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Return to Contact or Combat Sports After Extraction of Impacted Mandibular Third Molars: A Narrative Review with Emphasis on Mandibular Fracture Risk

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Abstract

Background. Mandibular third molar extraction is common in young adults, including athletes participating in contact and combat sports. Removal of an impacted tooth creates a bone defect in the mandibular angle, which may be enlarged by osteotomy and exposed to direct trauma. Although postoperative mandibular fracture is rare, temporary reduction in local bone resistance may be clinically relevant when planning return to sport.

Aim. This narrative review summarizes current evidence on recovery after impacted mandibular third molar extraction, focusing on bone healing, postoperative mandibular vulnerability, and return to contact sports.

Material and methods. Material and methods. This narrative review was based on a structured literature search conducted in PubMed and Google Scholar, supplemented by the reference lists of selected publications. The search included literature concerning impacted mandibular third molars, mandibular fractures after third molar removal, complication after third molar removal, the influence of impacted mandibular third molars on the risk of mandibular angle fracture, sports-related maxillofacial trauma. Publications were selected based on their relevance to postoperative mandibular fracture susceptibility and return to contact sports after extraction of impacted mandibular third molars. The findings were analyzed descriptively and grouped into thematic areas.

Results. Postoperative outcomes are influenced by patient-related, anatomical, and surgical factors, including age, sex, systemic health, medication use, impaction depth and angulation, local bone pathology, surgeon experience, surgical technique, and extent of bone removal. Reported fractures are associated particularly with male sex, older age, complete impaction, preexisting bone lesions, and extensive osteotomy. Most occur during the first four postoperative weeks, when socket healing is incomplete and mandibular resistance may remain reduced. Published cases mainly involve functional loading, such as chewing or clenching, whereas contact sports add the risk of direct mandibular impact. Sport type, contact level,

training intensity, protective equipment, and maxillofacial trauma risk should therefore be considered.

Conclusions. Return to contact and combat sports should be individualized and not based solely on resolution of pain, swelling, trismus, or bleeding. Clinical recovery may precede restoration of bone resistance. Surgical difficulty, healing course, temporary mandibular vulnerability, and sport-specific trauma exposure should guide a gradual return to training and competition. Further studies are needed to establish evidence-based, sport-specific recommendations.

Keywords: third molar extraction, mandibular fracture, mandibular angle fractures risk after third molar extraction, contact or combat sports, return to contact and combat sports after third molar extraction

1. Introduction

Mandibular third molar impaction is a common clinical condition in late adolescence and early adulthood.[1] Mandibular third molars are the last permanent teeth to erupt, making their eruption particularly dependent on the amount of residual space available in the posterior dental arch. Insufficient retromolar space is considered one of the main factors associated with mandibular third molar impaction. However, the etiology of impaction is multifactorial and may also involve genetic influences on jaw size, tooth size, and eruption potential. Some reports suggest that the softer consistency of the modern diet and reduced masticatory demands may be associated with an evolutionary decrease in jaw dimensions, potentially contributing to limited space for third molar eruption [2]. Impacted or partially erupted mandibular third molars may contribute to recurrent pericoronitis, caries, periodontal defects, pain, and other local complications, which frequently constitute indications for surgical extraction.[3] This age group also includes many individuals participating in recreational or competitive sport, including contact and combat disciplines. Therefore, in physically active patients, including athletes participating in contact and combat sports, postoperative recommendations after extraction of impacted mandibular third molars should take into account not only the typical course of oral surgical recovery, but also the potential risks associated with return to sport.

Especially considering the growing contribution of sports-related trauma to the occurrence of mandibular fractures. [4]

The anatomical position of impacted mandibular third molars is clinically important because these teeth are located in the posterior mandible, close to the mandibular angle. The mandibular angle and molar regions are considered among the most biomechanically vulnerable areas in the body of the mandible, together accounting for almost half of mandibular fractures [5]. The removal of an impacted mandibular third molar creates a post-extraction bone defect, and in surgically difficult cases, additional bone removal during osteotomy may further reduce local bone support. During the early postoperative period, before sufficient bone regeneration occurs, the mandibular angle region may therefore represent a potential site of reduced resistance to mechanical loading or direct trauma.

