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Original article

Management of combined anterior or posterior cruciate ligament and posterolateral corner injuries: A systematic review



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ABSTRACT

Background: Combined injuries to the posterolateral corner and cruciate ligaments are uncommon. The heterogeneity of injury patterns in many studies complicates the assessment of outcomes.

Objective: To assess the prognosis and functional outcomes after surgery for combined injuries to the posterolateral corner and to the anterior cruciate ligament (ACL) or posterior cruciate ligament (PCL).

Material and methods: We systematically reviewed the literature for articles reporting outcomes 1 year or more after surgery for combined injuries to the posterolateral corner and ACL ($n=4$) or PCL ($n=9$). Patients with bicruciate injuries were not studied.

Results: Overall, 65% of patients were IKDC A or B after surgery. The mean Lysholm score improved from 67 to 90. Mean time to surgery was 4.43 months in the group with ACL tears and 18.4 months in the group with PCL tears, and mean follow-up was 34.4 and 40.7 months in these two groups, respectively. In the groups with ACL and PCL tears, the proportions of patients classified as IKDC A or B at last follow-up were 81.6% and 81.0%, respectively, whereas 88% and 99% of patients, respectively, were IKDC grade C or D before surgery. The mean Lysholm score improved from 77 to 92 in the group with ACL tears and from 65 to 89 in the group with PCL tears. Improvements in laxity ranged from 28% to 79% in the group with PCL tears.

Discussion: Most of the articles selected for our review provided level III or IV evidence. Functional outcomes were satisfactory but less good than those reported after surgical reconstruction of isolated cruciate ligament tears. Full reconstruction seems the best strategy in patients with combined ACL/posterolateral corner injuries. Outcomes were also good but more variable in the group with PCL/posterolateral corner injuries. The time to surgery, which reflected the time to diagnosis, was shorter in patients with ACL than with PCL tears in addition to the posterolateral corner injury.

Level of evidence: Level III (systematic literature review).

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1. Introduction

Injuries to the posterolateral corner of the knee occurring in isolation or in combination with injuries to the central pivot are uncommon. Posterolateral corner lesions have been estimated

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to occur in 9.1% of acute knee injuries with haemarthrosis and 16% of all knee ligament injuries [1]. The diagnosis is usually missed at the time of the accident. The main structures that make up the posterolateral corner of the knee are the lateral collateral ligament, popliteus tendon, popliteo-fibular ligament, and lateral knee capsule [2]. Biomechanical studies have established that injuries to the posterolateral corner of the knee worsen the deleterious effects of tears in one or both cruciate ligaments [3–5]. A posterolateral corner injury that is not taken into account in the initial treatment strategy increases the risk of failure of procedures to reconstruct the central knee structures [6].

Published data are difficult to assess, as most studies pooled patients with injuries to multiple medial and lateral ligaments [7], chronic and acute injuries [8], and/or one and both cruciate ligaments [9].

Here, our objective was to perform a systematic review of studies reporting the outcomes of surgery for combined injuries to the posterolateral corner and to either the anterior cruciate ligament (ACL) or posterior cruciate ligament (PCL), excluding bicruciate injuries. We assessed both the prognosis and the functional outcome.

2. Material and methods

In June 2014, we searched PubMed, Medline, the CINAHL, the Cochrane Database, Embase, and Google Scholar, with no date limits. We used the following indexing terms: 'posterolateral corner', 'posterolateral corner and ACL', posterolateral corner and PCL', and 'posterolateral corner and high tibial osteotomy'. Two of us (R.G. and A.M.), working independently of each other, used the titles and abstracts to select articles that answered our research question. Selected articles were read in their full-length version, and their reference lists were searched manually for additional relevant publications. We selected only articles in French or English. Inclusion criteria were a follow-up duration of 1 year or more, surgery for a combined injury to the posterolateral corner and to one of the cruciate ligaments, a functional evaluation using one or more functional scores (e.g., IKDC and Lysholm scores), evaluation of rotational instability using the dial test at 30° and 90°, objective evaluation of differential knee laxity, and radiological evaluation. We excluded studies in which patients were followed up for less than 1 year, had medial and lateral multiligamentous injuries or bicruciate injuries, or received only non-operative treatments. We also excluded strictly technical articles.

