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# Are open mandibular fractures still an emergency?

## Les fractures ouvertes de la mandibule sont-elles encore une urgence ?

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### Summary

**Introduction.** Early surgical management is often advocated for fractures of the tooth-bearing portion of the mandible. A 6-hour delay has been mentioned for the fixation of these fractures. Our aim was to bring this paradigm into question.

**Methods.** All patients referred to our department from September 2012 to May 2014 for fractures of the tooth-bearing portion of the mandible were retrospectively included. For each patient, age, gender, aetiology of the fracture, and characteristics of the fractures were recorded. Tobacco and/or alcohol addictions, diabetes and mandibular dental condition were taken into account. We also noticed the preoperative delay and the occurrence of complications such as: haematoma, infection, wound dehiscence, osteosynthesis failure and pseudarthrosis.

**Results.** Among the 47 patients referred, 36 were treated with a delay of more than 6 hours (76.6%). In 88.8% of the cases, the reason for this delay was unavoidable. The mean delay time from trauma to surgery was 52 hours (range: 7–312). Forty-nine percent of the patients had comorbidities. Complications occurred in 6 patients leading to an overall complication rate of 16.67%. A statistically significant higher complication rate was observed among smokers ( $P = 0.006$ ). No statistical relationship was found between the delay and the occurrence of complications ( $P = 0.994$ ). This study suggests that fractures of the tooth-bearing portion of the mandible should no longer be considered as an emergency that must be treated within a 6-hour delay.

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**Keywords:** Mandibular fractures, Complications, Maxillomandibular fixation, Time-to-treatments

### Résumé

**Introduction.** Certains auteurs préconisent une prise en charge chirurgicale précoce des fractures de la portion dentée de la mandibule et un délai de 6 heures a été évoqué pour réaliser la fixation de ces fractures. Le but de cette étude était d'étudier la validité de ce paradigme.

**Matériel et méthode.** Tous les patients pris en charge pour une fracture de la portion dentée de la mandibule au sein de notre service entre septembre 2012 et mai 2014 ont été inclus rétrospectivement. Pour chaque patient ont été renseignés : l'âge, le sexe, le type de traumatisme causal ainsi que les caractéristiques de la fracture. Il a été tenu compte des comorbidités suivantes : tabagisme, alcoolisme, diabète, état de la denture mandibulaire. Nous avons également noté le délai écoulé entre le traumatisme et le traitement chirurgical et la survenue de complications telles que : hématome, infection, déhiscence de plaie, bris du matériel d'ostéosynthèse, pseudarthrose.

**Résultats.** Sur les 47 patients pris en charge, 36 ont été traités chirurgicalement dans un délai supérieur à 6 heures (76,6 %). Dans 88,8 % des cas, la cause du délai prolongé était inévitable. Le délai moyen entre le traumatisme et la prise en charge chirurgicale était de 52 heures (7–312). Quarante-neuf pour cent des patients avaient des comorbidités. Des complications sont survenues chez 6 patients, ce qui représente un taux de complication global de 16,67 %. Un taux de complication plus élevé a été observé parmi les fumeurs ( $p = 0,006$ ). Il n'a pas été retrouvé de lien statistiquement significatif entre un délai augmenté et la survenue de complication ( $p = 0,994$ ). Cette étude suggère que les fractures de la portion dentée de la mandibule ne devraient plus être considérées comme des urgences devant être prises en charge chirurgicalement dans un délai de 6 heures.

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**Mots clés :** Fractures mandibulaires, Complications, Délai au traitement

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## Introduction

Fractures of the tooth-bearing portion of the mandible are considered as open fractures. Due to the risk of infection, it is commonly recommended to perform an open reduction with a rigid internal fixation (ORIF) as early as possible. In comparison with open fractures in orthopaedic surgery, Champy et al. in 1978 considered that the treatment within a 6-hour delay was ideal [1]. This statement has remained the gold standard in a lot of trauma centres. However, maintaining this delay in practice is often not possible, for reasons out of the surgeon's control.

