

Anaesthesia recommendations for patients suffering from

## Treacher Collins Syndrome

**Disease name:** Treacher Collins syndrome

**ICD 10:** Q75.4

**Synonyms:** Mandibulofacial dysostosis, Franceschetti-Zwahlen-Klein syndrome

Treacher Collins (TCS) syndrome is a rare disorder of craniofacial development with an incidence of approximately 1:50 000 live births resulting from mutations in the TCOF1 gene (1). Although Thomson (2) and Berry (3) were probably the first to describe the signs now associated with this syndrome, it was Dr Edward Treacher Collins, an English surgeon and ophthalmologist, who first characterized the condition in 1900 (4,5). It exhibits autosomal dominant inheritance with variable penetrance. About 60% of the cases arise from fresh mutations in TCOF 1 gene with no previous family history (1). It is a disorder of neural crest cell proliferation, involving the first and second branchial arches. It is thus bilateral, symmetrical and restricted to head and neck region of body. The clinical features and severity are variable.

---

Medicine in progress



Perhaps new knowledge

Every patient is unique

Perhaps the diagnostic is wrong

---



Find more information on the disease, its centres of reference and patient organisations on Orphanet: [www.orpha.net](http://www.orpha.net)

---

## Disease summary

---

Features relevant to anaesthesia and intubation include bony hypoplasia involving maxillary, zygomatic, and mandibular bones, small oral aperture, high arched palate and severe temporomandibular joint abnormalities. Other findings include predominant hypoplasia of soft tissues observed in the malar bone, inferior orbital rim and cheek, antimongoloid obliquity of the palpebral fissures, a coloboma of the outer third of the lower eyelids with absence of eyelashes, external ear abnormalities including anotia with atresia of the external auditory canal, and anomalies of the ossicular chain. Facial retrognathia or micrognathia is also commonly associated. Cleft palate is present in up to 35% of patients and an additional 30-40% have congenital palatopharyngeal incompetence. Chronic respiratory deficiency, obstructive sleep apnea (OSA) and sudden death are other features. Uncommon findings are spinal or cardiac anomalies. People with TCS usually have normal intelligence.

Anaesthesia in patients presenting for surgery is a challenge in view of difficult mask ventilation and difficult intubation by conventional means (6,7). This was first described by Ross way back in 1963 (8).

---

## Typical surgery

---

Airway surgery: mandibular distraction, tracheostomy

Craniofacial: cleft palate repair, orbitozygomatic surgeries (including bone grafting), orthognathic surgery of maxilla (e.g. Le Fort I osteotomy) and/or mandible (9).

ENT: tympanostomy tube insertion, otoplasty

---

## Type of anaesthesia

---

Anticipation of a difficult airway is the key anaesthetic consideration (see below). There are no known contraindications to specific anaesthetic drugs or techniques beyond this consideration.

However, in adult patients it may be preferable to employ regional anaesthesia techniques where feasible to avoid the need to manage the difficult airway. Regional anaesthesia / analgesia may also reduce the risk of airway obstruction postoperatively by reducing opioid requirements.

---

## Necessary additional diagnostic procedures (preoperative)

---

There may be coexisting obstructive sleep apnoea (sleep study may be warranted in individual cases).

---

## Particular preparation for airway management

---

Always prepare for an anticipated difficult airway as this is the most frequent problem encountered during anaesthesia.

Initial face mask ventilation, with or without oropharyngeal airway after induction of anaesthesia, has been described as difficult in a third of the patient population (6). A large proportion of children with TCS require intubation techniques other than conventional direct laryngoscopy.

Direct laryngoscopy becomes more difficult with increasing age (6). Therefore preparation for an anticipated difficult airway should always be undertaken for a patient with TCS even if previous airway management and intubation was uneventful. Additionally, in contrast to Pierre Robin sequence, patients with TCS who have had surgical correction with mandibular distraction may still be difficult to intubate (10).

