



## Original Research Article

## Forehead crease-An approach to frontal-naso-orbito-ethmoid fractures

Vikas Kakkar<sup>1,\*</sup>, G. S Kalra<sup>2</sup>, Rajiv Sharma<sup>1</sup><sup>1</sup>Dept. of Surgery, Sri Guru Ram Institute of Medical Sciences and Research, Amritsar, Punjab, India<sup>2</sup>Dept. of Burns & Plastic Surgery, SMS Medical College, Jaipur, Rajasthan, India

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## ABSTRACT

**Introduction:** Fractures of frontal bone and naso-orbito-ethmoid region are usually associated with facial trauma. These usually present a frontal depression, csfrhinorrhoea, nasal deformity, diplopia, nasal bleeding with physical signs of midface injury. In our study we had used this transverse forehead crease as an approach. This has provided good surgical exposure for managing these traumatic injuries. By careful dissection and preserving sensory nerves supplying the forehead and scalp, a cosmetically well accepted scar within the crease and normal forehead sensation could be achieve.

**Material and Methods:** The study was conducted from Aug 2007 to august 2011. During this period patients who presented with isolated faciomaxillary injury involving fronto-naso-orbito-ethmoid were part of the study. A total of 13 patients with these isolated injuries presented. The age of patients ranged from 23 years to 65 yrs. All patients were male.

**Surgical procedure:** All the patients were explained the details of operative procedure pre operatively and informed consent was taken. Skin incision was given along the transverse crease. Subcutaneous dissection was done, followed by dissection of frontal is muscle along vertical plane splitting the fibres in order to avoid trauma to supratrochlear and supraorbital nerves branches. Dissection was then preceded to periosteum. Subperiosteal dissection was carried to expose Fracture segments. The fracture segments were elevated when depressed and reduced. Fracture segments were fixed with mini plates.

**Results:** The age of patient ranged from 23yrs to 65yrs. All patients were male. Depressed isolated frontal bone fracture were present in two cases and in remaining 11 patients this was associated with nasoethmoid fractures. CSF rhinorhea was present in two of these patients. There was no wound over forehead in 10 of our patient. The follow up ranged from 1 month to 48 months. There was no permanent loss of sensation or motor anesthesia over forehead. All patients were satisfied with surgical procedure

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## 1. Introduction

Fractures of frontal bone and naso-orbito-ethmoid region are usually associated with facial trauma. These usually present a frontal depression, csfrhinorrhoea, nasal deformity, diplopia, nasal bleeding with physical signs of midface injury. The usual surgical approaches for these injuries are bi coronal, through the lacerated wounds when present. These approaches are either difficult or cosmetically unacceptable.

The resting skin tension lines lie transversely over the forehead. These lines merges with the wrinkles as the age advances and becomes prominent. Forehead has very rich neurovascular supply with dense interconnections in between.<sup>1</sup> In our study we had used this transverse forehead crease as an approach. This has provided good surgical exposure for managing these traumatic injuries. By careful dissection and preserving sensory nerves supplying the forehead and scalp, a cosmetically well accepted scar within the crease and normal forehead sensation could be achieve

\* Corresponding author.

E-mail address: [kakkarvikasdr13@gmail.com](mailto:kakkarvikasdr13@gmail.com) (V. Kakkar).

## 2. Material and Methods

The study was conducted from Aug 2007 to August 2011. During this period patients who presented with isolated faciomaxillary injury involving fronto-naso-orbito-ethmoid were part of the study. A total of 13 patients with these isolated injuries presented. The age of patients ranged from 23 years to 65 yrs. All patients were male. These patients were in emergency department and were investigated with blood investigation and computed tomography of head and face. All these patients were examined by neurosurgery team regarding any head injury and after clearance regarding intra cranial injuries were then shifted to our unit.

**Surgical procedure-**All the patients were explained the details of operative procedure pre operatively and informed consent was taken. The forehead transverse creases were assessed and marked pre operatively preferably the lowest, above the vertical glabellar lines. All patients were operated under general anesthesia with oral intubation. Skin incision was given along the transverse crease. Subcutaneous dissection was done, followed by dissection of frontal is muscle along vertical plane splitting the fibres in order to avoid trauma to supraorbital and supraorbital nerves branches. Dissection was then preceded to periosteum. Subperiosteal dissection was carried to expose fracture segments. The fracture segments were elevated when depressed and reduced. Fracture segments were fixed with mini plates. Nasal septal forcep was used if required to support and stabilize nose segment during plating. Exteriorization of frontal sinus was done in depressed comminuted frontal bone fractures. The periosteum was closed followed by repair of musculoaponeurotic layer with vicryl and then subcuticular suturing was done. Nasal splintage was done.

