TREACHER COLLINS SYNDROME- A RARE CASE REPORT

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ABSTRACT

Treacher Collins syndrome (TCS) is a rare genetic disorder marked by distinctive craniofacial abnormalities, caused by mutations in the TCOF1, POLR1C, or POLR1D genes. These genetic changes disrupt the normal development of facial bones and tissues. Key features of TCS include downward-slanting eyes, underdeveloped cheekbones, a small lower jaw, and ear anomalies that can lead to hearing loss. The severity of symptoms varies widely, even among affected family members. Diagnosis is mainly clinical, supported by genetic testing. TCS follows an autosomal dominant inheritance pattern, though some cases arise from new mutations without a family history. Managing TCS requires a multidisciplinary team for craniofacial surgery, dental care, hearing rehabilitation, and psychosocial support. Early and individualized treatment plans are vital for enhancing functional outcomes and quality of life.

Keywords- craniofacial dysmorphism, genetic syndrome, multi-disciplinary medical care.

Introduction

Mandibulofacial dysostosis, also referred to as Treacher-Collins syndrome, is a congenital condition that impacts craniofacial development. It is inherited in an autosomal dominant manner and has a prevalence of about 1 in 50,000 live births.[1] The initial case of this condition was documented by Thompson in 1846. Treacher Collins, a British ophthalmologist, later provided a detailed description of its key characteristics in 1900. In 1944, Franceschetti conducted a comprehensive review of the disorder and introduced the term "mandibulofacial dysostosis."[2] Treacher Collins syndrome (TCS) arises from mutations in one of three genes: TCOF1, POLR1C, or POLR1D. Mutations in the TCOF1 gene are the most prevalent, responsible for 78% to 93% of TCS cases. Mutations in POLR1C and POLR1D together account for around 8% of cases. TCS resulting from heterozygous mutations in TCOF1, or less frequently in POLR1D, follows an autosomal dominant inheritance pattern, while compound heterozygous mutations in POLR1C are inherited in an autosomal recessive manner. The majority of TCS cases exhibit autosomal dominant inheritance.[3]

Treacher Collins syndrome (TCS) is commonly characterized by craniofacial abnormalities such as zygomatic hypoplasia, seen in 81% of cases, and micrognathia, present in 78%. In severe instances, the zygomatic arches can be completely absent. Changes in the size, shape, and position of the external ears are often accompanied by atresia of the external auditory canals. Abnormalities in the middle ear ossicles frequently lead to conductive hearing loss, while mixed or sensorineural hearing loss is uncommon in TCS patients.[4] Treacher-Collins syndrome (TCS) is associated with various oral manifestations. These include a high palatal vault, cleft palate, and enamel hypoplasia. Additionally, skeletal hypoplasia of the maxilla and mandible frequently results in an anterior open bite.[5]

Case Report

A 4-year-old boy reported a chief complaint of missing teeth in the upper front tooth region. When the child was 6 months old he was operated for cleft lip and palate (Fig 1). The patient gives a history of associated discomfort while chewing food. The patient’s father reported that there was a history of delayed speech and currently patient has difficulty in speech. There was no contributory medical, personal and family history. A general physical examination was done which revealed a short stature, and malnourished body. No abnormality was detected in

skin, hair and nails. The child was 94 cm long with a body weight of 11.3kg and vitals were under normal limits. The patient was conscious, and uncooperative but well oriented to time, place and person. There were multiple facial dysmorphic features including a narrow face with frontal bossing, a flattened nasal bridge, and a parrot-beak-shaped nose (Fig. 1 A&B). The zygoma was underdeveloped, with hypoplasia of malar bone, incompetent lip and ears were slightly enlarged and everted (Fig.1A). Also, proptosis was observed in both eyes with normal eye movements (Fig. 3). After examining the lateral profile slight maxillary prognathism was observed (Fig.1 B).

Intraoral examination revealed V- shaped narrow and high-arched palate. Also, there was missing w.r.t. 51, 61 and 62 in the upper front tooth region. An orthopantomogram revealed a slightly prominent antegonial notch and partial anodontia w.r.t. 51 and 61. Based on clinical history and examination provisional diagnosis of Treacher Collins syndrome was made. However, the following conditions are considered as differential diagnoses Goldenhar syndrome, Nager's Acrofacial Dysostosis, Pierre Robin syndrome and Apert syndrome.

