

Drooling and aspiration

Management plan for WoSCoR

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Ask about aspiration

Ask about coughing and choking on fluids and recurrent chest infections. While drooling is normal under 3 years and not really pathological until 5 or older, aspiration requires early aggressive management to preserve lung function.

Action: Consider Speech and Language Therapy (SLT) clinical swallow assessment and videofluoroscopy.

Ask about salivary stimulants

Most children who drool do so because they have poor oral motor control and/or sensory awareness rather than because there is too much saliva. Genuine hypersalivation does occasionally occur.

Saliva may be stimulated by certain drugs, including the benzodiazepine group particularly **nitrazepam**, and also by **habitual finger-chewing, gastro-oesophageal reflux and dental caries**

Action: Check medications to exclude medication-induced hypersalivation. Consider deferring specific treatment of drooling if a child is being weaned off nitrazepam as it may improve once they are off the drug. Reflux, dental caries and finger chewing should be addressed on their own merits.

Ask about (and examine for) open-mouth posture

Children who habitually sit with their mouths open will be more prone to drool. **Nasal obstruction** (adenoid hypertrophy, allergic rhinitis) should be specifically examined for and treated. **Dental malocclusion** is another important cause of open-mouth posture, but orthodontic treatment may have to wait until the permanent dentition have erupted.

Action: Consider a trial of topical nasal steroids, non-sedating antihistamines or saline nasal douching for nasal obstruction. ENT referral may be required for adenoidectomy. Orthodontic advice should be sought for malocclusion.

Address the child's posture

This is particularly a problem for children who are wheelchair users. If they are habitually sitting forward in

the chair then drooling will be exacerbated because a stable body posture is necessary for



development of independent movement of the jaw, lips and tongue and therefore ability to control saliva. Improving their **position in the chair** can make a huge difference to day-to-day symptoms. Equally, constructing a small wooden riser for the desk can allow them to use a computer or writing materials in an upright position rather than leaning over and this can also be beneficial. Be aware that some posture changes may increase the risk of aspiration.

Action: Consider liaising with the chair provider, physiotherapists and occupational therapists about seating position

Ask about speech and chewing

There is a small group of children with specific oral motor control issues in the absence of other major developmental delay. They may have difficulty chewing solid food and may even resort to moving food around their mouth with a finger. They may have indistinct speech due to poor articulation. We might label them as having an **oral motor (or verbal) dyspraxia**.

Action: SLT referral for assessment is the first step, but drugs, botox and surgery may occasionally be justified.

Some children just require reassurance

Drooling is not uncommon in boys of 3-5 years and it is usually a self-limiting phenomenon that reflects their lack of social awareness. In the absence of any exacerbating factors as mentioned above, simple reassurance is reasonable in the first instance.

Consider SLT referral

Children who drool frequently enough that their face is always wet need to experience the contrast with dryness that would allow them to develop the inner choice to swallow. A constantly wet face from drooling reduces the sensory cues needed to trigger a swallow. With young children, who are otherwise developing normally, developing the concept of wet versus dry is often a first step in addressing drooling. Any behavioural approach involves teaching the child to recognise the feeling of wetness and be able to either swallow more frequently or wipe the saliva from the lips and chin. It is helpful to put in place reminders for them, such as a cue or a reward. It is also useful to teach “swallow and wipe” together because the mouth is cleared of saliva with each wipe. Wearing towelling wrist bands, may be helpful in enabling a child to keep clean and dry. They may also serve as a visual cue to remind the child to swallow.

For children who may not comply or understand the purpose of more specific oral motor exercises to develop jaw and lip control then a more functional approach to therapy may be more

appropriate, e.g. graded straw drinking using lips alone. This skill can be developed by altering the variables of straw diameter / length and thickness of liquid. Graded blowing games, e.g. blowing bubbles/ candles to musical instruments (mouth organ to trumpets) may also be tried.

When drooling problems are more chronic then direct intervention to address oral motor control and/ or oral sensory awareness should be introduced. Oral facial treatments including specific techniques such as 'Brushing and Icing' are designed to improve oral sensory awareness. Improved sensory awareness will influence motor responses, e.g. swallowing in response to increases in saliva. Both brushing and icing are very stimulating and should be used with caution on young children and should not be used with children under the age of three years. This technique works best with children who have low postural tone and are orally hyposensitive. It is a technique that should be introduced by a speech and language therapist.

As stated, a stable aligned head and body posture is necessary for development of independent movement of the jaw, lips and tongue. Jaw stability is essential for the acquisition of lip closure and must be achieved before you can work on establishing dissociation of the jaw from the lips or tongue. When jaw control is established then therapy can address the development of lip control to increase awareness, placement, strength and memory for lip closure.

Success of all such strategies to address drooling is dependent on a number of factors, including level of cognition and compliance of the child and co-operation of key persons in the child's life in helping to implement strategies in a regular routine way.

Action: Consider SLT referral for children who have an adequate level of comprehension/ co-operation and motivation to change behaviour.

