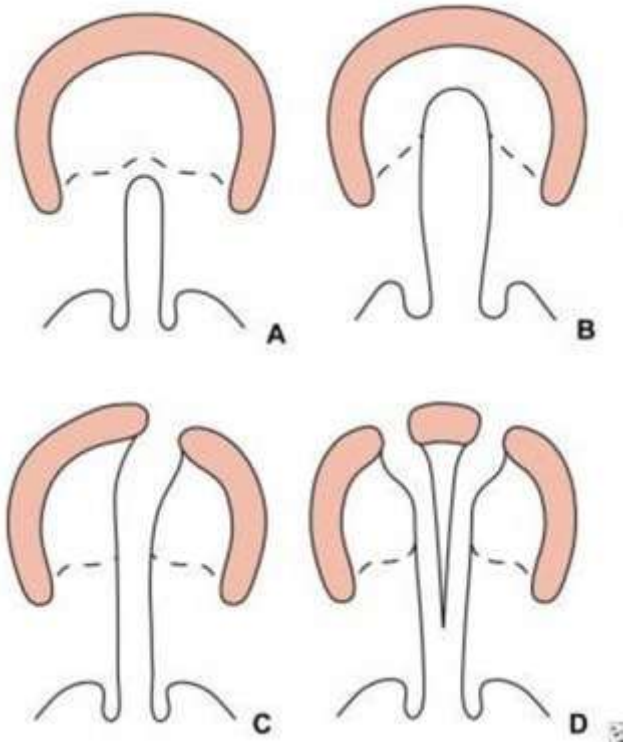
3. Psychological

The child may need encouragement to interact with other children from an early age. Children may ask questions regarding any visible evidence of cleft lip/palate- the child should be told in straightforward terms what a cleft lip palate is, so they can pass this information on to their friends when they ask. If the child's condition results in hearing and speech problems, it is important to liaise with the school. such simple things as making sure he/she sits at a strategic part of the classroom are important

Classification of Cleft lip and Palate

Cleft lip is classified either unilateral or bilateral and it could be minor cleft of the lip or increase in the severity to complete cleft of the upper lip or continue to reach the nostril or to the internal angle of the eye, mostly unilateral, sometimes cleft lip may involve the alveolar ridge





Cleft face

Veau's clef palate classified as:

Group I : cleft of the soft palate only.

Group II : involving the hard palate and soft palate (secondary palate).

Group III : complete unilateral cleft palate.

Group IV : Complete bilateral cleft palate.

Kernahan's striped Y classification :

This is symbolic classification. The classification uses a striped "Y" having numbered a blocks to represent a specific area of the oral cavity.

Block 1 and 4 Lip.

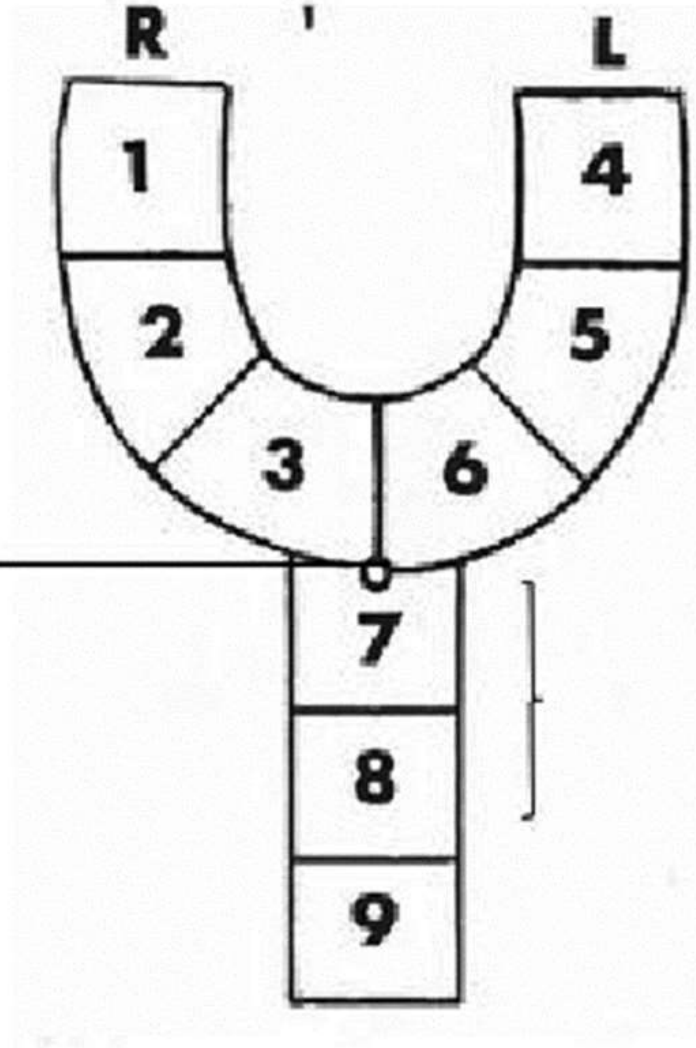
Block 2 and 5 alveolus.

