The Types of Hearing Loss and Ear Pathology Noted in Screening Craniofacial Patients

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Seventy patients who underwent craniofacial reconstruction were screened by otological and audiological examinations. Thirty-seven patients had visible ear pathology, thirty-six had conductive hearing impairments. No sensorineural losses were detected.

The high incidence of otological pathology in craniofacial patients emphasizes the importance of multi-disciplinary care. Otological rehabilitation should be integrated into the treatment plan to provide maximum function throughout the period of craniofacial reconstruction.

Suggestions are made to facilitate communication in the immediate post operative period.

Introduction

The development of surgical techniques to deal with craniofacial deformities and interest in the multidisciplinary approach to patient care has included the otorhinolaryngologist and the audiologist in the evaluation and care of craniofacial patients. Hearing impairment and otological deformities can be detected early and integrated into the treatment plan.

A high incidence of hearing impairment in cleft palate patients and patients with branchial arch anomalies has been well documented (Stool and Randall, 1967; Northern and Downes, 1974). Since patients with musculoskeletal deformities in the head and neck area frequently have multiple anomalies, identification of ear pathology is an essential part of rehabilitation.

One hundred twenty-five patients had surgical correction of facial deformities at the Children’s Hospital of Philadelphia between 1972 and 1976. The patients had a wide range of deformities. Seventy were screened for otological pathology and hearing impairment (Figure 1). The findings and relationships to treatment planning will be discussed.

Materials and Methods

Seventy patients representing a wide range of facial deformities were screened preoperatively in the Children’s Hospital of Philadelphia Craniofacial Center. The patients ranged in age from one year to 40 years with the majority being between two and 21 years. Socioeconomic backgrounds were diverse, and intellectual levels varied from slight retardation to superior intelligence, as indicated by psychometric evaluations.

Each subject was audiometrically evaluated using a standard calibrated pure-tone and speech audiometer. Pure-tone, air-conduction thresholds were obtained at 250, 500, 1000, 4000 and 8000 KHZ, and pure-tone bone conduction thresholds at 250, 500, 1000, and 4000 KZ. The degree of hearing impairment was categorized as none (normal 0–5 dB), mild (5–15 dB), moderate (20–40 dB) and severe (excess of 40 dB) based on pure-tone air conduction thresholds averaged at 500, 1000 and 2000 KHZ. It should be noted that none of the patients evaluated had sensorineural hearing impairments. Therefore, degree of hearing impairment refers to air-bone gap or conductive loss.
Otological screening consisted of examination of the ear and pneumatic otoscopy to assess tympanic membrane mobility.

**Results**

Audiological examination of the 70 patients revealed 34 patients with normal hearing, 36 with conductive impairments, and no patients with sensorineural impairments. Of the 36 patients with conductive losses, eight were mild (5–15 dB air-bone gaps), 25 moderate (20–40 dB air-bone gaps) and three severe (air-bone gaps in excess of 40 dB). The number of patients with conductive impairment in each category of craniofacial anomaly examined is listed in Figure 1. The degree of hearing loss for the group is summarized in Figure 2.

Otological evaluation revealed 37 patients with some type of visible ear pathology. Nineteen patients had secretory otitis media; four had tympanosclerosis; and three had a pinna deformity without microtia. These otological problems are listed in Figure 3.

**Discussion**

Hearing impairments of the conductive type have been demonstrated in a significant number of patients with craniofacial anomalies (Black et al., 1971). In addition, some of these patients also have cleft palates for which the incidence of secretory otitis is said to be from 50 to 90%. In the series presented here, more than 50% of the patients had visible otological pathology and detectable conductive hearing impairment. Only twenty of the seventy patients had some degree of cleft palate and are not sufficient in number to account for the hearing losses detected.

Six of the seven patients with Apert’s syndrome had conductive hearing impairment. Three of these patients had cleft palate. Although this represents a small number of patients, the incidence of hearing impairments in Apert’s syndrome is very high. Case reports have documented significant ossicular anomalies in this group including stapes fixation (Bergstrom et al., 1972). The hearing loss may be progressive and secretory otitis may also be present.

Ten of the 70 patients required maxillary advancement procedures. Eight of these patients had conductive impairments with secre-
tory otitis media predominating. Six of these patients also had previously repaired cleft palates. All of these patients were over 12 years of age, beyond the age of three to eight, when secretory otitis media is most prevalent in the general population (Stool, 1972).

The incidence of conductive impairment in our series was greatest in patients with maxillary deformities alone or in conjunction with other anomalies. The anatomic alteration of the nasopharynx, palate, and eustachian tube region may account for this predisposition over and above the expected ossicular anomalies that are known to occur in some craniofacial anomalies.

Correction of the conductive hearing loss including myringotomy and tube placement was not performed at the same time as the craniofacial corrective procedure. The theoretical objection has been the possibility of contamination from mucopurulent middle ear secretions. However, from the practical standpoint, middle ear exploration and ossicular reconstruction are often too time-consuming to do in conjunction with major craniofacial procedures.

Early correction of the conductive hearing loss is important to prevent auditory deprivation as well as to improve the patient’s level of functioning in the post-operative period after major craniofacial reconstruction. Hearing aid amplification is employed when a hearing loss in excess of 25 dB is noted in patients requiring surgical dressings that occlude the eyes and ears. This amplification is provided by means of a body-worn conduc-

References

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