



## CRANIOFACIAL SYNDROMES AND GENETIC VARIABILITY IN A PEDIATRIC HOSPITAL IN MEXICO

**Juan Manuel Aparicio-Rodríguez**

*Genetics Hospital Para el Nino Poblano and Estomatology Benemérita*

*Universidad Autónoma de Puebla*

**San Martín Brieke Walter**

*Maxilofacial Surgery Hospital Para el Nino Poblano*

**Lucero Vázquez de Lara**

*Estomatology, Benemérita Universidad Autónoma de Puebla*

**Alejandra Peral García**

*Estomatology, Benemérita Universidad Autónoma de Puebla*

**Sergio Chatelain Mercado**

*Biothecnology, Universidad Metropolitana de México.*

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### ABSTRACT

*Craniofacial malformations and chromosomal aberrations are considered to be alterations in the phenotypic structure and may be considered secondary to errors of the birth. All these alterations should be observed during childhood and rating by chromosomal karyotype or deficiency in DNA repair. Pediatric patients were valued and showed different congenital and chromosomal alterations. These changes to level structure organic and multisystemic, were analyzed as well as chromosomal rearrangements which were classified as numerical and structural alterations respectively. Another group of genetic alterations are known as mutations and are inherited in different generations. A wide range of pediatric patients with congenital and genetic diseases by alterations mainly associated with craniofacial development during pregnancy, prenatal, or at birth are described in this study analyzing features clinical, medical, or surgical procedures and medical evolution according to malformation syndrome in study.*

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**Keywords:** Craniofacial malformation, Chromosome, Mutation, Chromosomal aberration, Karyotype and genetic alteration.

## 1. INTRODUCTION

It has been observed that a 60 to 70% of congenital malformations, there is not a definite cause. Within the causes that are known to exist: alterations chromosome 3-5%, 20% genetic mutations, environmental agents, radiation 1%, 2-3-% infections, metabolic disorders maternal 1-3%, drugs and agents chemical 2-3% of the remainder the cause is unknown.

The understanding of many of the development and growth disorders affecting craniofacial structures [Pinto-Cisternas \(1979\)](#); [Alfaro \*et al.\* \(1994\)](#); [Gorlin \(1985\)](#); [Witkop \(1975\)](#); [Slavkin \(1996\)](#) is achieved through knowledge of embryology, genetics and histology of these structures. The true etiologic factors present in several alterations in the development and growth of the oral cavity, maxillary and various soft tissues. Witkop in 1975 and Gorlin in 1983 stressed that in certain craniofacial diseases; genetic and hereditary factors may be decisive or just contribute to the emergence of a specific disease. Most of craniofacial malformations are of unknown etiology, and, as a result, the classification is mainly based on features of form and structure. There are many types of anomalies relating to the shape, number and structure and it has a hereditary origin. The nature of the abnormalities depends mainly by genetic factors. The frequency which these problems may arise depends on the form of inheritance and other laws of probability.

Some anomalies may occur as the only apparent hereditary alteration. Others are presented as part of a much more complex genetic problem. Specifically congenital agenesis of tissues that may also be the only problem of hereditary origin. However, Agenesis and malformations can be part of a syndrome and be related to alterations in other ectodermal tissues such as hair, skin and mucus membranes, assessed as syndromes in this study: Moebius, Goldenhar, Cockayne, Opitz G, Cornelia de Lange, Criduchat, Patau, Edwards, Down, Klinefelter and Turner.

In Mexico was established in 1978 the "registration and surveillance epidemiological of the malformations congenital external" (RYVEMCE), generating preventive information programmes targeting the population at risk [Ryvence \(1990\)](#). Currently the INFOGEN has been created in the Federal District, as a Centre for statistics of all kinds of congenital malformations in the Mexican Republic. For their study, malformations were divided as genetic or congenital abnormalities observed in this study into five groups according to the structural defect of the same as well as the genetic, congenital, and multifactorial cause.

The precise knowledge of the diagnosis in patients with some different capacity is important in present-day medicine, to provide patient management and treatment thus offering a better quality of life.

## 2. MALFORMATIONS OF SKULL, FACE AND BRAIN

### a) Microcephaly

It is considered a common disorder transmitted as an autosomal gene recessive in which the circumference is smaller than expected, is below for a patient's age. It can be primary or secondary depending to several factors such as Down's syndrome, rubella and other viral infections, and metabolic disorders such as phenylketonuria, irradiation of the fetus. Linear growth is limited and

the affected individual is small in stature, but general musculature and sexual development are normal [Goodfrey \(1980\)](#). Figures 1 and 2 A and B.

