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Respiratory tubes with nasal packings fallowing septorhinoplasty

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SUMMARY

The use of packings following septorhinoplasty is a matter of controversy. The recommendations go f'om glueing with fibrin glue only, if anything at all, over quilting stiches, perhaps in combination with silastic or teflon sheats or plates or these sheats alone, to the employment of various more substantial materials and in from 1 to even 14 days postoperatively.

If long-term nasal packing is chosen following consideration of prima,y healing, patients will experience discomfort of mouth-breathing, but pressure in the ears, too. Therefore, our department has used respiratory tubes simultaneously with packings since 1971. In this study, 47patients who underwent septa- and/or rhinoplasty were treated by nasal packings 6 days postoperatively. All patients were treated by silicone respirato,y tubes, one group in all 6days, one in 4 days only. Selj assessment as far as some typical complaints is concerned was carried out as well as tympanometry. There were statistically significant less complaints of pressure in the ears when tubes were used, and the period with tubes was significantly preferred to the period without. A low pressure in the middle ears was seen in many patients. The normalization was occurring significantly sooner with tubes. At the same time they seem to secure that the normalization will take place as fast as it has been demonstrated in an earlier study employing only 3 days of nasal packing. No synechias orpe,jorations were seen at an early follow-up, 1-3 months postoperatively. When long-term packing is preferred, respirat01y tubes then can be recommended as effective.

INTRODUCTION

The question of postoperative packing after septorhinoplasty is a mal:ter of discussion. The optimum duration if packing is chosen has not been studied. It seems therefore reasonable to evaluate the pros and the cons before arriving at

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the real topic of the present study: The treatment of the major inconvenience of nasal packings, continued for 6 days postoperatively, by respiratory tubes.

No packing

Fatal aspiration of the packing (Spillmann, 1962), late restoration of mucociliary clearance and drainage of the sinuses (Mann, 1979; Wullstein, 1979) and, through that, fear for infection or even toxic shock syndrome during use of absorbing packing (Thomas et al., 1982) or plastic splints (Wagner and Toback, 1986), damage to the mucosal surfaces contributing to adhesions postoperatively suspected by Shone and Clegg (1987) and demonstrated by Watson et al. (1989), and hypoxaemia (Fairbanks, 1986) are all possibly serious risks. The mere discomfort of mouth-breathing and Eustachian tube dysfunction (Koch et al., 1977; Laszig, 1985) supplements the reasons to avoid nasal packings. So, Wullstein (1979) glues the tissue with fibrin glue, whereas Mann (1979) prefers to use a spray containing an effective decongestant and an antibiotic, intensely the first days and continued for 6 days. Reiter et al. (1989) advocates in most cases meticulous suturing of the wounds and absorbable through-and-through suture in the septum instead.

Nasal packings

The main advantages of packings are claimed to be:

(1) They act like a haemostat by compressing wound edges, mucosa! damages and tissue slits: The primary haemorrhage usually takes place within the first postoperative day. Reiter et al. (1989) used only quilting stiches and observed 2 cases out of 75 patients (2.7%) who needed haemostatic packings within a few hours postoperatively due to haemorrhage. Immediately following surgery a clot is formed between the surfaces of the mobilized tissue, the fibrin acting like glue. This clot is replaced gradually by primary connective tissue during the 4th to 14th day (Hinderer, 1971), subsequently being transformed to scar tissue. Scar tissue contracts, however, and if the layer is too thick due to insufficient compression of tissue slits severe distortion can take place during this process, which can go on for months or even a year. Quilting stiches are considered effective, but more common is the recommendation of 1-2 days of packing which is preferred by Johnson (1986), Shone and Clegg (1987), and Watson et al. (1989), the latter investigating the results following three different types of packing. The frequency of adhesions was significantly higher following the use of pneumatic balloons (32%) than after Jelonet® (14%) and glove fingers filled with gauze (7%). In a randomized study of 50 patients who underwent septorhinoplasty, the septal part being a submucous resection, Guyuron (1989) compares 1-2 days of packing by Adaptic® with suture by quilting stiches alone. He concludes that breathing was improved, airflow was better as revealed by rhinomanometry, and

residual deviation less common if packing was used. The frequency of adhesions was lower, too, but not significantly.