Block 3 and 6 Hard palate anterior to the incisive foramen.

Block 7 and 8 Hard palate posterior to the incisive foramen.

Block 9 Soft palate.

KERNAHAN STRIPED Y CLASSIFICATION (1971)



INCISIVE FORAMEN

LIP

ALVEOLUS

PRIMARY PALATE

HARD PALATE

SOFT PALATE

Management of cleft lip and palate

Timing and sequencing of orthodontic care may be divided into four distinct developmental periods. These periods defined by age and dental development and should be considered as time frames in which to accomplish specific objectives.

Stage I (Neonatal stage from birth to 2 years)

Stage II (Primary Dentition stage from 2 to 6 Years of Age)

Stage III (Mixed Dentition stage (7 to 12 Years of Age)

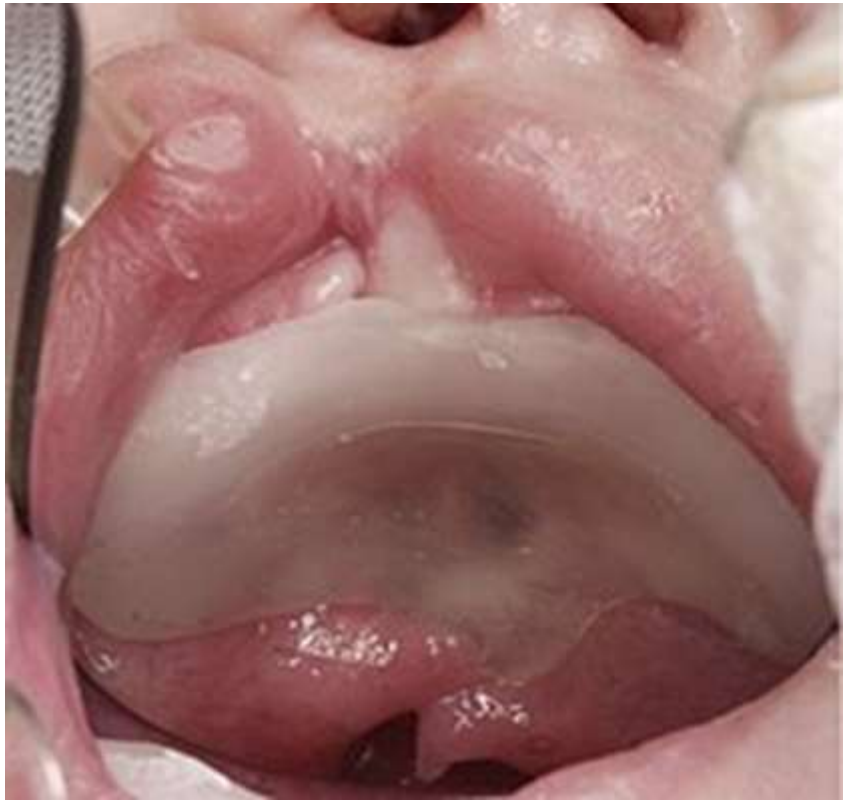
Stage IV (Permanent Dentition Stage)