## 3. Results

The age of patient ranged from 23 yrs to 65 yrs. All patients were male. Depressed isolated frontal bone fracture were present in two cases and in remaining 11 patients this was associated with nasoethmoid fractures. CSF rhinorrhea was present in two of these patients. There was no wound over forehead in 10 of our patient. Small irregular wound in supraorbital region was present in 2 patient, the exploration was done by merging this wound with the forehead crease. In the remaining 1 patient there were abrasions over forehead. All the patients were operated through forehead wrinkle crease incision and fractures were reduced and fixation with mini plates was done. Nasal splintage was applied in 11 cases. All patients were given antibiotic cover during post operative period. Patients were discharged on 3<sup>rd</sup> post operative day. Skin sutures were removed on day 5 in out patient department. There was decrease sensation over forehead in two cases which recovered within 3 months

of surgery. The follow up ranged from 1 month to 48 months. There was no permanent loss of sensation or motor anesthesia over forehead. All patients were satisfied with surgical procedure.



Fig. 1:

## 4. Discussion

The knowledge of anatomy is back bone for execution of any surgical procedure effectively and safely. The course of supraorbital nerve has been discussed in detail showing two divisions the superficial usually called medial and deep division called lateral division. The superficial division immediately divides into multiple branches that penetrate frontal is muscle at various points from the orbital rim to mid forehead level and then fan like. These branches were identified during the dissection in our study. These techniques principally include repair (open reduction and internal fixation of the anterior table), obliteration (ablation), and cranialization. In this classification the frontal, maxillary, and ethmoidal sinuses, the orbital cavity, and the nasal buttress may be regarded as shock absorbers, injury to which results in 2 broad injury categories: Type 1, which consists of frontonaso-ethmoidal and medial orbital frame, frontonaso-ethmoidal, and medial orbital frame fractures with frequent optic nerve compression.<sup>2</sup> An open, direct approach to these fractures with meticulous reduction, internal fixation, and repair of the medial canthal ligaments provides optimal repair. The use of craniofacial surgical

**Table 1:** Details of Patients

S.No	Age (Years)	Sex	Injuries	Complication
1	34	M	#NOE	NIL
2	62	M	# FR DEP	NIL
3	45	M	#NOE	NIL
4	27	M	#NOE & FR, CSF	NIL
5	33	M	#NOE	NIL
6	57	M	#NOE	NEURO
7	37	M	#FR& NOE	NIL
8	34	M	#NOE	NIL
9	29	M	#FR DEP	NIL
10	45	M	#NOE &FR	NEURO
11	23	M	#NOE	NIL
12	65	M	#NOE	NIL
13	54	M	#NOE	NIL

Abbreviations M=male, # =fracture, NOE =nasoorbitoethmoid, & = and, CSF= cerebrospinal fluid rhinorrhea, NEURO= neuropraxia , DEP = depressed

techniques and immediate bone graft replacement of missing or severely damaged bone will allow reconstruction of even the most difficult injuries in one stage.<sup>3</sup> Once it is decided that a fracture requires surgery, full exposure of the region is mandatory. Generally speaking, NOE reduction and fixation requires a coronal incision (for the superior NOE region) plus a lower eyelid incision (for the inferior NOE region or orbital walls).<sup>4</sup> The lower-lid incision is best performed transconjunctivally and can be extended to a transcaruncular incision if necessary.<sup>5</sup> When visualizing the NOE region and radix, it may be helpful to score the periosteum of the soft tissue envelope to expand this area and better improve visualization. The orbit should be completely degloved; however, care should be taken not to strip the soft tissue attachments off of the central fragment. Repair of the frontal sinus implies the preservation of the sinus anatomy, including the nasofrontal duct, sinus mucosa, and its anterior and posterior bony walls.

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### 6. Conflict of Interest

The authors declare they have no conflict of interest.

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### Author biography

**Vikas Kakkar**, Associate Professor

**G. S Kalra**, Professor

**Rajiv Sharma**, Fellow

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