Face asymmetries in children and adolescents – Classification and clinical characteristics

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Introduction

Perfect bilateral body symmetry is more of a theoretic concept that seldom exists in living organisms. However, pronounced and recognizable face asymmetries do exist and can have serious esthetic, functional and psychological implications. Asymmetry in the craniofacial areas may be the result of discrepancies either in the form and/or size of individual bones as well as malposition of one or more bones in the craniofacial complex. The asymmetry may also be limited to the overlying soft tissues (1). Early detection of face asymmetry may be critical with regard to the diagnosis, prognosis, and therapeutic management. The aim of this article is to briefly present the major categories of face asymmetries in children and adolescents and to provide information on their clinical characteristics.

Etiology

Genetics have been implicated in certain conditions such as multiple neurofibromatoses (Figure 1), hemifacial microsomia, cleft lip and palate. Intrauterine pressure during pregnancy and significant pressure at the birth canal during parturition can have observable effects on the bones of the fetal skull. Environmental factors can cause face asymmetry and may include pathological changes that are not congenital in nature (e.g., osteochondroma of the mandibular condyle), trauma, infection and inflammation within the temporomandibular joint (TMJ), ankylosis of the mandibular condyle to the temporal bone, damage to a nerve, which may indirectly lead to asymmetry from the loss of muscle function and tone, and sucking or chewing habits with influence on tooth position equilibrium (1,2).

Classification

Skeletal Asymmetries

The skeletal asymmetries may involve one bone (e.g., maxilla or mandible) or a number of skeletal and muscular structures on one side of the face.

Hemifacial microsomia

Hemifacial microsomia results from the malformation of the 1st and 2nd branchial arches. It may be associated with variable abnormalities of the external and middle ear, has similar manifestations with Goldenhar syndrome, and its etiology is heterogenous. The extent of TMJ involvement primarily determines severity, prognosis, timing and type of treatment. Face asymmetry in hemifacial microsomia is characterized by chin deviation. Occlusal manifestations include lower dental midline deviation, unilateral cross bite, tilting of the occlusal plane, all of them towards the affected side (Figure 2). Apart from ear abnormalities, soft tissue defects may include skin tags, facial clefts, cranial nerve function, soft palate function, bulk of subcutaneous soft tissue, muscles of mastication and facial expression, macrostomia, and skin tags (5).

Hemimandibular hyperplasia

Hemimandibular hyperplasia is an uncommon maxillofacial deformity characterized by increased ramus height, rotated facial appearance, and kinking at the mandibular symphysis. Usually it is associated with prominence of the lower border of the mandible, maxillary and mandibular alveolar bone overgrowth, compensatory canting of occlusal plane, and serious functional malocclusion (4) (Figure 3). Hemimandibular hyperplasia presents diffuse enlargement of the condyle, the condylar neck, the ramus, and the body of the mandible; it usually begins before puberty, is clearly due to hyperactivity in the condyle, whose cartilage actively proliferates.

Condylar fracture

Condylar fractures in growing individuals are usually the results of accidents and sports (Figure 4). In children they are often overlooked by parents and physicians since short time after the injury symptoms of pain usually disappear. The majority of condylar fractures in children, if properly diagnosed and man-

Figure 1. Facial photograph of an 11-year-old girl with neurofibromatosis (a). The lesion is also apparent in lateral orthodontic (b) and panoramic (c) radiographs.

Figure 2. Facial photograph of a 13-year-old girl with hemifacial microsomia (right side) (a). The discrepancies include asymmetries in the mandibular body, ramus, and condyle (c). Malocclusion is characterized by right posterior crossbite, tilting of the occlusal plane and lower dental midline deviation to the affected side (b).

Figure 3. Facial photograph of a 13-year-old boy with osseous ankylosis of the left TMJ. The discrepancies include severe asymmetries in the mandibular body and ramus (a). Malocclusion is characterized by left anterior and posterior crossbite, tilting of the occlusal plane, and lower dental midline deviation to the affected side (b).

Figure 4. Panoramic radiograph of a 13-year-old girl showing fracture of the left condyle.
Aged by short-term intermaxillary fixation and subsequent physiotherapy, do not lead to morphological and functional problems. However, no diagnosis of condyle fractures may lead to face asymmetries, severe malocclusion and TMJ ankylosis (5).

**Conclusions**

Face asymmetries in children and adolescents should be detected and diagnosed as early as possible. Early detection may be critical with regard to the prognostic and therapeutic management of this challenging dentofacial deformity.

**References**


**Muscular and Soft Tissue Asymmetries**

Facial disproportions could be the result of muscular and soft tissue asymmetry (e.g., hypertonia or atrophy), muscle size disproportion in volume and/or toxicity (e.g., masseter hypertrophy, dermatomyositis (Figure 6), and neoplasms (Figure 7)). Abnormal muscle function often leads to skeletal deviations (2).

**Functional Asymmetries**

Functional asymmetries can result from lateral or anteroposterior deflections of the mandible due to occlusal interferences, which prevent proper intercuspidation in centric relation (e.g., functional crossbites) (1). Functional crossbites in children, if left without correction, subsequently may cause mandibular asymmetry.

**TMJ ankylosis**

It is a chronic hypomobility and, if happens in growing subjects, it becomes a growth disorder (Figure 5). It results from intracapsular adhesions or ossification between the disc and temporal articular surface that attach the disc-condyle complex to the articular eminence. Its classification relates to the degree of limitation (partial or complete), location of the union (intracapsular vs. extracapsular), and type of tissues involved (fibrous, osseous, fibro-osseous). TMJ ankylosis occurs relatively infrequently. Principle causes include trauma, previous joint surgery, systemic or local infections, tumors, compressive function pattern and systemic diseases (6). Regarding history, patients report limited mouth opening without any pain, the condition has been present for a long time, and, if not associated with severe dentofacial deformity, patients do not feel that it poses a significant problem.

**Figure 6.** A 10-year-old boy with dermatomyositis creating a soft tissue toxicity imbalance (a) and resulting in a unilateral posterior crossbite (b).

**Figure 7.** A 15-year-old girl with hemangioma “infrabulbare” (a) applying excessive pressure on the left maxillary teeth (b) and severely influencing their position (c).

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