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# Blow or pure orbital floor fractures : (About six cases)

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***Summary :***
***Introduction*** *: Pure Blow-out fractures of the floor of the orbit correspond to the irruption of intra-orbital structures into the maxillary sinus, through a dehiscence of the inferior orbital wall, which is very thin and fragile. The aim of our work is to determine the clinical, radiological, therapeutic and evolutionary characteristics of this traumatological entitý.*
***Materials and Methods*** *: This is a retrospective study of six cases of fracture of the floor of the orbit type "blow out pure" collated in the department of maxillofacial surgery and stomatology, HMIMV Rabat over a period of six years (2019-2025).*
***Results*** *: Four men and two women, mean age 33 years. There were two causes of blow-out fractures in our series : road traffic accidents and assaults. Two of our patients had diplopia confirmed by the Lancaster test. Four of the six patients had V2 hypoesthesia. All our patients underwent a CT scan of the MF in the emergency department. Repair of the orbital floor consisted of a vicryl plate in three patients, a titanium plate in two, and a calvarial graft in one patient. Postoperative clinical follow-up with Lancaster test was performed.*
***Discussion*** *: Pure blow-out fractures of the floor of the orbit represent a particular form of orbital fracture. They are characterised by a risk of sequelae such as oculomotor disorders or enophthalmos. Knowledge of the clinical and radiological features of these fractures, mainly through CT scans, helps us to understand their different forms. Early and appropriate treatment is essential to obtain satisfactory results.*
***Key words*** *: blowout fracture ; orbital floor ; diplopia*

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## I. Introduction :

The fractures of the floor of the orbit of "purely blow-out" type correspond to the emergence of intra orbital structures in the maxillary sinus, through a dehiscence of the lower orbital wall formed by a papyrated (slim and fragile) bone. The surgical indication can be done in an emergency or delayed in front of a bundle of arguments, such as a diplopia on clinical examination, confirmed by a Lancaster test. The choice of the implant in the reconstruction of the floor depends on the importance of the collapse of the floor (vichel plate; titanium plate; calvarian graft, etc.). Clinical post -operative follow -up with Lancaster test is often necessary. We report six cases of Blow out pure fractures collected in the maxillofacial surgery department and stomatology of the Mohammed V military hospital in Rabat in the period from January 2019 to January 2025. Our work aims to determine the clinical and radiological characteristics of this entity.

## II. Materials and methods:

This is a unicenter retrospective study carried out in the maxillofacial and stomatology surgery service, the Mohammed V military hospital in Rabat on a six-year period, from January 2019 to August 2025. Were included all the patients operated during this period for an isolated fracture of the floor, with or without clinical diploma confirmed by a Lancaster test. Data concerning the patient and the disease were collected via the exploitation of clinical files. The follow -up was essentially clinical associated with the Lancaster test. Our cohort had six patients with a male predominance (66.7%), the average age was 33 years. The accidents of the public road (AVP) constituted the most frequent etiology (66.7%), followed with a direct blow on the eye (point stroke).

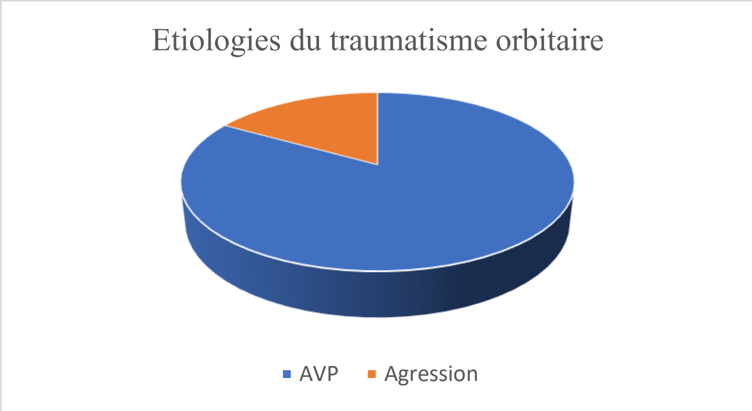


Figure 1 : Distribution of etiologies of orbital trauma

A case of the series presented an isolated diplopia (16.67%). Four others A hypoesthesia of the territory of the maxillary nerve (V2) (66.66%), and a diplopia associated with paresthesia of the territory of (V2) (16.67%) in the last