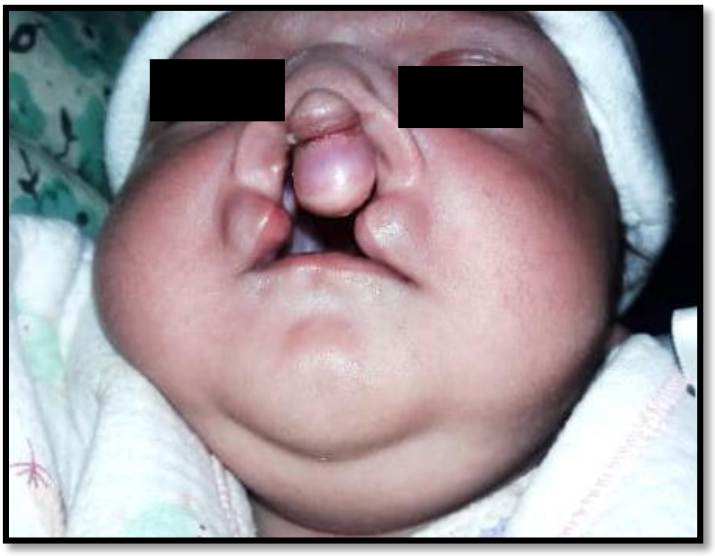

Figure 1- Cleft Lip and palate at the age of 2 months

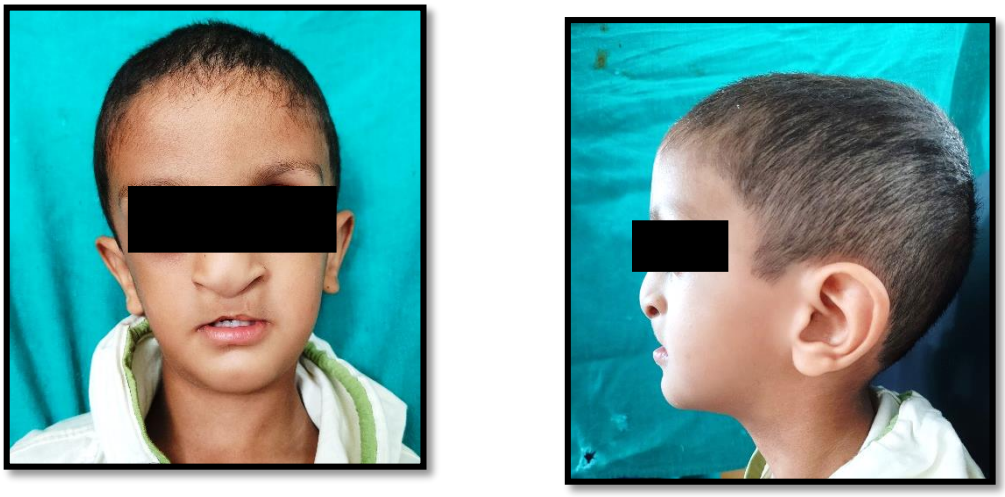

Figure 2- Extra Oral Pictures, A) Facial Profile B) Lateral Profile.