### **b) Craniosynostosis**

Sagittal sutures can close to 6 years of age, or stay open until the fourth decade. The coronal suture closes at 8 years, although it is sometimes open up to more than thirty years. Usually the lamboidea suture is the last to close at female patients age 11 and children. Metopic suture early closes between 6 months and 10 years of age. Premature ossification of skull sutures called craniosynostosis. Premature synostosis inhibits the growth of the skull in a direction perpendicular to the obliterate suture. Compensatory growth in other directions leads to abnormalities in size as: Turricefalia-(skull Tower) or Oxycephaly-high front, narrow anteroposterior diameter and the pointed apex.

Acrocefalia.-the skull is oxicefalico and is crowned by a median Ridge.

Scaphocephaly-is the isolated closure of sagittal suture, which produces a cranial vault long and narrow; and it is the most frequent type of craniosynostosis.

Dolichocephalism.-long and narrow skull without stenosis of the sagittal suture.

Brachycephaly-is a round skull with a short anteroposterior diameter.

Plagiocephaly.-the skull seems to be diverted being one frontal pole higher than the other, result of the premature union of sutures in one half of the skull and a compensatory development of the other half.

Trigonocephaly-skull with front shaped keel and a wide biparietal diameter of the skull.

Oral Manifestations-maxillary collapse, high incidence of caries, delayed tooth eruption [Gorlin \(1985\)](#); [Johnston \(1980\)](#); [Williams and Athanasiou \(1988\)](#) [Buyse \(1991\)](#). Figures 3 A and B

## **3. ABNORMALITIES IN THE DEVELOPMENT OF THE FACE AND ORAL STRUCTURES**

**a) Goldenhar Syndrome** (Microsomia hemifacial, syndrome, oculoauriculovertebral Dysplasia of the first and second branchial arches).

It is a syndrome in which the defects of the eyes and ears are associated with abnormalities of the vertebrae, heart and lungs. There are usually Agenesis of the outer and middle ears. It has a dominate autosomal, autosomal recessive transmission and multifactorial type. The face is notorious because of the asymmetry due to hypoplasia and displacement of the pinna. Maxillary temporary and malar bones on the affected side are somewhat reduced in size and flattened, and the eye on the same side can occupy a level lower to the opposite side. The consequent flattening may be cause of aplasia or hypoplasia of the branch and the condyle of the mandible. About 10% of the patients presented bilateral alterations, although the disorder is more pronounced on one side.

There has been lack of development or hypoplasia of muscles such as the masseter, temporal, pterigoideo and the facial expression on the affected side. The external ear malformation can vary from complete aplasia to distortion of the pavilion, which is displaced forward and down. 30-50%

of the cases has been observed deafness of hearing due to abnormalities of the middle ear and absence or deficiency of the external ear canal. From the ear to the corner of the mouth may be supernumerary tissular appendices. Palpebral cleft is somewhat lower on the affected side, although in this syndrome there is antimongoloid obliquity.

Lipodermoide epibulbar or dermoid cyst is a variable; presents a milky white colour to yellowish, with a flattened shape or something ellipsoid, and is usually solid rather than cystic. Unilateral coloboma of superior eyelid is common and occurs in 50-60% of cases. The defect occurs usually in the third half and the inside of the eyelid.

Oral Manifestations.-It can be seen from a low development of the condyle of the maxilla to the unilateral aplasia of the branch of the condyle or both, with the absence of the glenoid fossa. There is decrease of the distance of the palate from the Palatine Raphe medium to the lingual surface of the teeth on the affected side; there can be hypoplasia, paralysis, or both on the same side of the palatal or lingual muscles. 7% May present cleft palate, cleft lip, or both.

