

An Anatomical Comparison of Minimally Invasive Nasal Valve Procedures

David Weeks, MD and Jay Dutton, MD

Department of Otolaryngology, Head and Neck Surgery, Rush University Medical Center
Chicago, IL

Abstract

Using eight fresh cadaver heads, the minimal cross sectional area of the nose at the internal nasal valve was measured with acoustic rhinometry. Z-plasty and spreader grafts were performed and the new cross sectional area was recorded. Z-plasty increased the nasal valve surface area in all 8 nasal cavities with a mean increase of 65%. Spreader grafts increased the nasal valve surface area in all 8 nasal cavities with a mean increase of 31%.

CONTACT

David Weeks
Rush University
david_weeks@rush.edu

Objective

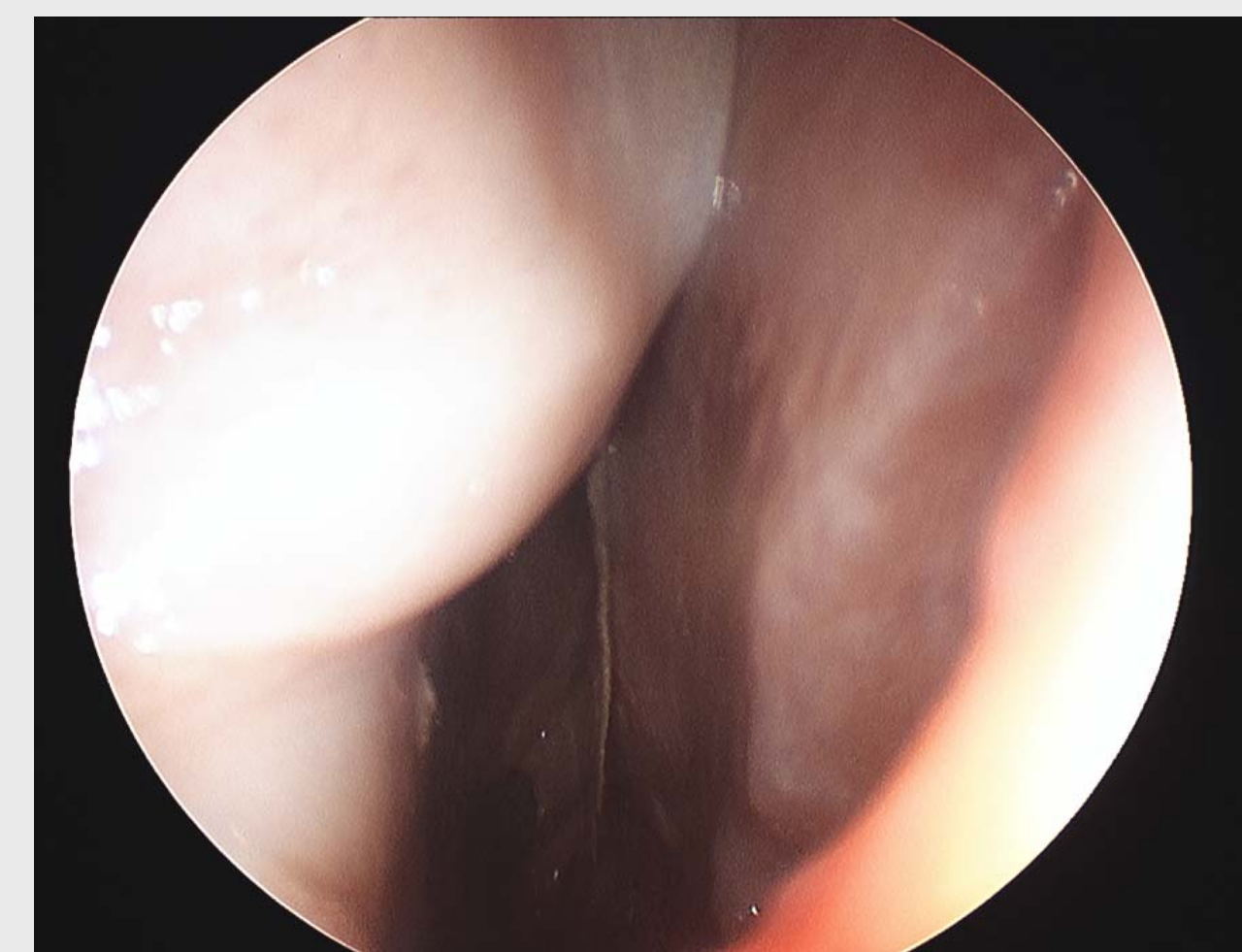
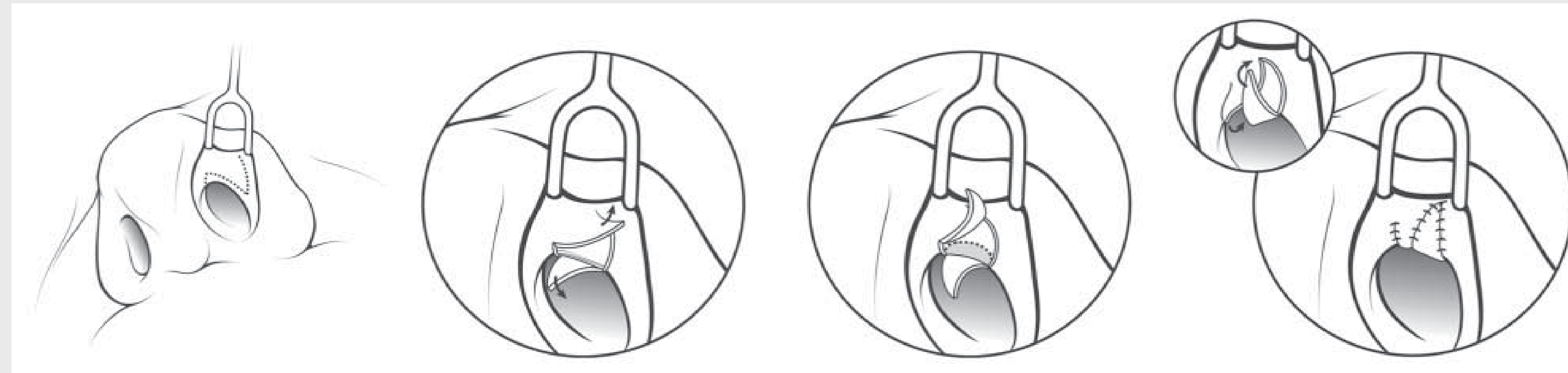
To determine the quantitative effects of z-plasty and spreader grafts on nasal valve surface area.