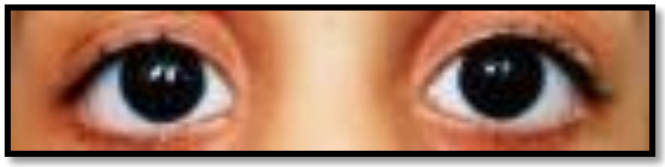

Figure 3- Proptosis seen in both the eyes

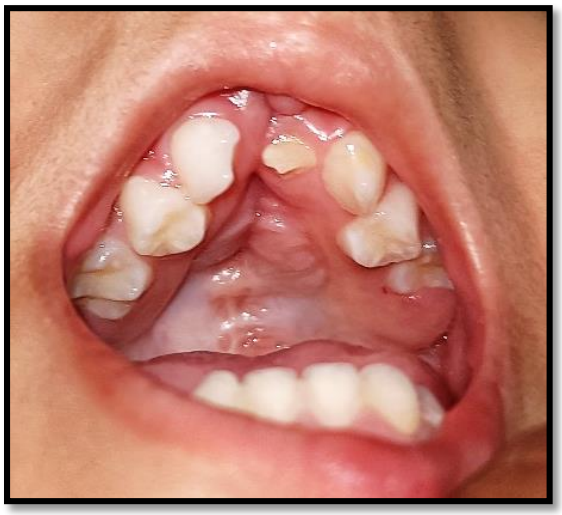

Figure 4- Intra Oral - Narrow V- Shaped Arch

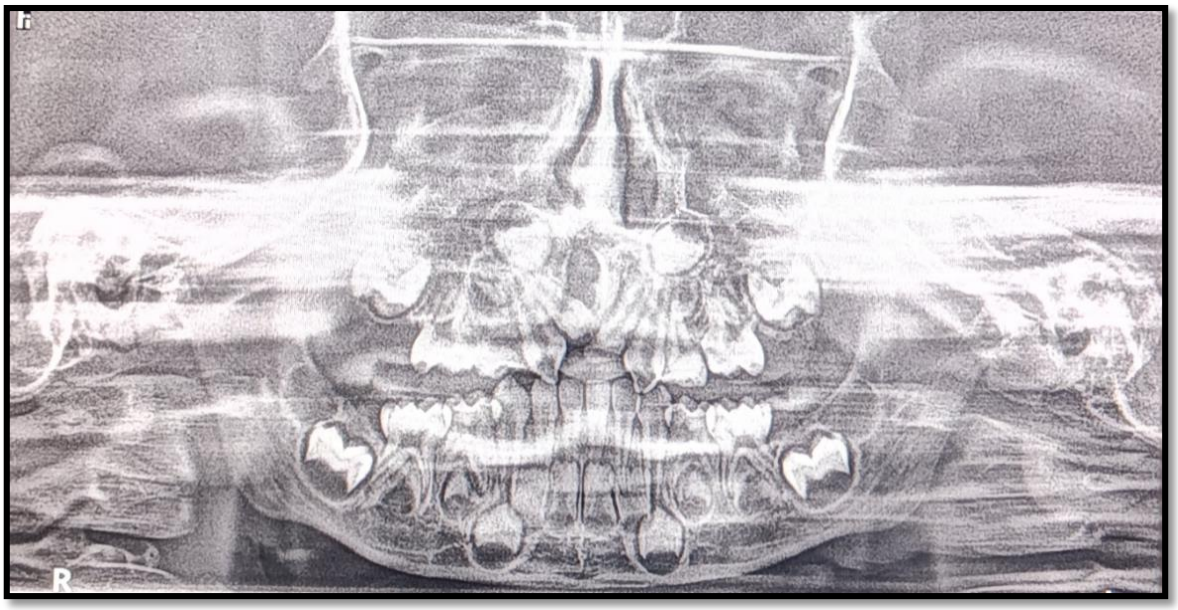

Figure 5. OPG showing prominent Antegonial Notch and partial anodontia w.r.t.

Discussion

Treacher Collins syndrome, also known as mandibulofacial dysostosis, is a developmental anomaly of the face caused by a genetic disorder. It involves the underdevelopment of the first pharyngeal arch, which may affect the maxilla and mandible either unilaterally or bilaterally. This can result in a small mandible with a receding chin and abnormalities such as colobomas of the lower eyelid. The ear may be absent or positioned lower than usual, and other features can include cleft palate and defective dentition. In some cases, one side of the face may be overdeveloped or underdeveloped. Additionally, nasal abnormalities like a proboscis, fusion of the eyes (cyclopia), or widely spaced eyes (hypertelorism) can occur. Due to these characteristics, Treacher-Collins syndrome is sometimes referred to as First Arch syndrome.[6]

TCS is a congenital disorder affecting craniofacial development. It exhibits high penetrance and significant variation in phenotypic expression. As a result, some individuals with TCS may display only mild characteristics, while others may experience severe deformities.[7]

Affected individuals with Treacher Collins syndrome suffer from coloboma of the lower eyelids, aplasia of the eyelashes, and slanting palpebral fissures. Vision issues such as loss of vision, strabismus, refractive errors, and anisometropia may also occur. These patients often exhibit brachycephaly with bitemporal narrowing, though the overall skull shape remains normal. Ear abnormalities include a small or rotated pinna, or complete absence of the pinna, along with symmetrical bilateral absence or narrowing of the external auditory meatus.[8]

Sometimes, individuals with Treacher Collins syndrome may experience deformities of the nasal cavity and a high-arched palate.[9] Less frequently, affected individuals may suffer from breathing difficulties, sleep apnea, choanal atresia or narrowing, pharyngeal hypoplasia, underdevelopment of the pharynx, and a narrow airway.[10] In most cases, there may be malformations of the ossicles and middle ear, and rarely, anomalies of the inner ear

Based on clinical features, Franceshetti and Klein have identified five clinical forms of Treacher Collins syndrome (TCS):

1. **Complete form**: Exhibits all known features.
2. **Incomplete form**: Presents with less severe abnormalities of the ear, eye, zygoma, and mandible.
3. **Abortive form**: Characterized only by lower lid pseudo coloboma and zygoma hypoplasia.
4. **Unilateral form**: Anomalies are limited to one side of the face.
5. **Atypical form**: Includes additional abnormalities not typically associated with TCS.[11]

Our patient demonstrated the incomplete form, with clinical features including zygomatic hypoplasia, micrognathia, cleft lip and palate, and a parrot-beak-shaped nose. TCS is an autosomal dominant disorder characterized by incomplete penetrance and variable expressivity. According to Mendelian inheritance laws, an affected parent of any sex has a 50% chance of passing the disorder to their offspring. This underscores the critical need for genetic counseling for affected families.

As oral physicians, it is our duty to identify this syndrome, understand its manifestations, and ensure close follow-up, appropriate treatment, and comprehensive counseling for patients.[12] Early diagnosis plays a crucial role in Treacher Collins syndrome (TCS), facilitating prompt intervention to address both aesthetic and functional impairments effectively. By mitigating outward signs early on, patients can experience improvements in their overall quality of life and social interactions. This underscores the importance of timely recognition and management of TCS in clinical practice.[13]

Conclusion

Treacher-Collins syndrome is a rare genetic disorder characterized by craniofacial deformities. The presented case underscores the importance of early diagnosis and a multidisciplinary approach to management, including surgical interventions, hearing rehabilitation, and genetic counselling. This case highlights the variability in clinical presentation and the necessity for personalized treatment plans to improve patient outcomes. Continuous follow-up and support are crucial for addressing the complex medical, developmental, and psychological needs of affected individuals. Further research and case studies are essential to enhance understanding and management of this syndrome.

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