At least one-third of patients with agenesis of the ramus of the mandible are associated to macrostomia, as lateral facial cleft. Sometimes a triangle of skin extends over the inside surface of the cheek at the level of the angle of the mouth. In the presence of cysts epibulbar dermoid can be slightly higher incidence of macrostomia. It is almost always one-sided, and is located on the side of the affected ear. Occasionally there may be agenesis of the same side [Fryburg et al. \(1996\)](#); [Gorlin and Goodman \(1983\)](#). Figures 4 A and B

#### **4. SYNDROMES ASSOCIATED WITH ABNORMAL GROWTH AND AGE**

##### **a) Cockayne Syndrome**

In 1936, Cockayne was the first to describe it; autosomal recessive inheritance is and presents with progressive neurological dysfunction. Only 140 cases have been reported worldwide. With a male predominance of 3/1. He is characterized by: a) cachectic dwarfism, premature aging, mental retardation, microcephaly, intracranial calcifications, neurological alterations, retinal pigment abnormalities, sensitive deafness and photosensitivity. The lack of subcutaneous facial fat particularly on the cheeks, causes prominence of the facial bones. There is microcephaly, sunken eyes, thin nose giving the patient an aspect of bird. Photosensitivity appears dermatitis to the second year of life in areas exposed to the sun with a butterfly shape on face layout. There is decrease of eyebrows and hair. There is enophthalmos, optic atrophy. Adolescents develop cataracts. Dystrophy corneal, nystagmus and photophobia is observed less frequently.

Oral Manifestations.-Increase in tooth decay, absence of many permanent teeth, with atrophy of the alveolar process is reported by many authors. It may also have marginal gingivitis without calculations dental, with a straight facial profile and lower permanent central incisors with slight mobility [Sorin \(1994\)](#); [Nance and Berry \(1992\)](#); [Aparicio et al. \(1995\)](#); [Aparicio et al. \(1996\)](#). Figures 5 A and B

**b) Opitz-G Syndrome (B.B.B.)**

Opitz G/BBB syndrome is a genetic condition that affects several structures along the midline of the body. The most common features of this condition are wide-spaced eyes (hypertelorism) with structural defects of the larynx, trachea, and/or esophagus causing breathing problems and difficulty swallowing (dysphagia). Some times in males shows, the urethra opening on the underside of the penis (hypospadias). Mild intellectual disability occurs in 30 percent approximately of patients with Opitz G/BBB syndrome, most likely caused by structural defects in the brain. About half of affected individuals also have cleft lip with or without a cleft palate as in this study. Some have cleft palate alone. Heart defects, an obstruction of the anal opening (imperforate anus), and brain defects such as an absence of the corpus callosum. Facial abnormalities that may be seen in this disorder include a flat nasal bridge, thin upper lip, and low set ears. There are two forms of Opitz G/BBB syndrome, which are distinguished by their genetic causes and patterns of inheritance. The X-linked form of Opitz G/BBB syndrome is caused by a mutation in a specific gene, MID1, on the X chromosome. Autosomal dominant Opitz G/BBB syndrome is caused by a mutation in an as-yet unidentified gene on chromosome 22. Two chromosomal aberrations in this study were observed in two patients, 47XXY and 46XXt [So et al. \(2005\)](#); [Mnayer et al. \(2006\)](#). However one patient with normal 46XY karyotype had an oral encephalocele. Figures 6 A and B

**5. MULTISYSTEMIC SYNDROMES**

**a) Robinow Syndrome (Fetal face syndrome).**

An extremely rare syndrome in which the patient has characteristic face with long and disproportionate skull, hypertelorism, carp and dental irregularities; as well as braquimelia of the forearm, genital hypoplasia, and various bone defects. The syndrome is an autosomal dominant transmission. Characterized because it presents a fetal face. There is a disproportionately large cranium, domed forehead, ocular hypertelorism, "S" shaped lower eyelids and mouth triangle with corners down.

Oral Manifestations -The maxillary arch is trapezoidal and the teeth are crowded. It has been observed lip cleft, cleft palate and small crevices of the lower lip and tongue [Buyse \(1991\)](#). Figures 7A and B

**b) Moebius Syndrome(Nuclear Agenesis, congenital facial diplegia, Moebius syndrome).**

It is a congenital syndrome characterized by the 6th and 7th cranial nerve palsy. This is usually bilateral and shares with various defects there is skeletal muscle, laryngeal stridor and hypoplasia of tongue. In this syndrome are both sexes are equally affected. There are paresis uni or bilateral congenital 6th and 7th cranial nerves, due to nuclei hypoplasia or agenesis. Incomplete closure of the eyes can cause ulceration corneal and facial weakness, causing significant feeding problems in the newborn baby. The mandibular hypoplasia and the anterior half of the language are common. Among other anomalies have been reported laryngeal defects muscle skeletal as Syndactyly, brachydactyly, and foot equinovarus [Goodfrey \(1980\)](#). Figures 8 A, B, C and D.

