

Septal-turbinate-suture in endonasal sinus surgery*

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SUMMARY

The middle turbinate (MT) is an important landmark in sinus surgery with specific functions in the nasal physiology. Because of postoperative instability and corresponding mucosal defects in the middle nasal meatus scar formations between the MT and the lateral nasal wall are frequent. Lateralization and scarring to the lateral nasal wall can be avoided by means of a resorbable mattress suture (septal-turbinate-suture (STS)) through the head of the MT and the septum.

Key words: middle turbinate, sinus surgery, suture technique, turbinate surgery

INTRODUCTION

The middle turbinate (MT) represents an essential surgical landmark in endonasal sinus surgery, especially in revisions. Surgical preparation should be limited lateral to the insertion of the MT in order to avoid injury of the olfactory epithelium and the olfactory groove.

Displacements and adhesions of the MT are well-known problems in postoperative care succeeding endonasal sinus surgery. It is caused by instability of the turbinates due to resection of the basal lamella and fracture of the turbinate. Raw surfaces after resection of the uncinate process and manipulations of the lateral part of the MT can result in fibrinous adhesions and finally end in scar formation. Both factors, instability and raw surfaces, can hardly be avoided during surgery.

The postoperative obstruction of the middle meatus by the lateralization of the MT and a fibrous connection between the head of the MT and the lateral nasal wall on the other hand is an important factor for recurrent sinus infections or relapsing polyposis. The access to the middle meatus, however, must be wide open for postoperative treatment as a prerequisite for a good, final result in endonasal sinus surgery.

Problems with the MT in the postoperative period can be avoided by total or subtotal resection (Kennedy, 1998). However, this fact interferes with the physiology of the nasal cavity and sacrifices an important landmark in case of revision-surgery. Any procedure that keeps the head of the MT to the midline until the healing process of the lateral nasal wall and the lateral aspect of the MT are completed can be helpful.

This can be accomplished by fixing the heads of the MT to the septum by means of a trans-septal, trans-turbinate resorbable mattress suture (STS = septal-turbinate-suture).

SURGICAL PROCEDURE

The procedure varies, depending whether a septoplasty with resection of the perpendicular plate was done or not. Independent of this, the goal is a medial fixation of the MT until healing of lateral mucosal defects is completed. In case of resection of the perpendicular plate, the suture (Vicryl 3/0; FS2 needle) penetrates the thin bone of the MT from the right middle meatus and the septal mucosa in a single movement to avoid caudal dislocation and disruption of the turbinate from its insertion (Figure 1, ②). The left MT is stabilized with the branch of a nasal speculum before the needle passes from the septum to the lateral aspect of the left MT. The back-stitch is only through the septum, anterior to the heads of the turbinates. To avoid adhesions between the caudal end of the MT in the middle and posterior part to the area of the middle meatus antrostomy, an additional suture through the MT and septum is applied at that level, if necessary. Without removal of the perpendicular plate, a thick bone that normally cannot be penetrated by a needle. In addition, the sharp needle will be dull and cannot be used to fix the left MT. In this case (Figure 1, ①), the suture runs obliquely anterior to the junction of septal cartilage and perpendicular plate, where the cartilage can easily be passed by the needle. After placing the knot on the right side, the thread is cut close to the knot in order to avoid crusting. The resorbable suture must not be removed (Figure 2).

In a follow up of our patients, the MT was found in medial position (Figure 3) without contact to the lateral nasal wall and the septum in 85% of the patients. In about 15%, medial or lateral adhesions (Figure 4) must be expected without negative consequences for respiration or olfaction.

