

Recommendations for using a multifunctional tracheostomy tube from a therapeutic perspective

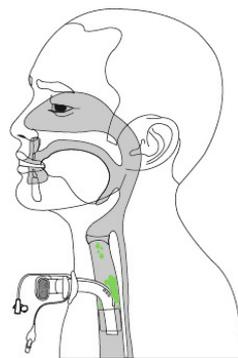
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Patients, who are affected by dysphagia with recurrent aspiration of saliva and/or need invasive ventilation, are mainly cared for with a cuffed tracheostomy tube (TT). The low-pressure cuff largely protects against the aspiration of saliva into the lower respiratory tract. The aspirated secretions collect on the cuff below the glottis.

Patients, who require invasive ventilation, are also cared for with a cuffed TT to ensure virtually leak-free ventilation.

Coughing and/or wrinkling of the cuff in the trachea can lead to microaspiration of the accumulated secretions into the lower respiratory tract. These secretions are often colonised by microorganisms and may cause aspiration pneumonia. Furthermore, a permanent accumulation of secretions above the cuff can lead to desensitisation of this

region of the trachea and thus to the dysphagia becoming chronic.

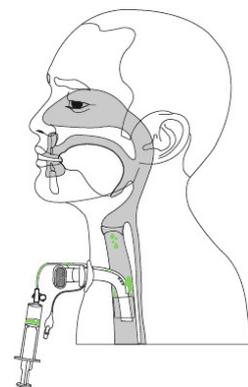


Accumulated secretion

In case the tracheostomy tube needs to be deflated when changing, for tracheal relief or for therapeutic reasons, the accumulated secretions can get into the lower respiratory tract.

A TT that offers the option of subglottic suction can minimise this risk by

keeping the area above the cuff as free from secretions as possible, i.e. by applying suction before deflation.



Suction process

Studies have verified a reduction in the incidence of ventilator-associated pneumonia (VAP) when such a TT is used⁽¹⁾.

Recommendations for using a multifunctional tracheostomy tube from a therapeutic perspective

Patients, who require a cuffed tracheostomy tube for any of a variety of reasons, are no longer in a position to communicate verbally, to taste or smell, to cough up secretions above the cuff or, in many cases, even to swallow at the right time⁽²⁾. Inflating the cuff inhibits the flow of air into the upper respiratory tract with the result that no air passes through the glottis and speech is not possible – moreover, sensory, moisturing and cleaning functions are also temporarily lost.

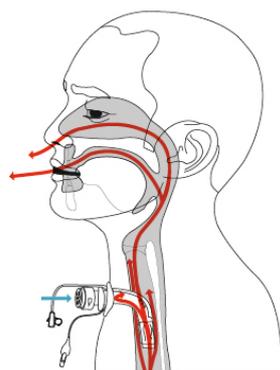
Oropharyngeal sensory function, the build-up of subglottic pressure and the effective use of voluntary and reflex cleaning functions (clearing one's throat and coughing) provide significant protection against aspiration⁽³⁾ and are thus very valuable elements of the rehabilitation process.

Another focus is on the fundamental need of every one of us to partake in social interaction and to be able to communicate our needs and concerns.

In summary, this means that affected patients should be put in the position of being able to pass their airflow over the upper respiratory tract as often as possible. This can be achieved by deflating the cuff.

A speaking valve is attached to divert the entire expiratory airflow along the

upper respiratory tract and to enable the patient to effectively use all the cleaning functions. The expiratory resistance is thereby considerably increased. However, patients often need more room to direct the airflow past the TT through the glottis into the upper airways. A fenestrated TT, in which a similarly fenestrated inner cannula is fitted, makes this manoeuvre possible. This additional fenestration considerably reduces the expiratory resistance.



Air flow through an unblocked tracheostomy tube with fenestrated inner cannula and speaking valve

In this situation, patients are now in a position to feel their laryngeal, pharyngeal and oral areas. They can use their cleaning functions effectively and are now in the position to communicate verbally, i.e. to vocalise.

In order to stimulate or reactivate all these functions during the rehabilitation process, patients need a multifunctional tracheostomy tube that

is equipped with both a fenestration (with unfenestrated and fenestrated inner cannulas), with a cuff and a subglottic suction channel.

The first field trials have shown that patients, whose cuffs have to be permanently inflated, profit from the „Above Cuff Vocalisation“ method.