(2) They prevent adhesions: Immediately following surgery a vasodilatation takes place and an oedema develops. This can easily lead to mucosal contact and in case of mucosa! damages this can be followed by formation of adhesions. This has been demonstrated by Shone and Clegg (1987) in a prospective study of 60 patients, subjected to different types of endonasal surgery. A frequency of adhesions of 25% was found if more than one procedure was carried out at the same time, one of these being a trimming of the inferior turbinate. The frequency was 3% following a single procedure. All were treated 1 to 2 days postoperatively with either bismuth iodoform and paraffin paste on ribbon gauze or Xeroform® at random. The exact duration of the postoperative oedema is not known. In one study, Koch et al. (1977) used packings for 3 days, and all 94 patients were subjected to daily tympanometry. Two-thirds of the ears developed negative pressure. The frequency of normal tympanogrammes seen preoperatively was reached again 6 days postoperatively. Postsurgical oedema is considered the most important factor, mechanical effect of the packing reaching the Eustachian tube orifice being number two. In a similar study, Laszig (1985) also uses packings for 3 days. He demonstrates that the preoperative mean pressure is reached only 6 hours after withdrawal of the packings and claims that the packings are responsible for the negative pressure at that time. However, Nafazoline treatment is instituted immediately after removal and, hence, the course is not spontaneous. It seems therefore reasonable when Farina et al. (1983) recommends packings for 5 days. The separation of the mucosal surfaces can also be secured by teflon sheats sutured to the septum (Lore, 1973). Silastic can also be used combined with iodoform gauze for 1 day (Brain, 1979) or 2 days (Donald, 1975). Oneal (1989) combines silastic with quilting stiches.

(3) They maintain stability: Extensive mobilization of the structures can cause instability and oedema can displace the structures. Even the normal breakdown of the clot, which starts within the first days postoperatively and before a stabilizing primary connective tissue is formed, can diminish the stability. Therefore, Masing (1971) recommends packings for 4 days routinely, but for 8 days in cases of extensive mobilization and when instability is suspected. Hinderer (1971) normally applies packings 7 days but even for 14 days in cases of low stability.

Six days of packing and respirato,y tubes

In order to combine the haemostatic effect, the ability to separate the mucosal surfaces during the period of postoperative oedema, and the supporting ability until primary healing has taken place, in our department nasal packings have been routinely used for 6 days postoperatively following septorhinoplasty, since

1971. Complaints from the patients suffering from mouth-breathing in such a long period and feeling of pressure in the ears, especially during swallowing, soon led to the use of silicone tubes placed below the packings. The use of tubes was advocated by Donald (1975), too, and was presented recently in a foam packing for nasal haemostasis, Merocel®. Proper functioning requires repeated instillation of a physiological saline solution followed by suction and demands therefore some nursing time. It seemed therefore reasonable to investigate the efficiency before continuation of the treatment.

MATERIAL AND METHODS

After surgery, nasal packings of 6-7 layers of 2-cm-wide iodoform gauze wrapped in Adaptic® were inserted in both cavities. At the same time, two silastic tubes - a little longer than the packings and with an inner diameter of 4 mm - were placed below the packings along the floor of the nose. Packings and tubes were securely fixed to each other in front of the columella (Figure 1). The tubes were removed 4 days postoperatively, the packings after 6 days.

From the third postoperative day, the patients filled out a questionnaire concerning complaints of headache, pain in the nose and a sensation of pressure in the ears, or difficulty of hearing, on a scale from O(= none) to 3 (= severe). Finally, the patients were asked to estimate how long the tubes in average stayed open following cleaning and to state which period they preferred, the one with or the one without tubes.

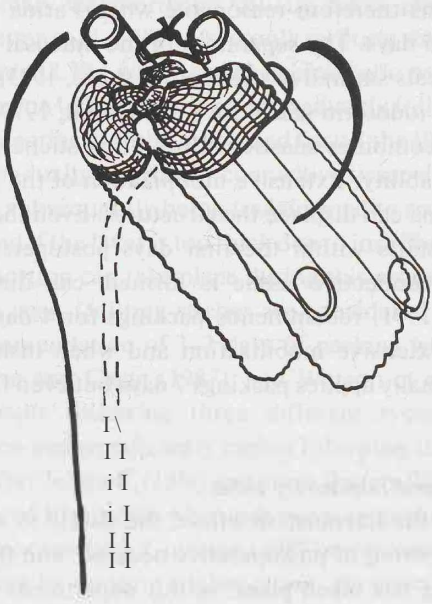

Figure 1. Nasal packings and respiratory tubes.

