

Impaired sense of smell in patients with nasal surgery

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The aim of the study was to determine the incidence of olfactory disorders before and following nasal and paranasal sinus surgery. It was a prospective observational study. Over a 6-month period, all patients who had been listed for nasal and paranasal sinus surgery underwent preoperative and postoperative evaluation of their sense of smell. A questionnaire and the 'Smell Diskettes Test' were used to assess olfaction. One hundred and eighty-four patients were studied. Preoperatively, 19 patients (10.3%) had an impaired sense of smell (8.1% before septoplasty, 6.1% before rhinoplasty and 17.1% before endoscopic sinus surgery). Only 16 (84%) of these patients were aware of their impaired sense of smell. Following surgery, four patients (2.5%) who were normal preoperatively developed impaired olfaction on questioning, and this was supported by testing it. In the subgroup that had a septoplasty, no patient developed hyposmia compared to one patient (2.6%) after rhinoplasty and one patient (3%) after endoscopic sinus surgery. No patient developed anosmia. Preoperatively, 10.3% of patients had an altered sense of smell, making it desirable that this is documented in order to avoid postoperative claims that this was caused by surgery. It also helps to audit the results of surgery.

Keywords *incidence of smell disorders hyposmia nasal surgery complications*

Smell disorders are common and are present in up to 0.9% of a normal population.¹ Rhinological disease often leads to an impaired sense of smell.^{2,3} Nasal surgery itself can lead to hyposmia or anosmia.^{4–6}

This study looks at the prevalence of smell disorders in a population of patients who had nasal surgery to help inform patients about the potential risk of surgery. Their pre- and postoperative assessments studied the effect of surgery on olfaction.

Materials and methods

Over a 6-month period (December 1999 until June 2000), all patients attending the Clinic of Otorhinolaryngology, Head

and Neck Surgery at the University of Zurich, who had been listed for nasal and paranasal sinus surgery, were evaluated.

A questionnaire was used to evaluate patients' subjective sense of smell before surgery. Six to 12 weeks after surgery, the same patients were reassessed with the same questionnaire. Additionally, patients underwent pre- and postoperative measurement of their sense of smell using the 'Smell Diskettes Test' (Novimed, Heimstrasse 46, CH-8953 Dietikon, Switzerland). As in other commonly known smell tests like the 'Smell Identification TestTM' or the 'Sniffin' Sticks[®] Test', the 'Smell Diskettes Test' is able to separate patients with hyposmia from a normosmic population.^{7,8} The 'Smell Diskettes Test' consists of eight reusable diskettes presenting odourants and is designed as triple forced multiple choice test, resulting in a score between 0 and 8.⁹ A score of 7 and 8 is regarded as normal, a score of 6 or less as hyposmia. To assess the prevalence of patients with complete anosmia, individuals with a score of 3 or less were further evaluated with an olfactometer to measure their threshold level to vanilla. If patients were not able to detect the maximal possible concentration of vanilla (15.04 ng/L), they were regarded as anosmic.

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Results

One hundred and eighty-four patients were studied; 105 men and 79 women (mean age 39 years, range 8–78 years). The operations performed could be divided into the following groups: septoplasty (62 patients, 33.7%), rhinoplasty (49 patients, 26.6%), endoscopic sinus surgery (ESS) (35 patients, 19.0%) and others (38 patients, 20.7%). In the group of 'others', the following procedures were noted: ESS and septoplasty (18 patients), inferior turbinoplasty (six patients), endonasal tumour operations (five patients), dacryocystorhinostomy and septoplasty (three patients), surgery to close a cerebrospinal fluid leak (three patients), and one case each of closure of a septal perforation, ESS combined with rhinoplasty and endonasal biopsy.

Preoperatively, 19 patients (10.3%) had an impaired sense of smell (septoplasty five patients (8.1%), rhinoplasty three patients (6.1%), ESS six patients (17.1%), and in the group of 'other operations' five patients (13.2%)). Two patients (1.1%) had complete anosmia, both had chronic rhinosinusitis (nasal polyposis), and endoscopic sinus surgery was performed, in one case combined with a septoplasty. The results of the prevalence of hyposmia and anosmia are shown in Table 1.

The preoperative subjective self-assessment of the 165 normosmic patients revealed that only 125 (76%) thought that they had a normal sense of smell, whereas 30 (18%) had a moderate, nine (5%) a severe and one (1%) a total subjective loss of smell. Among the 19 patients with an impaired sense of smell shown by objective testing (Smell Diskettes score < 7), the majority or 16 (84%) were aware that they had a subjective loss of their sense of smell. However, three patients (16%) thought that their sense of smell was normal when it was not.

The preoperative subjective self-assessment is summarized in Table 2.

Following surgery, four patients (2.5%) developed impaired olfaction on questioning, and this was supported with tests of olfaction. In the subgroup that had a septoplasty, no patient developed hyposmia and this was compared to one patient (2.6%) after rhinoplasty and one patient (3%) after ESS. Two patients developed hyposmia after endonasal tumour surgery. No patient developed anosmia. In six patients (3.4%) with preoperative hyposmia, a normal sense of smell was recorded after surgery (septoplasty two patients (3.6%), rhinoplasty one patient (2.6%), ESS two patients (6.1%), and in the group of other operations one patient (3.1%)). The changes in olfaction induced by surgery are summarized in Table 3.

