Preseptal Transconjunctival Approach: A Retrospective Review

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ABSTRACT

Aim: The aim of this study was to determine types of facial fractures that use the preseptal transconjunctival approach and to evaluate the lower eyelid condition.

Materials and methods: Ninety-one patients who underwent open reduction internal fixation of facial fractures using preseptal transconjunctival approach from 2005–2013 were included and analyzed from clinical records. We evaluate the incidence of postoperative complication such as visible scar at rest, entropion, ectropion, scleral show, trichiasis, conjunctival granuloma, lower eyelid laceration, corneal lesion, and lacrimal drainage lesion. The types of facial fractures that frequently use this approach were also analyzed.

Results: Four out of ninety-one patients were excluded because of insufficient data. Zygomatic complex fracture occurring in isolation or combination with other fracture was the commonest fracture type encountered (93.5%). Two complications (entropion and trichiasis) occurred in one out of eighty-seven patients. The complication rate in this study was very low at 1.1%.

Conclusion: A preseptal transconjunctival approach is a versatile approach that can be used in all mid-face fracture situations providing an alternative to the invasive transcutaneous approach. It provides minimal complications with superior esthetic result.

Clinical significance: The management of facial fractures that involve orbital rim or floor often poses a challenge to the surgeon because surgeons aim for complete repair of the orbital anatomy with least complication and superior esthetic result. Two surgical incisions existed in the process of reaching orbital bony component which is the transcutaneous and transconjunctival approach. It will help clinicians to know which approach provides minimal complication.

Keywords: Complication, Facial fractures, Preseptal transconjunctival approach.

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INTRODUCTION

The maxillofacial geography is synonymous as the primary area of esthetic concern. Therefore, the surgeon must take into consideration the exposure needed for operative access versus aesthetic concern of the patient before deciding on an appropriate surgical approach.¹⁻³ The management of facial fractures that involve orbital rim or floor often poses a challenge to the surgeon. With the research and development over the years, current improvement of the orbital mini plate plating systems proves to be beneficial for surgeons around the world in providing the best choice of treatment for patients. Surgeons aim for complete repair of the orbital anatomy with least complication and superior esthetic result.¹

Two surgical incisions existed in the process of reaching the orbital bony component which is the transcutaneous and transconjunctival approach. Each of these approaches offers advantages and disadvantages depending on the condition and severity of the injuries that the patient has.¹ The transcutaneous approach, being a more popular approach used by maxillofacial surgeons in Malaysia, produces complications of eyelid deformity such as ectropion and visible cutaneous surgical scars.¹ The transconjunctival approach which was first used and described by Bourguet² and later popularized by Tessier³ provide excellent fracture site exposure with minimal long term postoperative surgical site complication with an emphasis on ectropion and entropion.

However, some authors suggested that the transconjunctival approach takes longer learning time compared to a transcutaneous approach and more time consuming intraoperatively.^{4,5} Furthermore, some surgeons often indicate that the procedure of transconjunctival approach restricts access to the orbital bony support systems when compared to the transcutaneous approach.⁶

A Malaysian-based review of the preseptal transconjunctival approach for internal fixation of orbital floor fractures has never

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been published before. Such a review in the nation's context is very important to popularize this surgical approach among oral and maxillofacial surgeons in Malaysia. With the clinical data received, it could be a guide for oral and maxillofacial surgeons in selecting the best surgical approach in managing open reduction and internal fixation of orbital fractures. Based on these, the aim of our study was to evaluate the lower eyelid condition after preseptal transconjunctival approach from 2005 to 2013 and also to determine types of facial fractures that uses preseptal transconjunctival approach.

MATERIALS AND METHODS

This study was approved by the Ethical Committee of the Hospital Universiti Sains Malaysia (HUSM).

All patients who had received treatment for facial fracture via preseptal transconjunctival approach in HUSM from 2005 to

2013 were included in this retrospective study. Medical records of all patients were studied. The respective medical records were obtained from the Medical Record Unit, HUSM. Information taken from medical records was recorded in data retrieval form. Figure 1 shows the data retrieval form.

The inclusion criteria of this study were:

- Patients who underwent preseptal transconjunctival approach for orbital trauma.
- Patients with documented follow-up of at least 3 months post-surgery.