Tympanometry was carried out pre-operatively and 4 and 6 days postoperatively using a Interacoustics Tympanograph AT2. As a blind cross-over design was impossible for obvious reasons the original plan, accepted by the statistician, was to compare the three measurements of the middle ear pressure, and the severity of the complaints on days 3 and 4 to those on days 5 and 6. Twenty-five consecutive patients who underwent septo- and/or rhinoplasty from February 1987 entered the study. However, it soon became apparent that these figures would be too difficult to analyze statistically. A control group was therefore incorporated, involving 22 consecutively operated patients. These were treated with tubes all of the 6 days of packing in comparison; the study design is presented in Figure 2, the age- and sex distribution of the patients is summarized in Table 1. The septoplasties were carried out by a modified Cottle technique using two anterior tunnels (Jeppesen, 1986). The rhinoplasties were dominated by wedge excisions for osseous deflection (Jeppesen, 1991) and hump removals according to the method of Joseph (1931).

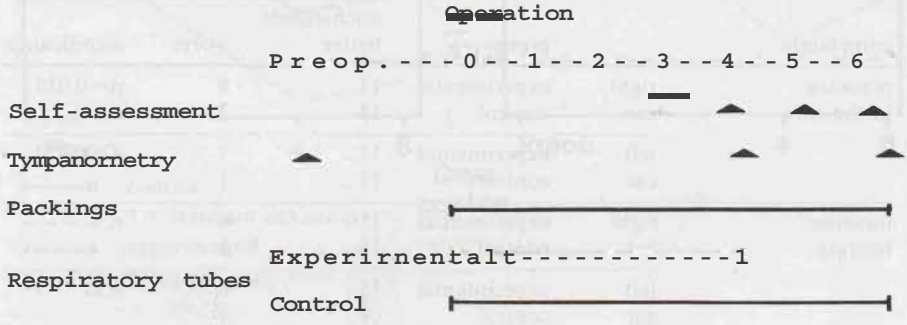

Figure 2. Study design.

Table 1. Age- and sex distribution.

	experimental		control	
age years	female	male	female	male
< 2.0		1		3
20-50	5	18	3	16
2".50		1		
	5	20	3	19
	25		22	

Follow-up

All patients were offered a follow-up, 1-3 months after septoplasties, 1 and 9 months after rhinoplasties but only the early result is considered in this study. Satisfaction of ability to nasal breathing was recorded and a careful examination of the nasal cavities carried out.

RESULTS

The scores of complaints were analyzed by a likelihood ratio-test for independence of aggravation the last two days without tubes compared to the control group. Complaints of pressure in the ears were significantly fewer in the control group wearing tubes, but all other complaints were equally distributed (Table 2). The patients in the experimental group showed statistically significant preference for treatment with tubes during 3-4 days (Table 3).

Table 2. Symptoms of discomfort during nasal packing. Patients who have not answered all 4 days are excluded.

			no. of patients		
complaints		group	unchanged/ better	worse	significance
pressure in the ears	right ear	experimental	12	8	p=0.028
		control	18	2	
	left ear	experimental	12	7	p= 0.029
		control	18	1	
impaired hearing	right ear	experimental	15	6	n.s.
		control	16	3	
	left ear	experimental	15	6	n.s.
		control	17	3	
pains in the nose		experimental	24	1	n.s.
		control	20	1	
headache		experimental	23	2	n.s.
		control	18	2	

Table 3. Preference of period with or without tubes.

period preferred	number of patients	confidence limits (95%)
with tubes	20	59-93%
without tubes	5	7-41%
	25	

Tympanomet,y

The mean middle-ear pressure on the three different days is demonstrated in Figure 3. The preoperative value was normal in both groups. Four days postoperatively a negative pressure was seen which was lowest, although not statistically significant, for the experimental group. Recovery to normal pressure was seen during the following 2 days, except for the right ear, in the experimental group. The difference seen 6 days postoperatively is statistically significant in the right but not in the left ear.