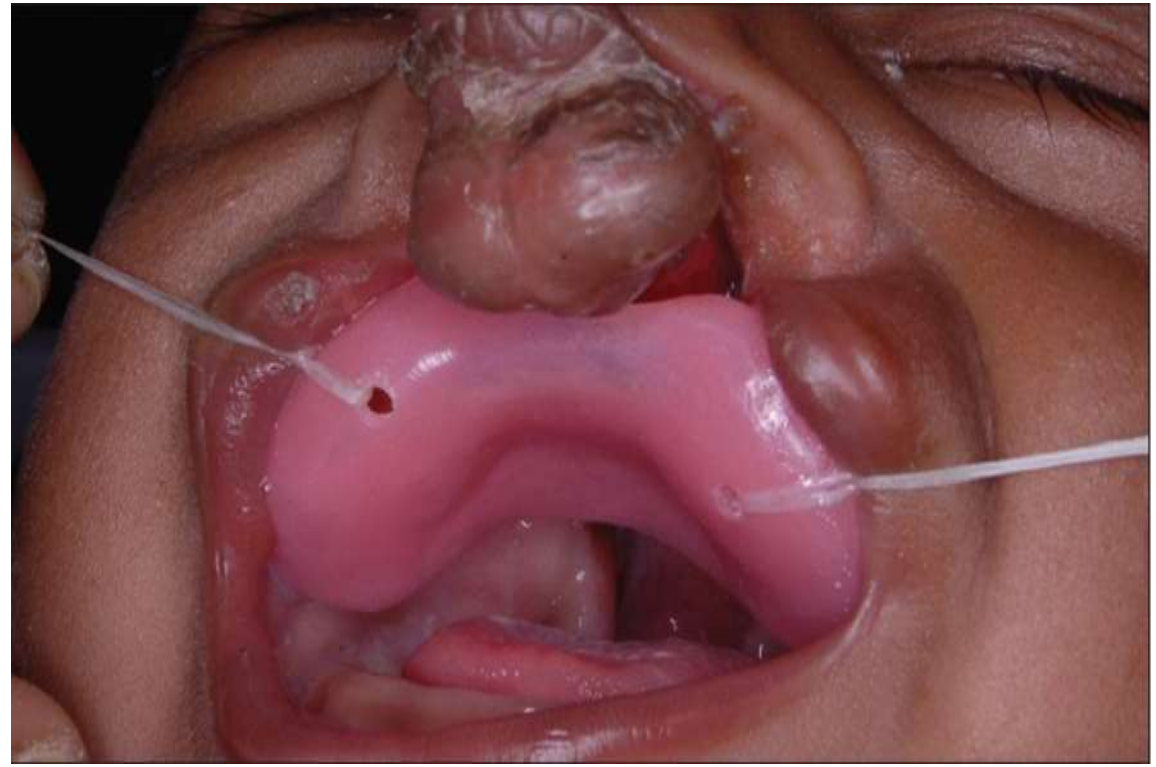
Stage I (Neonatal stage from birth to 2 years)

The functions orthodontist at this stage are

Fabrication of a feeding plate or passive maxillary obturator , Strapping of the premaxilla or other infant orthopedic procedures.