Preparation for an anticipated difficult airway includes:

- Previous history of general anaesthesia and difficult intubation.
- Clinical examination of the airway including assessment of mouth opening, temporomandibular joint movement, and dental implantation.
- Availability in the operating room of equipment necessary for difficult intubation and skilled assistance. This includes a variety of alternative airway devices and techniques / plans as described in difficult airway algorithms (11,12) such as: stylet, bougie, videolaryngoscope, fiberoptic intubation, two anaesthetist technique, paraglossal straight blade technique (13). The laryngeal mask airway (LMA) (6) or second generation supraglottic airway devices such as the i-gel (14) have been successfully used to provide an adequate airway in TCS when intubation has been difficult. Equipment and experienced staff for the scenario of a “can’t intubate, can’t oxygenate” (CICO) situation needs to be available and in theatre (11,12,15).

---

#### **Particular preparation for transfusion or administration of blood products**

---

Not reported.

---

#### **Particular preparation for anticoagulation**

---

Not reported.

---

#### **Particular precautions for positioning, transport or mobilisation**

---

Eye protection might be warranted during craniofacial or ENT procedures – e.g. lubrication and lid closure.

---

#### **Probable interaction between anaesthetic agents and patient’s long term medication**

---

Not reported.

---

## **Anaesthesiologic procedure**

---

Avoid sedative premedication where possible. Excessive use of opioids in postoperative period should be avoided because of the risk of airway obstruction. As far as possible, regional analgesia techniques and opioid-sparing agents should be used.

Always prepare for an anticipated difficult airway (see the “Particular preparation for airway management” section). Anaesthesia technique for an anticipated difficult airway usually involves maintenance of spontaneous ventilation as far as possible. Inhalational anaesthesia or remifentanyl infusion or dexmedetomidine infusion may provide suitable conditions for intubation whilst maintaining spontaneous ventilation. Airway patency with manual bag mask ventilation should be confirmed before considering administration of muscle relaxant (an exception to this may be the occurrence of laryngospasm).

The patient should be extubated only when fully awake and keeping all precautions of repeat intubation at hand (16).

---

## **Particular or additional monitoring**

---

The nature of the surgery will dictate the degree of monitoring.

Exercise great care to ensure endotracheal tube is well secured (adequate fixation with consideration to the operative field) as dislodgement intraoperatively has been reported (6). ETCO<sub>2</sub> monitoring is mandatory to confirm intubation and to detect dislodgement of the airway device.

Postoperatively, it is important to monitor for signs of airway obstruction.

---

## **Possible complications**

---

Airway instrumentation in the setting of a difficult airway may result in airway complications including dental trauma, lacerations to lips or gums, post-extubation oedema and stridor.

Endotracheal tube dislodgement intraoperatively has been described (6).

Gastric rupture has been described in a CICO scenario in a child (17).

---

## **Postoperative care**

---

Postoperatively, it is important to monitor for signs of airway obstruction (including stridor), particularly in patients with OSA. CPAP may be needed in the postoperative period for oxygenation.

The appropriate choice of postoperative ward setting is dependent upon the surgery type and the patient's airway. High dependency or intensive care unit (ICU) may be appropriate. If not admitted to ICU, monitoring of SpO<sub>2</sub> is mandatory in the recovery room with a clinical focus on early detection of respiratory problems.

---

### **Information about emergency-like situations / Differential diagnostics**

---

The most likely emergency scenario to be encountered under anaesthesia with Treacher Collins syndrome is the “can’t intubate, can’t oxygenate” (CICO) scenario.

---

### **Ambulatory anaesthesia**

---

Case by case determination based on of the impact of surgery and anaesthesia on the patient’s airway.

---

### **Obstetrical anaesthesia**

---

Early referral and regional anaesthesia techniques are preferable where feasible.

In urgent situations of failed intubation, the laryngeal mask airway (LMA) (18) or second generation supraglottic airway devices such as the i-gel (14) have been reported to provide an adequate airway including in an emergency Caesarean section (18).