Of 430 retrieved articles, 392 were excluded because they failed to meet our selection criteria (technical articles, language other than French or English, and articles on surgical anatomy or providing no clinical data). At the second selection step, 25 studies were eliminated because they chiefly included patients with bicruciate injuries. Fig. 1 is the article selection flow-chart.

3. Results

Only 13 articles met our selection criteria. Among them, four reported studies of combined ACL and posterolateral corner injuries [10–13] and nine studies of combined PCL and posterolateral corner injuries [14–22]. These 13 studies included a total of 390 patients with a mean age of 32 years. Mean time from injury to surgery was 16 months and mean follow-up after surgery was 37 months (range, 16–120 months).

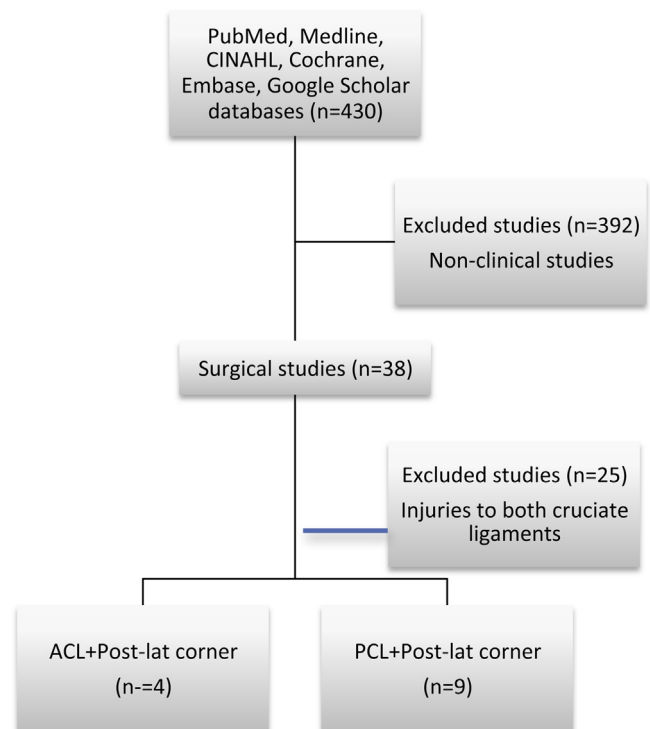


Fig. 1. Flow-chart depicting the number of studies identified, included, and excluded, with the reasons for exclusion.

3.1. Combined anterior cruciate ligament (ACL) and posterolateral corner injuries (four studies)

3.1.1. Level of evidence

None of the studies provided level 1 evidence. Evidence was level 2 for two studies with a comparative prospective design and level 4 for two studies with a retrospective non-comparative design.

3.1.2. Patients

The four studies included a total of 90 patients, 70 males, 11 females, and 9 patients of unspecified gender (Table 1). Mean age at surgery was 27.5 years (range, 15–53 years) and mean time from injury to surgery was 4.4 months (range, 0.5–168 months) (Table 1).

Sports were the most common cause of injury (81.5%), followed by motor vehicle accidents (13.1%) then by other causes (5.4%) (Table 1).

The preoperative work-up included an evaluation of coronal varus laxity in extension and in 30° of flexion, the dial test in 30° and 90° of flexion, and the reverse pivot-shift test to assess the injuries to the posterolateral corner. The magnetic resonance imaging (MRI) technique used to assess the posterolateral corner was that described specifically by Ross et al. [10]. Anterior laxity was evaluated using the 20° anterior drawer test. Dynamic radiographs were obtained in three studies [10,11,13]. The posterolateral corner injuries were grade III in the classification developed by Hugston et al. [23] or Fanelli et al. [24].

3.1.3. Treatment

The posterolateral corner lesions were managed surgically in three studies [10,11,13] and conservatively in one study [12] (Table 2).

There was no consensus regarding the type of transplant or type of reconstruction procedure used to treat the ligament lesions (Table 2). Posterolateral corner reconstruction was achieved using

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