

Velopharyngeal Dysfunction, Diagnosis and Management

An essay

**Submitted for partial fulfillment of Master Degree in
Otorhinolaryngology**

By

**Haitham Mohammad Mahmoud Attia
MB. B.Ch.**

Under supervision of

Dr. Sadek Zaher

**Professor of Otorhinolaryngology
Faculty of Medicine
Cairo University**

Dr. Mosaad Abdel-Aziz

**Professor of Otorhinolaryngology
Faculty of Medicine
Cairo University**

Dr. Sahar Saad Shohdi

**Assistant Professor of Phoniatics
Faculty of Medicine
Cairo University**

Faculty of Medicine

Cairo University

2010

بسم الله الرحمن الرحيم

"قالوا سبحانك لا علم لنا إلا
ما علمتنا إنك أنت العليم
الحكيم"

صدق الله العظيم

سورة البقرة

آية رقم ٣٢

**To Those Who Have Taken The
Trouble
Of Offering Me Everything For
Nothing
To
My Parents, , My Brother, My
Sister and My Wife**

Acknowledgment

First of all, thanks to Allah, with whose help I have completed this work.

I would like to express my sincere thanks and gratitude to **Pro. Dr. Sadek Wafeek Zaher**, Pro. Of Otorhinolaryngology, faculty of Medicine, Cairo University, for his continuous encouragement, instructions and perfect supervisions all over this work.

Words stand short when coming to express my sincere thanks and great appreciation to **Pro. Dr. Mosaad Abdel-Aziz**, Pro. Of Otorhinolaryngology, faculty of Medicine, Cairo University who offered me great help, endless support, constructive guidance and remarkable effort for the initiation and progress of this work.

My sincere thanks and appreciation to **Pro. Dr. Sahar Saad Shohdi**, Assistant Pro. Of Phoniatics, faculty of Medicine, Cairo University for her time, effort and support along the course of this work. I have taken much benefit from her experiences.

Also, I would like to present my sincere thanks to all staff members of Otorhinolaryngology Department, Faculty of Medicine, Cairo University.

ABSTRACT

The same time, closure is assisted by the posterior and lateral pharyngeal walls which move towards the rising velum, thus diminishing the lumen of the pharynx.

Velopharyngeal closure is essential for speech and non speech activities. The non speech tasks involve more reflex activities such as swallowing, gagging, yawning, blowing and suckling.

KEY WRDS

Velpharyngeal _ dysfunction _ management

Also, my thanks and appreciation to my family and everyone, who gave me an unfailing support and assistance at this time.

Haitham Mohamad Mahmoud

2010

List of Contents

	<i>Page</i>
Overview of velopharyngeal dysfunction.....	1
Aim of the work.....	5
Overview of velopharyngeal dysfunction.....	6
Aetiology of Velopharyngeal Dysfunction.....	23
Communication Disturbances Associated with Velopharyngeal Insufficiency.....	37
Assessment of the Velopharyngeal Port.....	54
Treatment of Velopharyngeal Dysfunction.....	97
Summery.....	157
References.....	168
الملخص العربي.....	١

List of Figures

Figure NO.	Contents	<i>page</i>
Figure (1):	Schematic illustration of the muscles of the soft palate	7
Figure (2):	The planes of movement necessary for velopharyngeal closure	14
Figure (3):	Illustration of endoscopic view for different velopharyngeal closure pattern	17
Figure (4):	Bluish zona pellucida in the midline of the soft palate	26
Figure (5):	A case of submucous cleft. Nasopharyngoscopy showing velopharyngeal port:	65
Figure (6):	Lateral videofluoroscopic view for a patient with VPI	72
Figure (7):	A patient during nasometric assessment of his speech	88
Figure (8):	The PERCI-SARS system	92
Figure (9):	An edentulous patient with an unoperated cleft of the soft and hard palate	112
Figure (10):	A 5 years-old girl with a rather wide cleft of the soft and hard palate	114
Figure (11):	A temporary prosthetic speech appliance	115
Figure (12):	Furlow Z-Plasty	124
Figure (13):	Furlow double opposing z-palatoplasty	124
Figure (14):	V-Y Pushback technique	125
Figure (15):	Intravelar veloplasty	131

Figure (16):	Pharyngeal flap inserted into the middle part of the soft palate	135
Figure (17):	The marked area is the site of incision for elevation of the superiorly based pharyngeal flap	136
Figure (18):	Pharyngeal flap	139
Figure (19):	Sphincter pharyngoplasty	146
Figure (20):	post operative sphincter pharyngoplasty	150
Figure (21):	Posterior pharyngeal wall augmentation	155