This involves introducing oxygen or compressed air through the subglottic suction channel after thorough suction. This method allows for ventilation of the upper respiratory tract. Depending on their cognitive resources, patients are now able to communicate verbally despite the inflated cuff.^(4, 5)

References:

1. Prävention der nosokomialen beatmungsassoziierten Pneumonie; KRINKO, 2013
2. Kompendium der Tracheotomie, 2012; Klemm, E. & Nowak, A.(Hrsg.); Springer Medizin Verlag
3. Dysphagie; Prosigel, M. & Weber, S.; 2. Aufl., 2013; Springer Verlag
4. Above Cuff Vocalisation - ACV; RT Spring 2020; p33-36; M.From et al
5. Subglottische Luftinsufflation bei tracheotomierten Patienten - ACV; N. Niers 2019

Use of a multifunctional tracheostomy tube

Indicated for patients with:

- Dysphagia with recurrent aspiration of saliva
- Invasive ventilation
- Existing cough flow
- Tolerance of intermittent leakage ventilation or spontaneous respiration

Contraindications

- Need for an excessively high ventilation pressure during invasive ventilation, in order to be able to tolerate leakage
- Obstructions that block the upper respiratory tract

When

- As early as possible during the rehabilitation/weaning process

Objectives

- Ventilation of the upper respiratory tract to retain/increase sensory function, even in the case of severe dysphagia
- To reduce the risk of pneumonia (e.g. VAP) by protecting against the accumulated, aspirated secretion above the cuff getting into the lower respiratory tract.
- Effective use of the reflex and voluntary cleaning functions
- Use of the physiological valve functions when swallowing
- Increase swallowing frequency
- Weaning
- Transition to a normal diet
- Prevention of chronification of dysphagia
- Possibility of verbal communication and social interaction

Important points:

- The fenestration of the TT must be positioned in the trachea in such a way that it is not obstructed by the stoma canal or the tracheal wall.
- The outer and inner cannulas of TRACOE multifunctional tracheostomy tubes lie so closely together that leakage between the two components of the tube can largely be ruled out.

The multifunctional tracheostomy tube is an important medical aid in the rehabilitation/weaning process for patients with dysphagia recurrent aspiration of saliva and/or invasively ventilated patients.

After successful treatment, the patient can be switched to a TT adapted to the patient's capabilities and needs.



TRACOE *twist plus* extract tracheostomy tube with subglottic suction and fenestration

Therapeutic procedure for complete use of the multifunctional tracheostomy tube

1 Preparation

- Patient is free of infection and fever
- Stop tube feeding 1 hour before starting the procedure
- Stable upright position/posture of the patient
- Switch to leakage system in the case of home ventilation

2 Procedure – deflation

- Tell the patient about the procedure
- Attach a pulse oximeter and CO₂ monitor, if necessary.
- Aspirate the secretions above the cuff through the subglottic suction channel.
- Remove the HME filter
- **Deflate the cuff** with a syringe at the same time as applying suction to the TT (this also removes any secretions that could not be removed by subglottic suction)
- Remove the unfenestrated inner cannula
- In home setting, check the fit of the fenestration with a torch, if necessary (clear in the trachea or possibly visible obstructions) – an endoscopic check is better
- Insert the fenestrated inner cannula
- **Finally: attach the speaking valve – never use one with an inflated cuff!** (first hold it loosely against the TT connector to help the patient to gently adapt to breathing)
- If the patient tolerates this well, attach the speaking valve completely to the connector

Depending on the setting and the rehabilitation status:

- Provide therapeutic treatment
- Communication
- Eating/drinking

During treatment or use with the speaking valve:

Observe the patient's respiration rate, respiratory exertion, heart rate and pulse as well as for signs of fatigue, and do not leave the patient alone.

3 Procedure – inflation

- **First step: remove speaking valve**
- Swap fenestrated inner cannula for unfenestrated inner cannula
- Inflate the cuff to the indicated range using a manometer (25 cm H₂O)
- Attach the HME filter
- Observe the patient regarding oxygen saturation levels, heart rate, facial colour and breathing for a few minutes

Very important

- Always make sure that the cuff has been completely deflated, preferably with a syringe
- When using a speaking valve, deflate the cuff and use a fenestrated inner cannula
- Each time the device is used, make sure that expiration is not impaired
- **Never use the speaking valve with the cuff inflated**