Discussion

An impaired sense of olfaction is a common finding in rhinological disease. To complicate matters, patients are not always aware of their loss of sense of smell and the possibility that surgery can alter olfaction is real and may be as high as 1%.^{5,6}

The preoperative assessment of olfaction has several potential advantages for the patient and surgeon. First, by testing it, it is considered and it is then more likely that it will be given the attention it deserves. The possibility that a medical cause may be responsible for many of the patients' symptoms may be highlighted and may result in patients having a more realistic expectations about the outcome of surgery. Should there be any preoperative olfactory disorder, whether temporary or permanent, this will be documented and drawn to the patient's attention. This will avoid any potential for postoperative recrimination that the surgeon was responsible for

Table 1. Results of olfactory measurements in patients before and after nasal surgery

Patient group (<i>n</i> = preoperative; <i>n</i> = postoperative)	Preoperative assessment		Postoperative assessment	
	Hyposmia, <i>n</i> (%)	Anosmia, <i>n</i> (%)	Hyposmia, <i>n</i> (%)	Anosmia, <i>n</i> (%)
All patients (<i>n</i> = 184; <i>n</i> = 159)	19 (10.3)	2 (1.1)	13 (8.2)	2 (1.3)
Septoplasty (<i>n</i> = 62; <i>n</i> = 55)	5 (8.1)	0	3 (5.5)	0
Rhinoplasty (<i>n</i> = 49; <i>n</i> = 39)	3 (6.1)	0	2 (5.1)	0
Endoscopic sinus surgery (<i>n</i> = 35; <i>n</i> = 33)	6 (17.1)	1 (2.9)	5 (15.2)	1 (3.0)
Other operations (<i>n</i> = 38; <i>n</i> = 32)	5 (13.2)	1 (2.6)	4 (12.5)	1 (3.1)

Table 2. Preoperative subjective self-assessment of the sense of smell

	Subjective self-assessment			
	Normal, <i>n</i> (%)	Moderate hyposmia, <i>n</i> (%)	Severe hyposmia, <i>n</i> (%)	Anosmia, <i>n</i> (%)
Normosmic patients (<i>n</i> = 165) (Smell Diskettes score: 7 and 8)	125 (76)	30 (18)	9 (5)	1 (1)
Hyposmic patients (<i>n</i> = 19) (Smell Diskettes score: <7)	3 (16)	4 (21)	6 (32)	6 (32)

Table 3. Changes in olfaction after surgery

Patient group (<i>n</i> = preoperative; <i>n</i> = postoperative)	Hyposmia induced by surgery, <i>n</i> (%)	Hyposmia normalized after surgery, <i>n</i> (%)
All patients (<i>n</i> = 184; <i>n</i> = 159)	4 (2.5)	6 (3.4)
Septoplasty (<i>n</i> = 62; <i>n</i> = 55)	0	2 (3.6)
Rhinoplasty (<i>n</i> = 49; <i>n</i> = 39)	1 (2.6)	1 (2.6)
Endoscopic sinus surgery (<i>n</i> = 35; <i>n</i> = 33)	1 (3.0)	2 (6.1)
Other operations (<i>n</i> = 38; <i>n</i> = 32)	2 (6.3)	1 (3.1)

any postoperative smell problems that may only have been drawn to the patient's attention as a result of their having nasal surgery.

The patients' subjective perception of smell performance does not always correlate with the assessment obtained by smell tests. This is documented by the result that 24% of the normosmic patients thought they had an impaired sense of smell, and that 16% of the hyposmic patients thought they had a normal sense of smell. Therefore, relying on the patients' subjective impression is not reliable in establishing the patients' true sense of smell.

This study showed a prevalence of 10.3% of hyposmia for patients before nasal surgery. The highest prevalence was found in patients with chronic rhinosinusitis before ESS (17.1%), but importantly, there was also a significant prevalence of hyposmia in patients before septoplasty (8.1%) and rhinoplasty (6.1%). Therefore, the assessment of all patients prior to nasal surgery, whether they have rhinosinusitis or not, is indicated. This would help prevent any postoperative claim that the surgeon was culpable for any olfactory problem. Testing olfaction can also help audit response to treatment.

Hyposmia induced by surgery was found in 2.5%. No patient developed anosmia. The question rises whether the prevalence of anosmia induced by surgery of 1/100 indicated by Kimmelman⁵ is too high? This study suggests that a larger study examining the prevalence of anosmia after nasal surgery is needed so that we can counsel our patients more accurately. The cause of olfactory problems after septoplasty and rhinoplasty in the absence of any other endonasal disease is speculative and justifies further study.

Conclusion

Preoperatively, 10.3% of patients had an altered sense of smell, making it desirable that this is documented in order to avoid a postoperative claim that this is caused by surgery. Only 16% of these patients were unaware of their impaired

sense of smell. Whilst 6.1% of patients with chronic rhinosinusitis who underwent ESS had an improvement in their hyposmia and 3.6% of those undergoing septoplasty who previously had hyposmia reverted to normal, 2.5% of all patients undergoing nasal surgery developed hyposmia. None developed anosmia. Of particular concern is the fact that 2.6% of those having rhinoplasty developed hyposmia.

Routine preoperative smell testing is advisable in assessing patients prior to surgery. Olfactory tests will also help as an aide-memoir to remind the surgeon to counsel the patient about hyposmia as a potential complication of nasal surgery.

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