The mechanism leading to mandibular angle fractures is particularly relevant in the context of contact sports. Direct trauma to the lateral aspect of the mandible, such as a blow received during fights or sports participation, may occur when the teeth are in occlusion and the muscles of mastication are contracted. Under these conditions, the ramus and condylar region may be stabilized by muscular support, while the molar region is fixed by occlusion. As a result, stress may concentrate in the angle region, located between these relatively fixed segments. Local anatomical factors may further influence the fracture line. In this context, the presence of an unerupted or impacted third molar has been described as a factor that may weaken the mandibular angle, whereas recent molar extraction may reduce the structural resistance of the molar region due to the presence of a post-extraction defect [5] Therefore, athletes returning to contact or combat sports after extraction of impacted mandibular third molars may represent a clinically relevant group in which postoperative mandibular vulnerability should be carefully considered.

Although general postoperative recommendations after mandibular third molar extraction commonly advise rest and temporary avoidance of strenuous physical activity, they are usually not specific to athletes participating in contact and combat sports. In particular, limited attention is given to the distinction between return to light exercise, non-contact training, and full-contact exposure. This represents an important gap, because athletes in contact sports may be exposed to direct mandibular trauma during a period in which bone healing is still ongoing and post-extraction defects may persist. Therefore, the relationship between impacted mandibular third molar extraction, mandibular vulnerability, and return to contact sports requires further discussion.

Research Objective

The objective of this narrative review was to discuss clinical, anatomical, and sport-specific factors that may influence return to contact and combat sports after extraction of impacted mandibular third molars, with particular attention to postoperative mandibular vulnerability and potential fracture risk.

Research Problems

1. What clinical and anatomical factors may influence postoperative mandibular vulnerability after extraction of impacted mandibular third molars?
2. How may post-extraction bone defects and osteotomy-related bone loss affect the potential risk of mandibular fracture during the early postoperative period?
3. What sport-specific factors should be considered when assessing return to contact and combat sports after extraction of impacted mandibular third molars?
4. Is there sufficient evidence to define clear return-to-sport guidance for athletes after extraction of impacted mandibular third molars?

Research Hypotheses.

Due to the narrative review design of this article, no formal research hypotheses were formulated. Instead, the review was guided by predefined research problems concerning postoperative mandibular vulnerability, potential fracture risk, and return to contact and combat sports after extraction of impacted mandibular third molars.

2. Research materials and methods

2.1. Search strategy

A structured literature search was conducted using PubMed, Google Scholar, and the reference lists of selected publications. The search focused on literature related to impacted mandibular third molars, lower third molar surgery, mandibular angle fractures, sports-related mandibular trauma, contact sports orofacial injury, combat sports orofacial injury, and return to sport after extraction of impacted mandibular third molars.

2.2. Data collection and analysis

The publications identified through the literature search were reviewed to extract relevant clinical data and information on risk factors associated with impacted mandibular third molars, mandibular third molar surgery, mandibular angle fractures, and sports-related orofacial trauma. The findings from the selected articles were analysed descriptively. Relevant clinical outcomes and risk factors were reviewed, compared, and organised according to the main topics of the review. Particular attention was paid to the relationship between impacted mandibular third molars and mandibular angle fractures, sports-related mechanisms of injury, postoperative complications, recovery, and return to contact or combat sports. Similarities and differences between the findings of individual studies were identified, and the available evidence was summarised narratively.

2.3 AI

During the preparation of this narrative review, ChatGPT (OpenAI) was used as an auxiliary tool to support linguistic editing, grammar correction, and improvement of academic clarity. The tool was not used to generate research data, select literature, interpret scientific findings, or formulate conclusions. All AI-assisted content was reviewed, revised where necessary, and approved by the author, who takes full responsibility for the final version of the manuscript.

