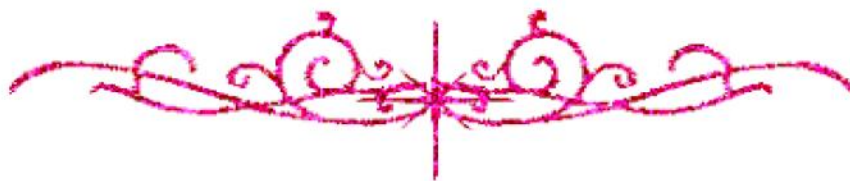


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



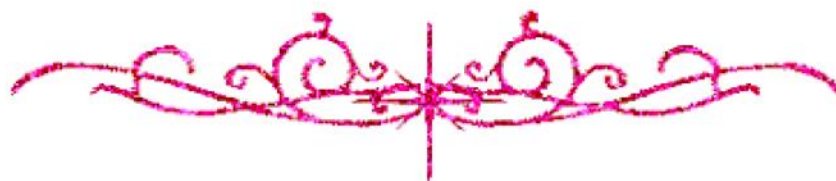


بعض الوثائق الأصلية تالفة





بالرسالة صفحات
لم ترد بالأصل



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*

Presented by

Aseel Abdulwahed Asar

BDS 2014

Faculty of Dentistry, Ain Shams University

Supervisors

Dr. Marwa Abdelwahab Elkassaby

Professor of Oral and Maxillofacial Surgery

Faculty of Dentistry, Ain Shams University

Dr. Mahmoud Yehia Abdul Aziz

Lecturer of Oral and Maxillofacial Surgery

Faculty of Dentistry, Ain Shams University

Dr. Ramy Mohamed Gaber

Lecturer of Oral and Maxillofacial Surgery

Faculty of Dentistry, Ain Shams University

Faculty of Dentistry

Ain Shams University

(2020)

Acknowledgement

Special thanks are due to all my colleagues and friends at the department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University; for their support and help with this work, with particular appreciation to **Dr. Omnia Adel**, *lecturer at Oral and Maxillofacial Surgery Department*, for her help in the preliminary screening process of this review and **Hossam El-dien Hany**, *assistant lecturer at Oral and Maxillofacial Surgery Department*, for his help in the quality assessment of the included articles.

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.

Table of Contents

Introduction	1-2
Review	3- 30
➤ Anatomy of VPV:	3
➤ Velopharyngeal physiology:	9
➤ Cleft palate and velopharyngeal dysfunction:.....	11
➤ Normal Speech production.....	13
➤ Speech production errors associated with CP patients:.....	16
➤ Speech assessment of cleft patients:	17
➤ Treatment options of VPI in patients with CP:	21
Aim of the study	32
Material and methods.....	33-36
➤ Search strategy	33
➤ Study selection	33
➤ Screening process.....	34
➤ Data Extraction	34
➤ Data Synthesis.....	35
➤ Quality assessment.....	35
Results.....	37- 54
Discussion.....	55- 75
Summary and conclusions.....	76-77
Recommendations.....	78
References	79- 93
Appendix.....	94

Keywords

Cleft palate surgery, Velopharyngeal insufficiency and Speech

List of Figures

Figure 1. Muscular structure of the VPV.	3
Figure 2. Illustration of the muscles of the soft palate.	5
Figure 3. The musculature of the pharyngeal walls.	8
Figure 4. Closure patterns of the VP port.	11
Figure 5. Normal vs. cleft velar anatomy.	12
Figure 6. Double opposing Z-palatoplasty.	26
Figure 7. Buccinator myomucosal flap (BMMF).....	27
Figure 8. Superiorly- based pharyngeal flap.	28
Figure 9. Sphincter pharyngoplasty surgery.	30
Figure 10. Data extraction was done manually using Microsoft Excel.....	35
Figure 11. Study selection process following the PRISMA flowchart.	37
Figure 12. Pie chart showing the study designs of the included studies.	38
Figure 13. Pie chart showing the distribution of the primary cleft anomaly in the studies' participants.	43
Figure 14. Pie chart showing the number of studies in each surgical technique.....	44
Figure 15. Pie chart showing the different PSA scales used in the included studies.	46
Figure 16. Pie chart showing instrumental speech assessment methods among the studies	46
Figure 17. Pie chart showing the PSA panel.....	47
Figure 18. Speech and OSA outcome among the surgical techniques.....	52
Figure 19. Our proposed treatment algorithm.....	54
Figure 20. The validated MINORS tool.....	54
Figure 21. Treatment algorithm proposed by Lau et al.	54
Figure 22. Treatment algorithm proposed by Denadai et al.....	54
Figure 23. Treatment algorithm proposed by Denadai et al.	54
Figure 24. Treatment algorithm proposed by Denadai et al.	54
Figure 25. Treatment algorithm proposed by Elsherbiny et al.	54

List of Tables

Table 1. Classification of sounds according to the place of vocal tract closure.....	15
Table 2. Classification of speech sounds based on the manner of articulation.	15
Table 3. Individual study characteristics and outcomes, sorted chronologically by procedure.....	39
Table 4. Details of PSA and airway assessment recording.	48
Table 5. Average MINORS score of included studies.	53

List of Abbreviations

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 videoflourosocopy.
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)

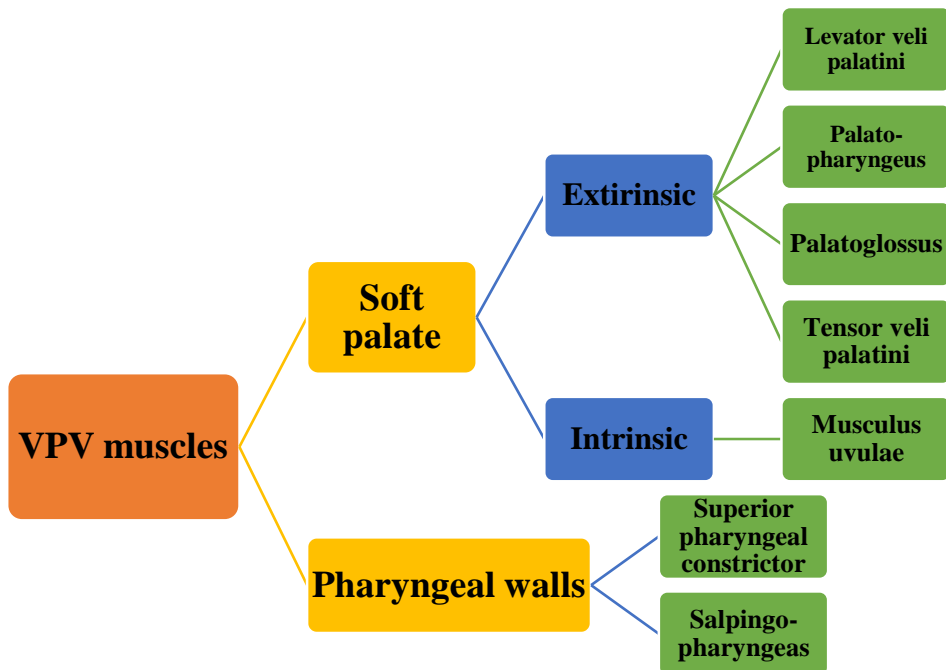


Figure 1. Muscular structure of the VPV.