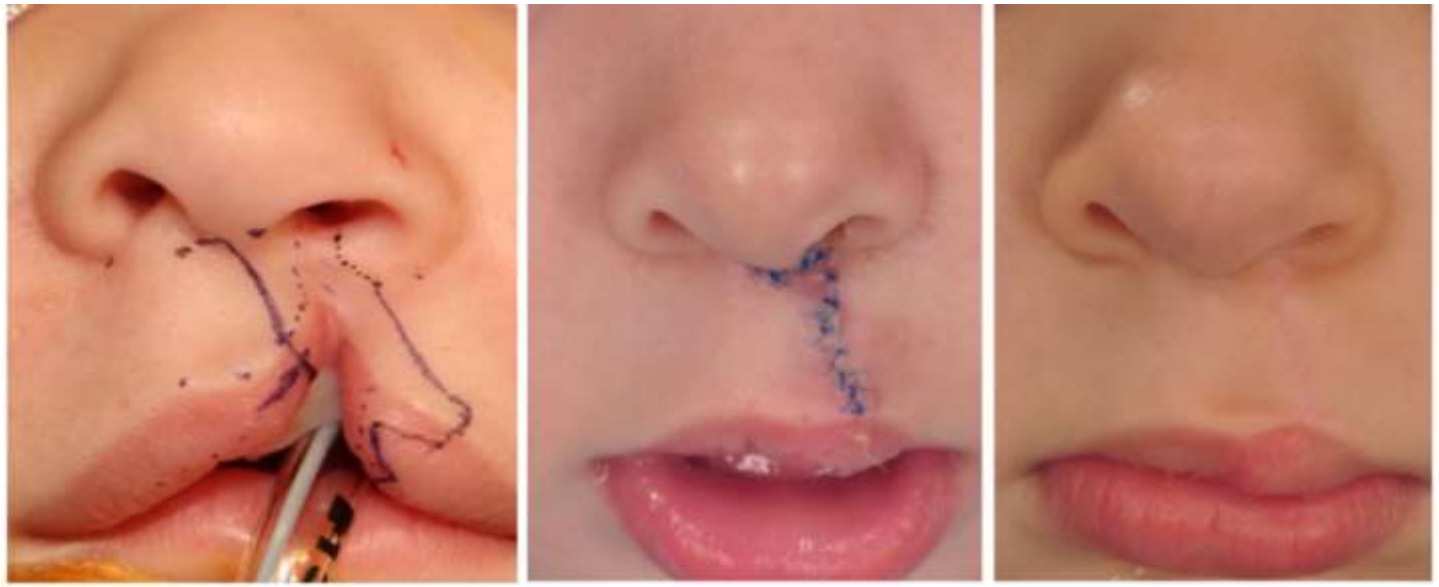
The feeding plate or passive maxillary obturator is a passive prosthetic appliance that is a used to restore the palatal cleft and aid oral function. It also help in preventing the maxillary arch from collapsing further. The appliance is generally made of cold cure or heat cure acrylic. The benefits from early presurgical orthopedic appliances also need to be weighed against the increased burden of care because of the number of clinic visits necessary to adjust the appliance during the first year of life.





