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EDITORIAL

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Multiligamentous injuries of the knee: Fast (and not furious) or later

Multiligamentous knee injuries represent a particularly challenging issue for orthopaedic surgeons [2, 12]. Patients initially arrive in emergency settings, where diagnosing the extent of ligament damage is difficult [8]. In effect, clinical examination is challenging in cases of multiligament injury, and the standard tests used to assess peripheral laxity may be unreliable, as the evaluation of the anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) for central pivot injuries. For example, the 'false Lachman' test corresponds to the reduction of the posterior drawer in cases of PCL injury [15] and may be a source of confusion in cases of multiplanar laxity associated with swelling. Furthermore, neurovascular complications are commonplace requiring sometimes urgent management before any orthopaedic procedure can be considered with complex procedures in the majority of cases [23, 27]. Injuries to vital organs often require immediate treatment in the context of polytrauma, and the social and psychological impact on patients can be significant, given the extended recovery and lifestyle changes provoked by these injuries [29].

As reported by Murray et al. [21] there is no clear consensus to recommend early surgical management, and it remains an open question. The 3-week timeframe was promoted by Levy et al. [19] and was supported by other studies [28]. Operating within this time frame allows for potential repair of injured structures associated to a reconstruction [14]. Even it has not been published, it could be hypothesised that this period helps avoid the beginning of fibrosis which could confer difficulties in identifying anatomical structures. Adhering to this strategy has required trauma centres to adapt, ensuring that resources are in place to accommodate these surgeries within the 3-week window [1]. This often involves securing operating room time and assembling a skilled team due to the complexity and duration of these procedures [22], which require multiple steps and adequate expertise in ligament reconstruction [17].

Despite the benefits of a non-delayed surgery, performing surgery shortly after trauma carries several risks. First, local conditions—such as skin contusions, haematoma and hemarthrosis—can increase the risk of wound complications, including necrosis, and the associated inflammation elevates the risk of infection [6]. The articular capsule is often damaged making arthroscopy difficult in these cases, with an increased risk of compartment syndrome [5]. Second, neuromuscular control must be perfect prior to surgery but that can take some time to achieve. Third, the local inflammatory state can hinder recovery of range of motion in the initial months after surgery, contributing to a higher likelihood of postoperative stiffness [24]. Fourth, the urgency of early surgery may leave patients and their families with little time to adapt to the social, psychological, and economic implications of such an injury. With surgery occurring almost immediately after trauma, many patients face the burden of addressing these adjustments only after the procedure, often around one or two months post-injury.

The potential disadvantages of early surgery do not suggest that all multiligamentous injuries should automatically be managed with delayed surgery but they do suggest a more conservative approach could be beneficial for some injuries. In circumstances where all the required conditions have been achieved (local aspect, range of motion, motor control, psychological readiness and access to rapid strategy, including allograft, if needed) a rapid treatment is possible. Associated injuries, such as unstable meniscal lesions, may also indicate the need for prompt management [13, 16]. In Otherwise, a delayed approach is preferred.

A delayed strategy offers the potential for natural healing in some ligamentous structures, reducing the need for extensive surgical repair. For example, some medial collateral ligament (MCL) injuries such as Type I and II MCL injuries can heal well with conservative treatment, which can eliminate the need for surgical repair in some cases [4, 11]. This approach requires an initial period of functional treatment meaning, depending on the patient's pain and discomfort, resumption of weight-bearing and immobilisation with adapted or custom-made braces designed to support ligaments healing that have a strong potential for self-repair

Abbreviations: ACL, anterior cruciate ligament; AMI, arthrogenic muscle inhibition; MCL, medial collateral ligamenrt; PCL, posterior cruciate ligament.

among injured structures [9]. A subsequent physical exam is performed 6–12 weeks after the trauma to assess residual laxity. Patients would be informed from the outset that surgery will likely still be necessary, but that the goal of this approach is to minimise the number of structures needing reconstruction, thereby potentially simplifying the surgery with percutaneous procedures. Delayed strategies also decrease the risk of deep vein thrombosis.

Commencing with conservative management helps reduce swelling and enhances recovery of range of motion with better neuromuscular control before surgery [9]. Ideally, patients have to reach active full extension and at least 90°–110° of flexion before undergoing surgery [20], as research shows that the preoperative range of motion is strongly correlated with postoperative flexibility [30]. Thus, a delayed strategy offers more time for initial recovery of range of motion and facilitates this after the surgery which could support a smoother return to activity after surgery. The impact of these injuries is broad and, as in the case of ACL trauma, arthrogenic muscle inhibition (AMI) can be generated as part of the neuromodulatory reflex loop [18]. Delaying surgery allows patients to work on this issue with their physiotherapist, targeting central stimulation with modern strategies using cerebral neuroplasticity. Regaining full range of motion before surgery is also a protective factor against the occurrence of AMI postoperatively [7].

From both psychological and economic perspectives, further benefits exist; delayed surgery allows patients to organise their lives just after the trauma and before the surgery [25]. They can take measures to adapt their worklife, apply for insurance, and consider their psychological wellbeing where necessary [3, 10, 26]. It is likely that planned surgery will lead to a greater degree of organisation which would decrease absenteeism from the workplace.

Last but not least, a delayed strategy allows surgeons to organise complex surgeries to a suitable time (certainly not to be left to the end of a heavy surgical day's list), to ensure the appropriate team, implants and devices are available.

In conclusion, while early surgery remains one of the approach for multiligamentous knee injuries if all conditions are optimal [20], a delayed strategy may be advantageous for other cases, by allowing for partial healing and reducing the complexity of surgical interventions. As it has not been studied yet, an analysis comparing the type of surgery (and the number of ligaments planned for reconstruction) that would be performed in the case of early surgery with the type of surgery ultimately performed after delayed surgery would be of interest.

An approach with delayed surgery could also improve postoperative outcomes by optimising preoperative conditions and enhancing the recovery process. A more flexible protocol that considers both immediate and delayed surgical strategies may ultimately provide better individualised care for patients with multiligamentous injuries, balancing the urgency of repair with the potential benefits of natural recovery and a staged approach. Further studies and clinical discussions are warranted to refine these treatment strategies and identify which patients would benefit most from each approach. Finally, given the variability in lesion types in multiligamentous knee injuries, the complexity of management, and their lower frequency compared with other injuries, no consensus has yet been established regarding the timing of treatment, which currently relies only on recommendations. Multicenter studies involving a large number of centres, allowing for the inclusion of a sufficient number of patients to demonstrate significant differences, could therefore be useful.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

N/A.

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