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What is This?
“Double-Doyle” Intranasal Airway Splint Technique

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Keywords
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Adequately addressing unstable nasal bone fractures has been a frustrating issue because of the lack of reliable intranasal support for depressed, comminuted portions of the nasal dorsum. Several methods have been proposed ranging from intranasal packing with gauze to open reduction and wiring or use of mini-plate fixation.¹,²

We present a novel technique used by the senior author (G.J.R.) for support of unstable, comminuted nasal bone fractures. In addition to placement of Doyle II intranasal airway splints (Medtronic), a second modified Doyle II splint is placed higher in the nasal cavity on either or both sides to provide greater intranasal support, a technique we refer to as “Double-Doyle” splinting. We performed a retrospective chart review of the senior author’s past surgical procedures since 2001 that used this technique and present our findings.

The University of Missouri Institutional Review Board approved this study.

Methods

The Doyle II intranasal airway splint (Medtronic) is composed of medical-grade silicone and consists of an airway chamber to facilitate nasal breathing postoperatively. For a patient with an unstable, comminuted nasal bone fracture, conventional closed nasal reduction is performed. A full-size Doyle splint is then placed bilaterally in typical fashion. Next, a single Doyle splint is modified to create 2 smaller airway splints that are inserted higher in the nasal cavity. The Double-Doyle modification involves altering a Doyle splint by trimming the silicone philanges superior and inferior to the airway chamber and dividing the chambered portion into 2 halves. The airway chamber is sized to extend from the anterior margin of the middle turbinate to the cephalic portion of the nose at the level of the upper lateral cartilages. The posterior aspect of the airway chamber is trimmed to avoid pressure against the anterior middle turbinate surface (Figure 1). The modified Doyle splint is coated with antibiotic ointment, placed, and secured to the anterior-superior margin of the chamber of the full-size Doyle splint with a nylon suture. The full-size Doyle splints are then secured with a trans-septal nylon suture (Figure 2). An external nasal dorsal splint is applied. The senior author has kept the Double-Doyle splints in for up to 21 days. We typically cover the patient with an

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antistaphylococcal antibiotic for the splinting duration. The Double-Doyle splints are later removed in the postoperative clinic visit. We normally see these patients several days after surgery to confirm tolerance of the splints and to determine that no ulcerations of the septum are imminent.

**Results**
Retrospective chart review of the Double-Doyle intranasal airway splint was performed. Thirty-nine patients underwent this procedure for unstable nasal bone fracture since 2001. The mean age of the patients was 24.8 years, and mean duration of stenting was 11.3 days. No complications were noted in this population, with a mean duration of clinical follow-up of 105 days. Overall, this intranasal splint modification is considered safe and reasonably well tolerated, and it presents minimal morbidity.

**Discussion**
Various techniques have been proposed to address an unstable nasal bone fracture.\(^1\)\(^-\)\(^4\) External nasal dorsal splinting alone does not provide the support necessary to prevent inferior and medial displacement of the comminuted fragments.\(^2\) The most simple method for intranasal support involves packing of the nasal cavity and bony vault with gauze dressing. However, this packing may result in complete nasal obstruction, migration postoperatively, inflammatory reaction, and even significant and life-threatening toxic shock syndrome infection (TSS). TSS is generally related to tampon use; however, reported cases in the literature have described this entity from the use of gauze intranasal packing.\(^5\) Other absorbable packing material has been used; however, the material tends to dissolve quickly and lose adequate support. Another method described involves the use of bilateral external plastic or metallic (most often lead) plates molded to the shape of the nasal dorsum and secured with transnasal wires. This allows for adequate lateral and inferior splinting; however, there is a tendency for the dorsal portion of the nasal pyramid to migrate medially with possible “pinched” nose deformity.\(^1\)\(^,\)\(^2\) Open reduction and wiring or mini-plate fixation may also be used to provide fixation of the comminuted nasal dorsum. This often may require a transverse external incision, use of traumatic laceration, or external approach rhinoplasty incision. If the comminuted fragments are too small, frequently wiring is extremely difficult.\(^1\)\(^,\)\(^3\)

We present a technique that provides prolonged nasal vault support in unstable nasal bone fractures without the need for external suspension devices or additional incisions. Using this method with closed nasal reduction and external dorsal splint application, safe and adequate functional and cosmetic results may be obtained with minimal patient morbidity. The additional cost of using a subsequent set of Doyle splints for this technique should be taken under consideration. Advantages of this technique include simple modification of a common Doyle splint, ease of placement, avoidance of additional incisions, relatively soft material to maximize avoidance of skin erosion while still providing firm support, and ease of removal in the clinic postoperatively.

**Author Contributions**
Young S. Paik, study conception and design, data acquisition, analysis and interpretation of data, drafting, revision, final approval of manuscript; Gregory J. Renner, study conception and design, analysis and interpretation of data, revision, final approval of manuscript (senior author); Gabriel M. Rice, data acquisition, revision, final approval of manuscript; Benjamin D. Liess, study conception and design, revision, final approval of manuscript.

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