

Velopharyngeal defects and their treatment – A Review

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Abstract

Aim: This study was aimed to review the role of prosthodontics in the treatment of congenital velopharyngeal defects.

Methodology: A systematic literature search was performed electronically and hand-searched with terms of palatal incompetence, palatal insufficiency, speech bulb obturator, and palatal lift appliance. The search was carried out through Medline via Pubmed, Wiley online library, Ebscohost, Science Direct, as well as the Google Scholar for articles published from 2000 to 2019. A total

of 220 articles were found. A total of 78 articles were relevant to the topic. Articles selected were critically appraised to evaluate their quality.

Results: Different articles described various treatment options for velopharyngeal defects, pertaining especially to prosthodontics. The literature search revealed 85 articles in PMC. 32 articles were found on Wiley online library, 82 articles in google search. Additional 21 articles were identified by hand search.

Conclusion: Prosthodontics is proved to be a multidisciplinary approach. Treatment of velopharyngeal

defects not only aims at reestablishing the lost structure but also rehabilitates the lost function.

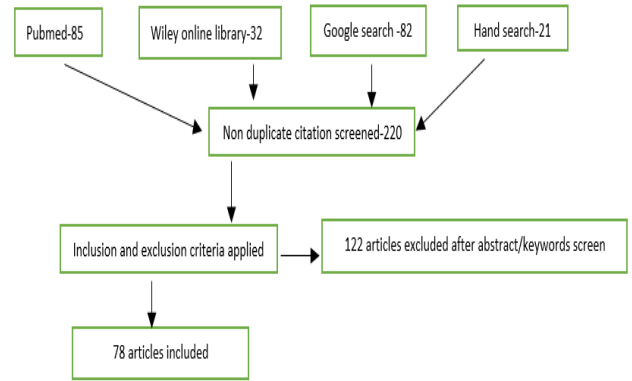
Keywords: Palatal incompetence, Palatal insufficiency, Speech Bulb obturator, Palatal lift appliance.

Introduction

Velopharyngeal defects are basically defects of the palate, which affects the closure of the nasopharyngeal and oropharyngeal isthmus. The term velum is often used interchangeably with the preferred soft palate. The term velum refers to a covering or veil, while the soft palate is actually a complex neuromuscular aponeurosis. The soft palate acts as a dynamic separator between the oral and nasal cavity. Velopharyngeal defects are of two types congenital and acquired. As there are many literature available discussing acquired defects, this article is mainly concentrated on congenital defects and their most commonly followed prosthodontic treatment options. The main aim of this study is to describe the role of prosthodontics in treating congenital velopharyngeal defects. Though there are different treatment options available, In this article, two most commonly used treatment options like speech bulb obturator and palatal lift appliance are discussed in detail.

Materials and Methodology

PubMed/Medline, Wiley online, and Google search were the electronic resources used to review the biomedical literature, using the following keywords Palatal incompetence, Palatal insufficiency, Speech Bulb obturator, Palatal lift appliance. In total, we found 220 relevant articles. The literature search revealed 85 articles in PMC; 32 articles were found on Wiley online library, 82 articles in google search. Additional 21 articles were identified by hand search.



Flow chart 1

As a criterion for the selection of these studies, we included only the articles published in English; after reading the abstracts, we selected 78 articles that fit these criteria, with the publication dates ranging from 2000 to 2019.

Classification of velopharyngeal defects¹:

- 1). congenital:
 - a) Palatal incompetence
 - b) Palatal insufficiency
 - c) Palatal inadequacy
- 2). Acquired:
 - a) Surgical resection of the neoplasm
 - b) Defect due to trauma and neurological deficiencies

Palatal incompetence

When the soft palate is of inadequate dimensions but lacks movement because of disease or trauma affecting muscular and or neurologic capacity.

Palatal insufficiency

When some or all of the anatomic structure of the soft palate is absent, it is

Causes for velopharyngeal defects

- a. Congenital malformations.
- b. Developmental aberrations.
- c. Acquired neurological defects.
- d. Surgical resection of neoplasms.

Diagnosis of velopharyngeal defects

Nasal endoscopy, evaluation of speech through various techniques like acoustic spectrogram, pressure flow technique², acoustic and aerodynamic techniques, videofluoroscopy, nasopharyngoscopy, radiographs like lateral cephalogram, MRI, etc.