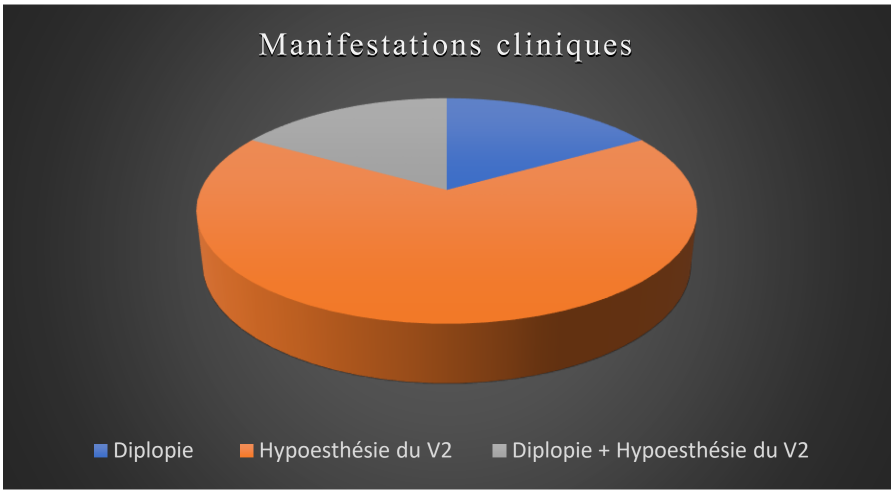


Figure 2 : Distribution of clinical manifestations

All our patients have benefited from a computed tomography of the facial mass in the emergency department. Trap fractures represented 16.67%, and fractures with collapse of the orbital floor 83.32%. Our entire series has benefited from an ophthalmological opinion, and a Lancaster test (100%). In any case, medical treatment of 24 to 48 hours, based on antibiotic therapy (amoxicillin + clavulanic acid) and corticosteroid therapy was established in all patients. Surgery deadlines were less than 5 days old. Whatever the type of fracture of our series, surgical management consisted of the establishment of an implant, by ciliary way A forced duction test was carried out before and after the reconstruction of the floor. Half of our patients, benefited from the implementation of a vicryl plate, (50%), a titanium plate in two patients (33.33%) and then a carvarian bone graft in a patient (16.67%). Post operative follow -up was essentially clinical, more or less associated with a Lancaster test. No sequelae (residual diplopia, ophthalmology, ectropion or unsightly scar) was recorded in our series for an average setback of around 18.67 months.