3. Research results

3.1. Complications after extraction of impacted mandibular third molars

Impacted mandibular third molars are commonly encountered in oral and maxillofacial practice and frequently require surgical management. Although most extractions are completed without adverse events, third molar surgery may be associated with a wide spectrum of postoperative complications. These include bleeding, persistent pain and swelling, infection, alveolar osteitis (dry socket), dentoalveolar injury, neurosensory disturbances involving the inferior alveolar or lingual nerve, temporomandibular joint-related symptoms, and, in rare cases, mandibular fracture. The occurrence and severity of these complications may depend on several patient-related, anatomical, and surgical factors, including patient age, general health status, gender, depth and position of impaction, smoking, oral hygiene, medication use, surgeon experience, and surgical technique. In particular, patient age, the depth of impaction and health of the patient are frequently highlighted as important factors influencing the likelihood of postoperative complications. [6, 7,8] It should be emphasized that every patient undergoing extraction of an impacted mandibular third molar should be informed about the potential risks

associated with the procedure. In patients for whom postoperative complications may significantly affect professional activity, including professional athletes, the clinician's competence in assessing individual risk based on patient-related, anatomical, and surgical factors is particularly important.

3.2. Factors associated with postoperative complications

Activity

In the first 24 hours following the procedure, strenuous physical activity may increase blood pressure and thereby contribute to bleeding from the extraction wound [9] Studies in rats have shown a beneficial effect of exercise, particularly aerobic exercise, on the healing process of post-extraction wounds during the inflammatory phase, which extends from tooth extraction to approximately the third postoperative day.[10] In the absence of additional risk factors, and provided that no postoperative complications are present, cautious low-intensity physical activity may not be contraindicated.

Gender

Studies indicate that sex may play a role in the occurrence of postoperative complications after third molar surgery. [11,12,13]Female patients were reported to experience a higher number of both early and late complications. This finding may be related to anatomical and physiological factors, such as smaller jaw dimensions, a more limited surgical field, hormonal influences, and greater bone density, which may increase surgical difficulty and tissue trauma. [11].It is worth noting that some studies have not demonstrated a significant association between sex and the occurrence of postoperative complications. [14]

Age

The likelihood of postoperative complications and long-term sequelae appears to increase with patient age. Consequently, when extraction of an impacted mandibular third molar is indicated, it is suggested that the procedure should be performed relatively early, preferably before the age of 25 years. [12,13]

Depth of impaction and angulation

The anatomical position of an impacted mandibular third molar plays an important role in the risk of postoperative complications. Greater depth of impaction and unfavorable angulation are associated with increased surgical difficulty, often requiring wider access, flap elevation, bone

removal, and more extensive manipulation of adjacent tissues. Studies have reported that deeply impacted teeth, as well as distoangular, mesioangular, or horizontal impactions, tend to be associated with a higher frequency of postoperative complications than more superficial or vertically impacted teeth. Bony impactions with distal inclination and radiographic overlap between the roots and the mandibular canal may further increase procedural complexity and the likelihood of adverse postoperative outcomes. These findings indicate that careful radiographic assessment of tooth position, impaction depth, angulation, and relationship to adjacent anatomical structures is necessary when estimating complication risk before extraction.[6,11,13,15]

Health of the patient

The course of postoperative healing may be influenced by selected medications and systemic conditions. Oral contraceptive use has been discussed in the literature as a factor potentially associated with postoperative complications, while diabetes is known to compromise wound healing, partly due to impaired blood circulation.[13] These factors may therefore be relevant when assessing the risk of complications after extraction of impacted mandibular third molars.

Surgeon's experience

The clinician's experience may have a significant influence on the occurrence of postoperative complications.[12] Third molar extractions are often more technically demanding than extractions of other molars and require appropriate surgical competence. The surgeon's experience may influence several aspects of the procedure, including atraumatic management of soft and hard tissues, maintenance of aseptic conditions, selection of surgical technique and equipment, and operative time. Proper control of these factors may contribute to a lower incidence of intraoperative and postoperative complications.[21]

It should be noted that this review does not discuss all factors potentially associated with postoperative complications.The following section focuses on selected factors that were most frequently addressed in the available literature and which the authors considered the most important.

