

CASE REPORT

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Treacher Collins syndrome: A case report

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ABSTRACT

Introduction: Treacher Collins syndrome (TCS) is a congenital craniofacial morphogenesis disorder of autosomal dominant inheritance, which symptoms vary greatly ranging from almost unnoticeable to severe. The most common clinical features include hypoplasia of the malar bones and the lower jaw, antimongoloid slanting of palpebral fissures, and ear abnormalities. Imaging, especially computed tomography (CT), enables both a quantitative and qualitative analysis of the malformations, allowing the diagnosis and the planning of surgical interventions.

Case Report: We report a case of a fully expressed Treacher Collins syndrome in a 3-month-old male child brought by his mother for dental malocclusion causing difficulties in breastfeeding. The examination revealed hypertelorism with antimongoloid slanting of palpebral fissures, hypoplasia of the malar and zygomatic bones, the mandible, and a microtia with no external auditory canal identified. The CT of the facial area revealed bilateral and symmetrical hypoplasia of the zygomatic bones, the mandible, the maxillary bones, and the temporal bone with agenesis of the bony external auditory canals.

Conclusion: Treacher Collins syndrome is a malformative craniofacial congenital disorder that can be well managed if the diagnosis is done early.

Keywords: Facial malformation, Mandibulofacial dysostosis, Treacher Collins syndrome

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INTRODUCTION

The large group of congenital craniofacial dysmorphism includes very characteristic and well-known types of abnormalities. Mandibulofacial dysostosis (MFD) or Treacher Collins syndrome is a congenital craniofacial morphogenesis disorder, of autosomal dominant inheritance, with an incidence of 1 in 50,000 live births [1]. The first case was reported in 1846 by Thompson [2], then the first description of its essential features was given by Treacher Collins, a British ophthalmologist, in the year 1900 [3, 4]. Later, in 1944, Franceschetti [5] wrote an extensive revision of the condition and named it “mandibulofacial dysostosis” [6].

The genetic abnormality appears as a de novo mutation in approximately 60% of cases [7]. It concerns the treacle gene (TCOF1), found on chromosome 5 [8, 9], and causes interference in the development of the first and second branchial arches [10–12].

Symptoms of this disorder vary greatly, ranging from almost unnoticeable to severe [13]. In cases of full expression of the syndrome, the diagnosis is easily made based on clinical characteristics alone. Teber et al. defined minimal diagnostic criteria such as antimongoloid palpebral fissures and malar and mandibular hypoplasia [6, 14].

Imaging, especially computed tomography (CT), finds its place in four levels: as a diagnostic element, provides precise malformation assessment before any surgical management, the study of postoperative growth,

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modeling growth, and determining a surgical program, leading to computer-assisted surgery [15].

We report a case of a fully expressed Treacher Collins syndrome, discussing the clinical features and the CT findings.

CASE REPORT

A 3-month-old male child was brought by his mother for facial malformation. He is her first and only son. She is G2P1, she had a miscarriage before. The pregnancy was carried to term but was not followed, which is why the mother did not have an antenatal morphological ultrasound. She reported dental malocclusion causing difficulties in breastfeeding. The examination revealed hypertelorism with antimongoloid slanting of palpebral fissures and deficient eyelashes in the lower eyelids. Below the eyes, there was a depression of the cheeks witnessing hypoplasia of the malar and zygomatic bones. The mandible was also hypoplastic with retrognathia, which led to an anterior open bite, giving the child the characteristic “fish or bird-like” profile. He also had bilateral microtia with no external auditory canal identified (Figure 1). The rest of the examination was normal. No family history was found for similar craniofacial dysmorphias.

The CT of the facial area (Figure 2) revealed bilateral and symmetrical hypoplasia of the zygomatic bones with agenesis of the zygomatic arches, an underdeveloped mandible with short rami, hypoplasia of the maxillary bones with agenesis of the maxillary sinuses. Temporal bones CT found a thin cranial vault, bilateral hypoplasia of the temporal bone with no pneumatization of the mastoids, agenesis of the bony external auditory canals, bilateral hypoplasia with tissue filling of the middle ear cavities, associated to bilateral dysmorphism of the ossicular chains, bilateral widening of the angle of the geniculum of the facial nerve (90°) and bilateral dehiscence of the upper semicircular canals. The other elements of the internal ears and skull base appeared normal.

Chest X-ray and abdominal ultrasound found no abnormalities. Based on those clinical and radiological findings, the patient was diagnosed with TCS.



Figure 1: (A) Frontal, (B) ¾, and (C) lateral views showing hypertelorism with antimongoloid slanting of palpebral fissures, depression of the cheeks, hypoplasia of the mandible with retrognathia and an anterior open bite (“fish or bird-like” profile), and the bilateral microtia with no external auditory canal.