Cleft friendly bottles

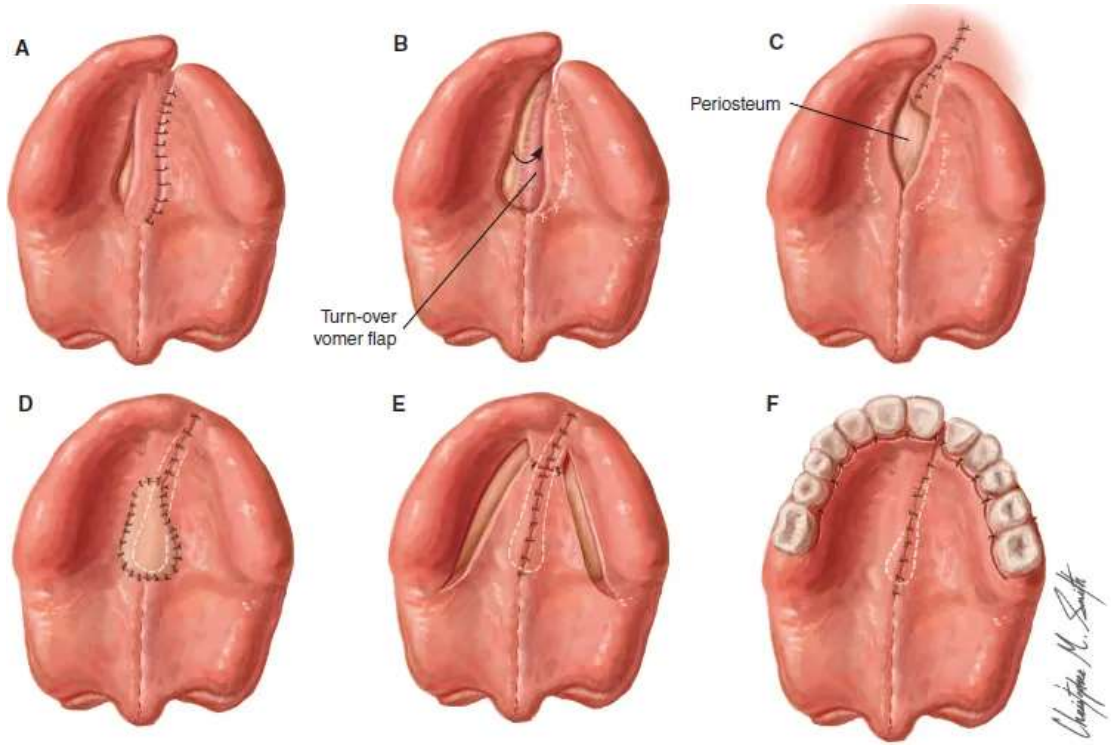
Surgical Repair of The Lip : This early surgical repair of the lip by an adhesion technique has much to commend it because the parents are not required to remove or adjust appliances, the cosmetic appearance is improved with a minor initial surgical procedure, and postoperative care by the parents is minimal. The most serious problem with this approach is the potential of **wound dehiscence** and the need for an additional surge definitive lip repair usually is achieved by the time the infant is **3 to 6 months old**.



Intraoperative markings | 1 week after repair | 8 months after repair

Repair of The Palate : Early repair of the palate and the resulting scar tissue have an effect on the growth and development of the maxilla, which is reflected in the occlusion as a crossbite of anterior and posterior teeth. it is delayed **until 12 months to 2 years** of age. An intact palate aids the acquisition of normal speech.

At this time speech is developing rapidly. For ideal speech palatal closure were done at this age. The objectives of palatal surgery are to join the cleft edges, lengthen the soft palate, and repair the levator palatinii muscle.



Stage II (Primary Dentition stage from 2 to 6 Years of Age)

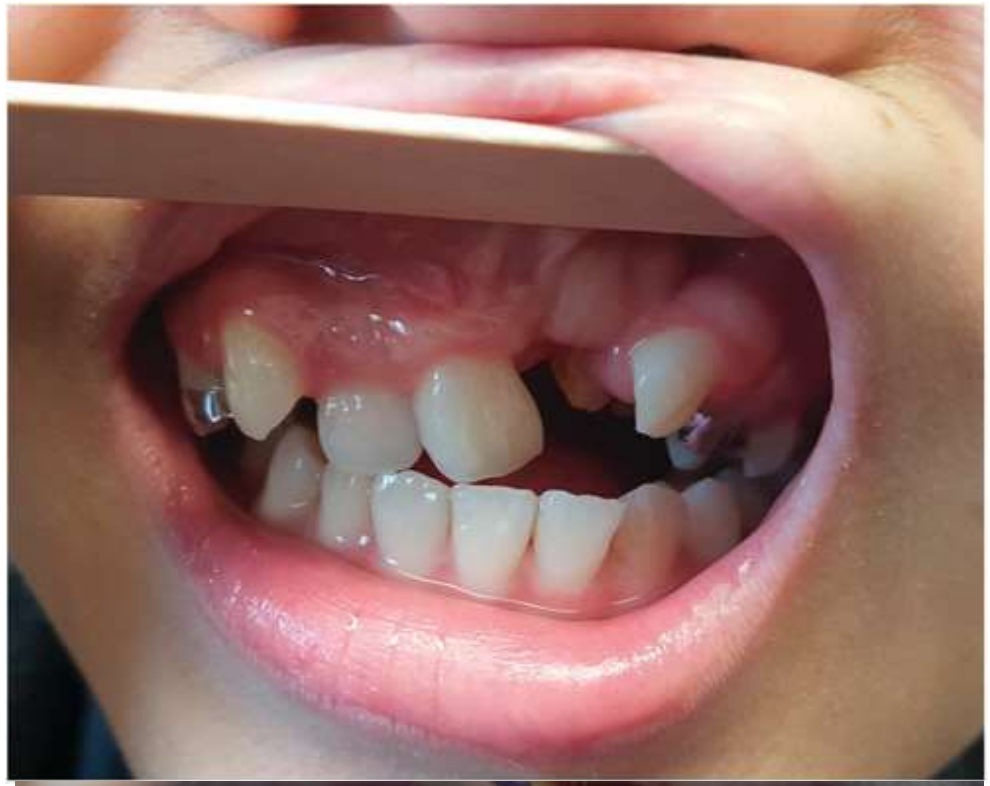
At 2 to 3 years of age the establishment of the primary dentition permits classification of the type of developing malocclusion. This determination may be part of the diagnostic regimen in which the contribution of the skeletal be and dental components may identified

