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RESEARCH ARTICLE

HIGH SUBCONDYLAR FRACTURES: SURGICAL VERSUS FUNCTIONAL TREATMENT

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Abstract

Introduction:- Mandibular condylar process fractures represent a frequent location of mandibular fractures. Management of high subcondylar fractures remains debated, particularly because of the difficulty of surgical exposure and the proximity of the facial nerve. The choice between open reduction and internal fixation and functional treatment depends on fracture displacement, occlusal disturbance, joint involvement, and the clinical context.

Objective:- To evaluate the functional and radiological outcomes of high subcondylar fractures in our unit and to compare the outcomes of surgical and functional treatment. **Patients and Methods** This was a retrospective study of 22 patients with high subcondylar fractures treated in the Department of Oral and Maxillofacial Surgery of Mohammed V Military Teaching Hospital (HMIMV). Fourteen patients underwent open reduction and internal fixation, while eight received functional treatment consisting of early active mandibular rehabilitation without immobilization or maxillomandibular fixation. Two surgical approaches were used: the high subangulomandibular (SMH) approach and the retromandibular (RM) approach.

Results:- The mean age was 26.5 years; 20 patients were men and 2 were women. Among the 14 surgically treated patients, 12 were approached through the SMH route and 2 through the RM route. Reduction was satisfactory in 12 cases. One osteosynthesis plate was used in each operated patient: 12 TCP plates and 2 X-shaped miniplates. Mean final mouth opening was 35.9 mm in the surgical group versus 30.4 mm in the functional group. Normal occlusion was found in 11 surgically treated patients versus 1 functionally treated patient. Deviation on opening persisted in 3 surgical patients versus 7 functional patients. Temporomandibular joint pain was reported in 4 surgical patients and 5 functional patients. Three postoperative hematomas, which resolved spontaneously, and two transient facial nerve deficits were observed in the surgical group. No permanent facial paralysis occurred.

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Conclusion:-In our series, functional outcomes were generally more favorable after surgical treatment. However, these findings do not establish an intrinsic superiority of surgery, particularly because of the retrospective design, indication bias, and the lack of standardized assessment of rehabilitation adherence and quality in the functional group. The limited availability of physiotherapy specifically directed toward the temporomandibular joint and maxillomandibular function is also an important contextual factor.

Introduction:-

Mandibular condylar process fractures account for a substantial proportion of mandibular fractures. Their management remains controversial, particularly for high extracapsular fractures, because of the difficulty of accessing the fracture site and the proximity of the facial nerve. Anatomically, the literature classically distinguishes the condylar head, condylar neck, and base of the condylar process. This topographic classification provides a useful framework for describing condylar fractures [1]. In our practice, we define high subcondylar fractures as extracapsular fractures located in the upper part of the subcondylar region, below the condylar head. Condylar head fractures are excluded. Treatment remains debated. Surgical treatment allows direct reduction of the fracture and restoration of ramal height, but carries approach-related risks, particularly facial nerve injury. Functional treatment, on the other hand, relies on early mandibular mobilization and rehabilitation aimed at restoring mandibular function [2,3]. The objective of this study was to report our experience in the management of high subcondylar fractures and to compare the functional outcomes of patients treated surgically and functionally.

Patients and Methods:-

Study population and setting:-

This was a retrospective descriptive and comparative study of 22 patients with high subcondylar mandibular fractures treated in the Department of Oral and Maxillofacial Surgery of Mohammed V Military Teaching Hospital (HMIMV). Collected data included demographic characteristics, trauma mechanism, side involved, associated mandibular fracture, displacement and condylar dislocation, initial functional findings, treatment type, surgical approach, osteosynthesis material, and outcomes at the last follow-up.

Anatomical definition:-

The reference anatomical classification of the condylar process distinguishes the head, neck, and condylar base [1]. In our series, a high subcondylar fracture was defined as an extracapsular fracture located in the upper part of the subcondylar region, below the condylar head. Condylar head fractures were excluded.

