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## Abstract

**Objectives:** To review the evaluation of and treatment for stress velopharyngeal incompetence (SVPI) in professional musicians with lipoinjection to the posterior pharyngeal wall.

**Study Design:** A retrospective and literature review

**Methods:** Two professional musicians suffering from stress VPI patients treated with autologous lipoinjection to the posterior pharyngeal wall are presented. Nasopharyngoscopy was performed in the office while playing their instrument both before and after injection.

**Results:** After successful autologous lipoinjection of the posterior pharyngeal wall, both patients resumed full play with resolution of their nasal emissions and no surgical complications. One patient is now 3 years s/p lipoinjection pharyngoplasty.

**Conclusions:** We describe the evaluation of these patients and present a less invasive, potentially permanent treatment option for SVPI with autologous fat injection pharyngoplasty of the posterior pharyngeal wall.

## Introduction

Stress Velopharyngeal Insufficiency/Incompetence (SVPI) is a particular form of Velopharyngeal Insufficiency/Incompetence (VPI) in which there is an escape of air from the oral cavity to the nasal cavity while playing brass or woodwind.[1] In SVPI the intraoral pressures greatly exceed those generated during normal speech and have been noted to “reach as high as 130 mm Hg whereas normal speech pressures rarely exceeds 5-6 mm Hg”. [2] This condition, if left untreated, is largely career ending for a professional instrumentalist as it impairs their ability to “play high and long”. [2]

Various treatment modalities have been shared in the literature ranging from conservative observation and Speech Language Pathology referral to surgical intervention with sphincter pharyngoplasty, pharyngeal flap (V-Y pushback etc). [3] While soft palate lipoaugmentation specifically for SVPI has an isolated documentation in the literature, there are currently no reports or accounts of lipoaugmentation to the posterior velopharynx for SVPI. [4]

## Methods and Materials

### Patients

Retrospective review identified two patients, one male and one female. Both professional musicians aged in their 20's. Patients were first assessed in the outpatient setting with flexible videolaryngoscopy demonstrating clear central naso-oral escape of air upon playing their instruments.

### Fat Harvest & Injection

Our female patient opted for fat harvest via liposuction and harvested fat appropriately decanted and then loaded into the Bruening syringe. Our male patient opted for open abdominal fat harvest rinsed in lactated Ringer's solution. The fat was manually fragmented into lobules with removal of fibrous attachments and soaked in a dexamethasone solution prior to loading into the Bruening syringe. Once the fat was appropriately prepared, nasal endoscopy was performed with the patients under general anesthesia but in the upright position. Under direct view, approximately 6 mL of harvest fat was injected transorally into the area of bulk deficit noted on office endoscopy—central area at the level of Passavant's Ridge. Areas were slightly over-injected in anticipation of resorption. Palpation of the palate also indicated that the patients would have good palatal closure.

## Cases

### Case 1

An otherwise healthy 21-year-old female and aspiring professional trombone player presented to the Laryngology clinic with difficulties of nasal air escape while playing for 2 years. The air escape occurred shortly after she begins playing. She typically practices for 4-5 hours a day. As a result of this, she felt that she had less stamina, loss of efficiency, and feels that the sound is somewhat compromised. She had an unremarkable past medical and surgical history. Initial flexible scope examination revealed a small area of central incompetence with obvious mucus bubbling. The lateral pharyngeal walls appeared to constrict normally.

After several months of strengthening exercises she underwent fat harvest (via liposuction) and subsequent augmentation. She was seen two weeks post-operatively with complete resolution of her symptoms and instructed to gradually increase her trombone playing and is now successfully playing her trombone for an international orchestra.