The purpose of this study was to compare the complication rates occurring in patients operated within and after a 6-hour delay in our department, to analyze what were the main causes for the delay to surgery and to put into question the paradigm for early management of these fractures.

## Material and methods

All patients who underwent ORIF for fractures of the tooth-bearing portion of the mandible in our department between September 2012 and May 2014, with a minimal follow-up of 3 months, were included in this retrospective study. Data included time from trauma to surgery, age, gender, aetiology of the fracture, number of fractures on the tooth-bearing portion of the mandible and total number of fractures of the mandible. The following conditions were also included: tobacco and/or alcohol addiction, diabetes, illegal drug abuse and dental condition of the mandible.

Once the diagnosis of mandibular fracture was made, patients were administered oral or intravenous large spectrum antibiotics, which were continued for 7 days following the surgery. Chlorhexidine (0.1% dilution) mouthwashes were also administered as well as a soft diet. No patient required any intermaxillary fixation during the postoperative period. All the fractures were treated following the AOCMF guideline using titanium plates from the SYNTHES® Matrix mandible™ system (Depuy Synthes, Switzerland). Complications such as haematoma, infection, wound dehiscence, plate failure, pseudarthrosis were recorded.

A statistical analysis was done using the SPSS software (IBM®, Chicago, IL). The Fischer's exact test was used to analyze the possible relation between comorbidities and the occurrence of complications (nominal outcome variable). A logistic regression was used to see if an increased delay was associated with the occurrence of complications. The occurrence of complications was considered a binomial outcome (complication or not) and the delay was used as a continuous numerical variable. Statistical significance was set at  $P < 0.05$ . All the patients gave their consent for the use of their medical records for scientific study purpose.

## Results

Forty-seven patients met the inclusion criteria. Two patients with incomplete data and lost for follow-up were not included. Of these 47 patients, 11 patients underwent ORIF within 6 hours (early group) (23.4%) and 36 (76.6%) underwent ORIF with a delay of more than 6 hours (delayed group).

Mean age of the patients was 35 years (range: 3–86, SD: 22.9). Twenty-four patients were male (67%) and 12 were females (33%). The comorbidities of the patients are summarized in *table I*. The five fracture aetiologies were, in descending order of frequency: falls, assault, sport accidents, road traffic accidents and work accidents (*table II*).

Seventeen patients had a unifocal fracture (47.2%), 17 had a bifocal fracture (47.2%) and 2 had a trifocal fracture of the mandible (5.6%). Twenty-five patients had one fracture of the tooth-bearing portion of the mandible (69.4%) and 11 patients had two fractures of the tooth-bearing portion (30.6%).

The mean delay time in 36 patients with a delay of more than 6 hours from trauma to surgery was 52 hours (range: 7–312). The distribution of the patients regarding the delay is shown in *fig. 1*. The causes for delayed treatment were: transfer from another hospital (44.4%), delayed consultation (27.8%), additional vital emergency (16.6%) and non-availability of the operating room (11.2%).

Extraction of teeth included in the fracture line was done in 7 patients (19.4%).

*Table III* reports the complications observed during the follow-up. These complications occurred in 6 patients, all of them being in the delayed group (16.7%) (*table IV*). No other complications were observed.

**Table I**  
Comorbidities of the patients.

Comorbidity	Early group n (%)	Delayed group n (%)
Tobacco use	1 (9%)	16 (44.4%)
Diabetes	0 (0%)	1 (2.8%)
Alcohol abuse	0 (0%)	3 (8.3%)
Edentulous	1 (9%)	0 (0%)
Total	2 (18%)	20 (55.5%)
	23 (49%)	

**Table II**  
Aetiologies.

Aetiology	Early group n (%)	Delayed group n (%)	Total n (%)
Falls	5 (45.4%)	17 (47.2%)	22 (46.8%)
Assault	4 (36.4%)	7 (19.5%)	11 (23.4%)
Sport	1 (9.1%)	6 (16.7%)	7 (14.9%)
Road traffic accident	1 (9.1%)	3 (8.3%)	4 (8.5%)
Work accident	0 (0%)	3 (8.3%)	3 (6.4%)
Total			47 (100%)

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