Australian Society of Orthodontists

THE UNIVERSITY OF SYDNEY

Cleft Lip and Palate

Creating Brighter Futures

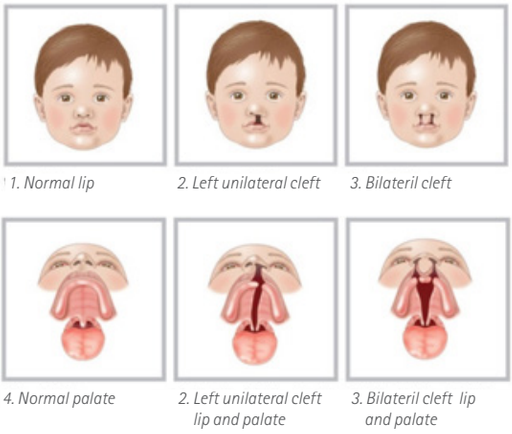
Cleft Lip and Palate

Introduction

Cleft lip and/or palate is one of the most common craniofacial anomalies, affecting approximately 8.1 in 10,000 live births in Australia[1,2,3]. Cleft lip occurs embryologically due to a failure of fusion of the median and lateral nasal processes with the maxillary prominence. Cleft palate results from failure of fusion of the lateral palatal swellings. Its aetiology is multifactorial however there is a significant genetic component. It is commonly a part of other presenting syndromes, such as Pierre Robin sequence, Velocardiofacial and Stickler[4]. Associated environmental factors include nutritional deficiencies, teratogens and maternal alcohol, cigarette and recreational drug use.

Classification

Classifying cleft lip/palate conditions is important for communication between the members of the cleft team. Affected orofacial structures can be a combination of soft tissue, skeletal and dental. Anatomical classification distinguishes between cleft subphenotypes of cleft lip only (CLO), cleft palate only (CPO), or cleft lip and palate (CLP) that is either unilateral or bilateral[5]. Palatal clefts may affect the hard and/or soft palate, and in some instances present as a sub-mucous cleft[6]. Children with CLP can be further classified as syndromic or non-syndromic if or not associated with an underlying syndrome.

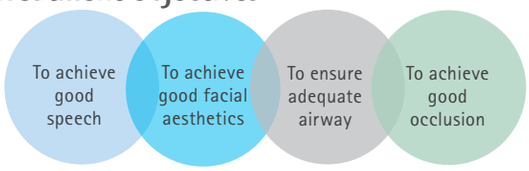


1. Normal lip *2. Left unilateral cleft* *3. Bilateril cleft*

4. Normal palate *2. Left unilateral cleft lip and palate* *3. Bilateril cleft lip and palate*

Figure 1 - Subphenotypes of CL/P[1]

Treatment objectives[7]



Treatment Pathway

Cleft anomalies can be identified prenatally via ultrasound examination at week 20 of pregnancy, although cleft palate can be difficult to identify until after birth[8]. CLP patients ideally should be cared for within an integrated hospital setting. The treatment pathway for CLP patients may span two decades or longer, and children and their families need to be guided through a sequence of therapy in a supportive manner. A range of the following treatment protocols tailored to the specific needs of the CLP individual can result in excellent outcomes.

0–3 months	Visit from cleft nurse within 48 hours of birth. Genetic counselling. Specialist feeding advice. Preventative dental advice. Newborn hearing assessment. Ongoing clinical psychology support for parents and patients.Presurgical infant orthopaedics - nasal-alveolar moulding (NAM)
3–6 months	Repair of cleft lip, anterior palate and nasal cartilages. Ongoing care by ENT specialist
6–18 months	Repair of remaining cleft palate
18 months –4 years	Start speech therapy. Ongoing paediatric dentistry care
4–5 years	Lip or velopharyngeal (speech) revision surgery
6–9 years	Orthodontic assessment: Phase 1 orthodontics and preparation for alveolar bone grafting
9–11 years	Alveolar bone graft
>12 years	Phase 2 comprehensive orthodontic treatment
>16 years	Rhinoplasty and orthognathic surgery

Table 1- Treatment pathway for CLP patients[9]

You may wish to share this issue of Brighter Futures with your hygienists and other staff members.