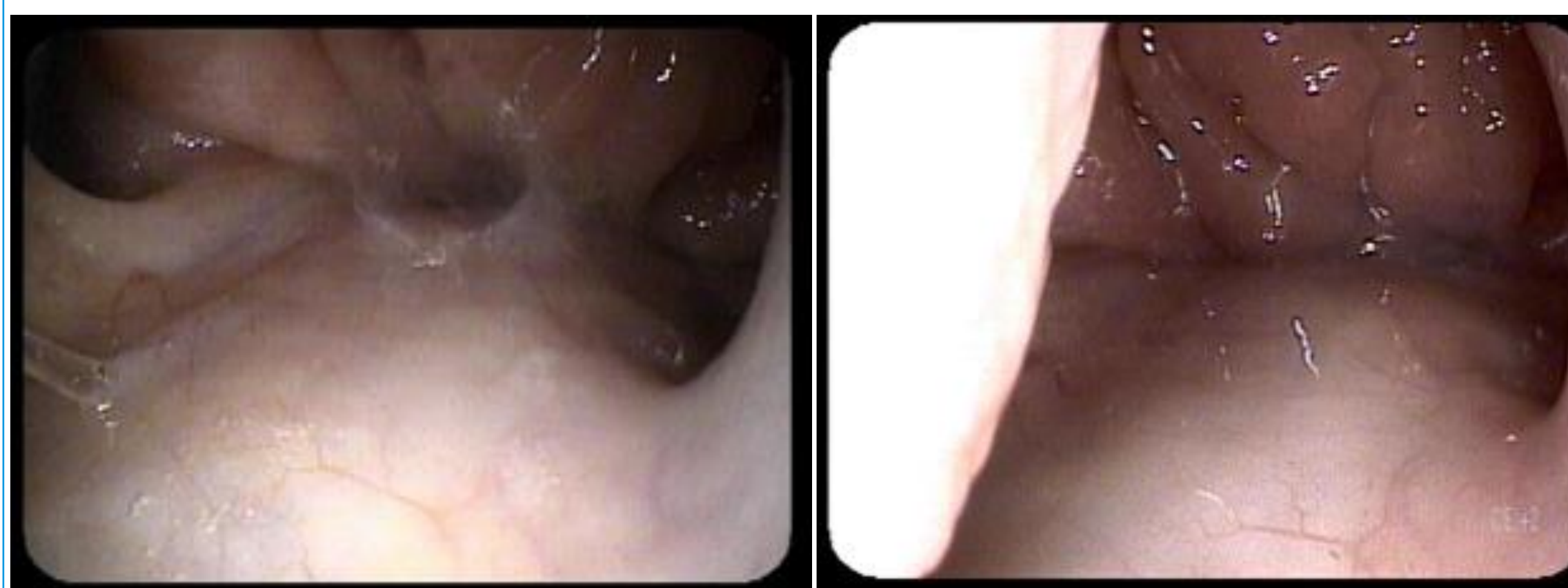


Figure 1: Before Injection

Figure 2: After Injection

### Case 2

A 20-year-old male with a past medical history of VACTERL presented to the outpatient laryngology office. Congenitally, he is deaf in his right ear, had abnormalities of his vertebrae and lower GI tract but no evidence of tracheoesophageal fistula or clefts. His chief complaint was increased nasal air escape when he plays his saxophone. He had not previously undergone tonsillectomy or adenoidectomy. On exam, he was noted to have some subtle air escape with speaking. On scope exam he clearly demonstrates central air leakage when he played his instrument

The decision was made to proceed with injection pharyngoplasty. Two weeks following the procedure, there was evidence of persistent VPI and emission in the midline and just left of midline on playing. As such, fat augmentation was performed again with directed injection in the persistent deficient area. Assessment two weeks following now showed significantly reduced velopharyngeal escape on playing his saxophone. However, assessment two months following his revision showed that his benefits lasted only 2-3 weeks before returning to baseline.