Treatment for velopharyngeal defects

Congenital velopharyngeal defects due to palatal insufficiency can be restored by surgical reconstruction followed with an insertion of an obturator to correct the residual palatal insufficiencies. Congenital velopharyngeal defects due to poor structural integrity can be treated with palatal surgery. Acquired velopharyngeal defects due to surgical resection can be treated by surgical reconstruction and prosthodontic rehabilitation. (e.g., obturator). Acquired velopharyngeal defects due to trauma and neurological deficiencies can be treated by prosthodontic rehabilitation using a palatal lift prosthesis.

Prosthodontic rehabilitation

Speech bulb prosthesis/ pharyngeal obturator.

Palatal lift prosthesis.

Methods of fabrication

Steps involved in the fabrication of speech bulb obturator³:

1. First preliminary impression should be made either by using irreversible hydrocolloid impression material or elastomeric impression material. Then the cast is fabricated with the help of die stone.
2. This oral section of the prosthesis is fabricated with self-cure acrylic resin.
3. The next impression is needed to make for the pharyngeal section, for this retentive loop was fabricated with 21 gauze wire to support impression material. It has to be stabilized with self-cure acrylic resin.

4. Impression compound was softened, kneaded and placed over the wire loop inserted in the patient mouth, patient was instructed to bend his head upward, downward, turn the head right and left side and touch his shoulder with the help of the chin then prosthesis should be removed and inspected for overextensions, excess compound removed from the superior aspect until the patient was able to breathe comfortably, peripheries of the impression compound were trimmed.
5. Low fusing compound should be added, prosthesis must be inserted, and the patient was instructed to do the head movements again until the smooth margins appear on peripheries.
6. Now the Pharyngeal section of the primary cast should be removed by using frit saw blade, two retentive aid should be created in the posterior part of remaining cast, prosthesis with pharyngeal impression should be seated firmly on the cast, boxing should be done with modelling wax, and new cast should be prepared.
7. Now the pharyngeal section of the prosthesis should be fabricated by removing the impression compound and cutting the wire loop. Only a few millimeter lengths of wire should be extending into the defect area to support the pharyngeal section of the prosthesis.
8. Then self-cure acrylic should be mixed and filled into the pharyngeal defect. Trimming, finishing, and polishing should be done.
9. Finally, the prosthesis needs to be inserted and clinically evaluated for overextensions, and if his hypernasal speech has been reduced or not.
10. Speech can be evaluated through various techniques like acoustic spectrogram, pressure flow technique, and acoustic and aerodynamic techniques.

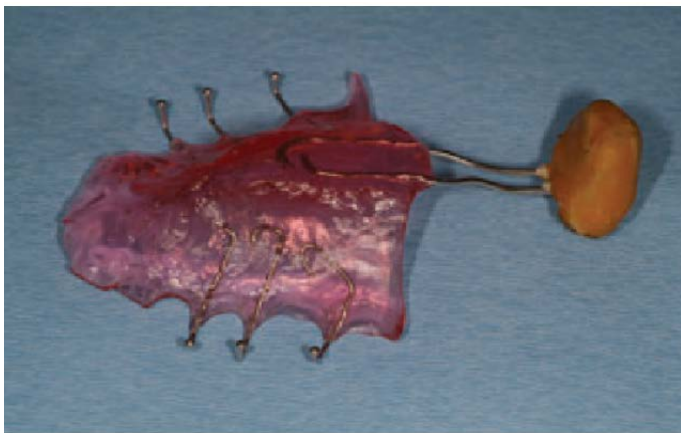


Fig 1: Speech bulb obturator

Steps involved in the fabrication of palatal lift prosthesis⁴: Fabrication procedure is almost similar to that of speech bulb obturator, but the main difference is that while making an impression with the help of the impression compound, the softened compound should not be placed in the mouth because the soft palate will displace it downward and the lift action will not occur. Displacement of the soft palate is the goal of the procedure and can only be accomplished with the hardened compound. Instead, the impression is added in increments and evaluated either with nasal endoscopy or by making patients speak plosive sounds like b and p.



Fig 2: palatal lift prosthesis

Conclusion

Treatment of velopharyngeal defects is a multidisciplinary approach involving a surgeon, speech therapist, ENT, and prosthodontist. Fabrication of prosthesis should not only replace the lost structure but should also replace the lost function. Prosthodontist plays a very important role in the management of velopharyngeal defect. It is a teamwork, which finally results in managing patients with the velopharyngeal defect and also in the success of the prosthesis.

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