### c) **Cornelia De Lange Syndrome**

Characteristic face with microbraquicefalia, generalized hirsutism, abnormalities of the hands and feet, heart defects, and cleft palate. There is low weight at birth disorders of swallowing and suction. The skull is microbraquicefalic, the eyebrows are confluent (synophrys). Often seen a purplish discoloration around the eyes, nose and mouth. Hirsutism is widespread, with low implantation of hair, shoulders lumbar region, and limb hair line.

Oral Manifestations.- Micrognathia, the Chin prominence. Lips thin with angles downward (CARP mouth). Delayed eruption of teeth, cleft palate in 20% of cases, crying tone low and grumpy [Opitz et al. \(1969\)](#); [Fryburg et al. \(1996\)](#). Figures 9 A, B, C and D.

## **6. CROMOSOMIC SYNDROMES**

### **6.1. Anomalies of the Autosomes**

#### **a) Cri-Du-Chat Syndrome.- (Deletion5p)**

Originally described in 1963 It is the deletion of the short arm of chromosome 5 (5 p). Only 10-15% of cases are the result of chromosome translocation.

As its name implies, the syndrome is characterized by weak cry similar to the cat, in childhood by hypoplasia of the larynx. Pointed mental retardation, lack of development and hypotonic children and microcephaly, hypertelorism, epicanthus is observed. Face-shaped moon, antimongolode and strabismus obliquity. Birth defects of the heart and kidney are presented. Various skeletal muscle anomalies include hypotonia, scoliosis, flat foot, iliac small, metacarpal and metatarsal short. Oral manifestations as high and narrow palate and micrognathia [Guzmán \(1986\)](#); [Kula et al. \(1991\)](#). **Figures 10 A and B.**

#### **b) Patau Syndrome (Trisomy 13)**

The incidence of this syndrome is one case by 5 000 births. In more than 60% of the patients has been observed moderate microcephaly, with slanted front, large sagittal suture and wide fontanelles. Macroftalmia or coloboma of the iris, retinal dysplasia and ocular hypertelorism is observed in 80% of cases. They may be holoprosencephaly, capillary hemangiomas, malformed ears in the region of the glabella and defects located in the occipital and parietal region.

Oral Manifestations.-In 60-70% of patient lip and cleft palate, or isolated cleft palate and micrognathia have been reported. It has been observed that the tip of the tongue is bifid in several cases [Gorlin and Goodman \(1983\)](#); [Guzmán \(1986\)](#).

#### **c) Edward's Syndrome (Trisomy 18)**

In relation to this syndrome, an estimated incidence of 1: 7.7000 have been reported by Hamerton in 1975. Oral and facial anomalies were observed, prominent occipital, bifrontal narrow diameter, discreet hirsutism, malformed ears and micrognathia. Microcephaly, corneal and palpebral ptosis opacity is observed less frequently. In 15% of the cases cleft lip, cleft palate or both was reported by [Guzmán \(1986\)](#); [Buyse \(1991\)](#).

**d) Down Syndrome (Trisomy 21)**

This is the most common autosomal Trisomy, and also the most frequent cause of severe mental retardation. With an incidence of 1:600 to 1:700 births. Many cases are associated with an increase in maternal age at the time of conception.

Craniofacial and Oral-Manifestations.-Brachycephaly, fontanelles are spacious and its closure is late. It has been observed persistence of metopic suture. Missing the frontal and sphenoid sinuses and in 90% of cases the maxillary sinuses are hypoplasics. Hemifacial bone hypoplasia causes ocular hypertelorism, small nose, with flattening of the nasal bridge and relative mandibular prognathism.

There are also obliquity of palpebral clefts and the epicanthal folds. The ocular manifestations are Brushfield stains (85%), opacity (50%), convergent Strabismus (33%), nystagmus (15%) and cataract (1-3%). The palate is narrower and shorter. In 0.5% cleft lip and palate. Periodontal disease has been also observed in more than 90% of the cases.

