Genetic Risks

[Note the incidence in the general population - 1 in 700 (0.14%)

- *Where one child already has a cleft, yet neither parent has a cleft, there is a less than 3% chance that the next child will have a cleft (i.e. less than 3 chances in 100).*
- *If one parent has a cleft, the chances of the first child having a cleft are approximately 2-5% (i.e. 2 to 5 chances in 100). The risk rises to approximately 10-12% (1 chance in 10) if a parent also has a close relative with a cleft.*
- *If one parent and the first child both have clefts, the chances of the next child also having a cleft rises to approximately 10-15% (i.e. 1 to 1.5 chances in 10).*
- *Where two children in the family already have clefts, yet neither parent has a cleft, there is a 10-15% chance that the next child will have a cleft (i.e. 1 to 1.5 chances in 10).*
- *The risk of a sibling of a person with a cleft themselves having a child with a cleft is approximately 1% (1 chance in 100). The risk increases to 5-6% (5 to 6 chances in 100) if more than one close family member has a cleft.*

Genetic counselling

Genetic counselling is available where a cleft has occurred. The term "genetic counselling" can be misinterpreted and should not be confused with psychological counselling. Genetic counselling is about providing as much information as is possible about the type of cleft a family may have encountered. It is not about telling people what to do nor is it about finding fault.

The process is reasonably simple – a family tree is taken and a quick history of a child's well being is noted. The genetic consultant will then do a physical check on the child. This is really all the information that is needed. The consultant should then be in a position to advise the family based on current research (remember there are lots of gaps in our knowledge regarding the cause of cleft).

There are a few things to remember about the service offered.

- *The service is paid for by the State*
- *Referrals must go through a cleft team*
- *If you get an appointment keep it – more information can only help*
- *If your family is not ready yet, contact the clinic so that another family can use the timeslot.*
- *If you haven't had a consultation but think it would be of benefit to your family, contact your cleft team.*
- *Finally, there is no time limit on seeking a genetic consultation*

Note: The National Centre for Medical Genetics is based in Our Ladies Hospital for Sick Children, Crumlin.

Titles in the Series:

1. *About the Cleft Lip and Palate Association of Ireland*
2. *What is Cleft Lip and Palate?*
3. *Questions and Answers for New Parents*
4. *Feeding Issues for New Parents*
5. *Speech and Hearing Concerns*
6. *The Genetics of Cleft Lip and Palate*
7. *Dental Health and Treatment*
8. *Surgical Treatment for Cleft Lip and Palate*
9. *Social and Psychological Aspects*
10. *Handout for Teachers and Carers*

Leaflets are available by post from the Association or can be downloaded from **www.cleft.ie**.

Acknowledgement:

The Association would like to thank the members of the cleft treatment teams and other health professionals for their valuable contributions.
See **www.cleft.ie** for the full acknowledgement and list of contributors.

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The Genetics of *Cleft Lip and Palate*

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The Incidence of Cleft Lip & Palate

About 1 in every 33 infants is born with a birth defect. Defects of the heart and circulation system constitute the most common birth defects (1 in 115 births), followed by defects of the muscle and skeletal systems (1 in 130 births). Cleft lip and/or palate are the fourth most common birth defect and are the most common congenital (that is, present at birth) birth defect of the head and face.

The incidence of cleft lip and/or palate is approximately 1 in every 700 births. Combined cleft lip and palate is the most common presentation (50%), followed by isolated cleft palate (30%), and isolated cleft lip (20%).

Clefts of the lip and combined lip and palate are twice as common in males. Isolated cleft palates are twice as common in females.

Classification of Clefts

Clefts can be classified as either isolated (or nonsyndromic, i.e. patient has no other health related problem) or syndromic, that is, part of a genetic syndrome.

Isolated cleft lip and/or palate cannot be attributed to any single factor and are usually presumed to be multifactorial, that is, due to a combination of genetic and environmental factors. Environmental factors are those that can influence the developing fetus in the womb. At present exact cause(s) is unknown.

Fetal Development

The critical period of fetal development, when genetic and environmental factors can influence the formation of clefts, is from the fourth to the ninth week of pregnancy. The lip and primary palate develop at 4 to 6 weeks, while the secondary palate develops at approximately nine weeks. The human embryo has a recognisable face at around eight weeks, when it measures about 28mm long. At this stage the nose and lips have already been formed. The primary palate results from growth from the inner sides of the upper jaw towards the midline, and their subsequent fusion. Fusion is not completed until the 11th week. The primary deformity in clefting of lip or palate occurs if this process of fusion is not completed.

Associated Conditions

Approximately 10 to 15 percent of babies with cleft lip/palate have other birth defects (not exclusively syndrome-related). Clefts that appear with a number of other hereditary or congenital disorders (as part of a syndrome) can be traced to a single inherited gene. Only a small percentage (approximately 3-4%) of clefts are associated with a syndrome, yet there are some 400 syndromes known to be associated with clefts. Most of these syndromes are very rare. Where there is only a cleft palate and no lip involvement, there is a 40% - 50% increase in the likelihood of an associated genetic syndrome.

Syndromes associated with cleft palate include Pierre Robin, Stickler, Aperts, Treacher Collins and "22q11" (22q11 incorporates DiGeorge, Shprintzen, and Velo-cardio-facial syndromes). Van der Woude's, Edward's and Waardenberg's syndromes are associated with cleft lip with or without cleft palate.

Heredity

While the causes of cleft lip and palate remain unknown, there is an agreement that heredity can play a role as a cause. In respect of the hereditary factor, the chances of having a child with a cleft are dependent on a number of factors. In general, the risk increases with the number of affected relatives. Studies have indicated that in approximately 20% - 40% of cases (depending on the study) there is a history of clefts in the family. Correspondingly, 60% - 80% of clefts occur where no close relatives have the defect.

Statistically given one in five people born with cleft have a previous family history of cleft, it is thought that genetic factors have a role to play. Studies of possible hereditary connections are ongoing.

Genetic disorders occur when either

1. *something occurs that alters a gene,*
2. *a disordered gene is inherited from one or both parents, or*
3. *when a particular combination of inherited genes give rise to a disorder.*

Fig.1 Normal Lip and Mouth

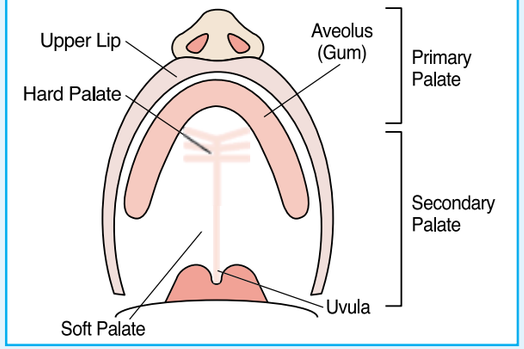

Fig. 2 Unilateral cleft lip and palate

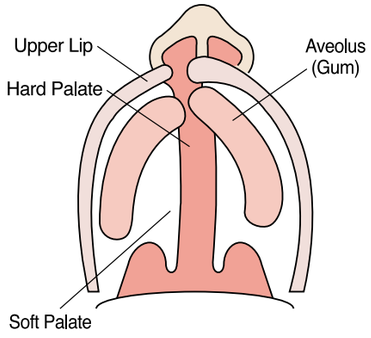

Fig.3 Bilateral cleft lip and palate