

Case Report

Treacher Collins Syndrome: A Rare and Special Case Report of a 9-Year-Old Boy from Saudi Arabia

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Abstract

Treacher Collins syndrome (TCS) is characterized by downslanting palpebral fissures on both sides, malar hypoplasia, micrognathia, and external ear abnormalities. Hypoplasia of the zygomatic bones and jaw may make it difficult to eat and breathe. TCS, also known as Franceschetti syndrome or mandibulofacial dysostosis, is an autosomal dominant craniofacial condition with a wide range of symptoms. Edward Treacher Collins (1862-1932), an English ophthalmologist, first defined the syndrome's fundamental characteristics in 1900. This syndrome is approximately affecting 1 in 50,000 live births with equal gender affection. In Saudi Arabia, it follows a similar pattern of prevalence. Antimongoloid slanting palpebral fissures, colobomas of the lower eyelid, hypoplasia of the zygoma and mandible, auditory microtia, conductive hearing loss, obstructive sleep apnea, and a range of orofacial abnormalities are the most prevalent clinical symptoms of TCS. In this case report, the author describes a deep-rooted analysis of the clinical features of TCS in a 9-year-old boy as well as his follow-up case. The study was conducted for a period of 9 years from birth to 9-year-old age, which makes this case report as a special rare 9-year follow-up case report from Saudi Arabia.

Keywords: Autosomal dominant, craniofacial deformities, mandibulofacial dysostosis, Treacher Collins syndrome

INTRODUCTION

Treacher Collins syndrome (TCS) is a rare autosomal dominant craniofacial condition with significant penetrance and a wide range of symptoms. It is approximately affecting 1 in 50,000 live births.^[1-3] This condition was initially described in 1846 and 1847 by Thomson and Toynbee, respectively, then in 1889 by Berry, but it is named after Edward Treacher Collins, a British ophthalmologist who reported two instances with crucial features description in 1900. After conducting an exhaustive study of TCS cases, Franceschetti and Klein coined the term “mandibulofacial dysostosis” in 1944.^[4] TCS manifests itself in the first and second branchial arches, grooves, and pouches that form between the 20th and 12th weeks of intrauterine life.^[5] TCS is caused by mutations in the 5q3233.2 region, which result in insertions or deletions in the TCOF1, POLR1C, and POLR1D genes. These genes code for the “Treacle” nucleolar phosphoprotein, which interacts with proteins involved in the DNA damage response under metabolic stress.^[6] The clinical presentation of TCS varies among the affected individuals, ranging from mild and therefore undiagnosed symptoms to severe facial involvement

and life-threatening airway manifestations.^[7] Antimongoloid slanting of the palpebral fissures, lower eyelid coloboma, malar and mandibular hypoplasia, auricle malformation associated with external auditory canal atresia, maldevelopment of the middle ear ossicles associated with conductive hearing loss, cleft palate, and dental anomalies are all common findings.^[8]

CASE REPORT FOLLOW-UP

A 9-year-old boy born in October 2010 presented with dysmorphic facial appearance mainly in the form of mandibular hypoplasia, micrognathia, bilateral microtia (the right ear is Grade 3, whereas the left ear is Grade 1 microtia), bilateral external auditory canals atresia, and antimongoloid slanting of the palpebral fissures [Figure 1]. Furthermore, the baby

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Figure 1: Picture showing the boy at his first birthday with Treacher Collins syndrome dysmorphic features