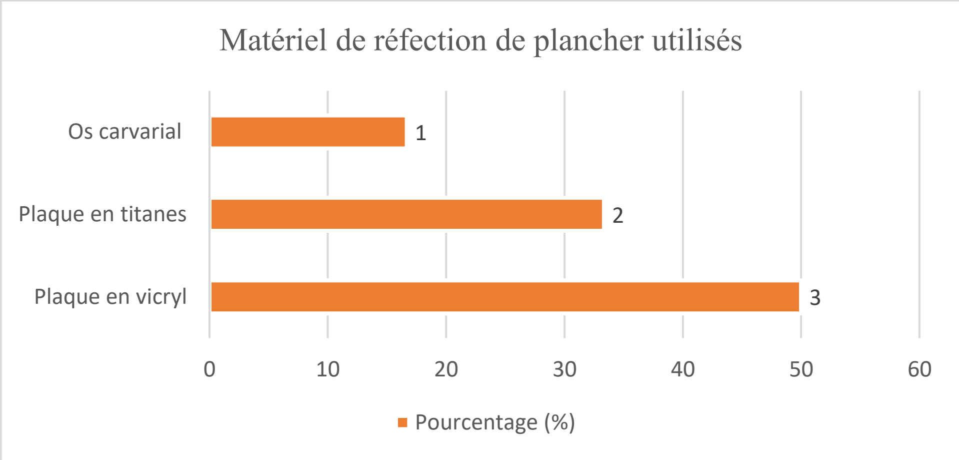


Figure 3 : Distribution of floor repair equipment used

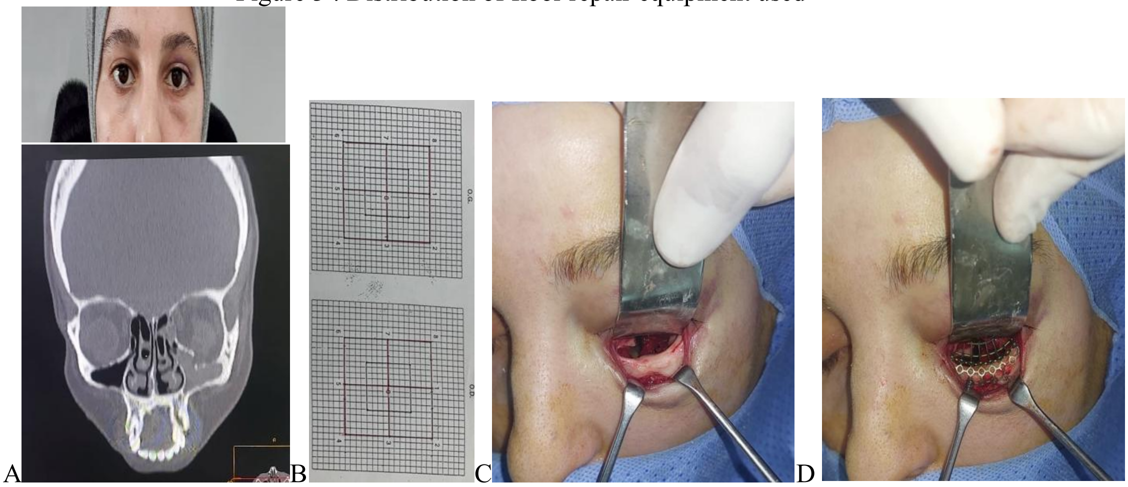


Figure 4: (a) at the top photograph of a woman with a fracture of the orbital floor with enophthalmia, without palpebral edema or hemorrhage under conjunctival. Down with Catrums in Bone Bone and Coronal Cutting showing a fracture of the floor of the left orbit (collapsed). (B): Image of the normal layout of the Lancaster test (C): Peroperative photography showing a loss of substance from the left orbital floor, by the ciliary route (D): reconstruction of the orbital floor by a titanium plate.

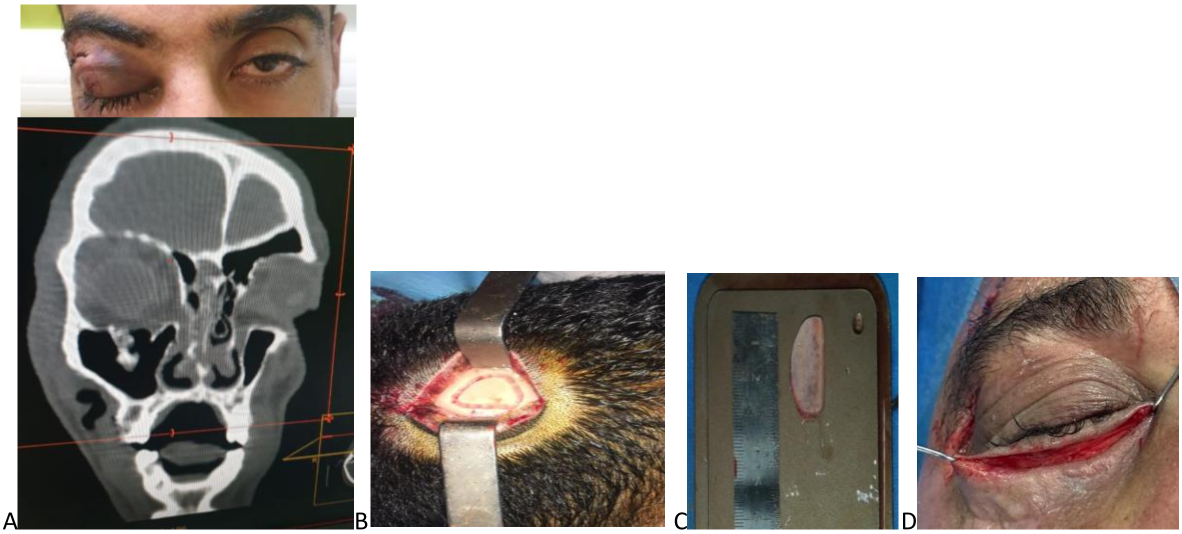


Figure 5 : (A) At the top photograph of a man with a fracture of the orbital floor with edema and bruise of the upper eyelid, hemorrhage under conjunctival. Down with Catrums in Bone Bone and Coronal Cut, showing a fracture (collapse) of the right orbital floor. (B and C) Peroperative photograph of the Calvarial bone graft. (D): Image showing the ciliary at the orbital floor.