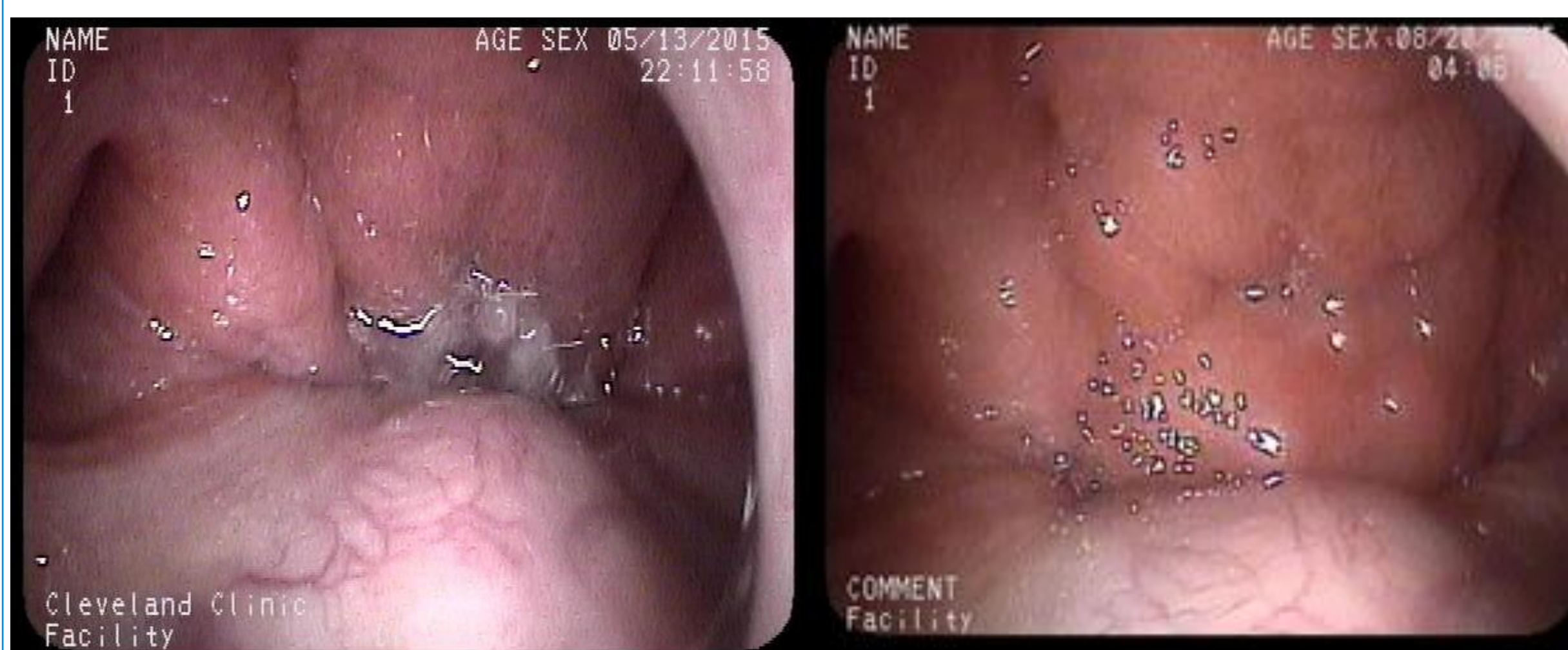


Figure 3: Before Injection

Figure 4: After Injection

## Discussion

Stress velopharyngeal incompetence (SVPI) is a unique entity that may not always be within the familiar territory for practicing otolaryngologists. In a 2007 study by Malik, only 45% of board-certified otolaryngologists and plastic & reconstructive surgeons were familiar with the term with only 27% having seen a patient with SVPI.[2] Conversely, incidence of SVPI in the recent literature varies 30% to 40% of musicians reporting symptoms at some point in their careers. [5,6]

When working and treating professional musicians, it is important to have them bring their instrument and to replicate the condition under which their SVPI occurs. The use or access to video nasolaryngoscopy is helpful not only to show the patient but more to identify the area of insufficiency anatomically so that injection location can be carefully planned.

In both presented cases, our injections areas were slightly over-injected based on visual inspection. The principal of over-injection is driven by the major disadvantage of autologous fat injection: fat resorption—which is thought to be due to both initial necrosis of fat at the time of transfer and gradual resorption.[7]

Our saxophone player demonstrated some initial benefit after his second injection but did not have any lasting benefit. While the resorption rate is variable, as stated earlier, we feel that his short-lived benefit may be attributed to his underlying VACTERL/VATER syndrome or an actual subclinical VPI. While the literature does not show a strong association VACTERL with palatal clefts, there was a hint of nasal escape of air noted on regular speech in the initial assessment. Thus, one could argue that this patient was not a true isolated SVPI.

In contrast, our trombone player achieved great benefit and functionality from just one injection. Thus, our experience with autologous fat injection to the posterior pharyngeal wall has been variable. For both patients, it provided an intermediary option between speech therapy and more formal surgical sphincteroplasty which is often thought of as more invasive permanent measures altering a larger portion of anatomy. Such surgeries may impair an instrumentalist's ability to engage in “circular breathing”. [3] Circular breathing is a technique of breathing that allows a player to sustain airflow through the instrument using the cheeks as bellows while inhaling nasally thereby allowing them to hold sound over a long period of time.[3]

## Conclusions

Stress VPI is often a career-threatening condition for professional brass and woodwind musicians. As only 12 cases of stress VPI have been described in the English-language medical literature, we offer two additional cases with a new application for autologous fat injection.[8] While the lasting results may be variable, the option to undergo a less invasive, potentially permanent treatment option for SVPI with autologous fat injection pharyngoplasty of the posterior pharyngeal wall can serve as a valuable tool in the armamentarium for treatment.

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