International Journal of Pediatric Otorhinolaryngology (2005) **69**, 1373—1381

ELSEVIER

International Journal of Pediatric Otorhinolaryngology

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Hearing and speech assessment of cleft palate patients after palatal closure Long-term results

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Received 13 December 2004; accepted 4 April 2005

KEYWORDS
Cleft palate;
Speech;
Conductive hearing loss;
Velopharyngeal insufficiency

Summary

Objective: The goal of this study was the development of a clinical methodology to assess speech and hearing impairment 5 years after the primary surgical repair of the cleft and, further, to determine the relative importance and long-term consequences of each cleft type and age to the velopharyngeal and eustachian tube function in patients who did not undergo pharyngeal flap surgery following primary palatoplasty.
Materials and methods: We evaluated with a certain assessment protocol hearing and speech abilities of 42 patients between 5 and 15 years of age: 9 with CP (cleft of the soft and hard palate), 19 with unilateral cleft lip and palate (UCLP), 14 with bilateral cleft lip and palate (BCLP), surgically treated by a team of surgeons using two different surgical techniques between 18 and 24 months of age.
According to our results we were able to evaluate: (a) the impact of hearing impairment to the development of speech in these patients. (b) The relation of hypernasality with compansatory articulation. (c) The influence of cleft type, by means of extent of the cleft palatal musculature, to speech integrity.
Results: Sixty-nine percent of our patients presented with mild and moderate hearing loss. Hypernasality was observed in 40.5%, compensatory articulation in 28.5% of our patients.
Conclusions: Our findings indicated: (a) a simultaneous appearance of speech and hearing impairment at the same age for each cleft type post-surgically in our patients; (b) that the muscular and vomer complex rather than the anatomic extent of the cleft is a significant factor for speech outcome after surgical repair; and (c) that hypernasality is exacerbated by compensatory articulation.

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0165-5876/$ — see front matter
doi:10.1016/j.ijporl.2005.04.023

1. Introduction

It is self evident that a physical defect that affects the structures of the mouth and face has the potential to influence articulatory development. Cleft palate has therefore traditionally been primarily considered as disorders of the vocal tract. The existence of this craniofacial deformity may give rise tohearing and psychosocial problems, in addition, to the more obvious difficulties such as feeding and speech disorders. With regard to clinical management, it is important to take a holistic approach to the assessesment and treatment of children with cleft palate. They require therefore a comprehensive screening of hearing, speech and language development, which must be evaluated pre- and post-surgically according to any physical, psychosocial and linguistic factors associated with the structural abnormality. There is general agreement that the language skills of cleft palate children tend to be delayed, particularly in the development of expressive language [1,2]. Cleft palate has the potential to influence articulatory development. This may effect the infant's phonetic output even during the prespeech stage of development and prior to palate repair. Poorer articulation procifiency might be expected after primary palatoplasty ut it might also be expected of those patients who receive primary surgical repair of the palate following onset of phonological development.

It appears that atypical patterns of articulation may develop as the child attempts to mask and compensate for the perceptual consequences of an incompetent mechanism prior to palatoplasty [3].

The effect of the operation itself on the child's vocalizations needs to be considered.

The causes of the delay may be more closely related to associated hearing loss psychosocial factors than the direct effects of the physical defects and the surgical management itself.

In our study we tried to approach the influence of post-surgical hearing output and type of cleft on speech proficiency of our patients according to their age.

No one in child health and development is immune to the controversy surrounding otitis media. Some maintain that repeated episodes of otitis media with effusion early in life and the accompanying reduction in hearing sensitivity compromise cognitive and language development [4]. Others hold that the minimal reduction in either the quantity or quality of auditory stimulation need not interrupt the acquisition of language, because the infant can actively search out alternative sources of information [5].

We concur with the hypothesis of Roland et al. [6] that the relationship between OME and language is mediated by hearing. That is, there is a direct causal connection between hearing and language and an indirect causal connection between OME and language based on the relationship between OME and hearing. In the above study a significant relationship between the middle ear status and hearing was confirmed.

A relationship between mild fluctuating hearing levels from OME and language performance was observed in a prospective, longitudinal investigation of high-risk infants [7] the results of which showed that by 2 years both expressive and receptive language performance is higher for children with better hearing between 6 and 18 months.

On the other hand, there is a direct connection between language and velopharyngeal valving. Warren et al. [8] studied timing characteristics associated with velopharyngeal closure in eleven subjects who had no more than a 25 db conductive hearing loss in the better ear; the subjects were hypernasal but had adequate closure on pressure flow testing. The results showed several unique timing features, including a delay of about 59 ms in achieval closure, a longer interval of nasal emission and a shorter duration of actual velopharyngeal closure. According the same study, some speakers with hearing loss do not use velopharyngeal closure for sounds requiring closure but may achieve closure on sounds not requiring it.

The purpose of the present investigation was to develop a clinical methodology to assess speech and hearing impairment after surgical repair of the cleft and to determine the relative importance and the long-term consequences of each cleft type and age to the velopharyngeal and eustachian tube function.

2. Methods

2.1. Patients

Between 1983—1992 42 patients (25 boys and 17 girls) of different cleft types were treated with primary surgical repair (1-stage palatoplasty) at the Pediatric Surgical Department. The initial subject pool of this study included these 42 patients with cleft lip and palate who participated in the research project of a newly formed CLP team which consists of Pediatric surgeons, otorhinolaryngologists, speech—language pathologists, orthodontists. The study took place at the Thessaloniki Medical School of Greece in the Departments of: Otorhinolaryngology 'AHEPA' University Hospital, and Pediatric Surgery 'G. Genimatas' Hospital during the period 1998—2003. The population of our study did not receive speech therapy before the assess-