The feather touch rasp, a powered instrument for hump reduction

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Abstract. The feather touch rasp, a powered instrument for hump reduction. Introduction and aim: Standard rhinoplasty procedure involves bony profile alignment with an osteotome, followed by profile refinement with a manual rasp. The entire bony hump may sometimes be addressed with a rasp. Manual rasps and osteotomes, however, can be traumatic instruments, resulting in tissue oedema and bruising.

The feather touch rasp is one of the powered instruments developed in recent years to improve precision and technical ease while preventing tissue trauma.

The powered rasps have been frequently used at our department in the last eighteen months for hump reductions.

Material and methods: Retrospective evaluation of 72 rhinoplasty procedures performed in 68 patients between January 2004 and June 2005. A bony hump reduction was necessary in 52 of the 68 patients. 60% of the patients were male. The mean age was 30 years. The open rhinoplasty technique was used in 65% of the patients. All humps were addressed with the feather touch rasp only. Patients were seen 10 days, 4 weeks and three months after surgery.

Results: In one patient the nasal dorsum remained too high. We found one asymmetric nasal dorsum. Another patient had a low nasofrontal angle, creating a false impression of a remaining hump. In two patients, bony irregularities appeared a few months after the rhinoplasty procedure. Overall, most patients were satisfied with the results of the hump reduction.

Conclusions: The feather touch rasp makes safe and gradual bony hump reduction possible, with fragments being aspirated and the overlying skin being well protected.

Introduction

Early descriptions of nasal and facial characteristics, in particular the nasal dorsum, date back to the 1600s.1 The first surgery to alter the nasal shape through external skin incisions was performed in 1845. However, the procedure was complicated by a lack of proper anaesthesia.

In 1891, the American surgeon Roe described the correction of angular deformities of the nose.1 From the beginning, the procedure has included dorsal hump reduction.

The standard procedure consists of bony profile alignment with an osteotome followed by profile refinement with a manual rasp. Alternatively, the entire bony hump may be addressed with the rasp.

Manual rasps and osteotomes, however, can sometimes be traumatic instruments that can cause temporary damage to nasal soft tissue, resulting in oedema and bruising and eventually, in some cases, persistent discoloration of the overlying skin. Both oedema and bruising may interfere with surgical outcome and, for example, lead to palpable or visible irregularities that may appear up to 5 years after surgery as a result of unnoticed bony fragments remaining in place.2

To improve precision and technical ease while reducing or even preventing tissue trauma, surgeons and companies have been developing new techniques and instruments.

A major trend in rhinoplasty at present is the use of powered instrumentation, such as the powered rhinoplasty drill and the feather touch automated suction rasp.

The powered rhinoplasty drill is a drill fitted with suction and an outer sheath to reduce damage to nasal soft tissue. Irrigation is even used in some cases to prevent thermal necrosis.

The powered rasps are characterised by a precise calibrated motion, rather than the excessive back-and-forth motion of the manual rasp.

Becker et al.2 used cadaver specimens to compare nasal bones rased manually and nasal bones...
reduced with the rhinoplasty drill. Scanning electron microscopy of the specimens showed that the surface of the nasal dorsum was smoother after the use of the rhinoplasty drill.

Those findings led to an extended clinical trial in 57 rhinoplasties. The rhinoplasty drill was used in 47 patients. The powered rasp was used for ten patients. No qualitative difference was detected between the powered instruments. After a follow-up of 13 months, it was concluded that powered instrumentation is well suited for smoothing the edges of the “open roof” after the use of the osteotome and for precise reduction of the bony dorsal hump or isolated bony irregularity. In addition, the researchers suggested that the use of the powered drill might reduce the incidence of bony dorsal irregularities after cosmetic rhinoplasty. On the other hand, they found that the powered instrumentation used in their report was not suitable for the reduction of cartilaginous humps.

Davis et al. performed powered-assisted bone removal in 105 consecutive rhinoplasties requiring nasal bone reduction. They concluded that powered instrumentation is useful in patients with small bony humps or modest bony asymmetries. In their opinion, power-assisted bone removal is preferable in nasal bones previously weakened by trauma, aging or prior nasal surgery.

In this paper, we would like to discuss the exclusive use of the feather touch rasp for complete bony hump reduction.