In 75% of cases there is late eruption of deciduous and permanent teeth. It has been described that 23-47% of patients have anodontia. In the permanent dentition there are more frequently, third molars, second premolars, and the lateral incisors. In 12% to 17% of patients the deciduous lateral incisors are abnormal. Sometimes it has observed extreme hypodontia and anodontia. Microdontia may occur in permanent dentition. There is usually a bad dental occlusion. [Buyse \(1991\)](#). Figures 13 A and B

**6.2. Sex Chromosome Anomalies.**

**a) Turner (46 Xo)**

The frequency is approximately 1: 2,500 female births. The most common oral and facial-expressions are folds in the epicanthal folds, ptosis of the eyelids, protruding ears and micrognathia. Two of the most consistent oral manifestations seem hypoplasia of the lower jaw and a palatal vault rounded and higher which is accentuated with age. Labial commissures are run down by the palmate neck. There is a late development of the skull. The teeth have premature eruption, and the first permanent molars appear between the ages of 1.5 - 4 years [Opitz et al. \(1969\)](#); [Fryburg et al. \(1996\)](#); [Madléna et al. \(1994\)](#); [Vandewalle et al. \(1993\)](#). The mesial-distal distance of the permanent teeth is lower than normal, and the roots may undergo resorption [Goodfrey \(1980\)](#). Figures 14 A and B.

**b) Klinefelter (47 Xxy.)**

Patients with this syndrome have more than one sex chromosome X, which is one of the most frequent causes of hypogonadism in men. Its incidence is 2:1000 males of the population in general. Craniofacial abnormalities. In Klinefelter's syndrome may be discrete microcephaly, ocular hypertelorism, myopia, strabismus, discrete Mongoloid obliquity of the palpebral fissures, epicanthal folds and short neck. Around 5% of the patients presented cleft palate. There is a high frequency of taurodontism XXXXY syndrome, with malformed incisors and mandibular prognathism. [Boraz \(1995\)](#). Figures 15 A, B and C

## 7. MATERIALS AND METHODS

The study was carried out in a Pediatric Hospital, assessing patients with craniofacial disorders, who arrived at the outpatient genetics and dentistry. Chromosome studies or karyotyping, hormonal and tomography or magnetic resonance studies were performed in some patients. All clinical alterations found in patients and clinical records data were analyzed for a better diagnosis and medical or surgical treatment was then performed. Patients who came to the Hospital for the first time with some alteration facial skull, of any age with any syndrome with impaired facial skull were evaluated in a multidisciplinary manner.

## 8. RESULTS

The evaluated patients average age was 5.5 with a standard deviation of 5.8; male (64.36%) and 31 female (35.65%). 87 Pediatric patients of different ages and with different congenital or genetic alterations were taken randomly. Craniofacial syndromes that were included are shown in table 1.

In terms of the frequency according to the sex, male patients showed most alterations; except in Turner syndrome (since this only manifests in women) with respect to the age had one higher incidence in Cockayne syndrome with an average of 16.8 years, followed by Robinow syndrome had an average age of 10 years; Turner of 9.2 years; Noonan with 8 years; Goldenhar with 6.6 years.; Cornelia de Lange 5.7 years; with 5 years of West syndrome, Down's syndrome with 4.9 years (although the total number of patients in this hospital with this syndrome in a period of 20 years is 1 700). Followed by syndrome of cri-du-chat with 2.6 years; craniosynostosis 2.3, 2 years of Crouzon syndrome, syndrome of Moebius 2 years; microcephaly with 2 years; syndrome of the 1st and 2nd brachial arches 1.6 years; syndrome of Apert 4 months (3 years) deletion of the short arm of chromosome 4 with 1 month of age.

The ranges of ages ranged from 1 year; 1-5, 6-10, 11-15, 16-20, 21-25. The majority of the population studied was between 1 to 5 years.

Syndromes with craniofacial disorders were, Down's syndrome, craniosynostosis, Goldenhar, Apert, Crouzon and Hallerman Streiff, syndromes dysmorphic, Moebius syndrome, Cornelia de Lange, West one of them associated with the carpal of Poland; deletion of the short arm of chromosome 4 (wolf-hirschhorn syndrome); Turner, Noonan, Cockayne, syndrome, nonspecific cromosopatias syndrome. dysmorphic associated with bilateral LPH; microcefalias, syndrome. Robinow; and the extremely rare craniofacial disorder maxillo-mandibular bilateral Fusion. Of all these the most frequent was Down syndrome with a total of 32 patients (43.24 %),. **Followed by** 6 patients with Cockayne syndrome (8.12%); with 6 dimorphic syndromes (8.1%) and 5 patients with Goldenhar Syndrome (6.75%).)