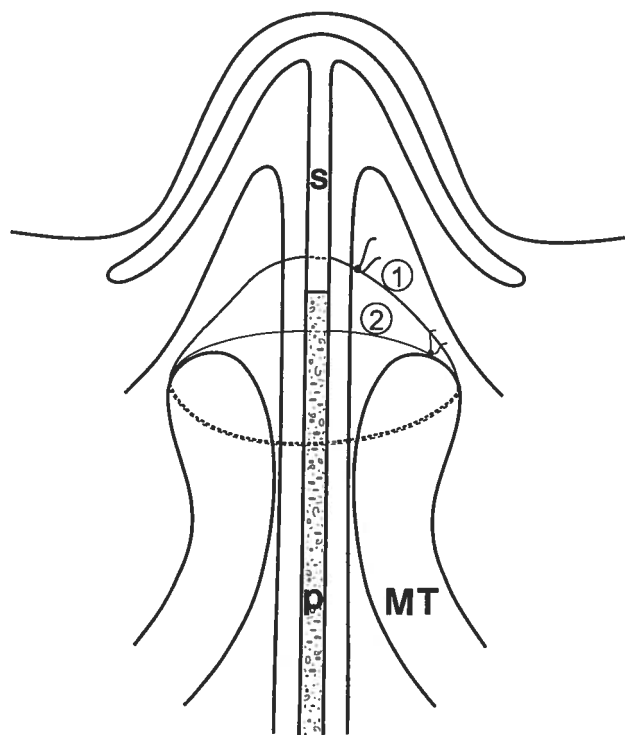


Figure 1. Septal- Turbinate- Suture without ① and with ② septoplasty (horizontal section). Septal cartilage (S), perpendicular plate (P), middle turbinate (MT).

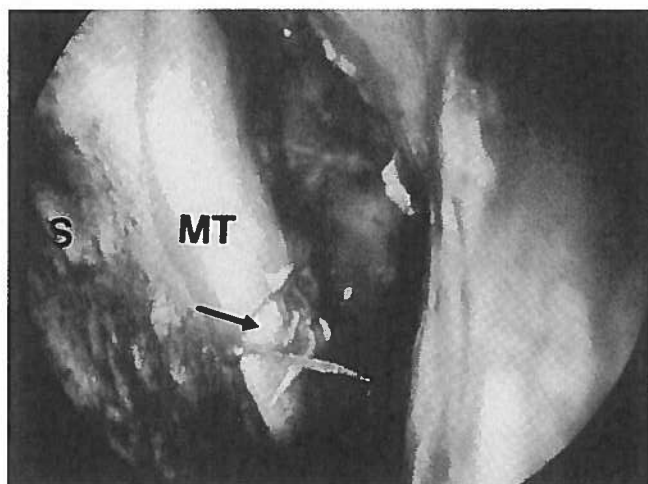


Figure 2. Intraoperative endoscopic photo of the STS (→). Septum (S), middle turbinate (MT).

COMMENTS

In endonasal sinus surgery the MT is treated in many different ways. Bilateral cautery, cryo- surgery and application of lasers as well as partial resection (Biedlingmaier and Whelan, 1996; Cook and Begegri, 1995; Fortune and Duncavage, 1998; Friedman and Caldarelli, 1996; Lamear and Davis, 1992; Toffel and Aroesty, 1989; Wigand and Steiner, 1978) or even total resections (Morgenstern and Krieger, 1980) have been reported. Partial turbinectomy can be an integral part of ethmoidectomy (Cook and Begegri, 1995; Toffel and Aroesty, 1989; Wigand and Steiner, 1978). The importance of the MT for

nasal physiology is controversially discussed (Kennedy, 1998). It takes part in the humidification and the heating of the inspired air and directs the airstream to the olfactory area. It protects the middle meatus from a turbulent airflow and supports mucociliary clearance. The MT plays a minor role for nasal resistance what is more attributed to the nasal valve area and the inferior turbinate (Courtiss and Goldwyn, 1983; Haight and Cole, 1983; Principato, 1979).

A routine resection of the middle turbinate must be rejected because of the risk of anosmia, crusting, atrophy of the mucosa and bleeding (Kennedy, 1985; Stammberger, 1991; Thornton, 1996). Nevertheless, some reports recommend the resection of the MT without fear of any disadvantages (Biedlingmaier, 1993; Biedlingmaier and Whelan, 1996; Cook and Begegri, 1995; Davis et al., 1991; Friedman and Caldarelli, 1996; Lamear and Davis, 1992).

