A Survey of Speech Pathologists: Current Trends In The Diagnosis and Management of Velopharyngeal Insufficiency

EDNA SCHNEIDER, M.A.
ROBERT J. SHPRINTZEN, PH.D.
Bronx, New York 10467

A *questionnaire* designed to *survey* methods of diagnosis and management of *velopharyngeal insufficiency* associated with *cleft palate* was distributed to over 1,000 *speech pathologists* in the United States and Canada. There was a 60% response, and 65% of those responding were associated with cleft palate teams. Findings included: (1) 90% of responding cleft palate team members primarily rely on listener judgment, oral examination, and articulation testing in the diagnosis of *velopharyngeal insufficiency* (VPI) and for the recommendation of pharyngoplasty. (2) Only 11% indicated that their team had a radiologist. (3) More than half of those responding said that they would prefer palatal repair to be completed after the age of two. (4) 60% of those responding regarded VPI as a voice disorder, yet 84% treated the symptoms of VPI with articulation therapy rather than voice therapy.

The treatment of hypernasal speech has long been an issue of some controversy. Review of the literature indicates that there is diversity in the treatment of hypernasal speakers dependent upon the approach most frequently utilized by the center implementing treatment (Spriestersbach, et al., 1973). It is not clear whether the different approaches are related to diagnostic evidence or to theoretical bias. The purpose of this study was to poll a representative sample of speech pathologists in the United States and Canada to determine the various procedures they utilized in the diagnosis and treatment of individuals with cleft palate and related speech disorders.

Method

A questionnaire designed to survey methods of diagnosis and management of the velopharyngeal insufficiency (VPI) associated with cleft palate was distributed in 1976–1977 to approximately 1,000 speech pathologists in the United States and Canada. The sample selected for the survey included: (1) the entire Speech Pathology membership of the American Cleft Palate Association (1974 Directory-240 members); (2) all speech pathologists affiliated with the cleft palate centers listed in the NIH Cleft Palate Team Directory, 1976 edition (260); and (3) a random sampling of speech pathology members of the American Speech and Hearing Association from diverse geographic regions (approximately 500).

Questions were formulated in order to:

1. gather information on the team approach in the diagnosis and management of VPI;
2. identify the procedures utilized in the assessment and treatment of VPI;
3. assess age preference for surgical repair of palatal clefts and for the initiation of speech therapy;
4. determine the educational background and attitudes of speech pathologists who were actively involved in the diagnosis and management of VPI.

A three-month period was allowed for the return of the questionnaires. In order to assure as much objectivity as possible, anonymity was protected by providing no space for identification of the respondent and by discarding all envelopes used to return the questionnaires. It was possible for the respondents to

Ms. Schneider is a research associate at the Center for Craniofacial Disorders of Montefiore Hospital and Medical Center and the Albert Einstein College of Medicine, Bronx, New York 10467. Dr. Shprintzen is Director of the Center and Associate Professor of Plastic Surgery and Otolaryngology.

provide multiple responses to a single question (Appendix 1). It was not the intent of the study to analyze attitudes and procedures geographically. Therefore, there were no questions included in the questionnaire to identify the location of the respondent. In case, however, there was more than one speech pathologist affiliated with a cleft palate team at a particular center, the questionnaires were coded so that, in the computation of percentages, the figures would not be biased by duplication of information from one center. A cover letter accompanied the questionnaire urging the respondents to be as candid as possible in their answers.

Results

The results of this study are based on a return of approximately 60% of the 1,000 questionnaires originally mailed. 592 questionnaires were received and analyzed within the three-month period. 26 questionnaires were received with personal comments on them indicating that the respondent was no longer affiliated with a cleft palate team and had little involvement in the diagnosis or treatment of cleft problems. These questionnaires were discarded. In addition to the answers provided on the questionnaire, many respondents added personal comments and remarks concerning the study.