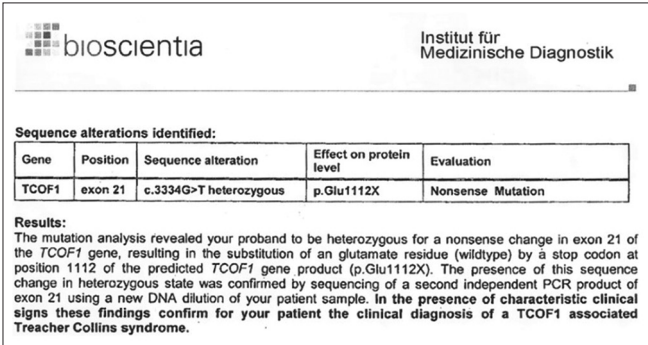


Figure 2: Patient's human genetic analysis

showed signs of mild respiratory distress, for which he was admitted to the hospital for further evaluation. The baby is a result of normal spontaneous vaginal delivery with normal birth weight (3.2 Kg), and he was maintaining normal oxygen saturation. There was no syndromic family history (also, he has two brothers younger than him [born in 2013, 2018, respectively] and both are normal). Basic laboratory and imaging investigations done during the admission with no significant abnormality were noticed. Furthermore, human genetic analysis was done at “bioscientiainstitutfürmedizinischediagnostik” and the final report confirms the diagnosis of *TCOF1*-associated TCS [Figure 2]. The patient is doing fine at the hospital, has mild respiratory distress mainly due to his micrognathia causing posterior positioning of his tongue that eventually leads to airway compromise. However, no oxygen desaturation events are recorded. The patient was discharged home with pediatric and ENT follow-ups.

At the age of 1 year old, the patient being followed at ENT clinic, auditory brainstem response (ABR) test was decided and done on October 8, 2011, and the result was moderate bilateral conductive hearing loss for which bone-anchored hearing aid (BAHA) band was prescribed [Figure 3].

At the age of 4 years old, the patient continued to have respiratory distress attacks during sleep. He was seen by the ENT team at Seattle Children Hospital, and polysomnography was ordered.

Sleep study done in 2014, and the result was severe obstructive sleep apnea with AHI >100 for which tracheostomy was decided and done on November 11, 2014 [Figure 4].