Patient who underwent preseptal transconjunctival approach for craniofacial resection and patient whose file was not available were excluded from this study.

Ninety-one clinical records of patients who have undergone preseptal transconjunctival approach for open fixation of various fracture types were traced from the medical record unit, HUSM. The patients were gathered from the operating theatre census as well as surgeons' compilation from the year 2005 till 2013 accounting to 9 years. Out of these, four patients were excluded. Three of the medical records were untraceable and one was excluded due to insufficient data. Finally, 87 patient's clinical records remained for data analysis.

RESULTS

Demographic Data

Among 87 patients, 76 were male patients and 11, female patients. Mean age of the study population was 22 years old with the majority of the patients fall into the 16–25 years old age group. The racial distribution of our study population was composed of predominant Malay patients (96.5%). There were four Chinese patients (3.5%). No Indian patients other races or Thai immigrants within the study (Table 1).

Vehicle Pattern

Type of vehicle implicated in respective patients' road traffic accident was obtained from the patients' record. It was observed that 77 patients (88.5%) were riding a motorcycle. Out of the 77 patients, 72 patients (93.5%) were driving during the collision, and only 5 patients (6.5%) were pillion riders (Fig. 2A). The remaining 10 patients (11.5%) were driving a car. Out of these 10 patients, 9 (90.0%) was assuming the driver's role during the collision and 1 (10.0%) was beside the driver (Fig. 2B).

Fracture Pattern

Seventy-two patients (93.5%) suffered from zygomatic complex fractures occurring in isolation or combination with other types of facial fracture. The isolated zygomatic complex fracture was present in 45 patients (51.7%). Zygomatic fracture in combination with lefort II occurred in 13 patients (14.9%) whilst in combination with unilateral lefort II occurred in 4 patients (4.6%). Lefort II occurred in 18 patients (20.7%), orbital floor fracture in 5 patients (5.7%) and isolated orbital rim fracture in 2 patients (2.3%).

Complications

No intraoperative complications were recorded in our series. All fractures were adequately exposed using the transconjunctival approach, and no patients had to undergo a second procedure due to inadequate fixation. Two complications (entropion and trichiasis) occurred in one patient out of a total of 87 patients. Table 2 shows the transconjunctival approach in various midfacial fractures.

Statistical Analysis

All the analysis was done into statistical package for the social sciences version 20.0 (SPSS Inc., Chicago, IL, USA). Descriptive analysis was performed. Percentage recorded is in nearest one decimal point. Mean was used as a central tendency for demographic data.

DISCUSSION

In this study, the majority of the patients were from the young adult age group. Mean age was 22 years old with 65.5% of the patients fall into the 16–25 years old age group. Our data characteristic supports findings by Nordin et al.⁷ in which sociodemographically, young Malay adult in the age group of 16–25 (65.5%) was the largest group involved in facial trauma. Their study recruited patients from two major tertiary hospitals in Malaysia which are Hospital Universiti Sains Malaysia and Hospital Universiti Kebangsaan Malaysia.

There were a total of 76 male patients in this study compared to a minute 11 female patients. The high male predilection gives rise to nearly 7:1 male:female predominance. This result was reproducible in similar studies conducted in HUSM where male preponderance was 77% compared to 23% female.⁷ There are many reasons for this scenario. The motorcycle is a common mode of transport among Malaysians. In this study, the majority (88.5%) of the patients involved were a motorcyclist. This finding was consistent with another study on road traffic accidents in Malaysia.⁸ Additionally, an international study published by the World Health Organization reported that 59% of road traffic accident fatalities in Malaysia involved motorcyclist.

In our study population, the most common type of fractures was the zygomatic complex fractures (71.2%). Similar findings also reported by Nordin.⁷ However, they reported a lower incidence of 15.6% compared to our series. We believe that the high incidence of zygomatic complex fractures is related to poor head safety practices among motorcyclists. In Malaysia, it is compulsory for motorcyclists to wear a helmet when riding the motorcycle. However, there is no strict regulation regarding the type of helmet to be used. Another potential reason for the higher incidences of zygomatic complex fractures is an insecure helmet. Insecure helmets are a result of insecure chin straps or not wearing a correctly sized helmet. The insecure helmet will easily get displaced during a high impact collision. Only secured helmets which remain attached to the cranium during a collision will provide some protection to the maxillofacial area.⁹ Thus, to decrease the incidence of midface trauma, we believe more attention should be given by enforcement agencies on, existing regulations regarding the type of helmet and helmet safety protocols.