**Tabla- 1.** Craniofacial syndromes in a Pediatric Hospital in a group of 87 patients studied at random.

SYNDROME	Number of cases	Percentage of cases
Down	32	36.79%
Craneosinostosis	3	3.52%
Goldenhar	5	5.74%
Apert	1	1.14%
Crouzon	1	1.14%
Opitz G	5	5.74%
Cornelia de Lange	2	2.29%
West	10	11.59%
Moebius	2	2.29%
Wolf-Hirschhorn (4p-)	1	1.14%
Turner	8	9.2%
Noonan	5	5.74%
Cockayne	6	6.89%
Cri-du-chat ( 5p-)	1	1.14%
1° y 2° arcos branquiales	2	2.29%
Microcephaly	6	6.9%
Robinow	1	1.14%
TOTAL	87	100.00%

## 9. DISCUSSION

Within the genetic or congenital abnormalities involved in this study, the patients were divided into groups according to the structural defect and etiology. The highest incidence age ranged from 1-5 years.

A study of a particular group of patients randomly was conducted to assess approximately clinical characteristics and incidence and compared with reported worldwide. It was observed that patients with Down syndrome (36.79%), taking into account what was reported by [Gorlin \(1985\)](#), where the frequency is 1:700; our results are according to the reported data; 3 craniosynostosis (3.52%) found in this study is consistent with the results obtained by [Johnston \(1980\)](#), with an incidence of 1-3: 1000. Although we analyzed only 32 patients out of the total 1700 patients with this syndrome.

Goldenhar was common if compared to those reported 75 cases [Molina et al. \(1984; 2000\)](#); [Opitz et al., \(1969\)](#), with a total of 5 patients. Apert syndrome is similar to [Molina et al. \(2000\)](#); [Opitz et al., \(1969\)](#). [Gorlin and Goodman \(1983\)](#). Opitz G, there were 5 patients, being similar to that reported by Opitz in 1969 and Fryburg in 1996 and So in 2005. Cornelia de Lange only 2 patients (2.29%) resulted with high incidence since only reported 250 cases [Fryburg et al. \(1996\)](#). And finally Moebius syndrome resulted in 2.29%.

Only one case diagnosed as Robinow (1.14%), being an genetic alteration with little incidence as the four reported by [Opitz et al., \(1969\)](#). [Gorlin and Goodman \(1983\)](#). The deletion of the short arm of chromosome 4 (Wolf-Hirschhorn syndrome) was observed in 1 patient (1.14%) taking in consideration the reported frequency of 1: 250,000 live births. Microcephaly was a 6.9% of the population under study, with a frequency of 1: 250, which is reported as of high frequency [Gorlin](#)

(1985); Shafer and Levy (1987); Opitz *et al.*, (1969). However, patients with maxillo-mandibular fusion are different from those results reported by Agrawal in 1993; Agrawal *et al.* (1993). Similarly, Cockayne syndrome has been reported 140 cases worldwide; however Aparicio in 1995 diagnosed 6 cases which originate in a population of 2,700 inhabitants an impact to 7.8% of the general population Aparicio *et al.* (1995; 1996).

Mostly all of the syndromes are similar to those reposted in the literature as mentioned before. All syndromes reported in this study, not only presented a craniofacial disorder; but they are mostly accompanied by systemic alteration, and they should be evaluated immediately to provide them a better quality of life.

## 10. FIGURES AND LEGENDS

**FIGURE 1.** Twin patients who presented microcephaly secondary to congenital rubella.

**Figures 2.** Male patient with true microcephaly with exophthalmos **B.** Lateral picture of the patient.

**Figures 3 A.** male patient with Apert syndrome and webbed hands **B.** Lateral picture showing exophthalmos and hypoplasia.

**Figures 4 A.** Male patient with lipodermoide epibulbar, unilateral microtia atresia, dermoid cyst and oral malformation **B.** RX with column malformation by hemivertebrae and severe scoliosis.

**Figures 5 A.** Male and female siblings with Cockayne syndrome **B.** Skin biopsy showing the dermis alteration caused by ultraviolet light.

**Figures 6 A.** Male siblings with Opitz syndrome G, with hypertelorism, well-rooted in cleft lip and palate **B.** Female neonate with Opitz G and lip cleft palate syndrome.

