

Frontometaphyseal Dysplasia

Subjects: Genetics & Heredity

Contributor: Nicole Yin

Frontometaphyseal dysplasia is a disorder involving abnormalities in skeletal development and other health problems. It is a member of a group of related conditions called otopalatodigital spectrum disorders, which also includes otopalatodigital syndrome type 1, otopalatodigital syndrome type 2, Melnick-Needles syndrome, and terminal osseous dysplasia. In general, these disorders involve hearing loss caused by malformations in the tiny bones in the ears (ossicles), problems in the development of the roof of the mouth (palate), and skeletal abnormalities involving the fingers and/or toes (digits).

Keywords: genetic conditions

1. Introduction

Frontometaphyseal dysplasia is distinguished from the other otopalatodigital spectrum disorders by the presence of joint deformities called contractures that restrict the movement of certain joints. People with frontometaphyseal dysplasia may also have bowed limbs, an abnormal curvature of the spine (scoliosis), and abnormalities of the fingers and hands.

Characteristic facial features may include prominent brow ridges; wide-set and downward-slanting eyes; a very small lower jaw and chin (micrognathia); and small, missing or misaligned teeth. Some affected individuals have hearing loss.

In addition to skeletal abnormalities, individuals with frontometaphyseal dysplasia may have obstruction of the ducts between the kidneys and bladder (ureters), heart defects, or constrictions in the passages leading from the windpipe to the lungs (the bronchi) that can cause problems with breathing.

Males with frontometaphyseal dysplasia generally have more severe signs and symptoms of the disorder than do females, who may show only the characteristic facial features.

2. Frequency

Frontometaphyseal dysplasia is a rare disorder; only a few dozen cases have been reported worldwide.

3. Causes

Mutations in the *FLNA* gene cause frontometaphyseal dysplasia.

The *FLNA* gene provides instructions for producing the protein filamin A, which helps build the network of protein filaments (cytoskeleton) that gives structure to cells and allows them to change shape and move. Filamin A binds to another protein called actin, and helps the actin to form the branching network of filaments that make up the cytoskeleton. Filamin A also links actin to many other proteins to perform various functions within the cell.

A small number of mutations in the *FLNA* gene have been identified in people with frontometaphyseal dysplasia. These mutations are described as "gain-of-function" because they appear to enhance the activity of the filamin A protein or give the protein a new, atypical function. Researchers believe that the mutations may change the way the filamin A protein helps regulate processes involved in skeletal development, but it is not known how changes in the protein relate to the specific signs and symptoms of frontometaphyseal dysplasia.

3.1. The Gene Associated with Frontometaphyseal Dysplasia

- *FLNA*

4. Inheritance

This condition is inherited in an X-linked dominant pattern. The gene associated with this condition is located on the X chromosome, which is one of the two sex chromosomes. In females (who have two X chromosomes), a mutation in one of the two copies of the gene in each cell is sufficient to cause the disorder. In males (who have only one X chromosome), a mutation in the only copy of the gene in each cell causes the disorder. In most cases, males experience more severe symptoms of the disorder than females. A characteristic of X-linked inheritance is that fathers cannot pass X-linked traits to their sons.

5. Other Names for This Condition

- FMD

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