



## Managing children with sialorrhoea (drooling): Experience from the first 301 children in our saliva control clinic



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### ABSTRACT

**Objectives:** Sialorrhoea (drooling) is defined as the involuntary escape of saliva from the mouth. It is considered normal in young children but may cause social problems in older children. Sialorrhoea is frequently seen in children with cerebral palsy, with rates between 10% and 58% and in other neurodevelopmental diseases. Management of these children can be challenging and often requires an individual and stepwise approach. This is a large case series of children managed at the saliva control clinic in Glasgow, Scotland.

**Methods:** A chart review of all children attending the saliva control clinic between 2006 and June 2012 was performed. This was to ensure that all children would have long term follow up (3 years minimum). Drooling severity was assessed on the child's first attendance at clinic, and at review following a treatment option, using the Teacher Drooling Scale (TDS).

**Results:** The total number of children attending this clinic was 301, of which 274 had adequate records for inclusion in the study. 176 (64%) were male. The mean age was 7.3 (median 5) years. In terms of development 35 (13%) of children were developing normally and 50 (18%) had general developmental delay. There were 105 (38%) children with cerebral palsy. The final management of sialorrhoea in these children was simple reassurance and advice for 34 (12%), speech and language therapy for 62 (23%) anticholinergics in 90 patients (33%), botox for 30 (11%) and surgery for 71 (26%) children. The rate of non-tolerance of anticholinergics is 30%; 90 of the 298 children tried on anticholinergics had side effects leading to the treatment being stopped. The average teachers drooling score was 4.24 before clinic and 1.59 after clinic. Satisfactory results were achieved in 215 (78%) of children.

**Conclusion:** Our data illustrates that effective patient management requires all treatment options to be available, including speech therapy, medications, botulinum toxin and surgery. This is one of the larger case series of children attending a saliva control clinic.

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## 1. Introduction

Sialorrhoea or drooling is considered normal in young children until the age of 2 years and normally resolves by the age of 5. Drooling after this age can be caused by cerebral palsy, developmental delay, poor oral motor control and facial paralysis [1]. Other contributing factors are dental problems, nasal obstruction and acid reflux [2,3]. Drooling may cause a significant social burden, with embarrassment to the child and frequent bib or clothing changes by the family, as well as dehydration and cracked,

painful lips and skin [4]. Difficulty in saliva control in children who aspirate fluids can cause recurrent lower respiratory tract infections. Management strategies include conservative measures, speech and language therapy (SLT), pharmacotherapy, palatal appliances, pharmacotherapy and surgical therapies. At the saliva control clinic in Glasgow, an individual approach to each child with a stepwise progression through management is taken [5] (overview in Fig. 1). Our clinic is modelled on a similar service in Canada [6].

The saliva control clinic in Glasgow was established in 2006. Initially it comprised of a consultant paediatric otolaryngologist and a paediatrician. Today, it has a consultant paediatric otolaryngologist and a specialist speech and language therapist. Close ties have been established with dental surgeons and

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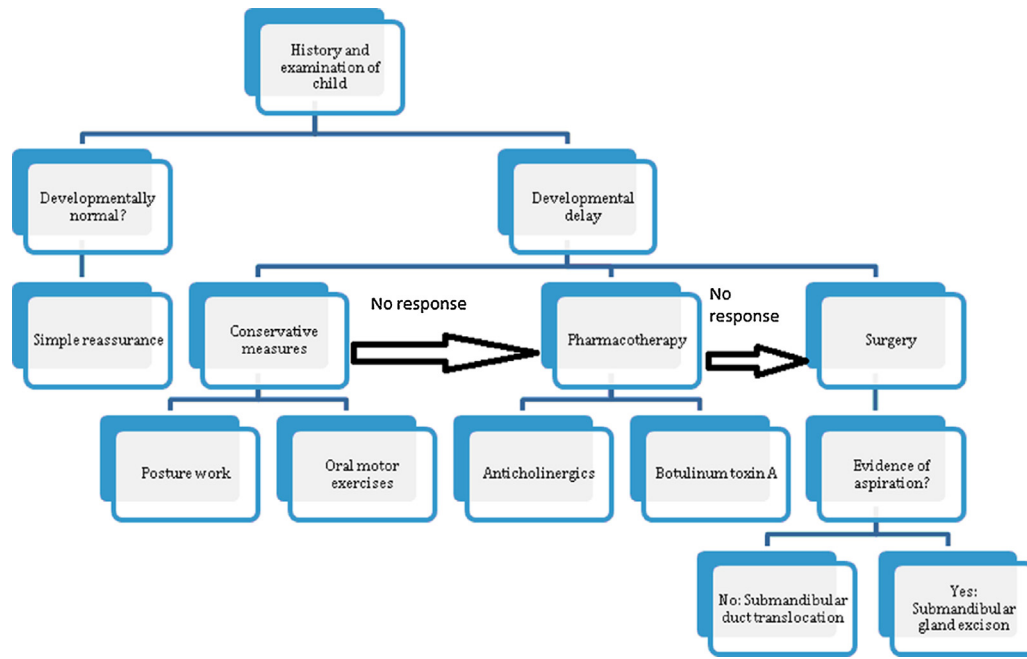