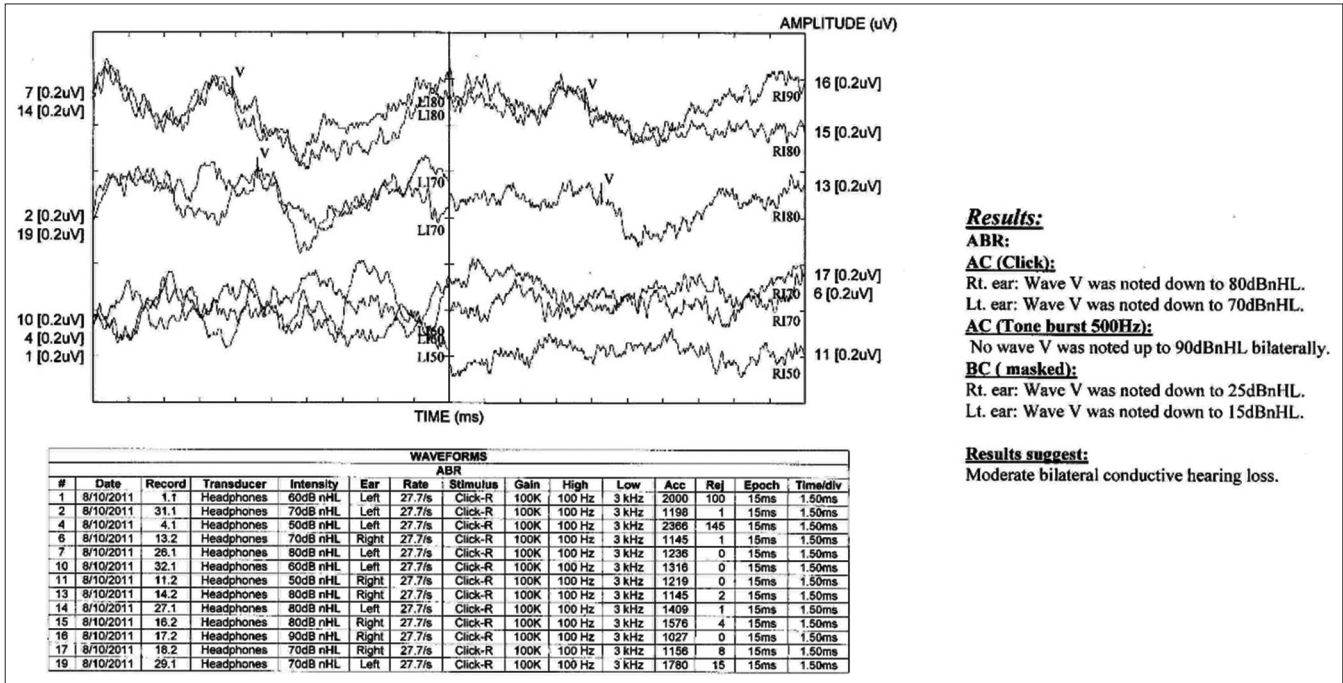


Figure 3: Auditory brainstem response of the patient showed moderate bilateral conductive hearing loss

At the age of 8 years old, the patient followed by ENT and maxillofacial team to plan for tracheostomy decannulation. Sleep endoscopy was done and showed severe oropharyngeal collapse by the tongue as a consequence of retrognathia. The patient was evaluated at OroMaxilloFacial Surgery (OMFS) clinic, and bilateral mandibular distraction was planned and done successfully. Few months later, the patient underwent second sleep endoscopy, which showed more than 50% airway improvement followed by the removal of distractors. Two weeks postdistractors removal, the patient was evaluated by ENT and OMFS teams and tracheostomy decannulation was decided which was done successfully with no complications [Figure 5]. The patient underwent polysomnography few months postoperative and showed improvement with AHI = 8 with 0 apnea [Figure 6].

At the present time, the boy is doing well, studying at the third-grade level with excellent grades. Meanwhile, he is following with the ENT clinic and has regular speech therapy sessions.

DISCUSSION

The clinical features of TCS show a distinctive bilateral pattern, unlike the other cleft and craniofacial syndromes. However, it shows rarely symmetrical distribution of skeletal and soft-tissue structures. The typical clinical features of the TCS include ocular and periorbital deformities (malar hypoplasia, downslanting palpebral fissures due to skeletal dysmorphism of the orbits, colobomas), auricular deformities (bilateral microtia or anotia, malpositioned auricular remnants, stenosis or atresia of the external auditory meatus, and hearing disability), or maxillofacial deformities, retrognathic maxilla, decreased posterior facial height, deficient proximal mandible or missing the ramus/condyle unit in severe cases, (temporomandibular joint [TMJ] dysfunction and ankylosis) and other features that are not consistently seen include speech problems, missing eyelashes, epiphora, visual disability, choanal atresia, cleft palate, cervical spine malformation, congenital heart disease,

renal anomalies, etc.^[9-12] Management of TCS is tailored based on the specific needs of the affected individual. Thus, a multidisciplinary craniofacial management approach is required to critically evaluate and coordinate craniofacial, oral, dental, and pediatric care.^[13-15] The TCS patients have a myriad of complex problems, and thus the preoperative planning and evaluation are crucial. Early priorities need to be identified first, and urgent focus should be given to the problems that disturb the individual most.

The protocol for the management of TCS suggests three epochs based on the birth to maturity protocol.^[8] The first epoch is done from birth to 2 years, which commonly includes respiratory and airway management, nutrition, tracking hearing ability, management of hearing problems, genetic counseling of the parents, etc.^[14] The second epoch (2–12 years) usually involves review and follow-up of the first epoch interventions, repair of zygomatic/orbital deformities, orthodontic corrections, physiological and social assessment, etc. In the third epoch (13–18 years), the patient is followed up for the intervention performed and also reviewed for other skeletal and soft-tissue deformities, where appropriate orthognathic surgery or correction is done based on the growth stage of the individual.^[16-18]