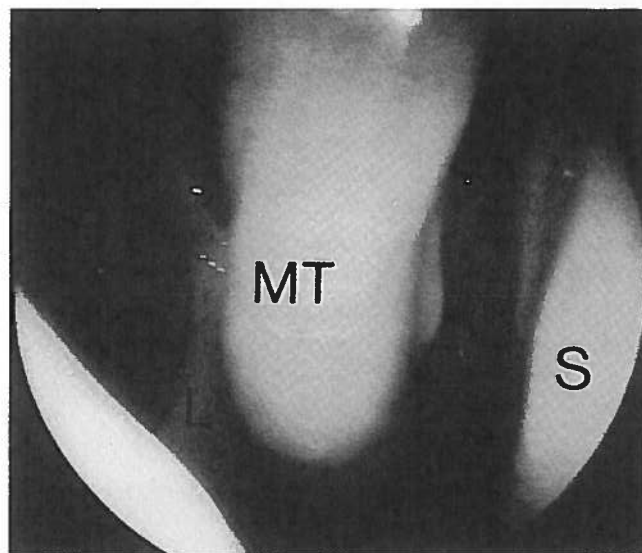


Figure 3. Median position of the MT without contact to the lateral nasal wall (L) and the septum (S) after STS.

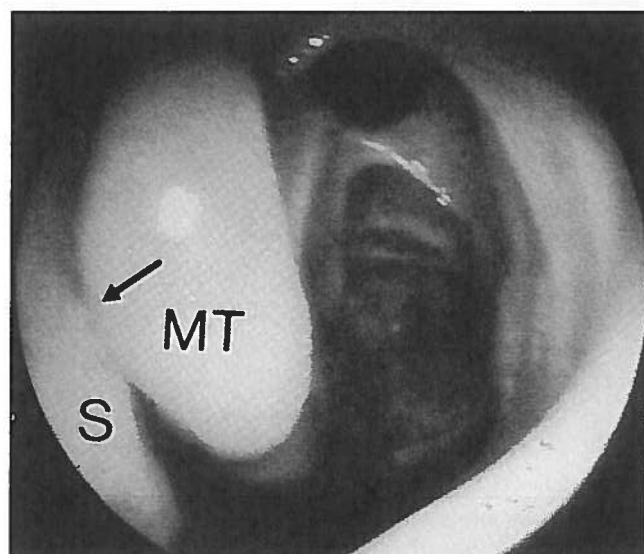


Figure 4. Pin-point contact (→) between the MT and the septum (S) after STS.

We believe that the MT was developed by nature to carry out certain functions in nasal physiology. It should be preserved during endonasal sinus surgery for protection of the olfactory epithelium and the olfactory groove. It is an important landmark in case of revision surgery. The risk of lateral adhesion of the MT does not justify its total or subtotal resection as there are measures to allow a midline position and to avoid adherence.

A resorbable mattress suture through the heads of both middle turbinates (STS) and the septum is used by the senior authors (G. R.) as a routine procedure in all endonasal sinus interventions since 1989. Other authors have also reported about similar middle turbinate stabilization techniques in endoscopic sinus surgery (Bolger et al., 1999; Thornton, 1996).

In contrast to a "controlled synechia technique" (Bolger et al., 1999) by means of incisions in the septal and turbinate mucosa and packing in the middle meatus, the suture fixation is based on a different philosophy. A suture is a really "controlled procedure" and does not rely on a sufficient medial position of the turbinate by means of packings. The goal is not a permanent synechia, although this is not of clinical importance. The resorbable suture is only needed until the mucosa of the middle meatus has healed and adhesions can no longer occur.

Septoplasty is not an obligatory prerequisite for the STS, although it was done in nearly all cases operated by the senior author. The septal part of the suture can also be placed caudal to the perpendicular plate.

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