3.3. Factors associated with mandibular fracture risk after extraction of impacted mandibular third molar

Gender

Unlike more common complications following extraction of impacted mandibular third molars, including pain, dry socket, swelling, and bleeding, which have been associated with a higher frequency in female patients [11].Post-extraction mandibular fractures have been reported more frequently in males. [17] This sex-related difference may be explained by greater masticatory forces in men, which Pires et al. suggested as a possible factor contributing to the higher incidence of post-extraction mandibular fractures in male patients[19].

Age

Age-related changes in the mandible, including reduced bone elasticity, may contribute to the higher frequency of fractures reported in patients over 40 years of age undergoing third molar surgery. In older patients, ankylosis of the impacted tooth may further increase the difficulty of extraction, as more extensive osteotomy may be required. This additional bone removal may reduce local mandibular support and potentially increase susceptibility to fracture. [16] Libersa et al. reported that age over 25 years may increase the risk of mandibular fracture after extraction of mandibular third molars, and the mean age of patients who experienced fracture in their study was 40 years[18]

Depth of impaction

The degree of impaction may also influence mandibular fracture risk. Fully impacted third molars often require more extensive osteotomy during surgical removal, which may reduce local mandibular support and increase susceptibility to fracture. [16]

Preexisting bone lesions

Local pathological conditions, including periodontal disease, cystic lesions, or recurrent pericoronitis, may additionally compromise bone strength in the mandibular angle region and increase susceptibility to fracture. [16,17]

surgical technique

A thorough clinical and radiographic evaluation of each case, combined with an appropriate surgical approach, represents one of the key measures for minimizing mandibular fracture risk following extraction of impacted mandibular third molars. [17]

3.4. Time since extraction

Post-extraction mandibular fractures are most often reported within the first four weeks after removal of impacted mandibular third molars. The second and third postoperative weeks may represent a particularly vulnerable period, as granulation tissue within the socket is gradually replaced by connective tissue and the mechanical resistance of the mandibular bone may be temporarily reduced [17]

It is important to emphasize that the majority of available reports on mandibular fractures after extraction of impacted mandibular third molars describe late postoperative fractures associated with functional loading, such as chewing or clenching, rather than fractures caused by external traumatic forces. This distinction is relevant in the context of contact and combat sports, where direct impact to the mandible may introduce an additional mechanism of injury. Consequently, the risk factors discussed above may not be fully transferable to sports-related trauma and should be interpreted within this limitation.

3.5. Risk of Injuries in Contact and Combat Sports

Combat sports

Combat sports are associated with an increased risk of injury due to their offensive and defensive nature, which involves high-intensity strikes, blocks, and full-force techniques directed at various body regions, including the face. The use of limited protective equipment may further increase the risk of facial trauma, particularly when direct blows are delivered to the maxillofacial region.The findings suggest that injury risk may increase with the level of sports participation. Experienced fighters may be particularly exposed to high-risk techniques, as greater technical confidence and competitive experience can increase their use during fights.[22]

Contact sports

Contact sports involve direct physical interaction between opponents. Because of frequent body contact, collisions, and the exposed position of the face, these disciplines are associated with a considerable risk of orofacial and dental trauma. Sports-related dental and facial injuries may result from impact with a ball, sports equipment, or another player. The most commonly reported injuries include soft tissue trauma and fractures of the facial bones, particularly the nasal bones, zygomatic bone, and mandible.[23]

4. Discussion

The findings of this narrative review indicate that return to contact and combat sports after extraction of impacted mandibular third molars should not be considered only in relation to the absence of common postoperative symptoms. Although pain, swelling, bleeding, trismus, infection, or dry socket remain important clinical indicators of recovery, they do not fully reflect the ongoing process of bone healing within the mandibular angle region. This is particularly relevant in athletes exposed to direct trauma, high masticatory forces, clenching, and sudden impacts to the mandible. Therefore, the assessment of return to sport should take into account the stage of postoperative healing, the presence or absence of symptoms, the surgical difficulty of extraction, and the specific trauma risk associated with the discipline.