Interdisciplinary Management

The complex nature of CLP means that an interdisciplinary team is crucial for successful management and ideal outcomes[10].

Responsibilities of the cleft team include[11]:

Paediatrician
Provides patient education and support immediately following ultrasound diagnosis
Initial systemic examination
Monitoring of growth and development

Clinical Nurse Consultant
Team coordinator
Patient education and support
Monitor growth and development

Geneticist
Genetic diagnosis, determination of cleft aetiology
Recurrence risk and genetic counselling

Speech Pathologist
Provide feeding advice and support from birth
Evaluate speech anomalies in articulation, resonance, voice and language development
Speech therapy

Audiologist
Neonatal hearing tests
Follow-up through adolescence
Maintain hearing assistance devices

Ear, Nose and Throat specialist
Monitor for development of middle ear disease
Middle ear ventilation tubes (Grommets)
Surgical intervention for velopharyngeal dysfunction

Plastic and Oral and Maxillofacial Surgeon
Lip adhesion
Primary repair surgeries
Alveolar bone grafting
Surgery for velopharyngeal dysfunction
Orthognathic surgery

Paediatric Dentist and Orthodontist
Pre-surgical orthopaedics, nasoalveolar moulding
Interceptive treatment including expansion and maxillary protraction
Assessment of dental development for informing surgical timing
Comprehensive orthodontic treatment / orthognathic surgery

Psychologist and Social Worker
Evaluation and treatment of emotional, learning, developmental and adjustment disorders for both patient and family members

Table 2 - Roles and responsibilities of the interdisciplinary cleft team[11]

Role of the General and Paediatric Dentist

The general dentist plays an important role as part of the interdisciplinary team in preventing dental disease, maintaining oral health and assessing dental development. Keeping a good record of the patient's comprehensive medical, surgical and dental history helps to establish an understanding of the dental professional's role in the context of the CLP patient's overall management. A team management approach is likely to include orthodontics, oral surgery and restorative care[12]. It is essential to educate the parents about their role in maintaining oral health and the unique challenges that CLP patients may experience with respect to their dental journey.

Oral Health

Regular preventive dental care and good dental habits instilled early are important in CLP patients. Increased prevalence of poor oral hygiene and gingivitis at the cleft site are attributed to factors such as the presence of anatomic defects, scar tissue, loss of upper lip elasticity, early use of prosthetic appliances, misaligned teeth and long-term orthodontic therapy[13]. This can contribute to periodontal disease and have a detrimental impact on the entire dentition. Poor gingival health at the cleft site has implications for the success of secondary alveolar bone grafting procedures[14,15]. Along with the presence of pathogenic microorganisms in subgingival plaque at the cleft site, poor oral health can influence the treatment outcomes of orthodontic, prosthodontic and restorative management[16]. Syndromic CLP patients, who often have varying forms of special needs, may be at even greater risk of developing periodontal disease due to reduced manual dexterity and compromised oral hygiene practices.

Dental Caries

There is a reported increased prevalence of dental caries in CLP patients[17]. Children with CLP may have higher levels of cariogenic bacteria that, associated with poor oral hygiene, leads to high caries incidence[18].
Other implicating factors include dry mouth from mouth-breathing or incompetent lip seal, developmental defects of enamel and reduced access for oral hygiene due to the cleft morphology[19].

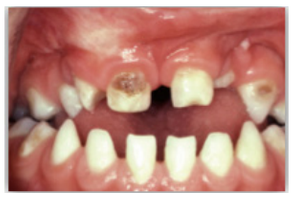


Figure 2 - Carious teeth adjacent to cleft site[2]

Dental Anomalies

A higher incidence of dental anomalies associated with CLP patients include hypodontia, supernumeraries, impacted or malpositioned teeth, microdontia and enamel defects[5,20,21]. Current research indicates that mutations of cleft genes may also result in disturbances of oral tissues and changes in the dental lamina during dental development[22,23]. Delayed dental development and eruption is common on the side affected by the cleft. Hypodontia of the maxillary lateral incisor is noted in up to 60% of patients, as well as other missing teeth away from the cleft site[24].

