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Surgical Management of Velopharyngeal Dysfunction in Patients with Cleft Palate: A Systematic Review

Thesis

Submitted to the Faculty of Dentistry, Ain Shams University for partial fulfillment of the requirements for Master degree in Oral and Maxillofacial Surgery

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Dedication

To my mother, my role model. I would never have accomplished anything without your guidance and support.

And to my family and friends, who have been always there for me.

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Keywords

Cleft palate surgery, Velopharyngeal insufficiency and Speech

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BCLP: Bilateral complete cleft lip and palate.

BMMF: Buccal myo-mucosal flap.

CP: Cleft palate.

DOZ: Double opposing Z- plasty.

iCP: Isolated cleft palate.

IVV: Intravelar veloplasty.

LPW: Lateral pharyngeal wall.

LVP: Levator veli palatine.

MRI: Magnetic resonance imaging.

MU: Musculus uvulae.

MVF: Multi- view videoflouroscopy.

NPE: Nasopharyngeal endoscopy.

OSA: Obstructive sleep apnea.

PF: Pharyngeal flap.

PG: Palatoglossus.

PP: Palatopharyngeus.

PPW: Posterior pharyngeal wall.

PSA: Perceptual speech assessment.

PWA: Pharyngeal wall augmentation.

Re: IVV: Redo intravelar veloplasty.

SLP: Speech and language pathologist.

SMCP: Submucous cleft palate.

SP: Salpingopharyngeus.

SPC: Superior pharyngeal constrictor.

SPP: Sphincter pharyngoplasty.

TVP: Tensor veli palatine.

UCLP: Unilateral complete cleft lip and palate.

VPI: Velopharyngeal insufficiency.

VPD: Velopharyngeal dysfunction.

VPV: Velopharyngeal valve.

Cleft palate (CP) is the most common congenital anomaly in the head and neck region, its incidence is variable in different countries. Cleft palate does not only represent a morphological distortion, but it also affects different functional aspects of the child's life. It affects feeding, swallowing, hearing, speech and social communication.[1]

Cleft palate is one of the most common causes of velopharyngeal dysfunction (VPD). Velopharyngeal dysfunction is defined as the inability of the velopharyngeal valve (VPV) to close properly, due to inadequate function of the dynamic structures that control it. The VPV is created by the soft palate, the lateral pharyngeal walls (LPW), and the posterior pharyngeal wall (PPW). Velopharyngeal dysfunction affects multiple functions, with speech being the most critical.[2,3]

Despite best attempts, primary palatal repair only achieves normal speech in approximately 70% of individuals with CP. It was found that, 5%-45% of children born with CP will require secondary surgeries to manage VPD. [4–6] This could be due to weak palatal elevation; either due to faulty muscle repair, scarring of the palate or palatal shortening due to scar contracture.[7–9]

One of the often-stated goals of cleft care is to establish normal speech. Achieving this goal is faced by multiple challenges including: structural deficits of CP, a changing velopharyngeal (VP) environment, a developing dentofacial structure, and a propensity for hearing loss.[10]

Numerous surgical techniques have been described for the treatment of post-palatoplasty VPI. However, no one operative procedure is suitable for all cases. Therefore, the factors that dictate the choice and success of each technique should be highlighted.

Nowadays, evolving diagnostic tools allow for a detailed and comprehensive speech assessment and therefore it allows for easier surgical planning, and tailoring the surgical technique to repair the defective VP mechanism accordingly.

Understanding the normal anatomy and physiology of the VPV is the first step in providing appropriate diagnosis and treatment for speech problems in children born with CP. Being able to identify the important structures and know how these relate to normal and abnormal speech production, is a critical part of these patients' evaluation.

➢ Anatomy of VPV:

Velopharyngeal valve is a muscular valve formed by the soft palate, LPW, and PPW. [11] Knowledge of the anatomy of the muscles, as well as their blood and nerve supply, is crucial during surgical dissection for a better functional outcome and less complications rate.[12] (Figure 1)

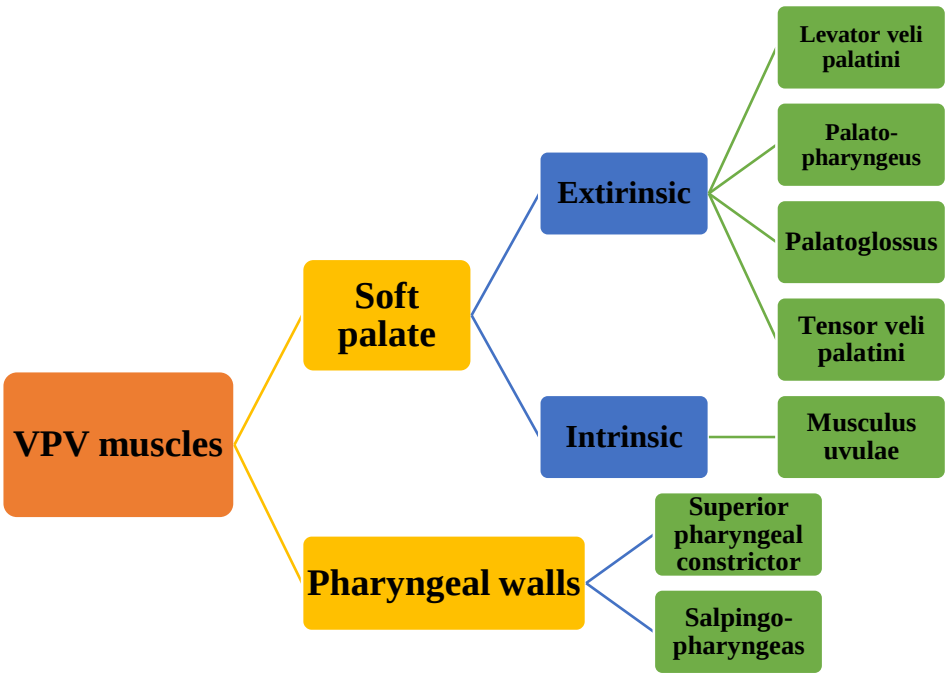

Figure 1. Muscular structure of the VPV.