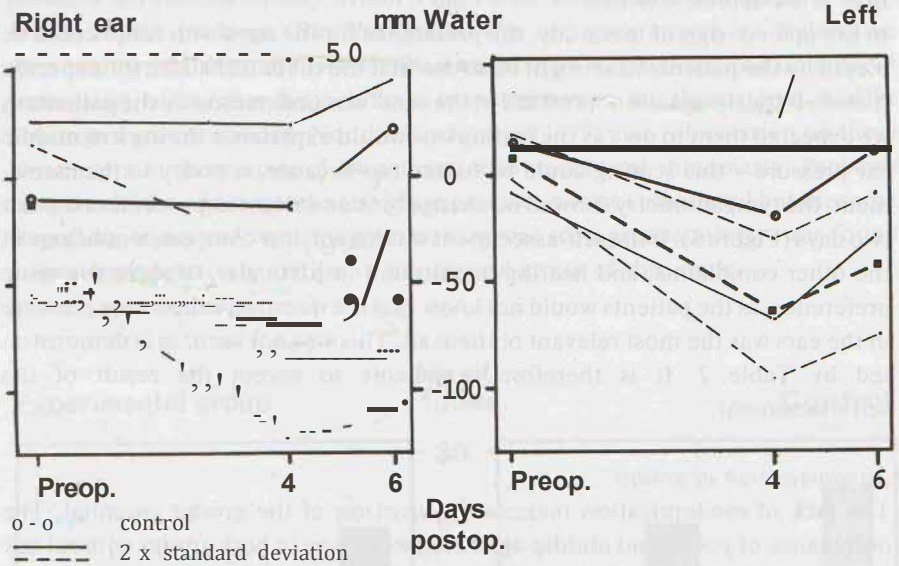

Figure 3. Tympanometry.

Follow-up

The follow-up rate was 88% for the experimental group and 77% for the control group. Satisfaction with nasal breathing was obtained in 18 and 14 patients, respectively. This corresponds to 82% in both groups. However, in 1 patient in

Table 4. Sequels to mucosa] damage at early follow-up.

	early follow-up		adhesions	perforations
	number of patients (%)	months postop. mean (range)	number % (confidence limits 95%)	number % (confidence limits 95%)
experi-mental n=25	22 (88)	1.7 (1-3)	0 0%	0 (0-9%)
control n=22	17 (77)	2 (1-3)		

either group an alar-insufficiencJ: was diagnosed at the follow-up examination, impossible to detect preoperatively due to marked anterior septa! deviation. Relief from nasal stenosis was obtained following supplementary alar-plasty in both patients. If this is taken into consideration the reasonable frequency of satisfied patients is 86% and 88%, respectively. No adhesions or perforations were seen (Table 4).

DISCUSSION

Bias in the self-assessment

In the open design of this study, the preference for the days with tubes could be biased by the patients who might be aware that the tubes were used for a specific reason. If the designation "pressure in the ears" was understood by the patients as we expected them to do - as the feeling one would experience during low middle ear pressure - this scoring could be biased too because, contrary to the assessment, the tympanometry showed no change or even a slight improvement the last two days (Figure 3). If the self-assessment was biased, however, one would expect the other complaints, and hearing impairment in particular, to show the same preference, as the patients would not know that the question concerning pressure in the ears was the most relevant of them all. This was not seen, as is demonstrated by Table 2. It is therefore reasonable to accept the result of the self-assessment.

Randomization of groups

The lack of randomization makes a comparison of the groups essential. The dominance of young and middle-aged men were seen in both groups without any significant difference (Table 1). The majority of the septorhinoplasties in the experimental group, and all in the control group, were performed by one of us (F.J.). The septoplasties were shared with a senior registrar who in the experimental group was highly experienced too (E.E.), in the control group less. Neither the frequency of septorhinoplasties nor the senior-registrar's share of the sample showed any significant difference between groups. Therefore, a difference in the severity of postoperative oedema should not be expected (Table 5).

Table 5. Comparison of groups. Numbers in brackets denote confidence limits (95%).

parameter	experimental (%)	control (%)	significance
frequency of rhinoplasties	52 (31-72)	52 (30-74)	n.s.
senior registrar's share	52 (31-72)	33 (15-57)	n.s.

Finally, the efficiency of the tubes expressed by the time they stayed open following cleaning was analyzed. No difference between groups was seen here either (Figure 4). So the slight, although not significant, difference between groups and between left and right in the development of low pressure could either be fortuitous or the result of too small a sample rather than caused by an incorrect selection. In this study, tympanometry was not performed during the first 3 postoperation days in which the lowest pressure has been found to occur as reported by Koch et al. (1977) and Laszig (1985). The latter author reports that the pressure normalizes already within 3 days after surgery and 6 hours after withdrawal of the packings. But the course was not spontaneous as Nafazoline treatment was instituted. The sample consisted of 42 patients who underwent septoplasty, but neither the technique, extent of surgery nor the material used for packings were mentioned. Nor did Koch et al. (1977) give information on these parameters in their study of 94 patients who underwent rhinoplasty. Packings were used 3 days postoperatively. Mean pressure was not calculated but the same frequency of normal tympanogrammes, as was seen preoperatively, was found 6 days postoperatively similar to the control group of this study.