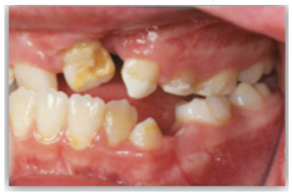


Figure 3- Enamel hypoplasia of upper central incisor[2]

Both the primary and permanent dentition may be affected. This is usually accompanied by enamel hypoplasia, hypomineralisation or misshapen teeth which contribute to poor prognosis or aesthetics.

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Malocclusion

The CLP patient may encounter skeletal and dental malocclusions, which develop primarily as a consequence of the cleft deformity, or as a result of reparative surgical intervention. This requires timely orthodontic referral and intervention. Commonly a skeletal Class III malocclusion tendency[25] is present, accompanied by dental anterior or posterior crossbite, crowding and malalignment[26]. Orthodontic treatment during the mixed dentition phase aims to achieve preliminary incisor alignment and preparation for alveolar bone grafting in the cleft site[27]. Patients may then require further orthopaedic treatment for skeletal base discrepancies and/or comprehensive orthodontics in conjunction with orthognathic surgery at the completion of growth.

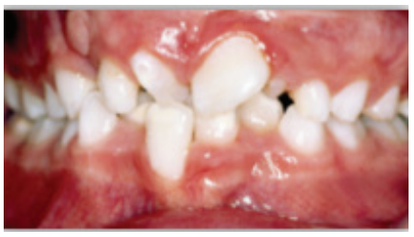

Figure 4- Rotated teeth and anterior crossbite[2]

Psychosocial Impact of Cleft Lip and Palate

All members of the interdisciplinary team have a role in promoting awareness of psychosocial issues. Parents' emotional response can span the range of shock, despair, grief and guilt[28]. The quality of information and manner of delivery by health care professionals can significantly aid in reducing anxiety and distress, influencing parental ability to cope[29].

CLP children have been reported to demonstrate more difficulty in social functioning, and are more likely to experience teasing and bullying[30], difficulties in their friendships and relationships[31], as well as social isolation[32]. This may be manifested in symptoms of social anxiety, internalising behaviour and depression[33]. Adolescents with CLP report a lower quality of life compared to their peers associated with feelings of dissatisfaction about their speech and appearance as well as reduced self-confidence[34,35]. In some circumstances this may not correlate with the severity or visibility of the cleft but rather to self-perception[36].

Patients can experience degrees of treatment burn out in adolescence from undergoing multiple invasive procedures and prolonged and complex treatment since birth. Psychological health is interrelated to all aspects of CLP care, and should be managed with utmost priority throughout all treatment stages.

Cleft Lip and Cleft Palate Scheme (Medicare)

Patients are eligible for treatment under the Cleft Lip and Cleft Palate Scheme if they are enrolled in Medicare, aged under 28 years, and have been diagnosed before 22 years of age. The scheme covers dental treatment including some orthodontic work, dental extractions, general prosthodontic services and oral and maxillofacial surgery. The eligible patient is entitled to 3 general dental visits each year. General dentists do not have to be registered with the scheme to treat patients and can issue an invoice listing the Medicare number 75800.

Further information can be found at Medicare Cleft Lip and Cleft Palate Scheme for health professionals<https://www.humanservices.gov.au/organisations/health-professionals/services/medicare/cleft-lip-and-cleft-palate-scheme-health-professionals>.

References available upon request

The Editors of the Brighter Futures Newsletter would appreciate feedback from readers about this and past newsletters and suggestions about future topics that would be of interest to readers.

Please send your comments to editorbrighterfutures@gmail.com

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