

Prevention of nostril laceration in endonasal drilling: The use of protective ear speculum

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Abstract

Key Points: * The use of drills in endoscopic rhinosurgery allows for precise, safe and rapid removal of solid bone in standard procedures such as dacryo-cysto-rhinostomia and has become indispensable in complicated surgical interventions such as median maxillectomy * Conventional otologic drills are often used as they are readily available, economical and very robust in use * Injuries caused by the rotating shaft of the burr are rare yet it can represent a serious complication following drilling procedures in extended endonasal surgery * The use of low-cost, reusable otology speculum eliminated this complication of nasal entrance lacerations throughout our institution to this date * As a simple safety measurement, we can recommend the application of ear speculum as a reliable protection against drill related nasal entrance laceration

Correspondence: Our Experience

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Key Points:

- The use of drills in endoscopic rhinosurgery allows for precise, safe and rapid removal of solid bone in standard procedures such as dacryo-cysto-rhinostomia and has become indispensable in complicated surgical interventions such as median maxillectomy
- Conventional otologic drills are often used as they are readily available, economical and very robust in use
- Injuries caused by the rotating shaft of the burr are rare yet it can represent a serious complication following drilling procedures in extended endonasal surgery
- The use of low-cost, reusable otology speculum eliminated this complication of nasal entrance lacerations throughout our institution to this date
- As a simple safety measurement, we can recommend the application of ear speculum as a reliable protection against drill related nasal entrance laceration

Introduction

Injuries caused by the rotating shaft of the burr are fortunately uncommon yet it can represent a serious complication following drilling procedures in extended endonasal surgeries such as dacryocystorhinostomia (DCR) and median maxillectomy (MM)^{1,2}. In the worst case, these ulcers of the nasal vestibular skin not only cause transient post-operative pain but also anxiety and psychological problems³, nasal obstruction due stenosis and cosmetic problems by scar formation and retraction^{4,5,6}.

When endonasal drills with guarded shafts are not available, most surgeons resort to the use of conventional drills with the potential aforementioned complications. These are readily available in most institutions due to economic reasons.

In order to prevent potential damage to the nostrils whilst using conventional otology drills (Fig 1A and Fig 1B), we hereby present a simple, noninvasive technique which in our institution has helped to prevent any such complications.

Material and Methods

We successfully use conventional otology drills (BASCH ref. 1700074-001, PMAM 1122 angled handpiece 70 mm ref. 1600207-001, Bien-Air Surgery SA, Switzerland in DCR and MM on a regular basis ranging from teaching operations in our residency program, to advanced revision surgeries by our senior surgeons.

In order to protect the nasal entrance from laceration by the free rotating drill shaft we position a otology speculum in the nasal entrance (Fig 2A). The speculum is held in place by the scrub nurse during the critical phase of bone drilling. The speculum size is chosen to tightly fit the nasal vestibule providing slight dilation and free exposure of the piriform aperture. Using speculum sizes from 8 to 10mm, adequate endoscopic visualization can regularly be achieved (Fig 2B). In addition, we apply nasal ointment (Bepanthen, Bayer, Germany) to lubricate the inner and outer surface of the nasal speculum (Fig 2C). Essentially, the surgeon must take precautions to minimize contact to the metallic speculum with the rotation burr shaft.

Conclusion

The use of powered instruments has revolutionized the management of simple and complicated conditions in paranasal sinuses, skull base and orbital pathologies^{7,8}. The use of drills allow precise, safe and rapid removal of solid bone in standard procedures such as DCR and has become indispensable in complicated surgical interventions such as MM.

Drills are either available as specifically designed endonasal drills or as conventional high-speed otology drills. Special drills for designated endonasal surgical procedures are equipped with special protective shields used to protect the nasal soft tissue structures. However, these drills are delicate and may break if the extended drilling of solid bone is undertaken.

Conventional drills have the disadvantage of a long rotating shaft but are extremely robust and readily available. Associated injuries by endonasal drilling procedures, to the best of our knowledge is not reported extensively in literature, whereas, there is sufficient evidence of nostril laceration due to nasogastric intubation^{9,10,11} or nasogastric feeding tubes¹².

