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[Intervention Review]

# Interventions for drooling in children with cerebral palsy

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## ABSTRACT

### Background

Drooling is a common problem for children with cerebral palsy (CP). This can be distressing for these children as well as for their parents and caregivers. The consequences of drooling include risk of social rejection, damp and soiled clothing, unpleasant odour, irritated chapped skin, mouth infections, dehydration, interference with speech, damage to books, communication aids, computers, and the risk of social isolation (Blasco 1992; Van der Burg 2006). A range of interventions exist that aim to reduce or eliminate drooling. There is a lack of consensus regarding which interventions are most effective for children with CP.

### Objectives

(1) To evaluate the effectiveness and safety of interventions aimed at reducing or eliminating drooling in children with cerebral palsy. (2) To provide the best available evidence to inform clinical practice. (3) To assist with future research planning.

### Search methods

We searched the following databases from inception to December 2010 : Cochrane Central Register of Controlled Trials (CENTRAL); Medline via Ovid; EMBASE; CINAHL; ERIC; Psych INFO; Web of Science; Web of Knowledge; AMED; SCOPUS; Dissertation Abstracts.

We searched for ongoing clinical trials in the Clinical Trials web site (http://clinicaltrials.gov.) and in the Current Controlled Trials web site (http://www.controlled-trials.com/). We hand searched a range of relevant journals and conference proceeding abstracts.

### Selection criteria

Only randomised controlled trials (RCTs) and controlled clinical trials (CCTs) were included.

### Data collection and analysis

Data were extracted independently by MW, MS and LP and differences resolved through discussion.

### Main results

Six studies were eligible for inclusion in the review. Four of these studies were trials using botulinum toxin-A (BoNT-A) and two were trials on the pharmacological interventions, benztropine and glycopyrrolate. No RCTs or CCTs were retrieved on surgery, physical, oro-motor and oro-sensory therapies, behavioural interventions, intra-oral appliances or acupuncture. In the studies eligible for review,

there was considerable heterogeneity within and across interventions and a meta-analysis was not possible. A descriptive summary of each study is provided. All studies showed some statistically significant change for treatment groups up to 1 month post intervention. However, there were methodological flaws associated with all six studies.

**Authors' conclusions**

It was not possible to reach a conclusion on the effectiveness and safety of either BoNT-A or the pharmaceutical interventions, benztropine and glycopyrrolate. There is insufficient evidence to inform clinical practice on interventions for drooling in children with CP. Directions for future research are provided.

## PLAIN LANGUAGE SUMMARY

**Interventions for drooling in children with cerebral palsy**

Many children with CP have difficulty controlling saliva. Drooling varies in severity and can be distressing for the children, families and caregivers. Excessive drooling can cause constant damp soiled clothing, unpleasant odour, irritated, chapped or sore skin around the mouth and chin, skin and mouth infections, dehydration, difficulties chewing, interference with speech, damage to books, communication aids, computer and audio equipment. There is also risk of social rejection and social isolation for these children.

Many interventions are used to reduce or eliminate drooling. These include surgery, medications, botulinum toxin (BoNT-A and BoNT-B)), physical therapies, therapies to improve sensory function, behavioural therapies to assist the child in managing his/her own drooling, appliances placed in the mouth, and acupuncture.

There is no clear consensus on which interventions are safe and effective in managing drooling in children with CP. This makes it hard to decide which intervention will be safest and most effective.

Only RCTs and CCTs were included in this review. Trials were identified by electronic searches of databases, searches of clinical trials registers, peer reviewed journals, published conference proceedings and reference lists of relevant articles.

Six trials were found. Four examined the safety and efficacy of BoNT-A and two examined benztropine and glycopyrrolate. No trials were found on other interventions. The quality of trials was variable. The trials all differed in the children recruited, the product used, how the product was delivered and how its effectiveness was measured. All trials reported a positive reduction in drooling and all showed some statistically significant change for treatment groups up to 1 month post intervention. Few studies examined client and/or carer satisfaction with the intervention. Some looked at side effects of the intervention but no study examined the effect of interventions on the child's quality of life or psychological well being.

There is insufficient evidence to support the use of one intervention over another. As trials on just two kinds of interventions were retrieved, and given the variation and quality of these studies, it is not possible to conclude that one intervention is more effective than another. The lack of trials on other interventions does not suggest that these interventions are ineffective.

Adequately powered well designed trials are required across all interventions. In addition to using sensitive measures looking at change in salivary flow, measures are needed that examine client and carer satisfaction, changes in quality of life, psychological well being and in unwanted symptoms associated with drooling.