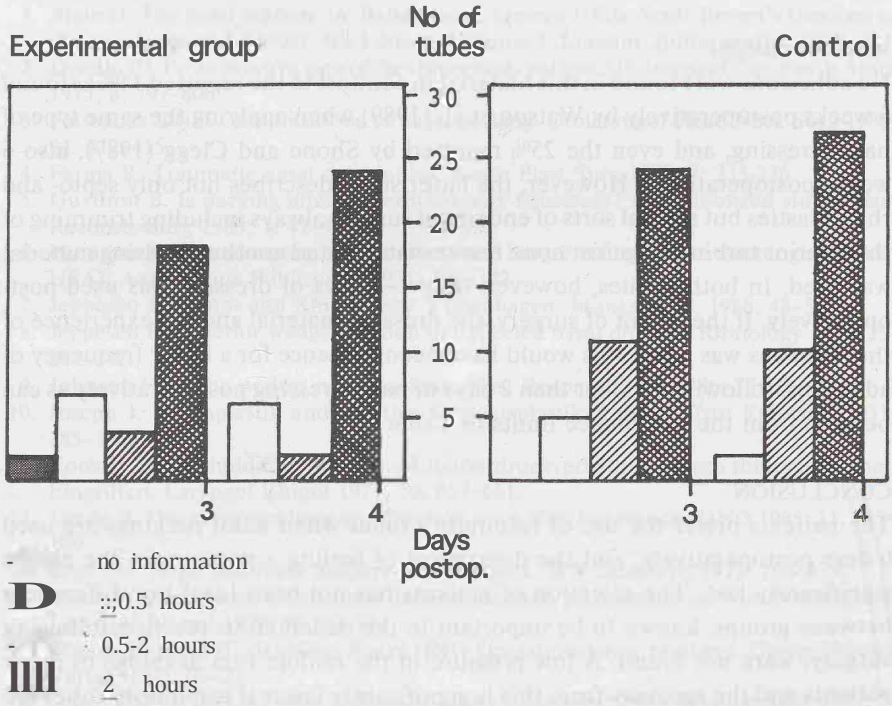

Figure 4. Duration of optn tubes following cleaning.

If the rate of pressure normalization is not dependent on the magnitude of low pressure, the faster normalization from 4 days to 6 days postoperatively seen in the control group (Figure 3), could be caused by the only known difference between the groups, that is the employment of respiratory tubes. If our material can be considered similar to that of Koch et al. (1977), then the normalization of pressure 6 days postoperatively, as demonstrated in the control group of this study, leads to the conclusion that the outcome as far as low pressure in the middle ears concerns, is identical following 3 or 6 days of nasal packing, provided respiratory tubes are used.

It follows that supplementary to the postoperative oedema, packings have an effect on the pressure of the middle ears, but this is not necessarily a mere effect of the packings directly on the surroundings of the orifice of the Eustachian tube as stated earlier (Koch et al., 1977; Laszig, 1985). The repeated low pressure in the epipharynx during swallowing could be responsible as well and is prevented by the tubes. This is supported by our experience that the patients treated with packings but without tubes, are complaining of sensations in the ears, especially during swallowing. It could be this sensation during swallowing which the patients interpret as "pressure in the ears", and this can explain the result of the self-assessment mentioned earlier.

Mucosa/ damage

No adhesions were found in this material in contrast to the reported 14% as found 6 weeks postoperatively by Watson et al. (1989) when applying the same type of nasal dressing, and even the 25% reported by Shone and Clegg (1987), also 6 weeks postoperatively. However, the latter study describes not only septa- and rhinoplasties but several sorts of endonasal surgery always including trimming of the inferior turbinate against none in our material and another dressing material was used. In both studies, however, only 1-2 days of dressing was used post-operatively. If the extent of surgery, the dressing material and the experience of the surgeons was equal this would have been evidence for a lower frequency of adhesions following 6 rather than 2 days of nasal dressing postoperatively as can be seen from the confidence limits in Table 4.