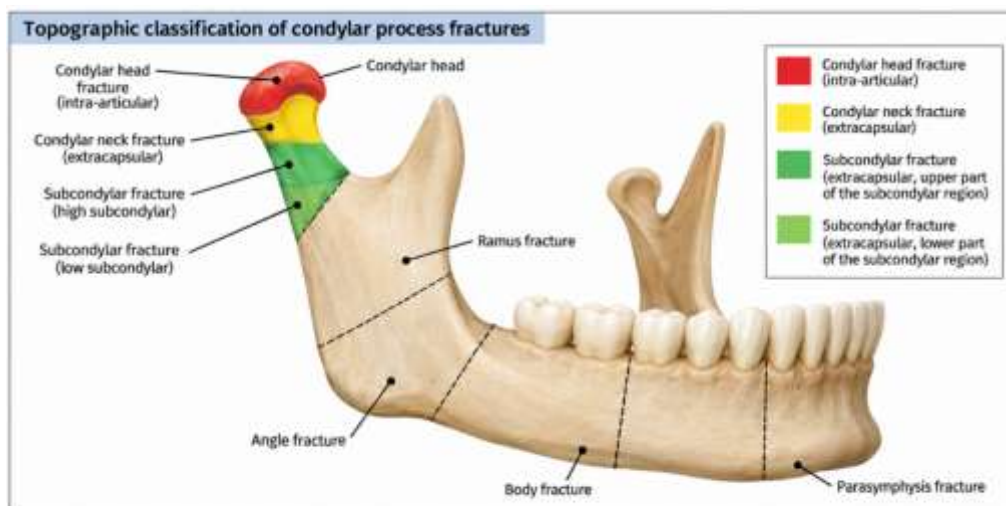


Figure 1. Simplified original diagram of the topographic classification of condylar process fractures.

Treatment:-

Fourteen patients underwent open reduction and internal fixation. Two surgical approaches were used: the high subangulomandibular (SMH) approach in 12 cases and the retromandibular (RM) approach in 2 cases. One osteosynthesis plate was used in each operated patient: 12 TCP plates and 2 X-shaped miniplates. Postoperative drainage was systematically performed. Eight patients underwent functional treatment based on early active

mandibular rehabilitation, generally initiated on the second or third day after trauma, without immobilization or maxillomandibular fixation.



Figure 2. Postoperative panoramic radiograph of a high subcondylar fracture treated with an X-shaped miniplate.

Assessment:-

Functional outcomes at the last follow-up were assessed according to maximum mouth opening, occlusal status, deviation on opening, and temporomandibular joint pain. In the surgical group, the quality of reduction was also assessed radiologically. Follow-up ranged from 3 to 36 months, with a mean of 20.0 months. Given the small sample size, the analysis was primarily descriptive, and differences observed between the two groups were interpreted with caution.

Results:-

The series included 22 patients, 20 men and 2 women. The mean age was 26.5 years. Fourteen patients were treated surgically and eight functionally. An associated mandibular fracture was found in 10 patients, and fracture displacement in 14 patients. Condylar dislocation was present in 7 cases. Among the operated patients, the SMH approach was used in 12 of 14 cases, whereas the RM approach was used in 2 cases. Reduction was considered satisfactory in 12 cases and unsatisfactory in 2 cases.

Table 1. Main characteristics and outcomes according to treatment strategy.

Parameter	Total series n=22	Surgical n=14	Functional n=8
Mean age	26.5 years	—	—
Men	20 (90.9%)	13 (92.9%)	7 (87.5%)
Women	2 (9.1%)	1 (7.1%)	1 (12.5%)
Associated mandibular fracture	10 (45.5%)	—	—
Displacement	14 (63.6%)	—	—
Condylar dislocation	7 (31.8%)	—	—
SMH approach	12 (54.5%)	12 (85.7%)	—
RM approach	2 (9.1%)	2 (14.3%)	—
TCP plate	10 (45.5%)	10 (71.4%)	—
X-shaped miniplate	4 (18.2%)	4 (28.6%)	—
Satisfactory reduction	12/14	12 (85.7%)	—
Final mean mouth opening	35.5 mm	35.9 mm	30.4 mm
Final mouth opening	25–40 mm	28–40 mm	25–39 mm
Normal occlusion	12 (54.5%)	11 (78.6%)	1 (12.5%)
Deviation on opening	10 (45.5%)	3 (21.4%)	7 (87.5%)
TMJ pain	9 (40.9%)	4 (28.6%)	5 (62.5%)
Mean follow-up	20.0 months	20.6 months	18.8 months
Follow-up	3–36 months	3–36 months	9–36 months

Three postoperative hematomas were observed in the surgical group. They resolved spontaneously without the need for surgical revision. Two patients developed transient facial nerve involvement. Both recovered favorably, with no permanent facial paralysis.