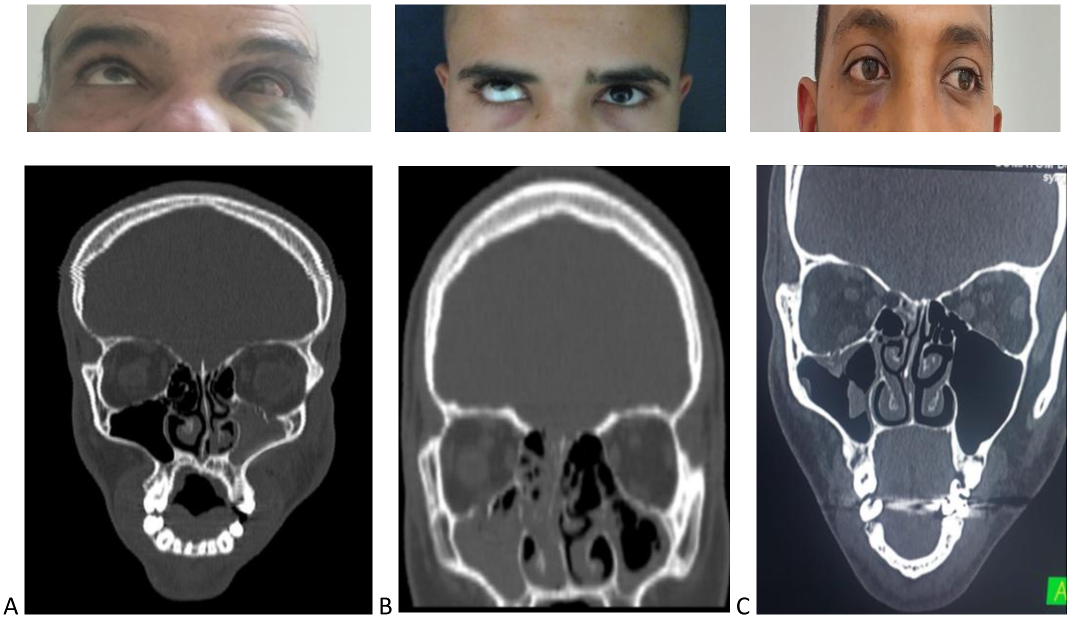


Figure 6 : (A): At the top photograph of a man with a fracture of the left orbital floor with left periorbital bruise, horizontal diplopia with high vision. Below, TDM in a bone window and in the coronal cut showing a fracture of the floor of the left orbit in Trap-Door with incarceration of the lower right muscle and homolateral hemosinus. (B): at the top photograph of a man with enophthalmos, a right vertical diplopia, below, CT of the facial massif in a bone window and in coronal cut showing a fracture of the floor of the right orbit with incarceration of the infected right muscle, right hemosinus (C): Photography of a man with a fracture of the right orbital floor with enophthalmia and a right orbital board fracture

## III. Discussion :

The floor of the pure "blow-out" type orbit fractures correspond to the emergence of intra orbital structures in the maxillary sinus, through a dehiscence of the lower orbital wall which is very thin and fragile. Orbital fractures represent 50% of face fractures, [1,2] male predominance. They mainly affect young adults with an age group between 16 and 40 years old. Aggressions are the main etiology, falls and accidents of the public road after 40 years. These come to confront our series. The isolated fractures of the orbital floor are rarer. The term blow out indicates the mechanism, and is reserved for isolated fractures of the orbital floor opening in the maxillary sinus [3,4]. This fracture is said to be blow-out pure when it is isolated at the lower wall of the orbit, and says blow-out impure when associated with other fractures of the average front (Orbito-zygomatic fracture; Naso-Orbito-ethmoidal) [3,4]. Diplopia and enophthalmos constitute the distinctive signs of a blow-out fracture. In addition, other signs may be associated, namely, peri-orbital bruising, a conjunctival hemorrhage, epistaxis, and/or hypoesthesia of the territory of the maxillary nerve (V2). The emergency report initially includes a clinical examination in search of a real trapping of the lower lower muscles which is exceptionally found [5]. And an examination of the eyeball by an ophthalmologist because an orbital trauma with or without an orbital fracture are frequently accompanied by lesions of the globe (corneal abrasion hyphema, retinal detachment, glass hemorrhage etc.) [6]. The particular case of the child imposes a more meticulous evaluation of the oculomotricity due to (white eyes syndrome) in which the eye seems normal except the limitation of ocular movements [7,8]. Unlike adults, eye limitations in children is very painful and very annoying diplopia. It combines neurovegetative symptoms linked to the oculo cardiac reflex (nausea, vomiting, bradycardia, syncope). This clinical presentation is often in relation to a trap fracture which remains the most frequent in the pediatric population [7,8]. The orthopedic examination (Lancaster test) which assesses eye motor skills in the different positions of the gaze is an integral part of the clinical examination. Compared to literature, our entire series has benefited from a Lancaster test. The CT scrutiny in fine sections (1mm) with reconstruction in the three planes of space (sagittal and coronal) constitutes the examination Reference radiological, and makes it possible to determine the type of fracture (pure or impure blow-out), morphology, the size of the fracture (in a trap, collapse, commutative), the damage of the optical channel, the presence of hematoma and or an intraocular emphysema [9]. It also assesses the size and extent of the incarceration of periorbital soft tissues and oculomotor muscles within the maxillary sinus. All our patients also benefited from a scanner with different cups in the emergency department. For surgical management, surgery deadlines depend on the type of fracture (fracture of the orbital floor with incarceration of soft tissue versus fracture without incarceration of soft tissue).

