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## Blowput Fractures of the Orbit

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**Abstract** Blowout fractures of the orbit is painful and bothersome accidental disease to both patients and doctors. The follow-up study of the cases was reported with some discussion. Fifty-two cases of blowout fractures of the orbit were treated in the otorhinolaryngological department of Yamaguchi University Hospital from 1981 to 1990. There were 42 males and 10 females treated. The age of the patients ranged from 5 to 78 years, and the mean age was 22.8 years. The most common cause of this type of fractures was sports related, and the second common cause was violence. Twenty-two patients were operated on, and thirty patients were treated by means other than surgery. The time lapse between the injury and the operation varied from 1 to 125 days, and averaged 31.9 days.

Seventeen out of 22 patients were operated on within 1 month after injuries and 14 of 22 patients were ultimately free from diplopia in daily life by not only surgical treatments but also steroid treatment and eye ball exercises. It was concluded that we needed pre-operative and post-operative eye ball exercises in addition to operation and steroid treatment in order to manage the patients with blowout fractures.

*Key Words* : Transantral approach, Eye ball exercises

### Introduction

Blowout fractures of the orbit, which are divided into 2 main groups, a pure type and an impure type, are a special type of facial injuries, since the term blowout fracture was coined by Smith and Regan in 1957<sup>1)</sup>.

Making decisions on whether and when to do surgery was a very important problem and has been discussed for a long time<sup>2)-6),9)</sup>. Including this problem, we evaluated 22 cases out of 52 cases who were operated on in our hospital, and discussed how we should manage the patients of blowout fractures.

### Subject

Fifty-two patients were treated in our hospital from 1981 to 1990. They were 42 males and 10 females (Fig. 1). The average age of patients with blowout fractures was 22.8 years with a range of 5 to 78 years. Teenaged

patients represented 51.9 % among the total.

Thirty patients were treated conservatively and 22 patients were operated on. This study included questionnaires for the surgical repair group to assess their recent postoperative conditions.

### Results

The most common cause in our hospital was sports, which accounted for 38.5 % of the total and the mean age was 15.6 years. Most of blowout fractures in teenaged patients were caused by sports. The second cause was violence (19.2 %). In comparison with other reports<sup>7),8)</sup>, traffic accidents were less, which accounted for 11.5 % (Table 1).

The fractures were classified as: 1) orbital floor fracture ; 2) medial wall fracture ; 3) orbital floor fracture and medial wall fracture ; 4) orbital floor and infraorbital rim fracture (Table 2). Thirty-three out of 52

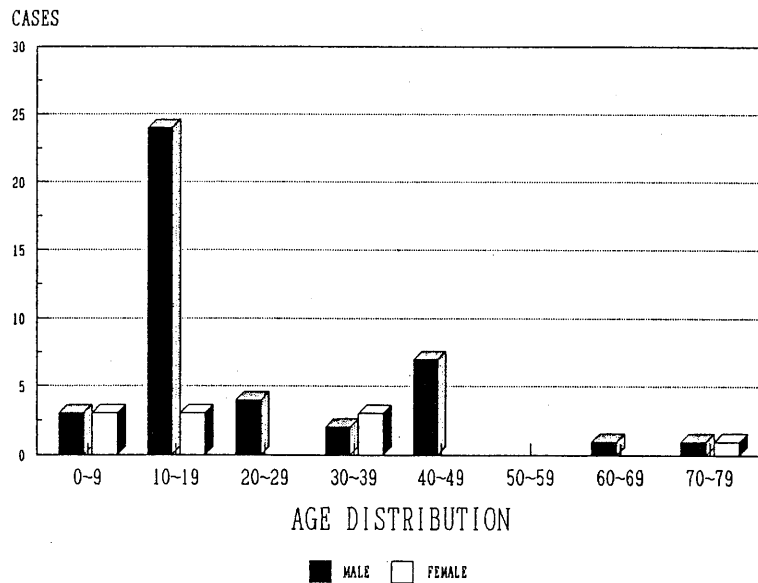


Fig. 1 Age distribution.

Table 1 Causes of blowout fractures.

CAUSE	CASE(%)	MEAN AGE (YR)
SPORTS	20(38.5)	15.6
VIOLENCE	10(19.2)	24.5
BUSINESS	4(11.5)	40.8
FALLS	4 (7.7)	31.5
TRAFFIC ACCIDENT	6 (7.7)	45.0
OTHER BLUNT OBJECTS	8(15.4)	12.4

Table 3. Time of repair and prognosis.

		-1W	1-2W	2-4W	1-2M	2-4M
NUMBER OR PATIENTS		2	2	13	3	2
DIPLOPIA in DAILY LIFE	+	0	0	0	1	1
	-	2	2	10	2	1
	unknown	0	0	3	0	0

M : month W : week

Table 2. Classification of blowout fractures.