In this study, the transconjunctival approach for internal fixation of midfacial fracture has a very low complication rate at 1.1%. This figure was consistent with recent studies. Baumann et al.¹⁰ in his series of 99 patients reported a similar complication rate at 2%. They reported temporary entropion and laceration of tarsal plate. Giorgio et al.¹¹ in his series of 56 cases reported a higher complication rate of 7%. From their review, they reported temporary partial entropion and trichiasis which resolved completely in 2 months with simple palpebral massages.

From 87 patients who underwent preseptal transconjunctival approach only one patient developed complication. The complications encountered were entropion and trichiasis. The patient had multiple fractures of facials bone involving the zygoma and Lefort II fractures; hence we believed due to the severity of the trauma the complication was exaggerated with over manipulation

Date Retrieval from
Patient No.

Notes:

Demographic Data

Name: _____
Registration No. _____ Gender M/F Race: M/ C/ I/ O: _____ Age: _____
Date of Accident: _____ Date of Admission: _____
Mechanism of injury: _____ Date of Discharge: _____

Motorcyclist		Driver		Helmet	
		Piilon Rider		No Helmet	
Car		Driver		Seatbelt	
Lorry		Co-D river		No seatbelt	
Van		Backseat p			

Injuries sustained:

Operative Data

Date of Operation: _____ Time start: _____ Time end: _____
Operative Procedure _____

Type of fracture	
Le fort II + zygoma	
Le fort II	
Le fort II (uni) + zygoma	
Zygoma	
Orbital floor	
Orbital rim (iso)	

Postoperative Data

Parameter	Yes	No
Visible surgical scar at rest		
Presence of ectropion		
Presence of entropion		
Lower eyelid laceration		
Excess tearing		
Presence of comeal lesion		
Presence of granuloma		
Scleral show		
Trichiasis		

Fig. 1: Data retrieval form

Table 1: Demographic data of study population

		Total number of patients, n (%) N = 87
<i>Age group</i>		
<16 years	16–25 years	12 (13.8%)
	26–40 years	57 (65.5%)
>40 years	14 (15.9%)	
	4 (4.8%)	
<i>Gender</i>		
Gender	Male	76 (87.4%)
	Female	11 (12.6%)
<i>Ethnic</i>		
Ethnic	Malay	84 (96.5%)
	Chinese	3 (3.5%)
	Indian	0 (0%)
	Others	0 (0%)

and extraction of the soft tissue. To avoid complications, respect of the soft tissue and anatomy of the planes during the intraoperative procedures must be implemented by the assistant and surgeons.¹¹ One author even suggested that conditions affecting naso-ethmoidal-orbital or fractures involving the floor of the orbit, the transconjunctival approach should be avoided.¹² On the contrary, we think this approach can be extended by lateral canthotomy or combined with another approach such as the coronal and vestibular approach to avoid violating the facial area.

In our study, the transconjunctival approach has excellent aesthetic outcomes. No patients had visible surgical scars at rest, and there were no cases of lower eyelid laceration. This is a pertinent advantage of this surgical technique. When compared with the transconjunctival approach, there is some evidence to suggest that the subciliary approach causes more cutaneous scarring, hence poorer cosmesis.^{13–15} Similar point was highlighted by Giorgio et al.¹¹ in his review of 56 cases where he concluded the transconjunctival approach to have better aesthetic result than the

Figs 2A and B: (A) Type of vehicle involved in a road traffic accident; (B) Patient position during a collision**Table 2:** Transconjunctival approach in various midfacial fractures

Patient	Age	Diagnosis	Complication
1	30	Le Fort 2 + Zygoma	No complication
2	27	Zygoma	No complication
3	25	Unilat Le Fort 2 + Zygoma	No complication
4	23	Zygoma	No complication
5	18	Zygoma	No complication
6	17	Zygoma	No complication
7	18	Le Fort 2	No complication
8	16	Zygoma	No complication
9	21	Orbital floor	No complication
10	25	Zygoma	No complication
11	18	Zygoma	No complication
12	26	Le Fort 2 + Zygoma	No complication
13	26	Zygoma	No complication
14	21	Zygoma	No complication
15	26	Zygoma	No complication
16	18	Zygoma	No complication
17	22	Zygoma	No complication
18	20	Zygoma	No complication
19	53	Zygoma	No complication
20	56	Le Fort 2	No complication
21	23	Le Fort 2	No complication

(Contd...)