Materials and methods

Aesthetic rhinoplasty procedures have been performed for some years now at the ENT department of the Sint-Lucas Hospital in Ghent. Between January 2004 and July 2005, 71 rhinoplasty procedures were performed in 68 patients.

A bony hump reduction was necessary in 52 patients. 60% of the patients were male. Their mean age was 30 years. The open rhinoplasty technique was used in 65% of the patients.

All bony nasal dorsum deformities were addressed with the powered feather touch rasp (Xomed) rather than the osteotome and the manual rasp.

The feather touch rasp (Figure 1) is attached to a converter, which is connected to the motor.

The motion is entirely horizontal, without any undesirable vertical excursion or chatter.

Speeds up to 5000 reciprocations per minute are possible with back-and-forth excursion of a few millimetres. The higher the speed, the greater the precision due to greater control.

Preoperative assessment was very important when considering aesthetic rhinoplasty procedures. Careful preoperative evaluation of the individual nasal and facial anatomy and assessment of the overlying skin were of vital importance. The specific wishes and desires of the patient were of course discussed.

When a date for surgery was planned, colour photographs of the nose in several standard positions were taken at the outpatient clinic. The extent of laboratory evaluation depended on the specific needs of the patient.

Prior to entering theatre, a nasal dressing soaked in cocaine and adrenaline was applied in the nose. After general anaesthesia was induced, the nasal septum, the piriform apertures, the nasal vestibule and the lateral nasal walls were injected with 1% xylocaine with 1:100,000 ephedrine. Injecting along the nasal dorsum was avoided at all times since the swelling interferes with the anatomical state of the nose.

It is helpful to indicate anatomical surgical landmarks on the external skin surface with a marking pen.

Like most rhinoplastic surgeons, we prefer to perform
The feather touch rasp

The degree and the angulation of hump removal depended on a variety of factors, including skin thickness, the amount of bony hump relative to cartilaginous hump, the relative width of the nose, the inclination of the nasal tip and, of course, patients’ wishes.

The nasal hump was reduced using either an external or an internal approach.

If an internal approach (35% of cases) was preferred, access to the bony-cartilaginous skeleton was most commonly achieved via a bilateral intercartilaginous incision with a medial extension to the partial transfixion incision, thereby preserving the vital support relationship of the medial crural attachment to the caudal margin of the septum.

For external approaches, an inverted V incision was used in the middle of the columella, above the feet of the medial crura.

Whatever the approach used, access to the nasal skeleton was gained by elevating the soft tissues over the cartilaginous and bony vault by means of dissection with scissors in the precise tissue plane.

When humps are to be reduced with the feather touch rasp, it is advisable – but not obligatory – to elevate the periosteum on the nasal dorsum. The periosteum not only prevents tissue trauma and bleeding but also stabilises the mobile bony sidewalls after all infractions are complete.

With the Aufricht retractor in place, excellent exposure of the nasal dorsum was achieved, allowing us to put the feather touch rasp in place. The retractor was then removed.

The instrument was held like a pencil in the right hand while the left hand was used to palpate over the dorsum.

After some of the nasal hump was removed, the profile was inspected and again palpated to ensure smoothness and a properly developing relationship to the tip.

Sometimes cartilaginous alignment was performed with the feather touch rasp. However, in our experience the cartilaginous vault tended to bend, resulting in difficult, and often partial, reduction. Reduction of the cartilaginous vault was therefore preferably accomplished with a knife or scissors instead of the powered rasp.

In most patients (90.3%) nasal profile alignment inevitably resulted in osteotomies to narrow the bony vault and close the open roof created by the hump reduction. Medial and lateral osteotomies were performed with a 3 mm delicate sharp micro-osteotome, followed by infraction
of the nasal bones. The periosteum on the pathway was not removed since the small osteotomes need little space. Moreover, the intact periosteum acts as an internal splint.

After final examination of the operated nose, the septum was supported with a couple of internal soluble stitches. The columella incision required for external rhinoplasty was stitched with a very fine non-soluble suture. Internal gauze wicks were put in place gently and an external splint was applied later.

Results

Over a study period of eighteen months at the ENT department of the Sint-Lucas hospital in Ghent, 72 rhinoplasty procedures were performed in 68 patients.

A bony hump reduction was necessary in 52 patients. The feather touch rasp was used for all these patients.

Patients had their postoperative consultations after 10 days, 4 weeks and three months.

