

# The Use of Computed Tomography before Septoplasty

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**Abstract:** The authors present their case studies from the last 20 years of septoplasty interventions. Preoperative CT was required in part of the septoplasty until 2016, especially in those endoscopic or associated with FESS, while it was routinely required in all surgeries from 2016 onwards. The authors analyze the advantages of preoperative CT and propose its routine use before each septoplasty operation.

**Keywords:** settoplasty, CT scan, endoscopy, turbinoplasty.

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## 1. INTRODUCTION

Septoplasty is one of the most performed procedures in ENT practice. Surgical technique of septoplasty involve classical phases described by Killian, Cottle, Freer and others and there are possible variations according with the preferences of any nasal surgeon.

Computed tomography makes use of computer-processed combinations of many X-ray measurements taken from different angles to produce cross-sectional (tomographic) images of specific areas of body.

Computed tomography (CT) of the nasal and paranasal sinuses uses special x-ray equipment to evaluate the nasal and paranasal cavities CT scanning is painless, noninvasive and accurate and it's also the most reliable imaging technique for determining the radiological anatomy of nasal septum and nasal cavities .

The use of computed tomography has increased in the last years and the use of CT scan in the evaluation of paranasal sinuses before F.E.S.S. is almost a gold standard in this surgery.

The purpose of this work is to evaluate the importance of routine use of computed tomography (CT) of the nasal and paranasal cavities before septoplasty.

## 2. PATIENTS AND METHODS

Our experience is based on 20 years of surgical activity performed at St. Camillus Clinique in Messina from march 2001 to september 2016 and C.O.T. Clinic in Messina from october 2016 to today.

We performed 1860 nasal surgical procedures of which 1150 traditional septoturbinoplasty, 198 endoscopic septoturbinoplasty and 512 septoturbinoplasty combined with FESS.

CT scan of nasal and paranasal cavities was always performed before endoscopic septoturbinoplasty and septoturbinoplasty combined with F.E.S.S. and in 350 of 1150 traditional septoplasty .

Totally CT scan was performed before 780 of 1860 performed procedures ( 46,98 %).

In the last five years we always performed CT scan before every type of septal surgery.

In traditional septoturbinoplasty the surgical procedure was performed without the use of endoscopy during surgery; endoscopic valuation was however performed in operation room before surgery and in the end of surgical procedure to estimate both preoperative situation and postoperative result and the absence of bleeding.

In endoscopic septoturbinoplasty and in septoplasty combined with FESS the entire procedure was performed under endoscopic control.

The phases of the two types of septoturbinoplasty are different and we will describe differently the two procedures.

In both cases we used diode LASER both in septal and turbinal surgery.

The phases of traditional diode LASER assisted septoturbinoplasty (L.A.S.T.) are the following:

- Packing of nasal cavities with cotton soaked with a mixture of xilocaine 10 and epinephrine for two minutes
- Hemitransfixed columellar incision, generally in the right side, performed with diode LASER using "6" intensity. LASER incision is simple, rapid and no bleeding and allow to arrive simply to a subpericondral plane exposing the inferior edge of quadrangular cartilage
- Subpericondral dissection from initial incision until the entire nasal septum is dissected from mucopericondrium and mucoperiosteum both in the right side and in the left side; in this phase, normally performed with a suction dissector type Macca, the use of diode LASER allows to dissect without difficulty some zones of sticking and scar especially in post-traumatic septal deformities
- Inferior condrotomy, usually performed using Fomon scissors, is easily accomplished with diode LASER incision; sometimes we realize multiple LASER incisions in the quadrangular cartilage to Break-out power-lines in the septal cartilage, according with Goldman. We called this surgical phase "Carfi's manoeuvre"
- Removal of bone spur and cartilaginous deformities using chisels and Jansen-Middleton rongeur
- Reposition of remoulded septal fragments and mucopericondral flaps
- Suture of the two edges of columellar incision with reabsorbable material
- Diode LASER turbinoplasty, performed inserting LASER fiber into the cavernosa tissue of inferior turbinate and photocoagulating the cavernosa tissue generally for 1 minute for a side or until turbinal mucosa turns white
- Endoscopic inspection of nasal cavities to control the good functional result and the absence of bleeding; a rapid movement of a Frazier suction tube n.3 in both nasal cavities until nasopharynx allows to clean the nasal cavities from residual blood and to control their perviousness; this phase is playfully called "Asprea's manoeuvre" by our operating room nurses
- Nasal packing with Songostan reabsorbable tampons