CONCLUSION

The patients prefer the use of respiratory tubes when nasal packings are used 6 days postoperatively, and the discomfort of feeling a pressure in the ears is significantly less. The selection of patients has not been ideal but differences between groups, known to be important to the oedematous reaction following surgery, were not found. A low pressure in the middle ears develops in many patients and the recovery from this is significantly faster if respiratory tubes are used. At the same time the tubes seem to ensure as quick a normalization of the

pressure after 6 days of packing as has been demonstrated earlier in the literature after only 3 days of packing. The low pressure in the middle ears as well as the complaints of pressure in the ears may be considered to be caused by the oedematous reaction following surgery, an effect by the packings directly on the surroundings of the Eustachian tube orifice, and the repeated negative pressure during swallowing. If long-term nasal packing is chosen following consideration of primary healing, the use of respiratory tubes can therefore be recommended. No adhesions or perforations were seen at the follow-up. But a study of the influence of the duration of packing on the long-term functional results is essential and has been started at the department.

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REFERENCES

1. Brain D. The nasal septum. In: Ballantyne J, Groves J, Eds. Scott-Brown's Diseases of the Ear, Nose and Throat, 4th Edition, Volume 3. London: Butterworths, 1979; 102.
2. Donald PJ. Postoperative care of the rhinoplasty patient. Otolaryngol Clin North Amer 1975; 8: 797-806.
3. Fairbanks DNF. Complications of nasal packing. Otolaryngol Head Neck Surg 1986; 94: 412-415.
4. Farina R. Traumatic nasal deformities. Aesth Plast Surg 1983; 7: 233-236.
5. Guyuron B. Is packing after septorhinoplasty necessary? A randomized study. Plast Reconstr Surg 1989; 7: 41-44.
6. Hinderer KH. Fundamentals of Anatomy and Surgery of the Nose. Birmingham (Ala, USA): Aesculapius Publishing, 1971; 136-142.
7. Jeppesen F. Septo- and Rhinoplasty. Copenhagen: Munksgaard, 1986; 48-52.
8. Jeppesen F. Anterior wedge excision in deflected nasal dorsum. Rhinology 1991; 29: 201-212.
9. Johnson HA. The perfect nasal packing. Plast Reconstr Surg 1986; 77: 337-338.
10. Joseph J. Nasenplastik und sonstige Gesichtsplastik. Leipzig: Curt Kabitsch, 1931; 185-196.
11. Koch U, Herberhold C, Opitz H-J. Mittelohrdruckverhaltnisse nach rhinoplastischen Eingriffen. Laryngol Rhino! 1977; 56: 657-661.
12. Laszig R. Druckentwicklung im Mittelohr nacb Nasenoperation. HNO 1985; 33: 187-189.
13. Lore JM. Head and Neck Surgery. Philadelphia: WB Saunders, 1973; 166-175.
14. Mann W. Eine neues Moglichkeit der endonasalen, postoperativen Wundversorgung. Laryngol Rbinol 1979; 58: 50-53.
15. Masing H. Eingriffe der Nase. Kurze HNO-Operationslehre. Stuttgart: Georg-Tbieme Verla& 1971; 20-21.
16. Oneal RM. Is packing after septorbinoplasty necessary? Plast Reconst Surg 1989; 7: 45-46.

17. Reiter D, Alford E, Jabourian Z. Alternatives to packing in rhinoplasty. Arch Otolaryngol Head Neck Surg 1989; 115: 1203-1205.
18. Shone GR, Clegg RT. Nasal adhesions. J Laryngol Oto! 1987; 101: 555-557.
19. Spillmann D. Aspiration von Nasentamponaden mit Todesfolge. Laryngol Rhino! 1981; 60: 56.
20. Thomas S, Baird I, Frazier R. Toxic shock syndrome following submucous resection and rhinoplasty. JAMA 1982; 247: 2402.
21. Wagner R, Toback JM. Toxic shock syndrome following septoplasty using plastic septa! splints. Laryngoscope 1986; 96: 609-610.
22. Watson MG, Campbell JB, Shenoi PM. Nasal surgery: Does the type of nasal pack influence the results? Rhinology 1989; 27: 105-111.
23. Wullstein SR. Die Septumplastik bzw. submukose Septumresektion ohne post-operative Nasentamponade. HNO 1979; 27: 322-324.

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