The airway was managed using bilateral mandibular distraction osteogenesis (MDO) for tracheostomy decannulation in this case report. Tracheostomy was formerly the primary choice of therapy for airway blockage, but it has since been phased out due to the risk of long-term consequences such as tracheomalacia, tracheostenosis, and recurring bronchopulmonary infections.^[17] Tracheostomy creates a huge socioeconomic burden for the family where the patient needs good home nursing care, and medical care and parental education are also inevitable. It is reported that many centers make their efforts to avoid tracheostomy, and it is a long-term commitment.^[16] MDO shows more effectiveness and fewer complications compared to tracheotomy and is now commonly done procedure for the advancement of the mandible forward, which will improve the retrolingual airway, thus relieving airway obstruction.^[19,20]



Figure 4: The boy with tracheostomy and bone-anchored hearing aid band

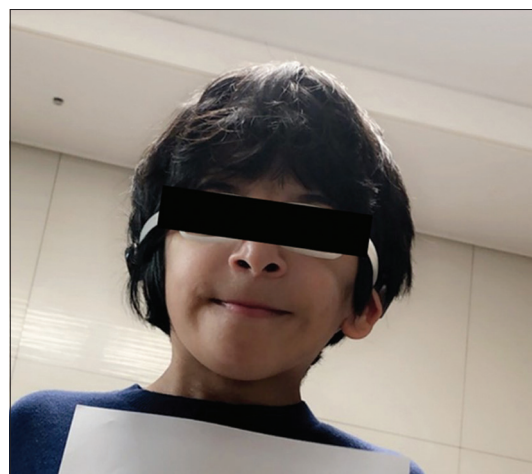


Figure 5: The boy at the age of 9 years with tracheostomy being decannulated

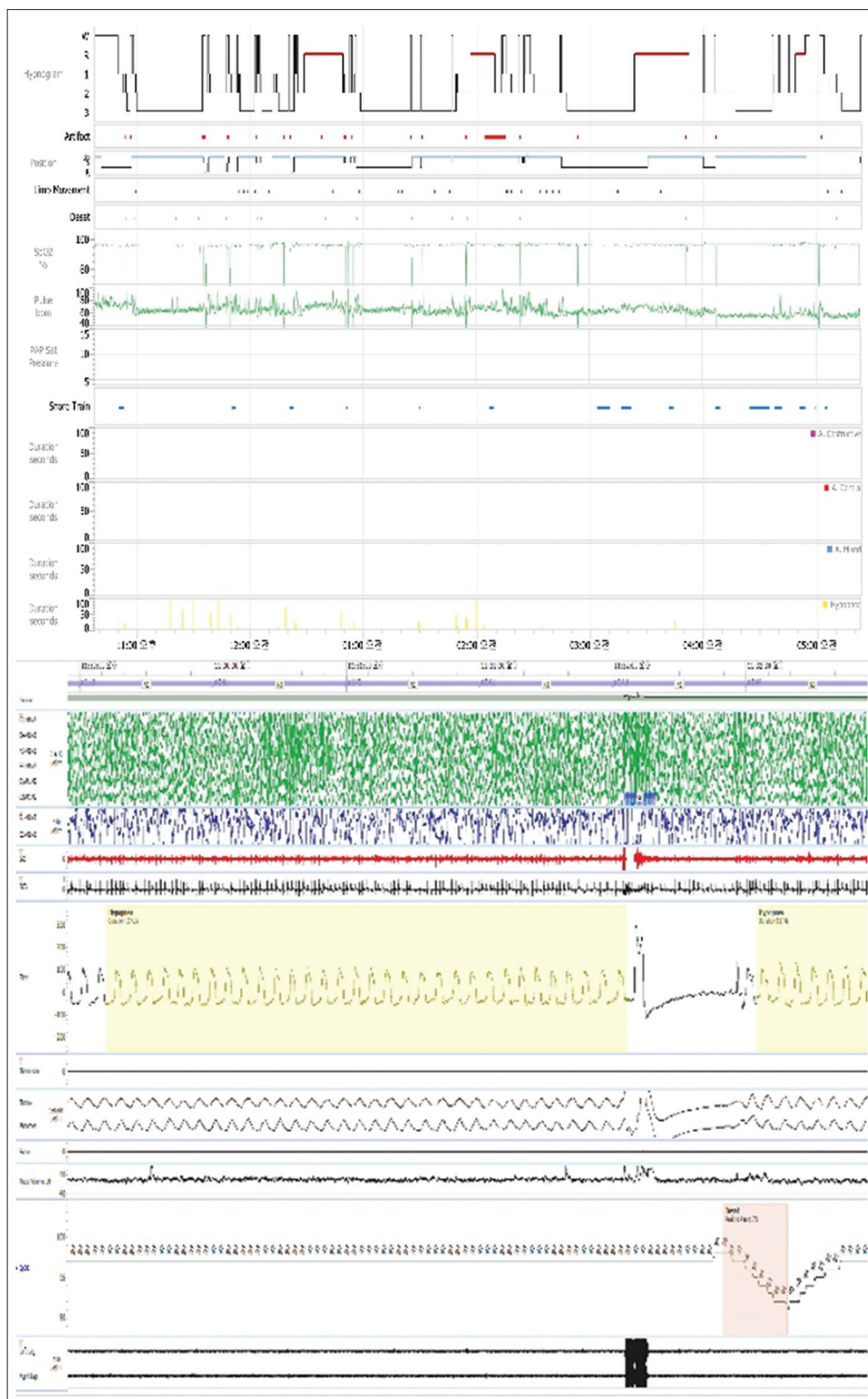


Figure 6: Polysomnography done at the age of 9 years

Hearing disability is a critical issue that should be addressed during the first epoch. In our case, moderate bilateral conductive hearing loss was diagnosed with ABR test, which was managed with bone BAHA. Middle ear reconstruction may be considered in older children with the aim of achieving hearing

without the need for any aids. Any otologic surgery should be performed by a surgeon who is knowledgeable with the anomaly in facial nerve structure seen in TCS patients.^[21] Some of the oro dental problems observed in TCS patients include malocclusion class II malocclusion, midline shift, posterior

open bite, deep bite, anterior open bite, mandibular rotation, and retrognathism with other commonly reported dental findings include impacted supernumerary teeth, limited mouth opening enamel hypoplasia, and dysplasia of the TMJ.^[22,23] The dental treatment in these patients is complex and challenging due to hearing disabilities, anxiety, and micrognathia, which could predispose the patients to breathing problems. Dental procedures should be done under general anesthesia rather than sedation or ambulatory interventions.^[24,25] Thus, it is important to educate the parents about the importance of keeping good daily oral hygiene.