In our institution, two patients had long term scarring due to nostril laceration following the application of powered tools for DCR and MM procedures. The discussion of these complications came to the rational to develop and use protective measures on a regular basis. Following the introduction of the ear speculum protection, we successfully treated our DCR procedures (n=27) and MM procedures (n=6) without any further soft tissue erosions.

The use of low-cost, reusable otology speculum in endonasal drill application eliminated the complication of nasal entrance lacerations throughout our institution to this date. Additionally, the use of the device did not prolong the duration of the operation. Moreover, we have not observed delayed wound healing or foreign body reactions because of potential metal dust accumulation by erosion of the otoscope speculum by contact to the rotating burr shaft.

In conclusion, we can recommend the application of an otology ear speculum as reliable protection against drill related nasal entrance laceration for both, simple DCR procedures as well as extended revision surgery for beginners and experienced surgeons.

Legends to Figures

Figure 1

A) Example of nostril laceration by burr shaft followed by median maxillectomy during the treatment of the left sided extended recurrent inverted papilloma.

B) Example of nasal superficial nostril laceration accompanied by the left sided dacryocystorhinostomia.

All photos are employed with the consent of the involved patients.

Figure 2

A) Skull model with protective ear speculum for a typical, left-sided endoscopic dacryocystorhinostomia (DCR) procedure held in position by the surgeon.

B) Intraoperative situation during left-sided DCR; scrub nurse stabilizing speculum position during drill process.

C) Endoscopic visualization of burr shaft and bur tip within lubricated ear speculum during reduction of the lacrimal crests in endoscopic DCR procedure.

Bibliography

1. Biro N, Murchison AP, Pribitkin EA et al. Air reflux and other sequelae following endoscopic dacryocystorhinostomy. *Ophthal Plast Reconstr Surg* 2013;29;386–388.
2. Horn IS, Tittmann M, Fischer M, Otto M, Dietz A, Mozet Chr. Endonasal nasolacrimal duct surgery: a comparative study of two techniques. *Eur Arch Otorhinolaryngol* 2014; 271:1923-1931.
3. Rachel JDI, Mathog RH. Nasal alar necrosis. *Laryngoscope* 2000;1437-1441.
4. Civelek B, Kargi AE, Sensöz O et al. Rare complications of nasal packing: alar region necrosis. *Otolaryngol Head Neck Surg* 2000; 123:656-657.
5. Menick FJ, Saliban A. Primary intranasal lining injury cause deformities and treatment plan. *Plast Reconstr Surg* 2014; 134:1045-1056.
6. Monem SA, Mann G, Suortamo SH. A method of safely securing Foley's catheter in the management of posterior epistaxis with prevention of alar cartilage necrosis. *Auris Nasus Larynx* 2000; 27:357-359.
7. Sindwani R, Manz R. Technological innovations in tissue removal during rhinologic surgery. *Am J Rhinol Allergy* 2012;212; 26:65-69.
8. Bell B, Dubach P, Heimgartner S, et al. „Technological Advances in Rhinology & Anterior Skull Base Surgery.“ In: Georgalas C, Fokkens W. *Rhinology and Skull Base Surgery. From the Lab to the Operating Room: An Evidence-based Approach*. Stuttgart–New York: Thieme Publishers; 2013:585-604.
9. Masanori T, Kobayshi M, Yokoyama T. Risk factors for pressure ulcers at the ala of nose in oral surgery. *Anesth Prog* 2017;64:104-105.
10. Ferreira Brasileiro B, Van Sickels JE. Nasal alar pressure ulcer after orthognatic surgery: Clinical presentation and preventive recommendations. *The Journal Craniofacial Surgery* 2019;1-3.
11. Iwai T, Goto T, Maegawa J, Tohna I. Use of a hydrocolloid dressing to prevent nasal pressure sores after nasotracheal intubation. *Br J Oral Maxillofac Surg* 2011;49 e65-66.
12. Shapira-Galitz Y, Karp G, Cohen O, Halperin D, Lahav Y, Adi Nimro. Evaluation and predictors for nasogastric tube associated pressure ulcers in critically ill patients: *IMAJ* 2018;29:731-736.