CLEFT PALATE TEAM MAKE-UP. Approximately 65% of the respondents were members of cleft palate centers or teams. Fifty-two percent of these indicated that their teams met monthly; 18% met weekly; 16% met bimonthly; and 7% met quarterly. The remaining 8% of the respondents indicated that the teams met tri-monthly, every other month, or tri-annually.

Forty-two per cent of these respondents indicated that their teams were headed by plastic surgeons, 24% by speech pathologists, 10% by orthodontists, 10% by pediatricians, and the remaining 14% by dentists, otorhinolaryngologists, audiologists, prosthodontists, oral surgeons, social workers, and educational specialists, in that order of frequency.

Speech pathologists, plastic surgeons, and orthodontists were represented on nearly all of the cleft palate teams which had respondents to the questionnaire (Table 1). Only from 65 to 80% of the teams included an audiologist, otolaryngologist, social worker, and prosthodontist. Pediatricians were included on a little more than half the teams, and psychiatrists or psychologists were named somewhat less than half the time. Pedodontists were included on about one-third of the teams. Geneticists and radiologists were listed on fewer than 20% of the teams.

TABLE 1. Cleft Palate Team Representation

Disciplines	*Percentage of Each Discipline Represented on All Reporting Teams*
Speech Pathologist	98%
Plastic Surgeon	96%
Orthodontist	96%
Audiologist	80%
Otorhinolaryngologist	75%
Prosthodontist	72%
Social Worker	65%
Pediatrician	54%
Psychiatrist/Psychologist	46%
Pedodontist	33%
Geneticist	19%
Radiologist	11%
* Other	5%

* Other disciplines reported in order of frequency were: nursing (i.e., public health nurse); neurologist; educational specialist; ophthalmologist; dermatologist; anatomist.

TEAM APPROACH TO THE DIAGNOSIS OF VPI. The most frequently reported methods of diagnosing VPI and determining treatment were, in descending order, listener judgment, intraoral examination, and articulation tests (Table 2). These three procedures were utilized to assess VPI by approximately 90% of the respondents. The next most frequently used procedure for the diagnosis of VPI was lateral view cine- or videofluoroscopy which was available to 72% of the respondents. Lateral still x-rays were used by 50%. Oral manometry was available to 47% and panendoscopy 22%. Air flow studies were utilized by 18% of the respondents. Tonar was used by 4%. Multi-view videofluoroscopy (the use of lateral view in combination with either frontal or base view) was used by 24% of the respondents and nasopharyngoscopy by 8% (Table 2). In all cases, the respondents indicated that the information obtained from these diagnostic tests was utilized in the diagnosis and treatment of velopharyngeal insufficiency.

TREATMENT OF VPI. Speech therapy and

TABLE 2. Frequency of Use of Techniques Utilized for Assessing Velopharyngeal Closure

Techniques	*Percentage Utilizing for Diagnosis*
Listener Judgment of Symptom	93%
Oral Examination	88%
Articulation Tests	92%
Lateral Cine/Videofluoroscopy	72%
Lateral Still X-ray	50%
Cephalometrics	50%
Oral Manometer	47%
Frontal View Cine/Videofluoroscopy	36%
Base View Cine/Videofluoroscopy	25%
Multi-view Cine/Videofluorscopy	24%
Oral Panendoscopy	22%
Air Flow Studies	18%
* Other Techniques	20%
Nasopharyngoscopy	8%
Tonar	4%

* Techniques—other than those listed in the questionnaire, which were cited by the respondents were, in order of frequency: various nasal listening devices, i.e., nasal listening tube, stethoscope, nasal olives; nasal flutter test; "referral and consultation"; nasal tube manometer; language measures; developmental landmarks; mirror test; whistling and blowing; occlusion of nostrils; child's ability to alter vocal quality and articulation patterns; conversational speed; Berci-Ward telescope; Doynbe tube; Panorex x-rays; palpation; and cinefluorography.

pharyngeal-flap surgery were reported to be the two primary modes of treatment of choice for VPI (Table 3). Eighty per cent of the respondents indicated that they used speech therapy to treat VPI. The most frequently used surgical approach reported by the sample was the pharyngeal flap, with 72% of the respondents indicating this as their choice. Speech-bulb appliances were used infrequently, as was the palatal lift, with only 10% answering affirmatively. Thirty-five per cent of the respondents indicated that they advocated the use of retropharyngeal implants, although, in actuality, only 10% reported that the procedures were done.