List of Abbreviations

VPD	Velopharyngeal Dysfunction.
VPI	Velopharyngeal Insufficiency.
VPC.....	Velopharyngeal Closure.
VCF.....	Velocardiofacial Syndrome.
KS.....	Kabuki Syndrome.
WAIS.....	Wechsler Adult Intelligence Scale.
WISC-R.....	Wechsler Intelligence Scale for Children-Revised.
AP view.....	Antero-Posterior view.
APA	Auditory Perceptual Assessment.
CT.....	Computer Tomography.
EMG.....	Electromyography.
GRBAS scale.....	
	G = Grade (The degree of dysphonia)
	R = Rough (Irregularity of the vocal fold vibration)
	B = Breathy (The extent of the air leakage through the glottis)
	A = Asthenic (Weakness of the voice)
	S = Strained (Hyperfunction state of phonation)
KS.....	Kabuki Syndrome.
PERCI.....	Palatal Efficiency Rating Computed Instantaneously.
TONAR.....	The Oral Nasal Acoustic Ratio.

Overview of velopharyngeal dysfunction

Velopharyngeal dysfunction (VPD) may occur in the absence of complete closure of velopharyngeal valve because of the lack of tissue (velopharyngeal insufficiency) or lack of proper movement (velopharyngeal incompetence), which can lead to communication disturbances (Joa~o et al., 2007).

Velopharyngeal dysfunction can be due to a variety of causes. **Velopharyngeal insufficiency (VPI)** is when there is an anatomical or structural defect, such as a short velum following cleft palate repair, a submucous cleft, or a deep pharynx secondary to cranial base anomalies. VPI can also occur following an adenoidectomy in rare cases, but most commonly if there is a pre-existing submucous cleft. **Velopharyngeal incompetence** is when there is a poor velopharyngeal movement due to a physiological cause. Velopharyngeal incompetence may be due to poor muscle function, pharyngeal hypotonia, velar paralysis or paresis, dysarthria, or even apraxia, (*Kummer, 2001*).

Causes of hypernasality and velopharyngeal dysfunction are many and range from structural causes such

as cleft palate to neuromuscular problems like those seen in velocardiofacial syndrome (VCFS). Functional aetiologies also exist, including splinting of the palate after tonsillectomy, and imitation of cultural or familial role models (*Partone et al., 1998*).

The activities of swallowing and speaking depend on the ability to obtain adequate closure of the velopharyngeal port; both are complex motor skills that involve the coordination of a diverse group of muscles along the upper aerodigestive tract. Velopharyngeal movements during speaking are quite distinct from those involved in swallowing, as is clinically evident in patients who are able to obtain good closure during swallowing and yet are unable to obtain adequate closure during speech (*McWilliams and Witzel, 1994*).

Phonation involves the generation of a column of air pressure passing from the subglottis and into the upper airway. Inadequate velopharyngeal closure allows air to escape through the nose during the generation of consonants requiring high oral pressure, leading to inappropriate nasal resonance during speech production (*Hirschburg, 1986*).

Velopharyngeal dysfunction is not only disturbed swallowing, but also disruption of speech and deterioration of communicative ability. It affects speech by several means; mainly hypernasality, imprecision of consonants articulation, audible nasal emission of air and faulty compensatory articulatory mechanisms (**Kotby, 1981**).

Velopharyngeal dysfunction has also many effects such as nasal regurgitation of food and liquids with feeding and spitting up, recurrent and chronic sinus infections may be a sign of nasopharyngeal reflux and repeated contamination of the nasal cavity. Persistent otorrhea with ear grommets in place may also be due to nasopharyngeal reflux extending up the Eustachian tube and through the middle ear (**Conley et al., 1997**).

Horii and Lang (1981) described the criteria for a recommended or perfect method of evaluation of the velopharyngeal valve function. The perfect method must be reliable and valid, be capable of analyzing connected speech as well as isolated sustained production of speech sounds, interfere as little as possible with the normal process of respiration, phonation, articulation and with auditory tactile and kinesthetic feedback. Also the method

Overview of velopharyngeal dysfunction

must be physically and psychologically non-invasive or essentially so.

Aim of the work

The aim of our study is to focus on etiology, diagnosis and treatment of the velopharyngeal dysfunction with stress on the new diagnostic and therapeutic methods.