Discussion:-

Surgical access to high subcondylar fractures is one of the main technical challenges in their management. The proximity of the facial nerve requires careful dissection and thorough knowledge of the anatomical planes. The high subangulomandibular approach provides direct exposure of the subcondylar region and was our reference approach in this series. Recent literature suggests a favorable profile of the high submandibular approach in terms of facial nerve safety and exposure, while emphasizing the importance of fracture level and surgical experience [4,5].

In our series, two transient facial nerve injuries were observed, with no permanent sequelae. This finding should be interpreted in light of the small sample size, but it emphasizes that facial nerve protection is an essential component of this surgery.

Mean final mouth opening was 35.9 mm in the surgical group versus 30.4 mm in the functional group. Normal occlusion was observed in 78.6% of surgically treated patients versus 12.5% of functionally treated patients. Deviation on opening persisted in 21.4% of surgical patients versus 87.5% of functional patients. These findings are consistent with several comparative analyses of extracapsular condylar fractures reporting favorable functional outcomes after open reduction for some criteria, including mouth opening, occlusion, and mandibular deviation [2,6]. A recent meta-analysis focusing on surgical approaches also reported favorable functional outcomes for some open approaches, while emphasizing the heterogeneity of the available evidence [7]. A key aspect of our study concerns the functional treatment group. In our protocol, this consisted of early active mandibular mobilization without immobilization or maxillomandibular fixation. The success of such a strategy depends on several factors: the quality and regularity of exercises, understanding of the protocol, and, above all, patient adherence.

In our retrospective study, adherence to rehabilitation was not objectively assessed: we had no standardized score to quantify the number of sessions performed, their regularity, or patients' compliance with prescribed home exercises. This limitation is important because a poor functional outcome cannot be attributed solely to the choice of conservative treatment: the quality of rehabilitation is itself a therapeutic variable [3]. This issue is particularly relevant in our context, where the availability of physiotherapists specifically trained in temporomandibular joint and maxillomandibular functional rehabilitation remains limited. Specialized and prolonged supervision of these patients may therefore be difficult to provide consistently, and the less favorable outcomes observed in our functional group should be interpreted with caution.

Comparison between our two groups is necessarily limited by the retrospective nature of the study. Patients were not randomized to surgery or functional treatment; treatment choice was based on fracture characteristics and the clinical context, introducing a possible indication bias that may have influenced the outcomes. It would therefore be excessive to conclude that the observed functional differences were exclusively attributable to the treatment modality. Recent evidence also indicates that both strategies remain acceptable depending on fracture characteristics and that the certainty of the evidence remains variable [2,8].

Limitations:-

The main limitations of this study were the small sample size, retrospective and single-center design, absence of randomization, indication bias, lack of standardized assessment of rehabilitation adherence, and the small number of patients treated through the retromandibular approach. Comparison between the two surgical approaches was therefore not possible in this series.

Conclusion:-

High subcondylar fractures represent a technically demanding traumatic location for which management should be individualized. In our series, surgical treatment was associated with more favorable functional outcomes in terms of mouth opening, occlusion, and mandibular deviation. The high subangulomandibular approach, used as our first-line technique, allowed satisfactory reduction in most cases. However, comparison between surgical and functional treatment should be interpreted with caution. The outcome of functional treatment depends strongly on the quality and timing of rehabilitation, as well as on patient adherence. In our context, limited access to physiotherapy specialized in temporomandibular joint and maxillomandibular function may also be a limiting factor. Our results therefore do not establish an intrinsic superiority of surgery. Rather, they emphasize the importance of careful

selection of surgical indications and of an early, standardized, and appropriately supervised rehabilitation protocol for patients managed functionally.

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No specific funding was received.

Conflict of interest:-

The authors declare no conflict of interest.

Ethical approval:-

This retrospective study was conducted in accordance with applicable institutional ethical requirements.

Consent:-

Patient consent requirements were addressed in accordance with applicable institutional regulations.

Data availability:-

Data availability is subject to applicable institutional policy.

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