In the context of contact and combat sports, the risk of mandibular fracture after impacted mandibular third molar extraction should be interpreted with caution. High-impact trauma to the mandibular region, such as trauma occurring during sports, falls, or accidents, may result in fracture even in the absence of previous tooth extraction. However, surgical removal of a mandibular third molar may temporarily reduce local bone support in the mandibular angle region, creating a potential weak point during the early postoperative period. This may be particularly relevant when postoperative symptoms improve by the end of the second week, as athletes may perceive recovery as complete and resume training or competition despite ongoing bone healing. In sports with a high risk of facial impact, especially when facial protection is not used, this false sense of security may increase exposure to trauma during a period of mandibular vulnerability. The first four weeks after extraction of mandibular third molars are associated with the greatest risk of mandibular fracture. Therefore, during this period, patients should maintain a liquid and soft-food diet and refrain from regular physical activity. [19]

Another relevant consideration is that the presence of impacted mandibular third molars has been associated with an increased risk of mandibular angle fractures. One proposed explanation for this relationship is that third molars occupy osseous space within the mandibular angle region and may reduce the cross-sectional area of bone, thereby decreasing the structural resistance of this region.[20] This fact may be relevant for professional contact or combat sport athletes who have indications for mandibular third molar extraction, such as recurrent pericoronitis, but delay surgical treatment because of concerns about postoperative mandibular fracture risk. In such cases, both the fracture risk associated with the retained impacted third molar and the temporary postoperative vulnerability after extraction should be considered.

Sport-specific factors should be considered an important component of return-to-sport assessment after extraction of impacted mandibular third molars. Contact and combat sports differ from general physical activity because they involve not only increased cardiovascular and muscular effort, but also a substantial risk of direct impact to the maxillofacial region. In combat sports, repeated strikes, blocks, clenching, and limited protective equipment may expose the mandible to high mechanical loads, particularly in experienced athletes who participate in more intensive training or competition.[22] Similarly, contact team sports are associated with collisions, player-to-player contact, and impacts with balls or sports equipment, all of which may contribute to facial trauma.[23] Therefore, when assessing return to sport after mandibular third molar extraction, the type of discipline, level of contact, use of facial or oral protection, training intensity, competitive level, and probability of direct mandibular trauma should be taken into account, rather than considering physical activity as a single uniform category.

5. Conclusion

The available literature indicates that mandibular fracture after extraction of impacted mandibular third molars is rare, but it remains a clinically important complication because of its potential consequences, especially in athletes exposed to direct trauma to the mandible. Postoperative recovery should therefore not be assessed only on the basis of pain, swelling, bleeding, trismus, infection, or dry socket. Although these symptoms are important indicators of early clinical healing, their resolution does not necessarily reflect complete restoration of mandibular bone resistance. Several factors may influence postoperative mandibular vulnerability, including patient age, sex, general health status, depth and angulation of impaction, presence of local pathological bone conditions, extent of osteotomy, and surgical technique. The first postoperative weeks appear to be particularly relevant, as post-extraction bone defects and ongoing socket healing may temporarily reduce local mandibular support. In this context, the second and third postoperative weeks may represent a period in which athletes feel clinically improved but mandibular bone healing is still incomplete. Return to contact and combat sports should be evaluated with consideration of sport-specific risk. Disciplines involving direct strikes, collisions, clenching, limited protective equipment, or frequent impacts to the maxillofacial region may expose the mandible to forces that differ substantially from ordinary daily activity or light exercise. Therefore, the type of sport, level of contact, training intensity, competitive level, use of oral or facial protection, and probability of direct mandibular trauma should be included in postoperative assessment. At present, there is

insufficient evidence to define universal return-to-sport guidelines for athletes after extraction of impacted mandibular third molars. Decisions should remain individualized and based on clinical assessment, surgical difficulty, postoperative course, and the trauma risk associated with the specific sport. Further studies are needed to determine more precise recommendations for safe return to full-contact training and competition after this procedure.

Disclosure

Author Contributions:

Conceptualization OJ

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Writing- orginal draft OJ, KC, MN

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Investigation AL, JJ

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