# TREATMENT OF NOSE VALVE DEFORMITIES WITH THREAD METHODS

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## INTRODUCTION

Increasingly, patients are seeking medical assistance to deal with complaints about nasal breathing disorders which have arisen from unsuccessful rhinoplasty. In such cases, difficulty in nasal breathing is most often caused by the nasal valve system disfunction. In these instances, classical treatment methods require that a surgeon possesses a good knowledge of anatomy and a mastery of filigree surgery technique which does not always lead to satisfactory results[1, 2, 3, 4]. In the past, thread suturing has been used for this purpose; however, the proposed methods provide short-term results due to the application of ordinary smooth suture material and not completely adequate suturing technique[5].

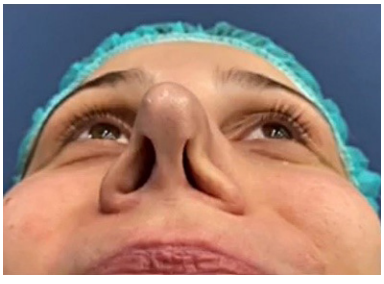

*Figure 1: Patient after unsuccessful rhinoplasty at the moment of air inhalation, showing weakness in the movable part of the nose's lateral wall.*

## MATERIAL AND METHODS

Anatomically, a distinction is made between the anterior and posterior nose valves. The following are considered to constitute the anterior valve boundary: columella, lateral crus of alar cartilage and fundus of nasal vestibule. Anterior valve dysfunction is mainly caused by the weakness of triangular cartilage or the loss of its elasticity. Stabilization of its movable part is necessary for correcting this problem ***(Figure 1)***.

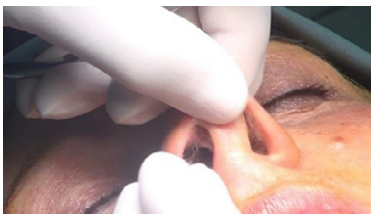

*Figure 2: Patient after unsuccessful rhinoplasty. The presence of "sail" narrows the lumen of nasal passage.*

On examination of the nostrils from the side, one can see the nose posterior valve which is delineated by the nose septum, the lower part of triangular cartilage and the anterior end of the inferior turbinate ***(Figure 2)***.

The main cause of nose posterior valve dysfunction is narrowness of the valve (less than 10-degree angle). It is necessary to widen this angle for treatment of the above-mentioned pathology.

We have elaborated the techniques for suturing the internal and external nasal valves using the special suture material, which contains double-edged needles and polypropylene threads with bidirectional cogs. It also contains threads with

*Figures 3a, 3b: Suture thread products designed for correction of nose valve deformities: two double-edged needles with polypropylene suture thread and a cannula with absorbable suture thread pre-placed in it.*

*Figure 5: Placing the suture thread to correct the deformation of the external valve.*

multi-directional cogs which are made of absorbable material and equipped with blunt-pointed cannulas ***(Figures 3a, 3b)***. The absorbable threads are composed of polylactic acid with caprolactone. The surgical suture material has a biodegradation period of 1.5-2 years[6, 7].

## SURGICAL TECHNIQUE

The procedures are performed without incisions, through punctures, under infiltration anesthesia.

The internal valve is sutured with a product consisting of two double-edged needles, the points of which, when juxtaposed, form one point; one 50cm-long thread is attached to them. The points of these needles are injected into the skin in the nose bridge area up to the periosteum, where they are separated. One of the needles initially advances subcutaneously and subsequently under the mucous membrane to the corner of internal valve on the right and is punctured into the nasal lumen. Here the needle is not fully withdrawn: the point is left in the submucosal space and turned around. Next, the hook maneuver is performed, the small piece of tissue is picked up, and the second point returns back to the nasion area. Pricking, incomplete withdrawal of the needle from under the skin, maximum pull-up of the thread, the hook maneuver, engagement of the periosteum and returning of the needle with the first point towards the valve are also performed here. These steps are carried out 2-3 times until the valve angle has been sufficiently increased and the valve has been opened. While still on the operating table, the patient should already be able to note the significant improvement in breathing through the right nostril. The same maneuvers are then performed on the left nostril ***(Figure 4)***.

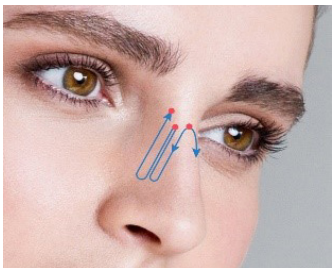

*Figure 4: Scheme of placing the suture thread for correcting the deformation of internal valve.*

The procedures designed for the elimination of valvular deformity of the external valve are somewhat easier and less traumatic to perform, since only the strengthening of the weak lateral nose wall is carried out. At the same time, several threads with multidirectional cogs are positioned fanwise through the punctures in the region of the nasal vestibule through the entire nasal sidewall ***(Figure 5)***.

## RESULTS

This article describes cases involving nasal valve system deformities occurring after unsuccessful rhinoplasty, which we treated using our thread correction methods. There was a total of 72 of these cases, the majority (68%) of which involved internal valve deformities. Among all 72 cases, 39 were characterized as bilateral deformities and 33 as unilateral deformities.

Applying the proposed technique, we managed to achieve the dilation of the nasal passage around the internal valve. In addition, given the weakness of the nasal sidewall, the strengthening technique proved to be effective. For both pathologies, free passage of air through the nasal passages was ensured in all cases and remained stable for many years. Disease relapses were not observed.

## CONCLUSIONS

The proposed methods of minimally invasive interventions designed to eliminate deformities of the nasal valve system offer an opportunity to achieve positive long-term results. Provided that patients are correctly diagnosed and selected properly, these methods may serve as a solid base for a surgeon dealing with rhinology. The significance of these procedures lies in the fact that they represent one of the few alternatives to traditional surgical rhinology that may be performed quickly (in 10-30 minutes), in the outpatient setting, under infiltration anesthesia and with a short rehabilitation period (2-5 days).

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