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Mandibular Condyle Fractures: Epidemiological, Clinical and Therapeutic Aspects at the National Center of Odonto-Stomatology Professor Hamady Traore in Bamako

Coulibaly Amady[1,2*], Keita Famady[1], Adam Saliou[3], Sangare Bourema Daouda[1], Konare Mbouille[4], Nientao Ousmane[4], Sissoko Yaya[1], Keita Kadia[1], Kone Rokiatou[1], Kassambara Abdoulaye[1,2], Toure Alphousseiny[1,2], Ba Boubacar[2], Traore Drissa[2]

[1]Department of Stomatology and Maxillofacial Surgery, CHU-CNOS Pr Hamady Traoré, Bamako, Mali
[2]Faculty of Medicine and Odontostomatology, Bamako, Mali
[3]Department of Odontostomatology and Maxillofacial Surgery, CHU SO, Lomé, Togo
[4]Departement of Anesthesic, CHU-CNOS Pr Hamady Traoré, Bamako, Mali
Email: *coulibalyamady@yahoo.fr

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Abstract

Introduction: Fractures of the mandibular condyle are defined as a break in the condylar process of the mandible. They can be unilateral or bilateral, intra-articular or extra-articular. The objective of this study was to investigate the epidemiological and clinical characteristics of mandibular condyle fractures in our setting. **Methods:** This was a cross-sectional, descriptive study conducted from January 2022 to May 2023, focusing on cases of mandibular condyle fractures at the CHU-CNOS Pr Hamady TRAORE in Bamako. **Results:** Of 87,741 patients seen over 17 months, 21 cases of mandibular condyle fractures were recorded, representing an incidence of 1.23 cases per month. Males were the most represented sex (76.20%). The 15 - 29 age group was the most represented (42.85%). Farmers accounted for 33.33% of cases. A low subcondylar fracture was present in 80.95% of cases. The modified Risdon approach was used in 47.36% of cases. Osteosynthesis using a miniplate was performed in 42.10%. The outcome was favorable in 78.96% of cases. **Conclusion:** Fractures of the mandibular condyle represent a significant entity in maxillofacial traumatology. Road traffic accidents are the leading cause.

Keywords

Fracture, Condyle, Mandible, Osteosynthesis

1. Introduction

Fractures of the mandibular condyle are defined as a break in the continuity of the condylar process of the mandible. They can be unilateral or bilateral, intra-articular or extra-articular. According to the classic Dingman and Natvig classification of mandibular fractures, 36% of mandibular fractures affect the condyle [1]. These include low subcondylar or basicervical fractures, high cervical or subcondylar fractures, fracture-dislocations, and true or capital condylar fractures. The diagnosis of these fractures is primarily clinical, confirmed by imaging [2]. Complications arise primarily when diagnosis and/or early, appropriate management are not provided. Early complications may include dental occlusion disorders, mandibular movement disorders, temporomandibular joint dysfunction, and temporomandibular ankylosis, which is the most severe complication, occurring mainly after an intra-articular condylar fracture. The approach to treating condylar fractures has evolved considerably in recent years, gradually shifting from a purely functional approach to more nuanced methods: functional treatment for minimally displaced fractures, fractures in children, and major fractures; and open reduction and internal fixation in other cases [3].

The objective of this study was to investigate the epidemiological, clinical, and therapeutic characteristics of fractures in the mandibular condyle region.

2. Methods

This was a descriptive cross-sectional study conducted in the Department of Stomatology and Maxillofacial Surgery at the Professor Hamady Traoré National Center for Odonto-Stomatology in Bamako, over a 17-month period, from January 2022 to May 2023.

We included in this study all patients of both sexes in whom a diagnosis of mandibular condyle fracture was made clinically and confirmed by radiography, and who had a complete medical record. All patients underwent a thorough clinical examination and radiological assessment (panoramic radiograph, computed tomography). The fractures were classified into 3 categories: low subcondylar fractures, high subcondylar fractures, and capital fractures. Data were collected using a pre-established questionnaire containing, for each anonymous patient, epidemiological, clinical, and therapeutic data, as well as the operating room log and medical record. The data were entered and analyzed using SPSS 6.0 software.

3. Results

Out of 87,741 patients seen, 21 cases of mandibular condyle fractures were recorded, representing an incidence of 1.23 cases per month. Condylar fractures accounted for 14% of mandibular fractures (N = 145). The 15 - 29 age group was the most represented, accounting for 42.85% of cases. Males represented 76.19% of cases, for a male-to-female ratio of 3.2. Farmers represented 33.33% of cases. Road traffic accidents were the cause of these injuries in 66.66% of cases.

