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### Managing an iatrogenic injury of medial collateral ligament during TKA

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#### ABSTRACT

Loss of the integrity of the medial collateral ligament during total knee arthroplasty (TKA) can lead to instability, loosening, and accelerated polyethylene wear.

The aim of this study was to review the available literature to know how to manage an MCL injury during TKA.

We realized a literature search on pubmed with the use of the two Medical Subject Heading terms: "medial collateral ligament" and « arthroplasty replacement knee ». One author screened the title and abstract of each article using predetermined eligibility criteria. A total of 32 articles were found. After eliminating duplicates, and articles that did not satisfy the selection criteria, 8 articles were selected (1 meta-analysis, 6 observational studies and 1 case report). The studies selected were on primary cemented TKA and had clearly documented an acute MCL injury recognized intra operatively and the management chosen.

In case of iatrogenic injuries, treatment choices include primary repair, augmentation, use of more constrained implants, or a combination of the previous treatment options

There is still controversy regarding the ideal method of treatment of intra operative MCL injuries. No consensus has been reached to the management of this injury. Different solutions and strategies can be integrated and adopted flexibly by surgeons.

## I- INTRODUCTION

Medial collateral Ligament (MCL) Integrity is crucial for the proper function and longevity of non constrained total knee arthroplasty (TKA). MCL injury during primary TKA is a recognized complication potentially resulting in frontal instability, suboptimal patient outcomes and a higher rate of revision or re-operation. Inconsistent recommendations throughout literature have made the approach to managing this complication problematic.

We aim to answer four questions: which patients are at risk? When does the injury occur? The level of section and last, what do I do when this happens?

The aim of this study was to review the available literature to know how manage an MCL injury during TKA.

## II- METHODS

We started a literature search in April-25-2022 on pubmed. We used the two Medical Subject Heading terms: "medial collateral ligament and « arthroplasty replacement knee ». We included only English-language articles, published at 5 past years and human non cadaveric. The electronic search was complemented by searching manually the reference lists of the articles found.

The exclusion criteria were: revision knee replacement, biomechanics, conference abstracts, comments and reports of undefined MCL injuries.

The studies selected were on primary cemented TKA and had clearly documented an acute MCL injury recognized intra operatively and the management chosen. Data extraction of all included studies was performed by one author (ZK).

## III- RESULTS

Following the search strategy described above, a total of 32 relevant papers were initially screened from pubmed. By reading the titles and abstracts, 20 studies that did not meet our requirements were removed, leaving 12 articles for further reading in full-text. Finally, 8 articles were included (Figure 1).

Among these studies, we found 1 meta-analysis <sup>[1]</sup>, 6 observational series <sup>[2-8]</sup> and 1 case report <sup>[9]</sup>.

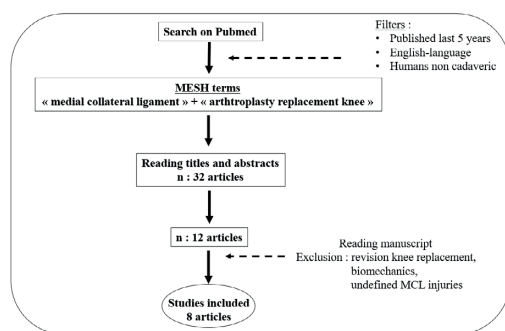


Figure 1 : a flowchart of our literature search strategy

Fig : a flowchart of our literature search strategy

## IV- DISCUSSION

Failure to repair MCL injury or to change the type of prosthesis to a more constrained design results in marked risks of knee instability, asymmetric accelerated polyethylene wear, and extremely early loosening.

Jihao li <sup>[1]</sup> in a meta-analysis published in 2021, aimed to determine whether MCL injury influences postoperative outcomes of patients undergoing TKA. Ten studies were included.

A total of 376 knees with MCL injury were studied in comparison with 5025 knees in the control group with intact ligament. Among them, 166 knees had an intra operative injury with tear in the mid-substance, while the other 220 knees were avulsion injuries.

Pooled data showed significant  $\neq$  between the 2 groups in terms of Knee Score Society, Knee Fonction Score, and range of motion, complications and revision rates.

The authors conclude that injury to the MCL during TKA significantly affects surgical outcomes. They don't found a consensus on the optimal management <sup>[1]</sup>.

Risk factors for MCL iatrogenic injury during knee arthroplasty include morbid obesity and severe varus deformities in patients who have undergone previous knee surgery or that have consistent medial condyle bone defects <sup>[7]</sup>.

Injury to the MCL during primary TKA may be caused during tibial or medial femoral condylar bone resection. Avulsion of the tibial or femoral insertions of the MCL may occur during high flexion in exposing the knee joint, inappropriately placed medial joint line retractors or by overly vigorous varus-valgus stressing of implants to assess stability. Bone avulsion injury is the most frequent injury 59% <sup>[1]</sup>.