Introduction

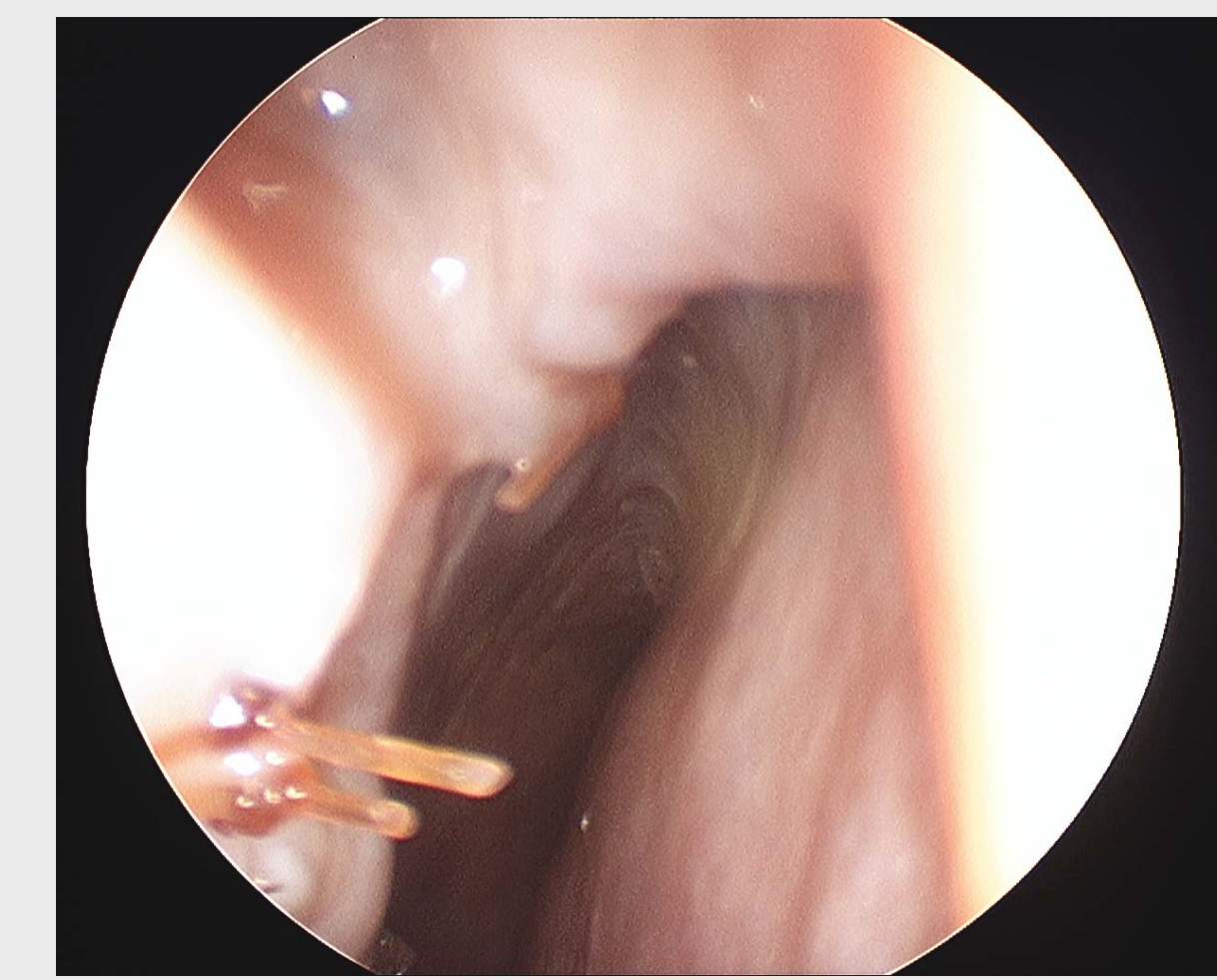
The internal nasal valve is the area between the caudal end of the upper lateral cartilages and the cartilaginous septum. This is the site of the highest nasal resistance and the primary regulator of airflow within the nose. An open nasal valve provides the sensation of normal nasal airway patency. The internal nasal valve angle is normally 10-15 degrees. Angles less than this can be corrected with surgical procedures. Z-plasty and spreader grafts are hypothesized to increase the internal valve angle thereby increasing nasal patency.

Methods

Eight fresh cadaver heads were used which provided 16 total nasal valve procedures. Surgical sides were randomized and z-plasty was performed on 8 valves and spreader grafts were performed on 8 valves. The minimal cross-sectional area at the level of the nasal valve was measured both pre-and post-operatively using acoustic rhinometry. We then compared z-plasty and spreader grafts using a Wilcoxon sign ranked test.



Right Nasal Cavity before



Right Nasal Cavity after z-plasty

Results

The mean nasal surface area at the nasal valve before z-plasty was 1.37 cm² (0.39-2.25) and after z-plasty was 1.95 cm² (1.08-2.62). The mean surface area at the nasal valve before spreader grafts was 1.15 cm² (0.75-1.48) and after spreader grafts was 1.48 cm² (0.95-1.95). This correlates with a mean increase in the nasal valve surface area of 65% when z-plasty was performed (CI: 28% - 88%, p = .007) and 31% when a spreader graft was performed (CI: 15% - 54%, p = .014).

Conclusions

Z-plasty and spreader grafts were both shown to increase nasal valve surface area. Z-plasty appears to increase nasal valve surface area more than spreader grafts.