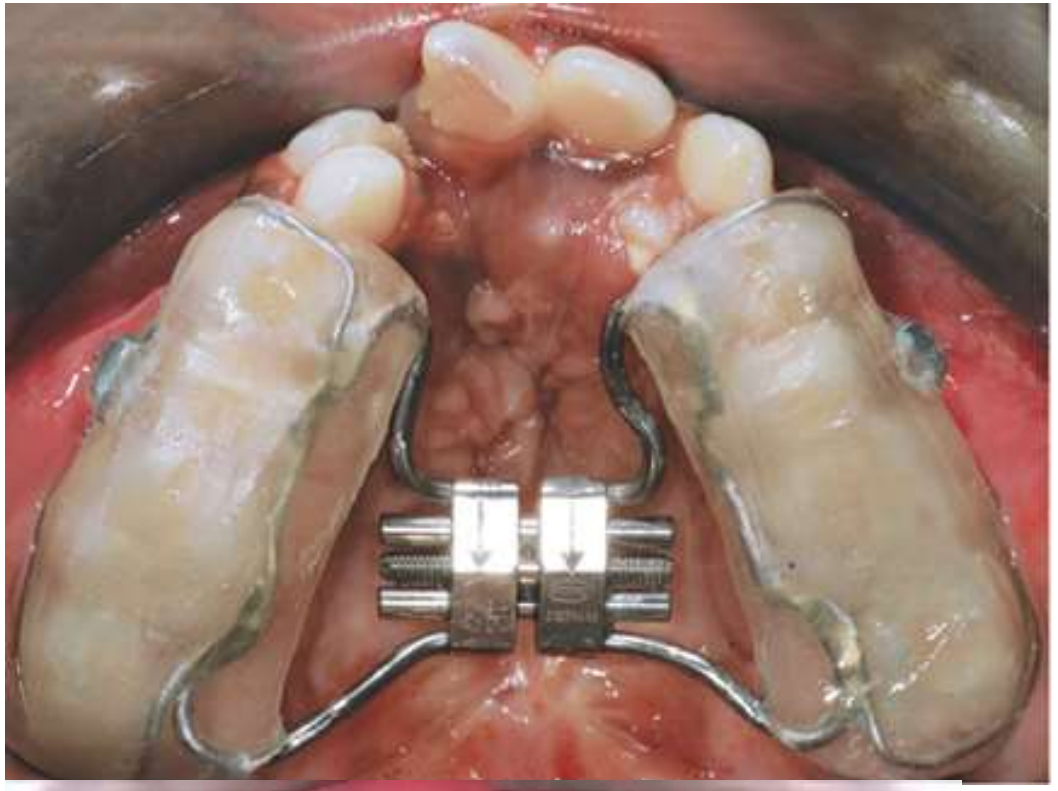
The orthodontist should consider many factors in determining when to initiate orthodontic treatment during the primary dentition stage. These factors include the ability of the **child to cooperate**, **the severity of the malocclusion**, **timing of secondary bone grafts**, and the **need for future orthodontic treatment in early the mixed or permanent dentitions**. The oral hygiene instruction may be emphasized upon and procedures undertaken to preserving the existing tooth structures.

