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## Surgical Management of Velopharyngeal Dysfunction: Major Techniques and Trends for the 21st Century

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**TITLE:** Surgical Management of Velopharyngeal Dysfunction: Major Techniques and Trends for the 21<sup>st</sup> Century

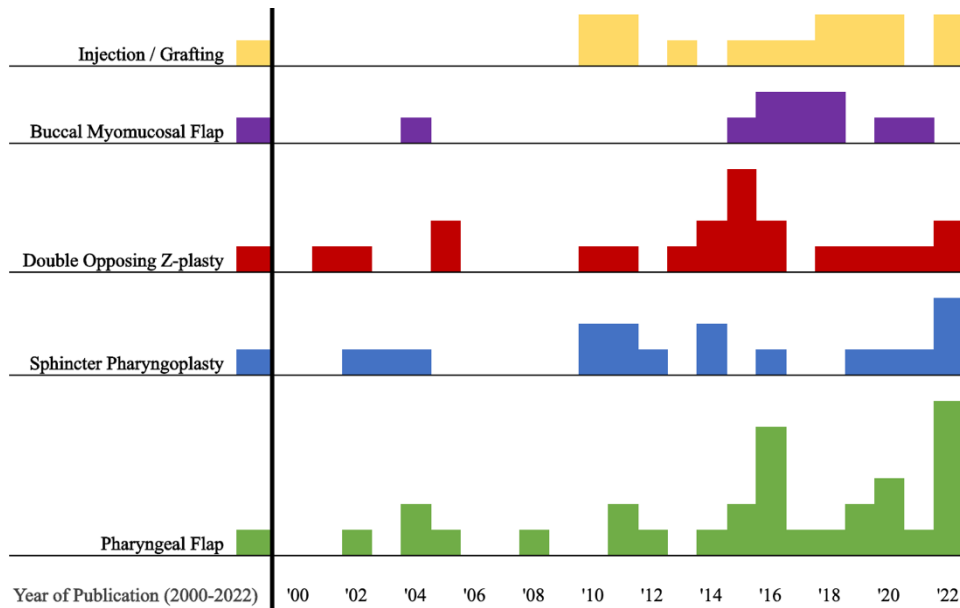
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**INTRODUCTION:** Surgical management of velopharyngeal dysfunction (VPD) has become increasingly complex over recent decades with advances in diagnosis, evaluation and technique, and research focus in this area is expected to shift accordingly. This study aims to educate readers on updates in management of VPD and explore changes in surgical methods through the 21<sup>st</sup> century.

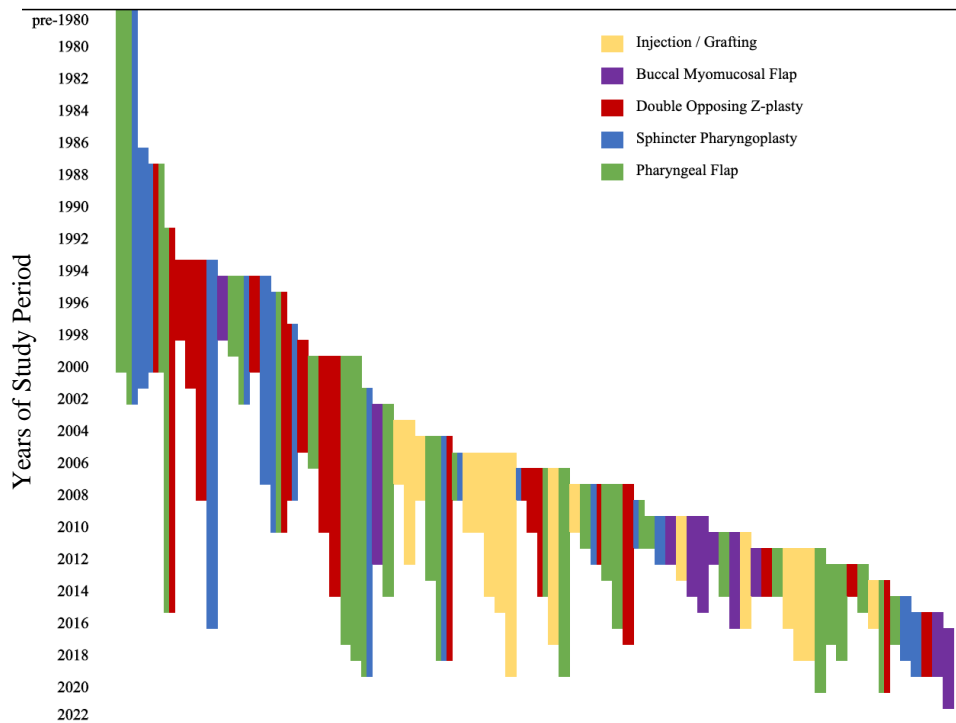
**METHODS:** A systematic review was conducted of all literature published on surgical treatment of VPD since the year 2000, following PRISMA reporting guidelines. Adult-acquired VPD, any non-surgical management, implants and prosthetic devices, animal or cadaver models, and case series involving less than 10 subjects were excluded. All relevant studies were surveyed for selection and use of surgical technique as well as study conclusions, which were then analyzed for trends in research focus over time.

**RESULTS:** Our review examined 77 original studies. The average number of publications per year increased over time. Overall, the most frequently discussed technique involved some form of pharyngeal flap (represented in 32% of publications), followed by double opposing Z-plasty (22%). While pharyngeal flaps were consistently popular, more recent studies introduced various modifications, many informed by preoperative patient evaluation. Grafting, injection, and buccal myomucosal flaps were more highly represented over the second half of the study period [*Figures 1 and 2*].

**CONCLUSIONS:** Research interest in VPD is increasing. Pharyngeal flaps remain a consistent staple of VPD management, but surgeons are moving toward modified procedures and patient-individualized methods. The last decade shows growing attention to alternative techniques including autologous tissue grafting and injection methods.



**Figure 1:** Frequency of appearance of the five major surgical techniques in original research publications per year since 2000.



**Figure 2:** Original research publications visualized chronologically by year and length of study period (as opposed to year of publication).