Cleft palate is the most common congenital facial deformity. Its impact on speech acquisition is early and the influence may continue after surgery. Compensatory misarticulations (CMAs) are one of the prominent speech problems associated with cleft palate; its prevalence is about 22-28% in English-speaking children. CMAs are usually errors in place of articulation. They are due to abnormal mouth positioning, so they are under the speaker’s control and can respond to speech therapy.

**Background**

Speech therapy using EPG

EPG is a computer-based device that records location and timing of tongue’s contact with hard palate during speech. Each patient wears a custom-made artificial dental plate that is matched to fit the corresponding EPG record. When the electrodes on the lingual surface of the plate are contacted by the tongue during speech, a signal is sent to an external processing unit and real-time visual feedback of the location and time of tongue-palate contacts is shown on a computer monitor.

EPG has been used in speech therapy with those who are unresponsive to "standard treatment" procedures. Although there is a substantial literature about speech therapy using EPG, there has not been a systematic review of the effectiveness of EPG therapy, hence, it remains difficult for clinicians to make decisions about whether or not to use EPG in their clinical practice. Therefore, this review aimed to assess the effectiveness of EPG in speech therapy for treating articulation errors in individuals with cleft palate.

**Method**

The review title was registered with the Developmental, Psychosocial and Learning Problems Group of The Cochrane Collaboration. A protocol that detailed the selection criteria, search strategies for identification of studies, methods of review, data extraction, management and analysis was developed and published on the online Cochrane Library.

**Selection criteria**

- Types of studies: randomized controlled studies or quasi-randomized controlled studies
- Types of participants: Individuals with articulation problems associated with cleft palate (non-syndromic). Those with learning disability associated with severely limited expressive/spoken language or severe hearing impairment were excluded. There was no restriction on age range.

**Types of interventions:** EPG therapy compared to no treatment, delayed treatment, “standard treatment”, or alternative treatment techniques. There was no restriction on the frequency, intensity and duration of speech therapy.

**Types of outcome measures:** Primary outcomes were measures of correct articulation of targeted speech sounds, as assessed by: standardized articulation tests; other perceptual analysis of articulation (e.g. consonants correct); accuracy based on instrumental measures (e.g. EPG); measures of speech intelligibility (e.g. number of words correctly transcribed). Secondary outcomes include measures of listener acceptability (e.g. rating scale); participants’ perceptions of impact of wearing EPG plate on (1) speech production, (2) tongue movement, (3) sensation in the mouth, (4) self-perceived appearance, (5) gagging, and (6) saliva; adverse effects.

The following search terms were used to identify articles:

1. cleft palate
2. electropalatograph*
3. EPG
4. 5 palatometry*
5. 6. or 3 or 4 or 5
6. 7. 1 and 6
7. 8. 1 and 6
8. 9. 1 and 6, 7, 8
9. 10. 1 and 6, 7, 8, 9
10.1 1 and 6, 7, 8, 9, 10
11.1 1 and 6, 7, 8, 9, 10, 11
12.1 1 and 6, 7, 8, 9, 10, 11, 12

The following databases were searched using those search terms:

- The Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 1, 2008)
- MEDLINE (1966 to March 2008)
- ERIC (1966 to March 2008)
- PsycINFO (1967 to March 2008)
- CINAHL (1982 to March 2008)
- LILACS (1982 to March 2008)
- AMED (1983 to March 2008)
- LILACS (1982 to March 2008)
- The National Research Register (searched March 2008)
- ClinicalTrials.gov (searched March 2008)
- Dissertation Abstracts International (1861 to March 2008)

Three journals were handsearched: Clin Log & Phonet (1987 to 2008, Issue 2); Cleft Palate J/Cleft Palate Craniofac J (1980 to 2008, Issue 1); Int J Lang & Commun Disord (1980 to 2008, Issue 1). The EPG bibliography was searched? Reference lists of relevant articles were reviewed.

**Results**

Colleagues & researchers were approached to identify other possible published & unpublished studies lists of relevant EPG research. Electronic (AL) & handsearch (FG) were conducted independently. AL independently assessed all titles & abstracts against inclusion criteria. The judgments were checked by FG. Any disagreement were resolved through discussion. Full text versions were retrieved for articles that had met the inclusion criteria: the Gibbon et al. study published in 2001 and Michi et al. study in 1993.