Pharyngeal Flap Surgery: A Review of the Literature

RICHARD B. YULES, M.D.
ROBERT A. CHASE, M.D.
Palo Alto, California

The plastic surgeon sees two groups of patients requiring secondary surgery for velopharyngeal incompetence—those cleft palate patients with persisting hypernasality, and those patients suffering from velopharyngeal incompetence secondary to nasopharyngeal disproportion, myopathy, or neuropathy. Of cleft palate patients, an estimated 25 to 40% require secondary surgery following primary palate repair (*16, 26*); these patients outnumber the noncleft velopharyngeal incompetent patients by four to one (*38*). The most frequently used surgical correction employs a pharyngeal flap, often in combination with palatal push-back. This is a literature survey of post-surgical evaluation of the various pharyngeal flap techniques as reported in the literature from 1951 to 1967.

History

The course of pharyngeal flap surgery has been reviewed by many authors (*2, 3, 7, 12, 15, 20, 30, 32, 34, 37*). The forerunner of the modern flap was executed by Passavant in 1865 when he attached a freshened soft palate to the pharyngeal wall, accompanied by small lateral swings of muscle tissue. Some years later, Schoenborn (1876) (*28*), and then Schede (1889) (*25*), attempted inferiorly based pharyngeal flaps. The inferiorly based flap has since been promoted on the continent by Frund (1927) (*13*), and introduced in the United States by Padgett (1930) (*24*). The technique was later fostered by Marino and others (1949) (*18*).

An early pioneer of the superiorly based flap was Bardenheuer (1892) (*14*); among the later advocates were Sercer (1935) (*29*), and Rosseli (1935) (*32*). The superior flap has subsequently been used in many centers throughout the United States, as can be seen in Table 1.

Discussion

Table 1 traces the recent literature on pharyngeal flap surgery with emphasis on post-surgical speech evaluation. It is noted that many cases

Dr. Yules is Fellow in Plastic and Reconstructive Surgery and Dr. Chase is Professor and Executive, Department of Surgery, Stanford Medical Center.

This project was supported by Research Grant HD 03305-05, The National Institute of Child Health and Human Development.

TABLE 1. Summary table of 26 studies of pharyngeal flap surgery. CP, cleft palate; VI, velopharyngeal incompetent.

author, ref. no., & date	*subjects**	*technique*	*definition of failure*	*judge*	*failure/ total: %*	*speech proficiency*			*air studies*
						good	*fair*	*poor*	
Dunn (*10*), 1951	30 CP	inferior flap	no speech improvement		1/30: 3				"blow test"
Moran (*20*), 1951	35 CP	inferior or superior flap	only slight improvement (2) or failure (3)	speech pathologist	5/35/: 14	23	8	5	
Conway (*7*), 1951	21 CP	superior (2) or inferior (11) flap; inferior flap and pushback (8)	fair or poor functional results		6/21: 29	7	6	8	
Walden (*33*), 1953	13 CP	superior (11/13) or inferior (2/13) flap	no speech improvement		3/13: 29				
Fogh-Andersen (*12*), 1953	6 CP 1 VI	inferior flap	no improvement	speech pathologist	0/6: 0				
Webster (*35*), 1956	23 CP 5 VI	superior or inferior flap with pushback			?/28: ?				
Champion (*6*), 1957	23 CP	inferior mucosal flap	unsatisfactory speech		0/20: 0				
Longacre (*17*), 1957	46 CP 6 VI	superior flap with pushback and without	no improvement		0/16: 0				
Gray (*15*), 1958		superior or inferior flap	no improvement		1/20: 5	18	0	1	
Webster (*36*), 1955	23 CP	superior or inferior flap	no improvement		2/18: 11				
Robinson (*27*), 1955	20?	superior flap	excessive nasality	speech pathologist	3/20: 15				
Obregon (*21, 22*), 1959	25 CP 4 VI	inferior flap for most	fair or poor speech	speech pathologist	5/20: 25				
Broadbent (*2*), 1959	35 CP 14 VI	high superior (16) or inferior (33) flap	no speech improvement		?/49: ?				
Conway (*8*), 1960	156 CP 6 VI	inferior flap and pushback	unacceptable speech		20/162: 12				
Stark (*32*), 1960	38?	inferior flap and pushback	socially unacceptable speech		4/19: 21				