The phases of endoscopic LASER assisted septoturbinoplasty (E.L.A.S.T.) are the following:

- Packing of nasal cavities with cotton soaked with a mixture of xilocaine 10 and epinephrine for two minutes
- Endoscopic evaluation of nasal cavities to value septal deformities, bone spur and zones of major turbinate hypertrophy
- Using diode LASER, we do a small vertical incision located at the front of septal spur, until osteocartilaginous surface point out
- Subperiosteal dissection of bone spur with a suction dissector type Macca and with diode LASER fiber until a subperiosteal flap is created online in the side of spur
- Removal of bone spur using a small chisel or Citelli nasal forceps

- Reposition of mucoperiosteal flap
- Endoscopic diode LASER turbinoplasty similarly to non endoscopic technique
- Normally nasal packing is unnecessary

In case of endoscopic or non endoscopic septoturbinoplasty performed simultaneously to FESS, the same surgical phases were performed before or after sinus surgery.

### 3. RESULTS

The septoplasty surgeries performed in the last 5 years were all preceded by a CT scan of the facial massif.

The preoperative CT study allowed a better anatomical evaluation of the nasosinusal area.

A first effect was a percentage increase in endoscopic septoplasty compared to traditional ones since the tomographic investigation has allowed in some cases to highlight that there was only a bone spur in the center of the nasal septum for which traditional septoplasty with . hemitransfix incision was not necessary.

The number of endoscopic septoplasty performed in the last 5 years is equal to 128, (64.64% of the total number of septoplasties performed in the last 20 years).

An increase in septoplasty associated with FESS was also noted, since the CT survey allowed to highlight sinus pathologies associated with septal deviation that otherwise would have remained unrecognized.

The septoplasty associated with FESS performed in the last 5 years were 222 equal to 43.35% of the total ones in the last 20 years.

In the last 5 years, the number of postoperative septal perforations has been 0 and so has that of postoperative septal turbino-synechiae. This result is certainly due to the refinement of the surgical technique thanks also to the use of diode LASER and resorbable tampons, but there is no doubt that an accurate preoperative CT study allows for better surgical planning

### 4. DISCUSSION

The preoperative CT allows an anatomoradiological study of the nasal septum and its relationship with the neighboring structures in order to improve surgical planning

- Preoperative knowledge of any associated sinus pathologies is very important, which allows the assessment of the need to associate other surgical procedures such as FESS

- The preoperative CT allows an accurate anatomical study of the lower turbinates and especially of the middle ones in search of anatomical anomalies such as the concha bullosa or the paradoxical curvatures of the middle turbinate which are often corrected during the same surgical procedure thus performing a septoturbinoplasty

Allows you to correctly evaluate the possibility of performing an endoscopic septoplasty

- Allows for an adequate classification of the types of septal deviation

- Studying the relationship between the perpendicular lamina of the ethmoid and the skull base allows an adequate preoperative assessment of the risk of rhinoliqoral fistula, a rare but not impossible complication of nasal septal surgery

- In case of reoperations on the nasal septum, the preoperative CT allows you to know in advance the amount of cartilage and bone that was removed during the previous surgical procedure in order to correctly plan the revision septoplasty avoiding complications such as septal perforation as much as possible Allows in some cases a study of the posterior part of the nasal cavity if completely obstructed by the deviation and not accessible endoscopically

- It is very useful for planning septoplasty in case of post traumatic septal deformations to better study the fracture gap and any associated fractures

- It is essential to evaluate the septal deviation in case of complex malformative pathologies

- Provides reliable and irrefutable preoperative images that can be very useful from a medico-legal point of view

- It can be very useful at the didactic level to discuss the case preoperatively with trainees or young surgeons in the light of radiological images
- The level of radiation to which the patient is exposed with the use of modern computed tomography equipment is very low

## 5. CONCLUSIONS

For over five years we have not performed septoplasty operations without having previously requested a CT scan of the nose and paranasal sinuses. In this way the preoperative planning has been greatly improved, the number of endoscopic procedures has increased with the advantage for the patient in terms of faster healing and fewer complications and the suitable endoscopic procedures that the CT images suggested case by case have been associated with septoplasty. We therefore believe that CT should be included as a routine preoperative examination in the case of septoplasty interventions.

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