(Contd...)

Patient	Age	Diagnosis	Complication
22	17	Zygoma	No complication
23	18	Zygoma	No complication
24	25	Le Fort 2	No complication
25	18	Zygoma	No complication
26	20	Zygoma	No complication
27	18	Zygoma	No complication
28	18	Le Fort 2	No complication
29	17	Zygoma	No complication
30	13	Zygoma	No complication
31	10	Zygoma	No complication
32	28	Zygoma	No complication
33	14	Zygoma	No complication
34	18	Zygoma	No complication
35	13	Orbital floor	No complication
36	18	Zygoma	No complication
37	34	Zygoma	No complication
38	22	Le Fort 2	No complication
39	23	Le Fort 2	No complication
40	23	Le Fort 2	No complication
41	24	Le Fort 2	No complication
42	22	Zygoma	No complication

(Contd...)

Contd...

Patient	Age	Diagnosis	Complication
43	15	Zygoma	No complication
44	25	Le Fort 2 + zygoma	No complication
45	20	Zygoma	No complication
46	42	Unilat Le Fort 2 + zygoma	No complication
47	15	Isolated orbital rim	No complication
48	36	Zygoma	No complication
49	20	Zygoma	No complication
50	23	Le Fort 2	No complication
51	30	Le Fort 2	No complication
52	20	Zygoma	No complication
53	15	Zygoma	No complication
54	19	Le Fort 2	No complication
55	19	Zygoma	No complication
56	16	Zygoma	No complication
57	45	Le Fort 2	No complication
58	15	Le Fort 2	Presence of
59	14	Zygoma	complication
60	27	Zygoma	No complication
61	29	Unilat Le Fort 2 + zygoma	No complication
62	17	Le Fort 2	No complication
63	22	Zygoma	No complication
64	23	Le Fort 2 + zygoma	No complication
65	25	Le Fort 2 + zygoma	No complication
66	30	Le Fort 2 + zygoma	No complication
67	21	Le Fort 2 + zygoma	No complication
68	18	Le Fort 2 + zygoma	No complication
69	16	Le Fort 2 + zygoma	No complication
70	20	Le Fort 2 + zygoma	No complication
71	16	Le Fort 2 + zygoma	No complication
72	18	Le Fort 2 + zygoma	No complication
73	14	Le Fort 2 + zygoma	No complication
74	17	Le Fort 2	No complication
75	18	Le Fort 2	No complication
76	25	Le Fort 2	No complication
77	19	Unilat Le Fort 2 + zygoma	No complication
78	13	Zygoma	No complication
79	16	Zygoma	No complication
80	28	Zygoma	No complication
81	24	Zygoma	No complication
82	30	Zygoma	No complication
83	20	Zygoma	No complication
84	18	Orbital floor	No complication
85	15	Orbital floor	No complication
86	23	Orbital floor	No complication
87	24	Isolated orbital rim	No complication

palpebral transcutaneous approach. The limitation of this study, data were obtained from a single center, and there were only two surgeons who performed all the operations. The two surgeons who performed these operations are well versed having performed the surgery many times. Therefore, observed complications in this series are low. This result may not be reproducible in other centers with many surgeons with varying expertise.

CONCLUSION

The preseptal transconjunctival approach is a versatile approach that can be used in all midface and orbital fractures situation

because of relatively low complication outcomes. The transconjunctival approach did not produce unsightly scar which is almost inevitable when the transcutaneous approach is applied.

CLINICAL SIGNIFICANCE

Facial esthetic concerns are an important part of the management of facial fractures. To achieve a perfect anatomical reduction in treating midfacial fractures, the surgeon must evaluate the best approach with the lowest complications and highest aesthetic outcome; hence the preseptal transconjunctival approach is coined. We believe even though the learning curve for a transconjunctival approach takes longer than transcutaneous approach, the result is most rewarding when the unsightly surgical scar is avoided.

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