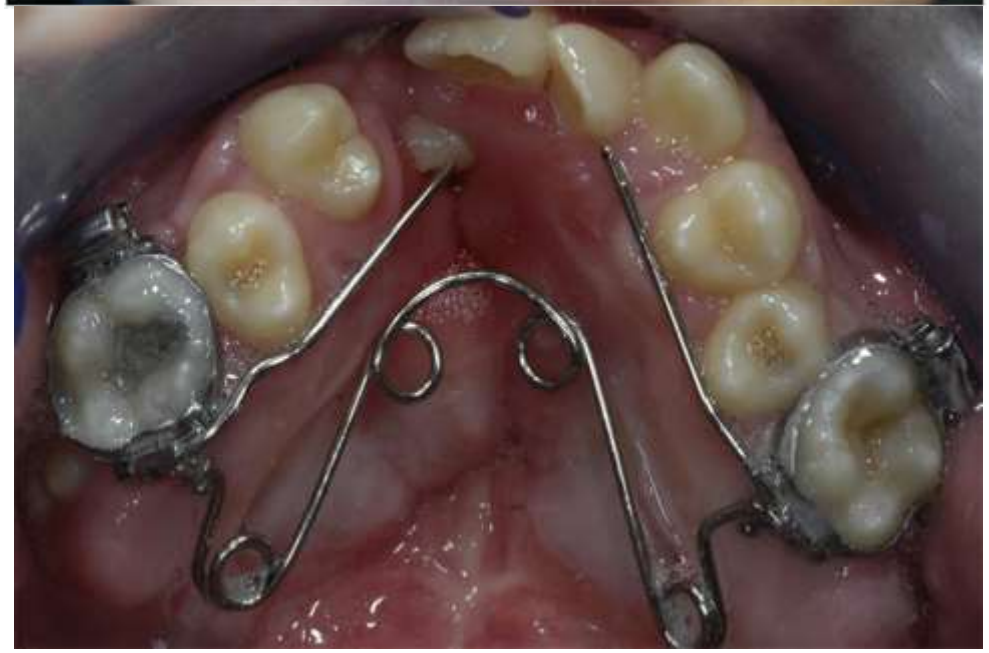
Stage III (Mixed Dentition stage (7 to 12 Years of Age)

