

An aesthetic approach in the repair of anterior frontal sinus fractures

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Abstract. The management of upper facial trauma is a common responsibility of surgeons taking care of maxillofacial injuries. Historically, the most commonly used surgical approach has been the bi-temporal (coronal) incision. As is well known, the coronal incision carries some inherent complications such as hair loss, long scars, and increased length of hospital stay. The purpose of this article is to describe an aesthetic approach, similar to an endoscopic brow lift, for the repair of anterior wall fractures of the frontal sinus without the need for long incisions or fixation devices.

Key words: aesthetic approach; frontal sinus fracture.

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The management of upper facial trauma is a common responsibility of surgeons taking care of maxillofacial injuries. Frontal bar/sinus fractures occur in about 15% of all facial injuries.¹ The treatment of these fractures can involve a myriad of options including repair of the anterior wall only, obliteration of the sinus and rendering it non-functional, and craniation of the sinus allowing the frontal lobe to advance anteriorly. Historically, the most commonly used surgical approach has been the bi-temporal (coronal) incision, although other peri-brow/forehead approaches have also been described. As is well known, the coronal incision carries some inherent complications such as hair loss, long scars, and increased length of hospital stay.

In today's culture, aesthetic surgery and minimally invasive surgery are often sought and preferred by patients when compared with more traditional approaches. Endoscopically assisted surgery has become increasingly popular in the field of maxillofacial surgery over the past 15–20 years. There have been multiple publications describing the use of surgical endoscopes in facial aesthetic surgery (brow lift, face lift), facial trauma (orbital floor, frontal sinus, zygomatic arch, mandibular subcondylar fractures), and temporomandibular joint surgery, as well as paranasal sinus surgery.^{2–4}

The advantages of endoscopically assisted surgery include better visualization, smaller incisions and dissection, more aesthetic result, shorter hospital stay,

and shorter patient recovery time. Another important advantage of endoscopic surgery is enhanced resident/student education through the use of closed circuit television screens in the operating room, thereby allowing everyone to visualize the operative procedure.

The purpose of this article is to describe an aesthetic approach, similar to an endoscopic brow lift, for the repair of anterior wall fractures of the frontal sinus without the need for long incisions or fixation devices.

Technique

Ideal patient candidates for this procedure are those with isolated anterior wall fractures not involving the naso-frontal ducts



Fig. 1. Endoscopic sheath and endoscopic instruments used during the procedure.

(NFDs) or the posterior wall requiring cranialization. Large fractured segments of the anterior wall are more amenable to this type of repair compared to grossly comminuted frontal sinus fractures. It is also important to inform the patient preoperatively about the possibility of 'converting' to a traditional open approach should the endoscopic approach fail.

The procedure is performed under general anesthesia. Instrumentation for this procedure is very similar to an endoscopic brow lift, including a 30-degree endoscope with a protective sheath, endoscopic elevators and nerve hooks, as well as common sinus surgery curettes (Fig. 1). Unlike a typical endoscopic brow lift which uses five ports, only two ports are

used for this procedure. Ports are about 2 cm in length and are placed within the hair-bearing scalp. These ports are essentially placed on either side of the fracture site (median and paramedian).

After the administration of local anesthetic and a vasoconstrictor, an incision is made in one of the ports through the entire scalp down to the cranium. This ensures a sub-periosteal (sub-pericranial) dissection. Once an appropriate dissection has been performed, the second port is incised under direct visualization (Fig. 2). It is imperative to use the protective sheath over the endoscope to reflect the soft tissue envelope away from the surgical field (Fig. 3). With the aid of the endoscope in one port and an elevator in the other

port, the dissection is carried down towards the fracture. The entire fracture site must be visualized; careful dissection of the periosteum is critical in this area. Similar to an endoscopic brow lift, a nerve hook is used to mobilize the supra-orbital neurovascular bundle in order to passively elevate the forehead flap; this manoeuvre also aids in visualization of the surgical cavity. Next, using a sinus curette, the edges of the anterior wall are engaged and the fractured wall is gently elevated and reduced. Once an appropriate reduction has been obtained, fixation will not be necessary since the segment will stay reduced in its anatomic location (see video, Supplementary Material). Palpation of the forehead can confirm a smooth contour. Alternatively, one can utilize intraoperative computed tomography (CT) to assess a proper reduction.

Supplementary Video related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ijom.2016.04.008>.

The surgical site is then irrigated, fibrin sealants are sprayed within the wound, and incisions closed. No pressure dressing or drains are placed. A postoperative CT scan is obtained immediately following surgery and the patient is discharged home on the same day (Fig. 4).

Discussion

The repair of frontal sinus fractures can be performed through multiple approaches, and depending on the severity of the injury, more aggressive manoeuvres such as occlusion of NFDs and cranialization of the posterior wall may be necessary. There is very little doubt that a coronal approach is certainly a true and tried approach in addressing frontal sinus injuries; however, clinicians should not abandon their knowledge and experience gained from aesthetic surgery while performing maxillofacial trauma surgery. Although the use of a coronal incision is absolutely necessary at times, it certainly prolongs patient recovery and hospital stay, and it can have aesthetic complications such as alopecia.

Endoscopic brow lifting has been around since 1992 and is clearly a popular approach for forehead lifting for many clinicians.⁵ There are inherent challenges with any type of endoscopic surgery, such as the expense of the instrumentation and endoscope, the steep learning curve in mastering the manipulation technique, and an initial protracted length of surgery. However, there are also tremendous advantages, such as the lack of long unsightly incisions, more aesthetic results,

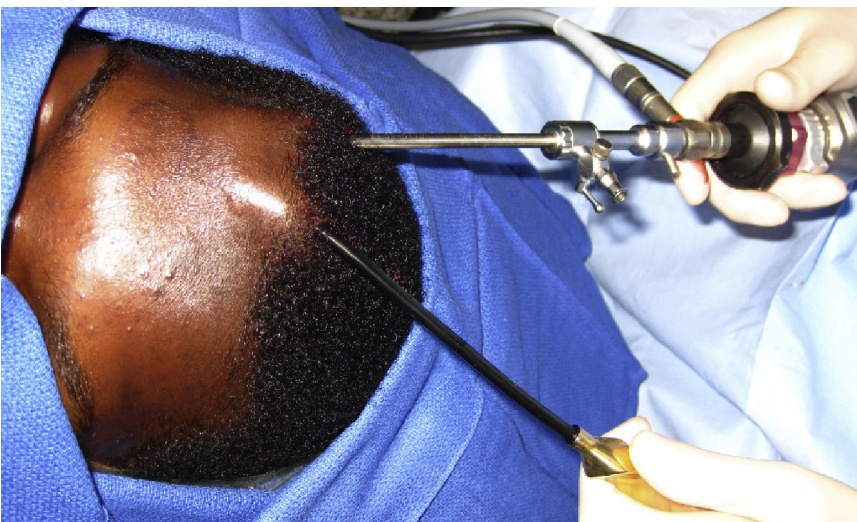


Fig. 2. Typical endoscopic approach.

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