	NUMBER OF PATIENTS (OPERATED PATIENTS)
ORBITAL FLOOR	33 (16)
MEDIAL WALL	13 (2)
ORBITAL FLOOR +MEDIAL WALL	4 (2)
ORBITAL FLOOR +ORBITAL RIM	2 (2)

cases had fractures of orbital floor only.

Seventeen out of 22 patients were operated on within 1 month from injuries and 14 out of 17 cases were ultimately free from diplopia in daily life according to questionnaires and the latest examinations. Two out of 22 operated patients, who were referred to out hospital at a late stage and operated on more than 1 month after injuries, had residual diplopia in daily life (Table 3). In these cases, one had a complex facial fracture, and the other had a fracture of the medial wall. In this report, the time lapse between the injury and the operation varied from 1 to 125 days, and averaged 31.9 days.

Table 4. Operation method.

Transantral approach	18
Transantral approach + Trans-ethmoidal approach	1
Transantral approach + Orbital approach	1
Trans-ethmoidal approach	2
	(cases)

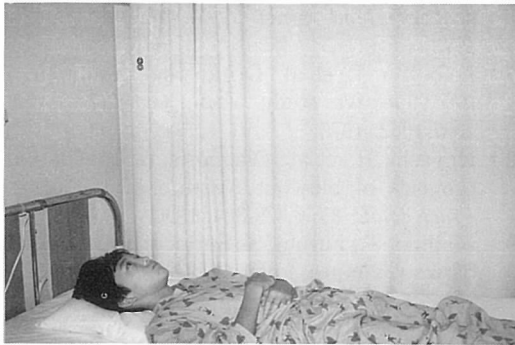


Fig. 2 A patients does exercises by using a pendulum three times a day pre-operatively and post-operatively.

There are two main approaches to blowout fractures of the orbital floor, i.e., the transantral approach and the orbital approach. In our hospital, the former was chosen for almost all of the cases with orbital floor fractures (Table 4). Our choice for operation is usually the transantral approach, which has the following advantages; 1) No incision is made on the skin of the face. 2) The depressed bony fragments will be supported with antral packs or balloons. 3) The autogenous bone grafts can be taken from the anterior wall of the maxillary sinus.

Pre-operatively and post-operatively, there are conservative treatments for the patients with blowout fractures, the steroid treatment and eye ball exercises. We have a protocol of eye ball exercises (Table 5). As shown in table 5, patients do exercises for thirty minutes, three times a day using a pendulum, which is constructed by a string from the ceiling (Fig. 2) or do exercises using the target board (Fig.3). Exercises are done by both

Table 5. A protocol of eye ball exercises.

1. With both eyes	
right and left	5 minutes
up and down	5 minutes
2. With the affected eye only	
right and left	5 minutes
up and down	5 minutes
3. Lateral gazing*	10 minutes
Total	30 minutes

\*Lateral gazing fixing a spot with eyes for 5 sec.

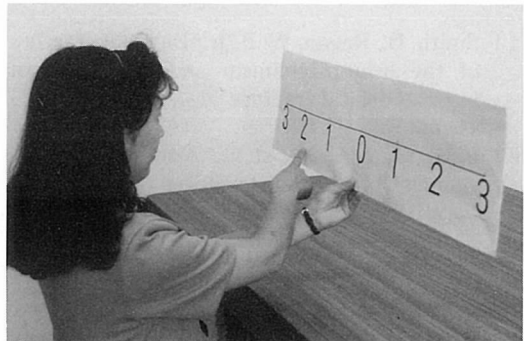


Fig. 3 A patients does eye ball exercises by using the target board.

eyes and the affected eye and patients gaze at an object at the edge of his field of vision for periods of five seconds. Furthermore, patients keep a records three times a day. By doing eye ball exercises pre-operatively and post-operatively, good results were obtained that 14 out of 17 operated cases who were operated on within 1 month after injuries, were free from diplopia in daily life.

## Discussion

The patients having surgical repairs within 1 month after injuries showed good prognoses by adding the steroid treatment and eye ball exercises. On the other hand, 2 out of 22 patients who were referred to our hospital at a late stage and operated on more than 1 month after injuries had residual diplopia in daily life. It was found that thier poor

prognoses were related to the type of fractures and the time of operation. This study has shown that the time of operation within 1 month after injuries, the type of orbital fractures and eye ball exercises done pre-operatively and post-operatively including the steroid treatment lead to good results.

To achieve better results and make decisions on whether and when to do surgery, it is necessary for us to examine what components are entrapped in the maxillary sinus or ethmoid cells by magnetic resonance imaging (MRI), in addition to careful clinical examinations and radiological assessment.

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