The speech therapy procedure reported to be used most often to treat VPI was articulation therapy (84%). Fifty-four per cent used palatal exercises (such as blowing, sucking, swallowing, etc.), and 48% used palatal stimulation. Thirty per cent reported using nostril occlusion, while a variety of other procedures such as feedback techniques, chewing and yawning, "voice therapy," and lowering placement of the back of the tongue were included by 26% of the respondents.

Seventy-eight per cent of the respondents thought that speech therapy could be successful when used to improve the function of the velopharyngeal sphincter in at least some cases. Twenty-two per cent did not believe this was possible.

RELATIONSHIP OF AGE TO PALATAL REPAIR AND TREATMENT. The respondents estimated that 70% of the children they followed had clefts of the hard and soft palates repaired before the age of two. Forty per cent replied that they would prefer palatal repair to be accomplished prior to two years of age, while 60% preferred two years or older as the time of palatal repair.

CLASSIFICATION OF VPI. Sixty per cent of the respondents indicated that they felt VPI was a disorder of voice. Twenty-three per cent regarded it as an articulation problem and 8% as a resonance disorder. Nine per cent responded with various other alternatives, such as rhinolalia aperta, dyspraxia, and dysarthrophonia.

POPULATION SURVEY. Fifty-four per cent of the respondents indicated that they were no longer using the same diagnostic and treatment procedures that they had been taught during their training. Twenty-four per cent said that they were using some of the procedures that they had been taught, while 22%

TABLE 3. Treatment Procedures for VPI

Procedures	*Percentages of Respondents Utilizing Each Technique (Not Mutually Exclusive)*
Speech Therapy	80%
Pharyngeal Flap	72%
Palatal Push-Back	35%
Speech Appliance (Bulb)	10%
Teflon Injection or Other Pharyngeal Implants	10%
* Other Forms of Treatment	8%
Palatal Lift Prosthesis	3.5%

* The treatment procedures utilized by the 8% which represented "other" included, in order of frequency utilized, the following: combination of treatments, especially speech therapy and pharyngeal flap surgery; bilateral pharyngoplasty, as well as other forms of pharyngoplasties, i.e., Hynes; free muscle grafts; obturator; prosthetic hard palate; Roll-Y; bone grafts; speech training; and growth studies.

reported they were using all of the approaches they had been taught as students.

Ninety-eight per cent of the speech pathologists who were members of cleft palate teams indicated that they felt they had some influence in decision making relative to treatment of patients with VPI.

Discussion

Diagnosis of VPI. Although 72% of the respondents reported the use of cine or videofluoroscopy, only 11% of the speech pathologists who were members of cleft palate teams indicated that radiologists were team members. These data contradict information included in the *NIH Cleft Palate Team Directory.* This shows that 28% of the teams listed claim to have radiologists. This may imply that the radiologist is peripheral to some teams, that, in many centers, there is not the good working relationship between the radiologist and the speech pathologist as called for by Skolnick (1977), or that definitions of "team member" differ. Since x-rays appear to be used, however, the direct input of a radiologist would seem to be important. It is important to note also that, in many cases, pharyngeal flap surgery and other types of surgical intervention are being recommended in the absence of any type of motion picture x-ray. As mentioned by Skolnick (1975), the input of a radiologist is especially important when recommendations for surgery are being considered.

Otolaryngologists, audiologists, pediatricians, social workers, and other specialists were not listed as members of a relatively large sample of cleft palate teams. Given the high incidence of middle ear disease and hearing loss in cleft palate individuals, it would seem that ENT, audiology, and pediatrics would be essential. Similarly, social workers can be extremely valuable to both children and their sometimes overburdened families.