The delayed management of a floor fracture with muscle incarceration may cause muscle ischemia and cause persistent diplopia [10, 11]. Silverman et al [12] report in a retrospective study of 45 patients a 17 -hour surgical management deadline for floor fractures with incarceration of soft tissue. In addition, Shokri et al [10], report in a review of the literature that the muscle remains incarcerated longer, the more the risk of post-operative diplopia increases. They therefore recommend urgent surgical extrication, ideally within 24 hours. Indeed, the clinical signs of incarceration are priority in relation to imaging, because there is a strong association between the presence of limitations of oculomotricity and the presence of a musculo-grave incarceration

On the other hand, incarceration is not always clearly visible on the scanner [12]. In any case, in the event of a Blow-Out type orbital floor fracture with clinical signs of muscle incarceration, rapid surgical management is necessary. For fractures of the Blow-Out type orbital floor without incarceration of soft tissues, there is no clear consensus in the literature on time between fracture and surgical management. However, most medical teams [13], [14], [15] recommend an intervention within 15 days of trauma. The time to take charge is correlated with operating indications. Indeed, according to service habits, treatment is surgical if clinical signs are present such as diplopia or enophthalmia. In any case, with or without clinical signs, the patient is delayed in an interval of 5 to 7 days, after the melting of edema. Some consider that when the loss of substance at the radiological level exceeds half of the orbital floor [16] or if the bone defect of the floor measures more than 2 cm2 constitute surgical indications [10]. So early treatment in these cases helps prevent fibrosis of periorbital soft tissue, unlike late treatment that makes the gesture more difficult and less effective. Based on imaging data, Kovar et al, in their series of 80 patients published in 2017 [17], offers surgery when the volume of fabric in protrusion in the maxillary sinus exceeds 1400 mm3, even in the absence of initial clinical signs.

Their objective is to operate these asymptomatic patients within 15 days of trauma, assuming that clinical signs would appear after the resorption of edema, given the importance of the size of the initial fracture. In general, if the patient has initial clinical signs, it is not necessary to wait a month before surgery. On the other hand, if the patient is initially asymptomatic, but presents scanographic signs of an important fracture, the question arises to be used surgically before clinical control at 1 month. The balance between profits and risks should be discussed between the surgeon and his patient. For our series, with or without initial clinical signs, associated with scanographic signs, surgery was done within a time of approximately 5 days. The technique of reconstructing the orbital floor in the Blow-out fracture can use several surgical and different ways type of implants. During the survey carried out by Cohen and his colleagues with 225 American surgeons in different centers, it was found that 90% of these surgeons preferentially used the transconjunctival path [2]. According to the work of Shokri et al, this technique has become the preferred approach during surgery of the orbital floor due to its low complication rate and easy dissection. This technique allows rapid access with simple dissection, does not leave a visible scar and reduces the risk of post-operative ectropion compared to the subciliary path [10], unlike the literature which shows that the authors.

Under ciliates was mainly used for the reconstruction of the orbital floor in our series.

## IV. Conclusion :

Fractures of the Blow-Out Pure Blow-Out's floor is a unique entity in facial trauma. The surgical indication can be done in an emergency (child) or in deferred (adult) in front of a bundle of arguments, such as a diplopia on the clinical examination, confirmed by a Lancaster test. The choice of the implant in the reconstruction of the floor depends on the importance of the collapse of the orbital floor. There is no standardized treatment currently in the Blow-Out fracture management.

Conflict of interest: the authors do not report any conflict of interest

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