Fig. 1. Overview of patient management.

paediatric specialties. Referrals are taken from all over Scotland including primary and secondary care, school nurses, speech and language therapists, audiology, dentists and health visitors. Each child is allocated a 30 min appointment slot so that a full assessment by ENT and a speech and language therapy screening assessment can be carried out.

Assessment of the child involves a full developmental assessment and enquiry into method of feeding and method of communication. Enquiries are also made into factors [5] that may contribute to open-mouth posture (dental malocclusion and nasal obstruction) or to excess production of saliva (dental caries, some antiepileptic drugs and acid reflux) and to posture.

## 2. Methods

Clinic records since the inception of the saliva control clinic were used to collate a list of children that had attended the service between 2006 and 2012. These dates were chosen to allow a full 3 years of clinical follow up and to be able to report upon any late complications. Clinic letters from the department of otolaryngology were used to collect information about attendances to the clinic. All patient data was anonymised and tabulated. Consent was given to use the two photographs included in the paper. We considered this project to be an audit of our outcomes and therefore full ethical approval was not sought, however this project was registered with the hospital's clinical effectiveness unit.

Our service applies a stepwise approach that is tailored to the child's needs and starts with the least invasive options. At the clinic, the child's family is actively involved in discussions. Sialorrhoea creates a burden for the child and their families. By having close links with dental services, neurology, paediatrics and general surgery, as well as a resident speech and language therapist, a balanced service is provided to these children. Prior to the formation of the saliva control service at our institution, these children were seen by several different teams where a non-individualised approach was applied, with community paediatrics, neurology, and surgical specialties each seeing the child and applying the treatment modality most frequently employed by their specialty (hyoscine patches, botulinum toxin A injections and surgery respectively). This data displays a spread of final

management options, and encompasses a comprehensive and holistic service.

The Teachers Drooling Scale (TDS) [7] is a five point subjective severity-rating scale for drooling, where 1 represents no drooling and 5 represents constant drooling with the child always being wet. It has been applied to children in this cohort to assess their responses to treatment. It is not frequently used in clinical practice although it is easily applied. The TDS score before and after intervention was recorded. Significance testing was performed using the Mann Whitney *U* test.

When reference is made to oral motor exercises below, these are non-speech sensory manoeuvres that are designed to stimulate the lips, tongue, pharynx and larynx into physiological type activity, with the aim of improving function.

## 3. Results

### 3.1. Section 1: Assessment

#### 3.1.1. Patient demographics

In the observation period, 301 children attended the service. Records were obtained from 301 children and outcomes for a minimum of 3 years after attendance recorded. Of these, adequate records for analysis were available for 274 (91%) children. Of these children, 176 (64%) were male. The age range of children attending the service was between nine months and twenty years (mean 7.3, median 5). The source of referrals is outlined in Table 1. As the clinic became more established, referrals were received from a wider area of Scotland and this is shown in Fig. 2. A peak number of referrals was received in 2007 shortly after the clinic was established. We hypothesise that this was created by a previous unmet need in the community. Lower numbers are reported in 2012 because we wanted at least 3 years of follow up for this audit. Data collection was between January 2006 and June 2012.

#### 3.1.2. Medical issues contributing to sialorrhoea

Contributory medical reasons for sialorrhoea were identified for 178 (65%) children, with many children having more than one factor contributing to sialorrhoea (Table 2).

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