Fifty per cent of the respondents relied at least partially upon lateral view still x-rays as a tool for the diagnosis of VPI and utilized that information in conjunction with other information in making decisions for treatment. The majority of these individuals did not have motion picture x-rays available.

Multi-view cine- or videofluoroscopy and nasopharyngoscopy, the only two diagnostic techniques which allow observation of the movement of the lateral pharyngeal walls during unimpeded connected speech, were used by only 25% and 11% of the sample respectively. Recent investigations have stressed the importance of lateral pharyngeal wall movement as a predictor of success of pharyngoplasty (Kelsey, et al., 1972; Shprintzen, et al., 1979). The limited use of these diagnostic techniques may indicate disagreement with this point and/or the inability to obtain the necessary equipment. However, a review of the Cleft Palate Team Directory indicated that only 9 of the centers which reportedly do not use cine- or videofluoroscopy are located in nonmedical environments. These facilities might not have access to the necessary radiographic equipment. However, this represents less than 7% of the listed centers.

Treatment of VPI. Articulation therapy was the procedure indicated most frequently by speech pathologists for the treatment of VPI. Eighty-five per cent of the total sample reported that they used articulation therapy to treat VPI contrary to Shelton's (1969) findings that improvement in articulation does not subsequently improve velopharyngeal closure. Speech therapy, in all probability, was directed toward the improvement of the acoustic product but did not correct VPI itself.

It is noted that 60% of the respondents felt that speech therapy could either eliminate or improve VPI in at least some cases. However, every single questionnaire received suggested the use of some speech therapy technique specifically for VPI. The reason for this discrepancy is not clear. It may be that speech pathologists feel obligated to attempt treatment in order to save patients from surgical or prosthetic procedures. Data from recent studies suggest that some individuals may learn to improve closure with appropriate feedback techniques (Miyazaki, Matsuya, and Yamaoka, 1975; Shelton, et al., 1975; Shprintzen, McCall, and Skolnick, 1975) but that case selection for treatment should be selective (Shprintzen, McCall, and Skolnick, 1975).

Thirty-nine per cent of the respondents indicated that they utilized blowing, sucking, swallowing, and other types of exercises as a speech therapy procedure to treat VPI. Studies by Moll (1965) showed that both sucking and filling the cheeks with air do not require velopharyngeal closure. Moll speculated that

muscle exercises such as blowing, sucking, and swallowing may facilitate closure for nonspeech tasks but do not provide closure during speech and consequently do not necessarily improve velopharyngeal closure. In a more recent study, Shprintzen, et al. (1974) showed that gagging and swallowing are physiologically dissimilar to speech and that the concept of using exercises to "strengthen" weakened palatal musculature is erroneous.

RELATIONSHIP OF AGE TO REPAIR AND TREATMENT. Sixty per cent of the respondents indicated that they would prefer palatal repair to be completed after the age of two. This was a rather surprising finding in that speech development normally occurs long before this time. If palatal repair is not initiated at an early age, deviant speech patterns have been documented to occur (Schultz, 1954). Velopharyngeal closure cannot be achieved, and the development and reinforcement of nonnasal speech cannot occur (Shprintzen, McCall, and Skolnick, 1975).

It should be noted from the results of this study that the opportunity to give multiple responses to a single question was apparent in the design of the questionnaire. It was not the intent of the investigation to provide mutually exclusive categories for the subject's response. Rather, the investigators wished to be exposed to all of the procedures and ideas currently in vogue with the speech pathologists in general. It is hoped that data from this study will be useful in the analysis of the status of the diagnosis and management of cleft palate and related disorders as of 1977.

Reprints: *Dr. Robert J. Shprintzen*
Center for Craniofacial Disorders
Montefiore Hospital and Medical Center
111 East 210th Street
Bronx, New York 10467

Acknowledgments: This paper was presented at the Third International Congress on Cleft Palate, June, 1977, in Toronto.