Genetic testing would help to identify the mutation of the gene but should be done only after an equivocal clinical diagnosis as testing is expensive and not a routine part of TCS protocol. This case has confirmed the presence of the TCOF1 gene, which is the mutation seen in TCS. A case series by Thompson *et al.* reported that two out of four patients tested for the TCOF1 gene showed positive results.^[16] The speech, language, and social interventions are usually done in the second epoch and should be reviewed routinely for development based on the protocol.^[26] Detecting maladaptive compensatory patterns at an early age is crucial, and appropriate intervention should be done when necessary. This could be achieved by regular monitoring of articulatory proficiency.^[16,27] No facial reconstruction is planned yet as the boy is still followed in the second epoch. The third epoch will depend on the outcomes of the previous interventions performed. Thus, formulating outcome goals will be based on the cumulative decision of all the multidisciplinary team members. It is clear that the outcomes of each intervention done in each specialty will be dependent on the severity of the deformity.

Ethical approval

The ethical approval has been taken from the Institute Ethics Committee.

CONCLUSION

In this case report, the author has reported the typical case of TCS, a rare congenital anomaly, from Saudi Arabia. The author has followed the case from birth to 9 years of age for noticeable changes in the clinical features and relevant examinations and investigations. Based on the findings and several encounters with the patient, it is concluded that the cases of TCS follow a similar pattern of prevalence and clinical picture as in other countries. The clinical feature followed a similar pattern as reported in other similar case reports.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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