Drug treatments

Anticholinergic drugs are widely used. All work by reducing saliva flow but the thick, sticky saliva produced can be troublesome in itself. Other common side effects include blurred vision, constipation, urinary retention and behaviour changes and parents need to be warned to **stop the drug if these occur**. Any attempt to reduce the amount of saliva (whether by means of drugs, botox or surgery) puts the teeth at risk of decay. All children should see their dentist regularly for check ups and fissure seals, and should brush twice a day with a fluoride toothpaste.

Glycopyrrhonium bromide is now widely available as a 400micrograms per ml syrup which is specifically licensed for saliva control in children (Sialanar). Generic glycopyrrholate syrup is available but care needs to be taken when prescribing as the amount of drug per ml is different. Glycopyrronium has the advantage of not crossing the blood-brain barrier and therefore has fewer central side effects (drowsiness, sleep disturbance, and effects on seizure control) than hyoscine or

trihexyphenidil. It can be given orally or via gastrostomy. It is given three times a day. The dose is started low and titrated upwards at weekly intervals according to effect. A dose calculator is available here: <https://www.sialanar.co.uk/dosing-scale-to-weight-finder>

	Dose Level 1	Dose Level 2	Dose Level 3	Dose Level 4	Dose Level 5
400 µg/ml (2mg/5ml) glycopyrronium bromide	(~16.0µg/kg)	(~32.0µg/kg)	(~48.0µg/kg)	(~64.0µg/kg)	(~80.0µg/kg)
Weight Kg	ml	ml	ml	ml	ml
13-17	0.6	1.2	1.8	2.4	3
18-22	0.8	1.6	2.4	3.2	4
23-27	1	2	3	4	5
28-32	1.2	2.4	3.6	4.8	6*
33-37	1.4	2.8	4.2	5.6	6
38-42	1.6	3.2	4.8	6*	6
43-47	1.8	3.6	5.4	6	6
≥48	2	4	6*	6	6

Severe renal impairment is a contraindication for this medication and a revised treatment algorithm for children with mild to moderate renal impairment is available on the above website.

Hyoscine patches are most commonly used. They are traditionally stuck behind the ear but work just as well on any thin, soft, hairless skin that isn't rubbed by clothes too much, so children who pick the patches off can have them attached somewhere they are less obvious such as inside the upper arm. Skin reactions to the adhesive are common and patches must be discontinued if these occur. Some children get a slightly uneven dosing with the patches – too dry the first day, not enough effect by the third day. This can be overcome by changing the patches more often but a more even dosing schedule using an oral/gastrostomy preparation may be more appropriate. Hyoscine tablets (Kwells or JoyRides travel sickness tablets) don't seem to be as effective as the patches and need to be taken 4 times a day.

Trihexyphenidyl syrup (“**Broflex**”, benzhexol) has a convenient twice daily dosing and is easy to use down a gastrostomy. It seems to be very effective for certain children and is particularly useful in children who also require medication to reduce muscle tone. Morning and afternoon dosing works well for children with no night-time symptoms and allows them drug-free time overnight.

Drug doses

Hyoscine hydrobromide patch (changed every 3 days)

1m - 3y: ¼ patch

3-10y: ½ patch

10y+ 1 patch

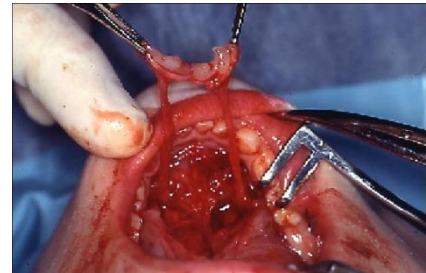
Trihexyphenidyl syrup (Broflex, benzhexol) 1mg per 1ml: blackcurrant flavour but *not* sugar free

Under 10 years consider low starting dose (1mg bd), increasing to 2mg bd as tolerated

Over 10 years can go as high as 3mg bd

Hyoscine and trihexyphenidyl are used *off licence* and prescribers should check the Children's BNF before use

Action: Consider anticholinergics for children with persistent symptoms, particularly those for whom SLT interventions are unsuccessful or inappropriate. Parents must be warned of potential side effects.



Saliva control clinic

The joint ENT-SLT saliva control clinic at RHC is happy to take referrals from all involved professionals. We can advise on **SLT interventions, drug treatments, botox injections and surgery**. Botox injections are ideally done under **local anaesthesia** as their only real advantage is as a way to avoid anaesthesia and admission to hospital. If a child is undergoing surgery for any other reason (orthopaedic, dental, change of gastrostomy) then we will happily do salivary botox under the same GA. Botox works well about **two-thirds of the time**, and when it does work it lasts about **3-4 months**. There is a **risk of dysphagia** which is noticeable in about 10-15% but problematic enough to require tube feeding very rarely. The ideal candidate for botox, then, is gastrostomy fed, and tolerant of injections due to cognitive impairment. For a more permanent solution, surgery may be considered. Surgery is tailored to the child's condition and risk of aspiration. Children who do not aspirate can expect a 90% chance of an excellent result with a **submandibular duct transfer**, although it requires a few days in hospital for pain relief and a three week recovery. **Submandibular gland excisions** leave scars in the neck but are suitable for saliva reduction in children who aspirate.

Action: Consider referral to the saliva control clinic when conservative measures are unsuccessful.