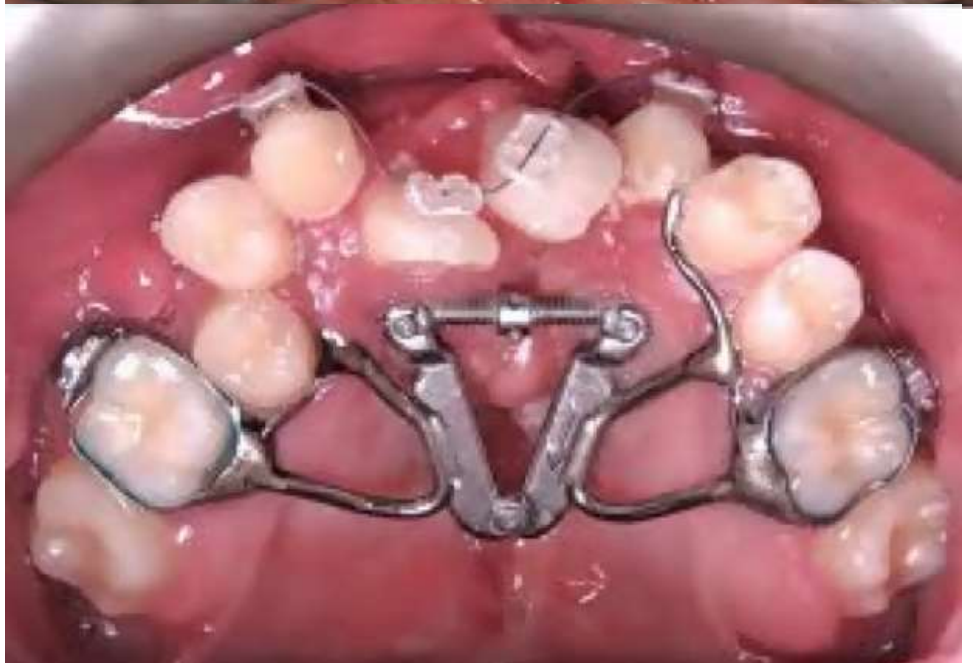
The transition to the mixed dentition starts at 6 to 7 years of age with the eruption of the first permanent molars and incisors. The cleft site was resolved with the advent secondary alveolar bone grafting. This bone grafting procedure provided the orthodontist with one of the most important milestones in managing the cleft site

Orthodontic intervention is often unnecessary until the permanent incisor teeth begin to erupt but is usually imperative at that point. As the permanent teeth come in, there is a strong tendency for the maxillary incisors to erupt rotated and often in cross bite. The major goal of orthodontic treatment at this time is to **correct incisor position**, and **prepare the patient for an alveolar bone graft**, Any necessary alignment of incisors or expansion of posterior segments should be completed before the alveolar grafting. The alveolar graft now is a routine of contemporary treatment, and doing it at the right time is critically part important. **Arch expansion, Maxillary protraction**, and Fixed orthodontic treatment can be initiated, which will form the basis of the final alignment and position of the teeth.









Timing : The timing of surgery depends more on dental development than on chronologic age. Ideally, the permanent canine root should be half to two thirds formed at the time the graft is placed Permanent canine root formation generally occurs between the ages of 8 and 11 years.

Sequencing : secondary bone grafting has been divided into early (2 to 5 years of age intermediate (6 to 15 years of age), and late (16 years to adult).

Stage IV (Permanent Dentition Stage)

As the canine and premolar teeth erupt, **posterior cross bite** is likely to develop, particularly on the cleft side in a unilateral cleft patient, and the teeth are likely to be malaligned. The more successful the surgery, the fewer the problems, but in essentially every instance, fixed appliance orthodontic treatment is necessary at this time. With contemporary treatment that includes **grafting of alveolar clefts**, **new bone fills in the cleft as the canine erupts. This makes it possible to close spaces due to missing teeth, and this now is a major objective of this phase of treatment**. If space closure is not possible, orthodontic tooth movement may be needed to position teeth as abutments for eventual fixed prosthodontics. In that circumstance, a resin-bonded bridge to provide a semi-permanent replacement for missing teeth can be extremely helpful. Orthodontic treatment is often completed at age 14, but a permanent bridge in many instances cannot be placed until age 17 or 18. The semi- permanent fixed bridge is preferable to prolonged use of a removable retainer with a replacement tooth. Dental implants are not appropriate for cleft areas.

Orthognathic Surgery for Patients with Cleft Lip and Palate

In some patients with cleft lip and palate, more often in males than females, **continued mandibular growth** after the completion of active orthodontic treatment leads to the return of anterior and lateral crossbites. This result is not so much from excessive mandibular growth as from deficient maxillary growth, both anteroposteriorly and vertically, and it is seen less frequently now because of the improvements in cleft lip/palate surgery in recent years. orthognathic surgery to bring the deficient maxilla downward and forward may be a necessary last stage in treatment of a patient with cleft lip or palate, typically at about **age 18** if required. occasionally, surgical mandibular setback also may be needed. After this, the definitive restorative work to replace any missing teeth can be carried out

Thank you