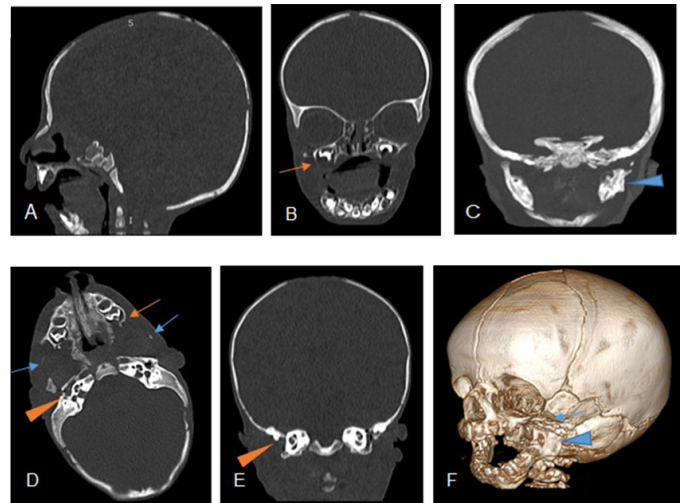


Figure 2: CT of the facial area and the temporal bones with MPR (A, B, D, E), MIP (C), and VRT (F) revealed a bilateral hypoplasia of the zygomatic bones with agenesis of the zygomatic arches (blue arrow), an underdeveloped mandible with short rami (blue arrow head), hypoplasia of the maxillary bones with agenesis of the maxillary sinuses (orange arrow), bilateral hypoplasia of the temporal bone with no pneumatization of the mastoids, agenesis of the bony external auditory canals, bilateral hypoplasia with tissue filling of the middle ear cavities associated to bilateral dysmorphism of the ossicular chains (orange arrow head).

DISCUSSION

Franceschetti–Klein syndrome or Treacher Collins syndrome or mandibulofacial dysostosis is an autosomal dominant genetic syndrome characterized by the existence of an abnormality in craniofacial development.

In only 40% of cases, the family history is positive and 60% of cases are a de novo mutation [7]. The responsible gene is located on chromosome 5 at q31, 3q32, and was identified in 1996 [16]. This gene, TCOF, codes for the nucleolar phosphoprotein “Treacle” which is involved in the transcription of ribosomal genes [8, 9, 17, 18], that appears to be essential for the survival of cephalic neural crest cells [19].

The transmission is autosomal dominant with a 90% penetrance and variable expressivity, even in affected patients within the same family.

More than 130 mutations have been identified to date, affecting different regions of the gene, without any correlation between the type of mutation and its phenotypic expression [14]. These mutations can be insertions, deletions, or nonsense mutations creating a premature stop codon [20].

Clinical features of MFD include facial malformations that are bilateral and asymmetrical, among which a retruding chin with a convex facial profile [6, 21], hypoplasia of the malar bones and the lower jaw resulting in an anterior open bite, that can be associated with malposition of the teeth and a palatal cleft (28%) [4, 22]. The palpebral slits are oblique with the external angle directed downwards, there are colobomas of the lower

eyelids (69%), and partial absence of eyelashes [5, 6, 9, 23].

Ear abnormalities associated are hypoplasia of the pavilions of the ears (77%), atresia of the external auditory canals (36%) [22], and anomalies of the middle ear ossicles [9, 24], causing conductive hearing loss in 40% of the cases [23].

Breathing difficulties may appear due to the narrowness of the upper respiratory tract [25], and intelligence is generally retained [22].

Franceschetti and Klein classified the syndrome into five categories based on these clinical features: complete form, incomplete form, unilateral form, abortive form, and atypical form [26–28]. Knowing that the obligatory features of TCS defined by Axelsson et al. in 1963 include antimongoloid palpebral fissures, an anomaly of the lower eyelid, hypoplasia of malar bones, and hypoplasia of the mandible [29]. In our case, the patient has all these obligatory features.

Computed tomography scan is the examination of choice for the exploration of TCS, allowing both a quantitative and qualitative analysis of the malformations, useful for the diagnosis, and the planning of surgical interventions [30, 31].

Besides the hypoplasia of the zygomatic and maxillary bones compatible with the clinically observed morphology, CT of the temporal bone reveals three radiographic findings that are unique for MFD as described by Jahrsdoerfer et al. [6, 32]: (1) absence of mastoid pneumatization, (2) ossicular disjunction with (3) a bony cleft in the lateral aspect of the temporal bone just anterior to the mastoid visualized on the 3D reconstructions.

Other studies report a characteristic slit attic usually containing hypoplastic ossicles, a hypoplastic epitympanum [33, 34], and even a complete absence of the middle ear and epitympanic space [9, 24], absent external auditory canal [30, 32], abnormal course of the facial nerve which follows a more direct path laterally from the geniculate ganglion, and is therefore more anteriorly positioned than normal [21].

Abnormalities of the inner ear are rare and considered to be an incidental finding [21].

Analysis of the CT findings, in combination with the clinical characteristics, permits the differentiation of MFD from other craniofacial anomalies [6].

Differential diagnosis of TCS are Nager acrofacial dysostosis, which involves malformations of the upper limbs in addition to the facial abnormalities, Goldenhar syndrome, which associates hemifacial microsomia and vertebral abnormalities [10], and also Miller syndrome which has the additional diagnostic feature of ectropion or out-turning of the lower lids [9, 24, 26].

Since our case presented all the features of TCS described above, and had no additional features such as anomalies of the upper limbs or vertebral anomalies, we retained the diagnosis of TCS.

Treatment requires a multidisciplinary approach, involving a team of orthodontists and maxillofacial surgeons since the method of choice in the treatment of MFD is distraction osteogenesis associated with preoperative and postoperative orthodontic treatment [35], but also a pediatric otolaryngologist, audiologist, geneticist, psychologist, and other healthcare professionals [12].

CONCLUSION

Treacher Collins syndrome is a malformative craniofacial congenital disorder that can be well managed by surgery and other supportive treatments and psychological support. If the diagnosis is done early, it is possible to obtain better therapeutic results, giving these patients the opportunity to have an improved social life.

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Author Contributions

Aïda Saoud – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Basma Taïbi – Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Ayman El Farouki – Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Latifa Chat – Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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