**Figures 7 A.** Male patient with Robinow syndrome, hypertelorism, flat nasal bridge **B.** Lateral picture with broad forehead, and flattened face.

**Figures 8 A, B, C and D.** Four different patients with Moebius syndrome, a none expression face due to facial paralysis can be observed.

**Figures 9 A, B, C and D.** Male and female patients with Cornelia de Lange Syndrome, with a face characterized by synophrys, small triangular nose and mouth with deviation downward.

**Figures 10 A.** Male **B.** And female patients presenting Criduchat syndrome, with facial features as hypertelorism, eyes with external epicanthal oblique, small eyes, and hypoplastic face.

**Figures 11 A.** Female newborn patient with Patau syndrome, with cleft lip and palate. Agenesis of maxillary **B.** Lateral picture shows nasal bridge agenesis, severe flattening from the middle part of the face and malformation of pavilions by bilateral microtia atresia.

**Figures 12 A.** Male patient with facial hypoplasia, micrognathia and dysplasia of the mandible **B.** hands features of Edwards's syndrome with specific position of phalanges.

**Figures 13 A, B and C.** Male and female patients with flat face, palpebral commissures with an oblique deviation characteristic of Down syndrome.

**Figures 14 A.** A female new born patient with Turner syndrome, broad face, short neck **B.** There is redundancy of neck tissue.

**Figures 15 A.** Male patient with Klinefelter syndrome **B.** With turricefalic skull and wide low maxillary **C.** Right upper limb synostosis.

**Figure- 1.**



**Figures- 2.**

**A**

**B**



Figures- 3.

A

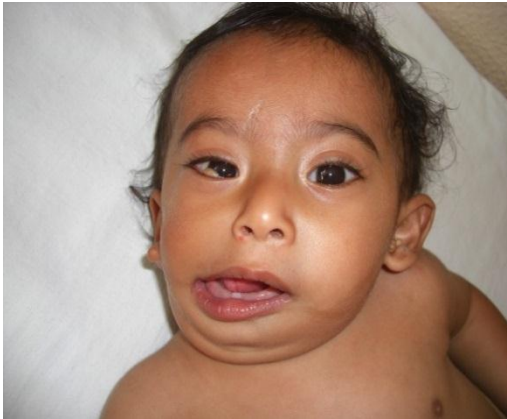


B

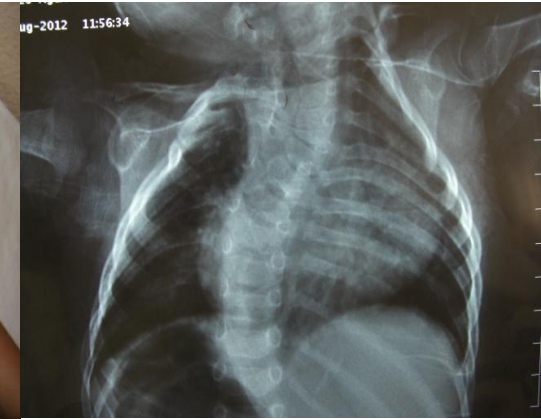


Figures- 4.

A



B

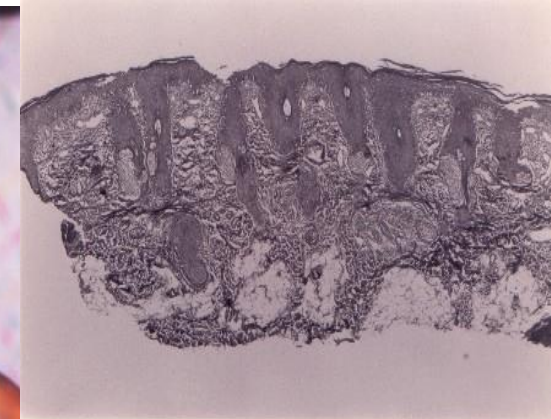


Figures- 5.

A



B



Figures- 6.

A

B



Figures- 7.

A

B



Figures- 8.

A



B



Figures- 8.

C



D



Figures- 9.

A



B



Figures- 9.

C



D



Figures- 10.

A



B



Figures- 11.

A



B





Figures- 12.

A



B



Figures- 13.

A



B



C



Figures- 14.

A

B



Figures- 15.

A

B

C



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