

# Nasal Plug for Nasal Air Flow Modulation

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## Technology description

### The Need

Nasal sinus disease is one of the most common medical conditions in the U.S., affecting an estimated 13% of the adult population and accounting for 12.5 million physician office visits annually. Among its many symptoms, complaints of nasal obstruction is one of the primary symptoms that most significantly impacts a patient's quality of life. However, it is well known that an individual's perception of nasal obstruction often does not correlate with their actual nasal resistance and could be due to a disoriented nasal airflow pattern. Therefore, a simple device to redirect nasal airflow could provide substantial symptomatic relief in this patient population.

Currently available nasal plugs do not address the issue of disoriented nasal airflow patterns because they are designed solely to prop open or dilate the nostrils. An exemplary nasal dilator includes two rigid cylindrical rings connected by a bridge. Each ring may, in fact, open the nasal passage to allow more airflow but the airflow is non-directional.

### The Technology

Dr. Kai Zhao at The Ohio State University Wexner Medical Center has designed a simple, inexpensive nasal plug with embedded tubes for redirecting airflow into a person's nasal passage. These plugs address prominent symptoms of pathologies such as "empty nose syndrome" and turbinate hypertrophy. Essentially, the problem being addressed is that some people's nasal airflow patterns are moderately to severely misdirected. For example, the airflow may form a narrow jet directed toward the middle meatus. The Zhao nasal plug redirects the nasal flow in these patients to the lower meatus, mimicking normal airflow patterns.

However, beyond patient's suffering from the above pathologies, initial clinical studies suggest that the plugs can provide symptomatic relief to a wide variety of individuals with nasal sinus complaints. These studies allowed patients to adjust the rotatable plug/tube system to the orientation providing the best sensation of airflow and prompted comments like: "I cannot believe how much these things return the sensation of air." While the plugs may be custom made based on a CT scan of the nasal cavity, it is

envisioned that they will also be made available for fast, over-the-counter access at drug stores and other commercial outlets.

## Application area

Inexpensive, over-the-counter plug kit for symptomatic relief for individuals with nasal sinus complaints  
Custom-made plugs for patients with nasal pathologies such as "empty nose syndrome"

## Advantages

Plugs easily adapt to any nasal passage

Patient-adjustable orientation providing best sensation of airflow

Inexpensive, over-the-counter availability as prospective high-volume product for nasal sinus symptom relief

A simple, inexpensive device for redirecting nasal airflow for individuals complaining of nasal obstruction.

## Institution

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