Cox (9), 1961	78 CP	superior and inferior flap	poor speech	speech pathologist	1/37: 3	18†	14	0	vital capacity ratio
Millard (*19*), 1962		combination superior and inferior flap				22†	8	1	
Williams (*37*), 1962	7 CP 5 VI	inferior and superior flap	nasality with articulation errors	speech pathologist	2/12: 18	4	6	2	positive pressure ratio
Smith (*31*), 1963	97 CP 26 VI	superior flap for most; inferior flap for?	no speech improvement (nasality)	speech pathologist	10/60: 18	relative improvement scale			positive pressure ratios
Skoog (*30*), 1965	82 CP	superior flap and pushback (49); inferior flap and pushback (33)	unacceptable speech	speech pathologist	10/49: 20 8/33: 24				
Edgerton (*11*), 1965	95 CP 21 VI	high suspensory flap	no speech improvement	family and surgeon	0/27: 0				
Owsley (*23*), 1966	54 CP 31 VI	high superiorly based flap	moderate nasality or no improvement	speech pathologist	12/85: 14				
Buncke (*5*), 1966	10 CP 8 VI	superior flap (5); superior flap and pushback (6)	not near normal speech	speech pathologist	1/11: 9				
Buchholz (*4*), 1967	21 CP 26 VI	superior flap and pushback	no improvement	speech pathologist	1/47: 2				Chase respiratory studies
Bernstein (*1*), 1967	143 CP 47 VI	occasional flap pad; superior flap	no improvement	speech pathologist	20/190: 11				positive pressure ratio

* CP: Cleft Palate; VI: noncleft Velopharyngeal Incompetents

† 18 (vowels), 22 (consonants).

required a judgment of *no speech improvement* as a definition of failure; while, in some, moderate nasality, or even *fair* speech, was sufficient to indicate failure. Although pharyngeal flap surgery has justified its popularity, the failure rates even as noted indicate refinements yet to be made in flap surgery.

Such refinements, as in the development of any surgical technique, are based on close analysis of that technique and of the results obtained. They depend vitally on the clearly defined degrees of success or failure reported of each variation of the technique. Still more vitally, for purposes of improving these results, they depend on evaluation in detail of why the desired result was or was not obtained.

The table demonstrates an absence of 1) speech evaluation by trained personnel, and 2) correlatable dynamic respiratory studies. The speech analysis is best performed by an impartial speech pathologist, not by the operating surgeon. Descriptions such as *fair speech* and whether or not *any* nasality persists postoperatively must be replaced by the degree of improvement from a given degree of defectiveness. Any residual hypernasality must be correlated with *dynamic* respiratory studies. Dynamic (nasal air leak during RMV or MBC) respiratory studies over a 15 to 20 seconds interval represent a more physiological analog to spontaneous and sustained speech, and are not routinely used in evaluation as they should be. Absence of nasal air leak by respirometry with presence of hypernasality is an indication for intensive speech therapy (40).

Before the pharyngeal flap procedure can stand up on its own as a procedure of choice for patients with a given cline of cine, speech, and respiratory study measurements (*38*, *39*, *41*, pre- and postoperative reliable measurements must be available. The present literature is remarkable for the relative absence of any such measures.

Summary

Twenty-six reports of pharyngeal flap surgery are reviewed and a summary of studies is presented in tabular form.

reprints: *Richard B. Yules, M.D.*
Emerson Place, Suite 2M
Boston, Massachusetts 02114

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