References

KELSEY, C. A., EWANOWSKI, S. J., CRUMMY, A. B., and BLESS, D. M., Lateral pharyngeal wall motion as a predictor of surgical success in velopharyngeal insufficiency, *New England J. Med.*, *287*, 64–68, 1972.

MIYAZAKI, T., MATSUYA, T., and YAMAOKA, M., Fiberscopic methods for assessment of velopharyngeal closure during various activities, *Cleft Palate J.*, *12*, 107–114, 1975.

MOLL, K. L., A cinefluorographic study of velopharyngeal function in normals during various activities, *Cleft Palate J.*, *2*, 112–122, 1965.

MORLEY, M. E., *Cleft Palate and Speech*, Great Britain: E. S. Livingston, 1970.

PIGOTT, R. W., The results of nasopharyngoscopic assessment of pharyngoplasty, *Scand. J. Plast. Reconstr. Surg.*, *8*, 148–152, 1975.

SCHULTZ, L. W., Correct time and sequence for closure of cleft lip and palate, *Amer. J. Surg.*, *87*, 651–666, 1964.

SHELTON, R. L., CHISUM, L., YOUNGSTROM, K. A., ARNDT, W. B., and ELBERT, M. Effect of articulation therapy on palatopharyngeal closure, movement of the pharyngeal wall, and tongue posture, *Cleft Palate J.*, *6*, 440–448, 1969.

SHELTON, R. L., PAESANI, A., and MCCLELLAND, K. D., Panendoscopic feedback in the study of voluntary velopharyngeal movements, *J. Speech Hear., Dis.*, *40*, 232–244, 1975.

SHPRINTZEN, R. J., LAVORATO, A. F., RAKOFF, S. J., and SKOLNICK, M. L., Incongruous movement of the velum and lateral pharyngeal walls, *Cleft Palate J.*, *14*, 148–157, 1977.

SHPRINTZEN, R. J., LENCIONE, R. M., MCCALL, G. N., and SKOLNICK, M. L., A three dimensional cinefluoroscopic analysis of velopharyngeal closure during speech and nonspeech activities in normals, *Cleft Palate J.*, *11*, 412–428, 1974.

SHPRINTZEN, R. J., LEWIN, M. L., CROFT, C. B., DANILLER, A. I., ARGAMASO, R. V., SHIP, A. G., and STRAUCH, B., A comprehensive study of pharyngeal flap surgery: Tailor made flaps, *Cleft Palate J.*, *16*, 46–55, 1979.

SHPRINTZEN, R. J., MCCALL, G. N., and SKOLNICK, M. L., A new therapeutic technique for the treatment of velopharyngeal incompetence, *J. Speech Hear. Dis.*, *40*, 69–83, 1975a.

SHPRINTZEN, R. J., MCCALL, G. N., SKOLNICK, M. L., and LENCIONE, R. M., Selective movement of the lateral aspects of the pharyngeal walls during velopharyngeal closure for speech, blowing, and whistling in normals, *Cleft Palate J.*, *12*, 51–58, 1975b.

SKOLNICK, M. L., Video velopharyngography in patients with nasal speech, with emphasis on lateral pharyngeal motion in velopharyngeal closure, *Radiology*, *93*, 747–755, 1969.

SKOLNICK, M. L., Velopharyngeal function in cleft palate, *Clinics Plast. Surg.*, *2*, 285–297, 1975.

SKOLNICK, M. L., A plea for an interdisciplinary approach to the radiological study of the velopharyngeal portal, *Cleft Palate J.*, *14*, 329–330, 1977.

SPRIESTERSBACH, D. C., DICKSON, D. R., FRASER, F. C., HOROWITZ, S. L., MCWILLIAMS, B. J., PARADISE, J. L., and RANDALL, P., Clinical research in cleft lip and cleft palate: The state of the art, *Cleft Palate J.*, *10*, 113–165, 1973.