In case of iatrogenic injuries, treatment choices include primary repair, augmentation, use of more constrained implants, or a combination of the previous treatment options

Previous findings had shown that the MCL had a good ability to heal after injury. Therefore, some scholars adopted for a conservative approach and reported good clinical results <sup>[2,3]</sup>

For avulsion, an attempt of bone reinsertion is done. We can use some type of tools like staples <sup>[4]</sup> or anchor <sup>[5]</sup>. Ni <sup>[6]</sup> used a screw with rectangular spiked washer. For transection, a direct suture is the first choice. In the case of which the quality of remaining tendon is weak, suspicion of stretching or persistent gap between both ligament ends an augmentation can be used. Some authors propose a tendon graft with semitendinous <sup>[7]</sup>, or a meniscus graft <sup>[8]</sup>. Inserting a thicker polyethylene liner or conversion to an implant with greater constraint are a possible management options in case of coronal plane stability is not achieved.

We found only 1 systematic review that focused on MCL lesion management in TKA. This work is published in 2014 <sup>[10]</sup>. The aim of this study was to compare outcomes following repair or reconstruction of recognized MCL injury to cases where additional constraint was used. A minimum of 5

patients and over at least 12 months from time of index operation was required. Five articles (retrospective studies) were included: 84 injuries in 5355 TKA (incidence: 1.5%), 28 mid substance disruption versus 56 bony avulsion, 37 increased constraint and 37 direct repair.

The conclusion of the authors is that they are unable to reach a definitive recommendation for all patients. Direct repair with or without augmentation is an acceptable alternative. Where the MCL repair is prone to stretching, tissue quality is poor or in the elderly, conversion to a semi constrained unlinked implant is preferable.

Postoperative management can be started without activity or weight bearing restriction. In direct repair (+/-) augmentation, addition of a unlocked hinged knee brace for 4-6 weeks would seem prudent.

However, there are some limitations to these studies. First, there are, no prospective no randomised article. Then, the studies include small sample size. Finally, no precise objective technique was used to measure joint stability.

Finally, we may propose this strategy. If a bony avulsion of MCL occurs during TKA, a transosseous reinsertion should be the first option fixed with staples or anchor. If it is a mid substance lesion, direct repair with or without augmentation is preferred. In both cases, if the knee is still unstable, thicker polyethylene is the next choice. Implant with greater constraint must remain the last alternative method.

## V- CONCLUSION

MCL injury during TKA significantly affects surgical outcomes. Obesity and significant varus are the most contributing factors. Bone avulsion is the most frequent lesion and it seen after large medial release or brutal implant reduction. Interstitial lesions occur due to saw blade. Conservative treatment is the first option. Implant with greater constraint is the last alternative method. Most appropriate method is still debatable.

## VI- REFERENCES

- 1- Li J, Yan Z, Lv Y, Li Y, Ye P, Feng W et al. Impact of intraoperative medial collateral ligament injury on outcomes after total knee arthroplasty: a meta-analysis and systematic review. *J Orthop Surg Res* 2021 ; 16(1) : 686.
- 2- Choi YJ, Lee KW, Seo DK, Lee SK, Kim SB, Lee HI. Conservative Management after Intraoperative Over-Release of the Medial Collateral Ligament from its Tibial Insertion Site in Patients Undergoing Total Knee Arthroplasty. *J Knee Surg* 2018;31(8):786-91.
- 3- Motiffard M, Sheikhabahaei E, Piri Ardakani M, Cheraghsahar H, Shahzamani A. Intraoperative repair for iatrogenic MCL tear due to medial pie-crusting in TKA yields satisfactory mid-term outcomes. *Knee Surg Sports Traumatol Arthrosc* 2021;29(10):3246-53.
- 4- Jin C, Zhao JY, Santoso A, Song EK, Chan CK , Seon JK et al. Primary repair for injury of medial collateral ligament during total-knee arthroplasty. *Medicine (Baltimore)* 2019; 98(39):e17134.
- 5- White KT, Fleischman A, Ackerman CT, Chen AF, Rothman RH. Managing Superficial Distal Medial Collateral Ligament Insufficiency in Primary Total Knee Arthroplasty Using Bone Staples. *J Knee Surg* 2019;32(9):900-5.
- 6- Ni M, Sun J , Fu J , Du Y , Shen J , Chen J et al. Management of Medial Collateral Ligament Insufficiency During Total Knee Arthroplasty with a Screw and Rectangular Spiked Washer: A Case Series of 14 Patients. *Orthop Surg* 2020;12(6):1784-91.

- 7- Wang X, Liu H, Cao P, Chang Liu C, Dong Z, Fei Wang F et al. Clinical outcomes of medial collateral ligament injury in total knee arthroplasty. *Medicine* 2017;96(30): e7617
- 8- Sun C, Rong W, Du R, Wu S, Liu P , Cai X et al. Meniscus Graft Augmentation for a Mid substance Tear of the Medial Collateral Ligament during Total Knee Arthroplasty. *J Knee Surg* 2022;35(4):449-55.
- 9- He A, Mao Y, Liu W, Zhang X. A novel reconstruction strategy for medial collateral ligament during total knee arthroplasty. *Asian J Surg* 2021;44(1) : 407-8.
- 10- Della Torre PK, Stephens A, Oh HL, Kamra A, Zicat B, Walker P. Management of Medial Collateral Ligament Injury During Primary Total Knee Arthroplasty: A Systematic Review. *Reconstructive Review* 2014 ;4(2) : 17-23.