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[Intervention Review]

Oral stimulation for promoting oral feeding in preterm infants

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ABSTRACT

Background

Preterm infants (< 37 weeks' post-menstrual age (PMA)) are often delayed in attaining oral feeding. Normal oral feeding is suggested as an important outcome for the timing of discharge from the hospital and can be an early indicator of neuromotor integrity and developmental outcomes. A range of oral stimulation interventions may help infants to develop sucking and oromotor co-ordination, promoting earlier oral feeding and earlier hospital discharge. This is an update of our 2016 review.

Objectives

To determine the effectiveness of oral stimulation interventions for attainment of oral feeding in preterm infants born before 37 weeks' PMA.

Search methods

Searches were run in March 2022 of the following databases: CENTRAL via CRS Web; MEDLINE and Embase via Ovid. We also searched clinical trials databases and the reference lists of retrieved articles for randomised controlled trials (RCTs) and quasi-randomised trials. Searches were limited by date 2016 (the date of the search for the original review) forward.

Note: Due to circumstances beyond our control (COVID and staffing shortages at the editorial base of Cochrane Neonatal), publication of this review, planned for mid 2021, was delayed. Thus, although searches were conducted in 2022 and results screened, potentially relevant studies found after September 2020 have been placed in the section, Awaiting Classification, and not incorporated into our analysis.

Selection criteria

Randomised and quasi-randomised controlled trials comparing a defined oral stimulation intervention with no intervention, standard care, sham treatment or non-oral intervention (e.g. body stroking protocols or gavage adjustment protocols) in preterm infants and reporting at least one of the specified outcomes.

Data collection and analysis

Following the updated search, two review authors screened the titles and abstracts of studies and full-text copies when needed to identify trials for inclusion in the review. The primary outcomes of interest were time (days) to exclusive oral feeding, time (days) spent in NICU, total hospital stay (days), and duration (days) of parenteral nutrition. All review and support authors contributed to independent extraction of data and analysed assigned studies for risk of bias across the five domains of bias using the Cochrane Risk of Bias assessment tool. The GRADE system was used to rate the certainty of the evidence. Studies were divided into two groups for comparison: intervention versus standard care and intervention versus other non-oral or sham intervention. We performed meta-analysis using a fixed-effect model.

Main results

We included 28 RCTs (1831 participants). Most trials had methodological weaknesses, particularly in relation to allocation concealment and masking of study personnel.

Oral stimulation compared with standard care

Following meta-analysis, it is uncertain whether oral stimulation reduces the time to transition to oral feeding compared with standard care (mean difference (MD) -4.07 days, 95% confidence interval (CI) -4.81 to -3.32 days, 6 studies, 292 infants; I^2 =85%, very low-certainty evidence due to serious risk of bias and inconsistency). Time (days) spent in the neonatal intensive care unit (NICU) was not reported. It is uncertain whether oral stimulation reduces the duration of hospitalisation (MD -4.33, 95% CI -5.97 to -2.68 days, 5 studies, 249 infants; i^2 =68%, very low-certainty evidence due to serious risk of bias and inconsistency). Duration (days) of parenteral nutrition was not reported.

Oral stimulation compared with non-oral intervention

Following meta-analysis, it is uncertain whether oral stimulation reduces the time to transition to exclusive oral feeding compared with a non-oral intervention (MD -7.17, 95% CI -8.04 to -6.29 days, 10 studies, 574 infants; I^2 =80%, very low-certainty evidence due to serious risk of bias, inconsistency and precision). Time (days) spent in the NICU was not reported. Oral stimulation may reduce the duration of hospitalisation (MD -6.15, 95% CI -8.63 to -3.66 days, 10 studies, 591 infants; I^2 =0%, low-certainty evidence due to serious risk of bias). Oral stimulation may have little or no effect on the duration (days) of parenteral nutrition exposure (MD -2.85, 95% CI -6.13 to 0.42, 3 studies, 268 infants; very low-certainty evidence due to serious risk of bias, inconsistency and imprecision).

Authors' conclusions

There remains uncertainty about the effects of oral stimulation (versus either standard care or a non-oral intervention) on transition times to oral feeding, duration of intensive care stay, hospital stay, or exposure to parenteral nutrition for preterm infants. Although we identified 28 eligible trials in this review, only 18 provided data for meta-analyses. Methodological weaknesses, particularly in relation to allocation concealment and masking of study personnel and caregivers, inconsistency between trials in effect size estimates (heterogeneity), and imprecision of pooled estimates were the main reasons for assessing the evidence as low or very low certainty.

More well-designed trials of oral stimulation interventions for preterm infants are warranted. Such trials should attempt to mask caregivers to treatment when possible, paying particular attention to blinding of outcome assessors. There are currently 32 ongoing trials. Outcome measures that reflect improvements in oral motor skill development as well as longer term outcome measures beyond six months of age need to be defined and used by researchers to capture the full impact of these interventions.

PLAIN LANGUAGE SUMMARY

Effects of oral stimulation for oral feeding in preterm infants

Review questions

Do oral stimulation interventions that involve finger stimulation protocols in preterm infants born before 37 weeks' gestation:

Reduce time (days) taken to achieve exclusive oral feeding?

Reduce time (days) spent in Neonatal Intensive Care (NICU)?

Reduce length of time (days) spent in hospital?

Reduce length of time (days) that an infant spends on tube feeding (parenteral nutrition)?

Background

This is an update of the 2016 review. Many preterm infants have delayed establishment of oral (suck) feeding and are fed at first with feeding tubes or with intravenous (parenteral) nutrition. Development of oral feeding skills needs careful co-ordination of sucking, swallowing and breathing. In preterm infants, the development of oral feeding can be challenging because of long hospitalisations, breathing difficulties and other medical conditions associated with preterm birth. Unpleasant and invasive procedures such as ventilation or frequent suctioning of secretions from the mouth or nose can negatively impact feeding skills. International guidelines for the transition from tube feeding to oral feeding vary widely. Healthcare providers use a range of interventions to improve sucking and feeding skills in preterm infants, and studies report faster transition time from tube feeds to oral feeds, reduced length of stay in hospital and improvement in infants' sucking skills. The first review in 2016 showed that while oral stimulation interventions appear to reduce length of hospital stay, reduce need for tube feeding and accelerate time to oral feeding, the studies were of poor methodological quality leaving some uncertainty about overall effects. This update assessed whether current research supports these findings and if the quality of studies has improved, leading to increased certainty of results.

Study characteristics

This review included randomised controlled trials (RCTs) that explored oral stimulation by finger stimulation only in preterm infants. Review authors identified studies to be included by searching electronic databases, clinical trials registers, peer-reviewed journals and published conference proceedings. Search is up-to-date as of March 2022.

Key results

For this update, we added 12 new studies of variable quality with small numbers of participants, making a total of 28 included studies. As the certainty of evidence was considered 'low' to 'very low', it remains uncertain whether oral stimulation interventions can shorten the transition to oral feeding, reduce length of hospital stay and decrease time spent on parenteral nutrition, although there may be some potential benefit. No studies reported length of stay in NICU. No studies looked at longer-term outcomes of the interventions (i.e. beyond six months).

Certainty of evidence

The numbers of infants in these studies were small, the methods employed by researchers varied in quality and the certainty of evidence is estimated to be 'low' to 'very low'.