In most cases, both the patient and the surgeon were satisfied with the immediate postoperative results (Figure 2). It should be mentioned that 10% of the patients were lost to follow-up.

There were residual minor deformities in five patients.

In one patient, the nasal dorsum remained too high, although this did not bother the patient.

One patient had an asymmetric nasal dorsum due to failing osteotomies.

Another patient had a low nasofrontal angle, creating a false impression of a remaining hump.

This was due to a misinterpretation of the nose in the preoperative setting. In fact, the nasofrontal angle should have been augmented with cartilage in association with the hump reduction as was done in the patient illustrated in Figure 3.

In two patients, bony irregularities appeared a few months after the rhinoplasty procedure.

Re-intervention was required in only three of the five cases. One patient needed a revision of the osteotomies. Two patients with bony irregularities underwent a minor correction, again using the feather touch rasp.

By contrast with the findings of Davis et al., we have not yet seen any delayed bone re-growth in patients treated with the powered rasp.

Overall, most patients were satisfied with the results of the hump reduction. There were no technical difficulties.

Discussion

Nasal hump reduction has been a component of aesthetic rhinoplasty since the very beginning. Although a hump reduction is considered to be a straightforward procedure, it has to be performed with a lot of care and attention.

Bony profile alignment is commonly achieved with an osteotome, followed by profile refinement with a manual rasp.

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Osteotomes and manual rasps, however, may be dangerous instruments in inexperienced hands. When using the osteotome, it is difficult to control the amount of bony hump that is removed. Moreover, there is a potential risk of damage to the overlying skin envelope during the removal of detached bony fragments.

Moreover, use of the manual rasp may cause permanent discolouration of the overlying skin of the nasal dorsum due to the lack of control over back-and-forth movements.

There is a risk that the upper lateral cartilages may be dislocated, leading to an aesthetically unacceptable inverted-V deformation.

If extensive soft tissue trauma occurs during surgery, there may be interference with intra-operative assessment, the execution of the surgical plan and the postoperative results. Indeed, soft tissue swelling can, for example, conceal bony fragments remaining in place that may become visible up to several years after surgery.

The feather touch rasp was developed to increase precision and technical ease while preventing tissue trauma.

It is a powered instrument that generates a pure horizontal motion at high speed with only a few millimetres of back-and-forth excursion.

It allows for safe, gradual, incremental hump reduction and the procedure is not time-consuming.

Minor deviations can be addressed easily using only the powered rasp. We did not even experience any difficulty with lowering the bridge in larger humps when using only the powered rasp.

While rasping is generally undertaken prior to lateral and medial osteotomies, the surgeon may sometimes find that additional bony takedown is necessary after osteotomies. The powered rasp has allowed us to perform additional bony takedown after osteotomies without any difficulty. Even in weakened nasal bones or in re-interventions, the rasp was pleasant to use.
By comparison with the manual rasp, the controlled back-and-forth excursion at high speeds significantly reduced the risk of dislocating the upper lateral cartilages or damaging the tip suturing in re-interventions.

The feather touch rasp includes a suction device to ensure that fragments are not left under the nasal soft tissues, appearing up to several years after the initial surgery and requiring re-intervention.

In our opinion the powered rasp has only a few minor drawbacks.

Obviously, in cases of overaggressive hump removal – however unlikely that may be with this very delicate instrument – bony fragments cannot be replaced. There are, however, other remedies available for reconstruction, such as autogenous cartilage graft from the septum or the auricle. Even alar cartilage remnants can be used. Alloplastic implants are generally not recommended.

At present, powered rasps are not suitable for modification of the cartilaginous dorsum. Calibrated scalpel excision of the cartilaginous dorsum under direct view remains a reliable approach for modification of the middle nasal vault.

In summary, the powered feather touch rasp makes safe, gradual, and incremental bony hump reduction possible, aspirating bony fragments and providing good protection for the overlying skin. Even in difficult cases, such as re-interventions or when dealing with weakened nasal bones, the powered rasp is clearly superior to the manual rasp and the osteotome for lowering the nasal bridge.

**Conclusions**

We find the feather touch rasp to be a significant improvement on manual rasps. Although it is a powered instrument, it can be used in a very delicate way.

In fact, at our institution, the powered rasp has replaced the sharp osteotome and the manual rasp completely. However, it should be borne in mind that bony irregularities may appear up to five years after surgery. We are looking forward to the re-evaluation of our study population.

**References**


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