## Literature and internet links

1. Trainor PA, Dixon J, Dixon MJ. Treacher Collins syndrome: Etiology, pathogenesis and prevention. *Eur J Hum Genet* 2009;17:275-283
2. Thomson A. Notice of several cases of malformation of the external ear, together with experiments on the state of hearing in such persons. *Monthly J Med Sci* 1846;7:420
3. Berry GA. Note on a congenital defect (?coloboma) of the lower lid. *R Lond Oph- thal Hosp Rep* 1889;12:255-257
4. Collins T. Cases with symmetrical congenital notches in the outer part of each lid and defective development of the malar bones. *Trans Ophthalmol-Soc UK* 1900;20:190
5. Rogers BO. Berry-Treacher Collins syndrome: a review of 200 cases. *Br J Plast Surg* 1964;17:109-137
6. Hosking J, Zoanetti D, Carlyle A, Costi D. Anesthesia for Treacher Collins syndrome: A review of airway management in 240 pediatric cases. *Paediatr Anaesth* 2012;22: 752-758
7. Sinkueakunkit A, Chowchuen B, Kantanabat C, et al. Outcome of anesthetic management for children with craniofacial deformities. *Pediatr Int* 2013;55:360-365
8. Ross ED. Treacher Collins syndrome. An anaesthetic hazard. *Anaesthesia* 1963;18: 350-354
9. Thompson JT, Anderson PJ, David DJ. Treacher Collins syndrome: Protocol management from birth to maturity. *J Craniofac Surg* 2009;20:2028-35
10. Frawley G, Espenell A, Howe P, Shand J, Heggie A. Anesthetic implications of infants with mandibular hypoplasia treated with mandibular distraction osteogenesis. *Ped Anesth* 2013;23:342-348
11. Weiss M, Engelhardt T. Proposal for the management of the unexpected difficult pediatric airway. *Ped Anesth* 2010;20:454-464
12. <http://www.das.uk.com/guidelines>
13. S Agrawal, V Asthana, J Sharma, U Sharma, R Meher. *Alternative intubation technique in a case of Treacher Collins syndrome*. The Internet Journal of Anesthesiology. 2005 Volume 11 Number 1
14. Soh J, Shin HW, Choi SU, Lim CH, Lee HW. Easy airway management using the i-gel™ supraglottic airway in a patient with Treacher Collins syndrome. *Korean J Anesthesiol* 2014 ;67(Suppl):S17-S18
15. Heard AM, Green RJ, Eakins P. The formulation and introduction of a ‘can’t intubate, can’t ventilate’ algorithm into clinical practice. *Anaesthesia* 2009;64:601-608
16. Difficult Airway Society Guidelines for the management of tracheal extubation. Membership of the Difficult Airway Society Extubation Guidelines Group: Popat M, Mitchell V, Dravid R, Patel A, Swampillai C, Higgs A. *Anaesthesia* 2012;67:318-340
17. Wołoszczuk-Gębicka B, Zawadzka-Głós L, Lenarczyk J, et al. Two cases of the “cannot ventilate, cannot intubate” scenario in children in view of recent recommendations. *Anaesthesiology Intensive Therapy* 2014;46:88-91
18. Morillas P, Fonet I, De Miguel, et al. Airway management in a patient with Treacher Collins syndrome requiring emergent cesarean section. *Anesth Analg* 2007;105:294.

---

**Last date of modification: October 2015**

---

*This guideline has been prepared by:*

**Authors**

**David Costi**, Anaesthesiologist, Children's Anaesthesia Department, Women's & Children's Hospital Campus, North Adelaide, Australia

[David.Costi@sa.gov.au](mailto:David.Costi@sa.gov.au)

**Yasmin Endlich**, Anaesthesiologist, Children's Anaesthesia Department, Women's & Children's Hospital Campus, North Adelaide, Australia

[Yasmin.Endlich@sa.gov.au](mailto:Yasmin.Endlich@sa.gov.au)

**Peer revision 1**

**Sanjay Agrawal**, Anaesthesiologist, Himalayan Institute of Medical Sciences, Jollygrant, Dehradun, Uttarakhand, India

[drumstix1972@yahoo.co.in](mailto:drumstix1972@yahoo.co.in)

**Peer revision 2**

**Marie-Paule Vazquez**, Service de chirurgie maxillo-faciale et plastique, CHU Paris - Hôpital Necker-Enfants Malades, Paris

[marie-paule.vazquez@nck.aphp.fr](mailto:marie-paule.vazquez@nck.aphp.fr)