Limited mouth opening accounted for 90.47% of functional symptoms in pa-

tients. In this study, 47.62% of patients presented with a chin injury. General occlusion (GO) and CT scans were performed on all patients (Figure 1). A low subcondylar fracture was present in 80.95% of cases. The fracture was unilateral on the left in 52.38% of cases. An association with another mandibular location (the ramus, symphysis, horizontal ramus, and angle of the mandible) was present in 42.85% of cases.

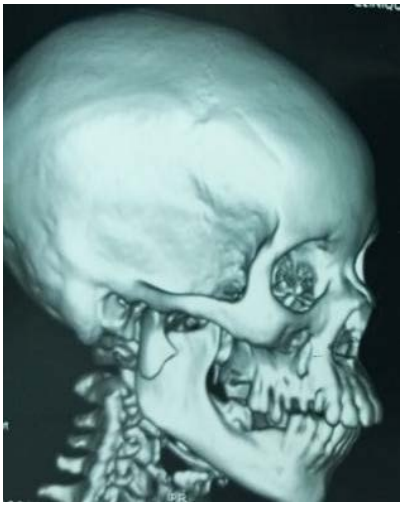

Figure 1. 3D CT scan showing the right low subcondylar fracture.

In 85.69% of cases, the treatment method was surgery combined with orthopedic treatment. The high submandibular approach was used in 52.63% of cases. Osteosynthesis using miniplates was performed in 42.10% of cases (Figure 2, Figure 3). The time to treatment was between 6 and 11 days in 52.64% of cases. The duration of maxillomandibular fixation was between 8 and 15 days in 60% of cases. Postoperative complications included facial paralysis and surgical site infection, each occurring in 10.52% of cases.

Figure 2. Osteosynthesis using a miniplate.

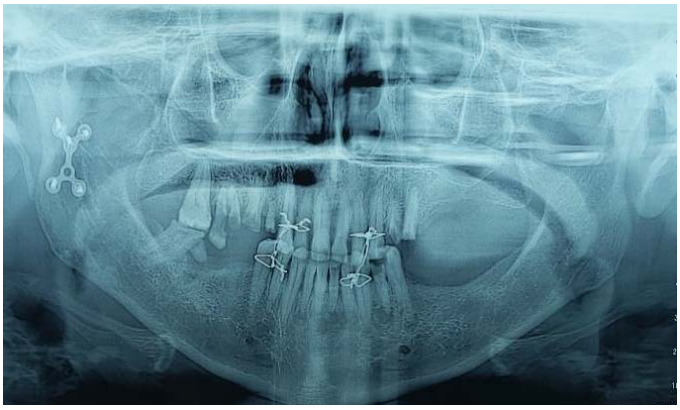

Figure 3. Post-operative panoramic radiograph.

4. Discussion

Of 87,741 patients seen, 21 cases of mandibular condyle fractures were recorded over a 17-month study period, representing an incidence of 1.2 cases per month. During this period, 145 patients presented with at least one mandibular fracture, 14% of which affected the condyle. In contrast, in the study by Elmansouri H., mandibular condyle fractures represented 39.75% of all mandibular fractures [4]. This difference may be due to the shorter study period in our setting. The 15 - 29 age group was the most represented, accounting for 42.85% of cases; the mean age was 31 years, with a range of 9 to 62 years and a standard deviation of 14.51. These results are close to those of Daniel D.T. *et al.* [5], who found a mean age of 33.6 years and a range of 18 to 81 years. These findings explain the exposure of young individuals to lower facial trauma. In this study, 76.20% of condylar fractures occurred in men, with a male-to-female ratio of 3.2. In the study by Elmansouri H. on mandibular condyle fractures, the male-to-female ratio was 9.83 [4]. Ahmedou S. also found a male-to-female ratio of 4 [6], reflecting this male predominance. This male predominance could be explained by the fact that men are more exposed to trauma due to their dynamism, professional activities, and tendency towards risk-taking. Among the occupations, the victims were predominantly farmers (33.33% of cases). This result is close to that of Ahamedou S., who found a predominance among manual laborers, with 47.05% of cases [6]. Indeed, in some regions of the world, a farmer is considered a manual laborer. Road traffic accidents accounted for 66.66% of the causes of condylar fractures in this study. In most studies in Africa, road traffic accidents, primarily accidents involving two-wheeled vehicles, were the leading cause of mandibular condyle fractures, according to the study by Elmansouri H., where they accounted for 66.6% of cases in a sample of 20 [4]. The same was true in the study by Ahmedou S., where road traffic accidents represented 45.09% of the etiologies [6]. This can be explained, in our context, by the unfavorable road safety conditions due to the failure to systematically wear full-face helmets and the disregard for traffic laws by road users, as well as the rapid increase in the number of vehicles on the road in recent decades.

In the diagnostic process, all patients underwent an OPG (optic panniculog-

raphy), which is the key examination for visualizing the mandible. This result is identical to the result reported by Elmansouri H. [4]. However, only 55% of patients in his study underwent maxillofacial computed tomography to explore associated craniofacial lesions, whereas in this study, all patients underwent CT, identical to the result of Daniel D.T. *et al.* [5]. Radiological examination is of paramount importance in the management of condylar fractures. Indeed, it constitutes a medico-legal document in addition to providing precise information on the fracture line and exact location. We recorded 21 cases of condylar fractures, of which 80.95% were low subcondylar fractures, 19.05% were high subcondylar fractures, and we recorded no cases of capsular or divicapular fractures. This is identical to the result of Meyer C. *et al.* [7] for capsular fractures; however, Zachariades N. *et al.* [8] recorded in their series 12% intracapsular fractures, 31% high subcondylar fractures, and 57% low subcondylar fractures. In a study of 75 cases of condylar fractures, Meyer *et al.* found a predominance of low subcondylar fractures (54 cases) and high subcondylar fractures (21 cases) [7]. Left condylar fractures were present in 52.38% of cases in this study. This result is consistent with that of Zachariades *et al.*, who found that condylar fractures are more frequent on the left side [8]. Condylar fractures very often occur following indirect trauma to the mandible, and involvement of the left side can be explained by the exposure of the left side of the lower face due to a decrease in the protective reflex system during trauma. Most of us protect ourselves with our right forearm when trauma occurs. According to associated injuries, 42.85% of cases were mandibular in this study. In the series by Veyret A., on condylar fractures, 4 cases were isolated fractures, and the other cases were bifocal or trifocal mandibular fractures (2 symphysis fractures, 2 parasymphysis fractures, and 2 mandibular angle fractures) [9]. This is explained by the exposure of the mandible as a bumper for the lower third of the face, in the context of the trauma to this third.

In this study, the time to treatment for patients was between 6 and 11 days in 52.38% of cases (excluding two patients who did not undergo surgery). This timeframe is longer compared to the study by Elmansouri H., where treatment was completed within an average of 3 to 10 days [4]. This delayed treatment could be explained in our context by the presence of associated lesions, but also by delays in seeking medical advice or patients' limited financial resources for accessing care. Health insurance coverage in our countries is still in its infancy or virtually nonexistent. The indications for treatment depend on the age of the subject, the location of the fracture and the displacement. In total, 19 out of 21 patients, or 90.47% of our sample, underwent surgery. The high submandibular approach (modified Risdon) was used in 52.63% of cases, followed by the Ginestet-type pretragal approach in 21.06% of cases. In France, according to the study by Trost *et al.*, 70% of the team performed the high submandibular approach described by Meyer in 2006 for low subcondylar fractures [10].

In 15.79% of cases, the intraoral approach was used for condylectomy but not for osteosynthesis. Condylectomy was performed in 47.36% of cases, and osteo-

synthesis using a titanium miniplate fixed with screws in 42.10%. In contrast, the anterior transparotid, retromandibular approach for osteosynthesis using a double triangular miniplate was performed in 102 out of 124 patients with a mandibular condyle fracture, according to the study by Torres B. *et al.* [11]. Only one patient in our series benefited from the translesional approach for the left low subcondylar fracture. This was the only patient who did not receive orthopedic treatment after osteosynthesis using a mini-plate fixed with screws. The work of Torres *et al.*, in a study of 25 cases of mandibular condyle fractures in children, showed that functional treatment yields excellent results. Furthermore, it has the advantage of being less traumatic than surgical treatment and avoids the risk of ankylosis associated with orthopedic treatment using intermaxillary fixation [5]. In this study, 85.71% of patients received combined surgical treatment with orthopedic maxillomandibular fixation. According to a study by Trost *et al.* in France, involving various maxillofacial surgery teams, postoperative treatment for mandibular condyle fractures included no maxillomandibular fixation and immediate rehabilitation for nine teams (53%), and postoperative maxillomandibular fixation for eight teams (47%). The minimum duration of fixation was 7 days and the maximum was 15 days [11]. This result is similar to ours, where 60% of patients were released between 8 and 15 days. This maximum delay of 15 days is explained by the risk of residual lobular dislocation due to temporomandibular ankylosis beyond 3 weeks of maxillomandibular fixation. In this study, two cases of postoperative complications were related to facial paralysis and surgical site infection. Assouan *et al.* reported two cases of stiffness of the temporomandibular joint [12].

5. Conclusion

Fractures of the mandibular condyle represent a significant entity in maxillofacial traumatology. Road traffic accidents are the leading cause. Computed tomography (CT) plays an important role in diagnosis. Treatment indications depend on the patient's age, the location of the fracture, and the degree of displacement. Appropriate management helps prevent serious sequelae that are difficult to treat later. It is important to emphasize raising public awareness about road traffic accident prevention.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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