ACL Update 2020

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Dr. DeLee has no relevant financial relationships with commercial interests to disclose.

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Learning Objectives

1. To review the most recent research on Anterior Cruciate Ligament Reconstruction.
2. To review factors which influence the results of the Anterior Cruciate Ligament injury and reconstruction.

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LaPrade, R.F., Engebretsen, L., et al
Effect of Meniscocapsular and Meniscotibial Lesions in ACL-Deficient and ACL Reconstructed Knees

American Journal of Sports Medicine Vol. 46(10) pp. 2422-2431, 2018

- "Ramp" Lesions: Tear of the peripheral attachment of the posterior horn at the meniscocapsular junction.
- The separate biomechanical roles of the meniscocapsular and meniscotibial attachments of the medial meniscus are to be investigated.

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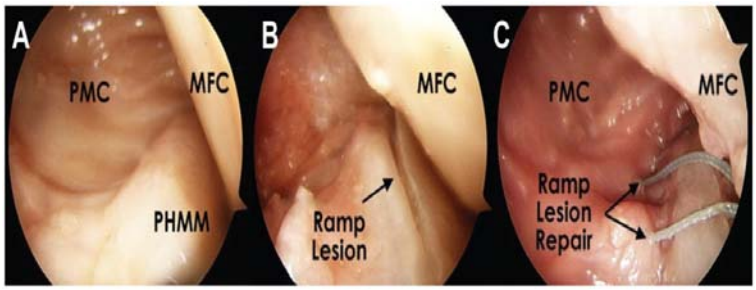
Ramp Lesion



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1. Twelve matched pairs of human cadaveric knees were tested in a 6 degrees of freedom robotic system.
2. Knees were randomized to the cutting of either the meniscocapsular or the meniscotibular attachments after ACL reconstruction.
3. Data from the intact knees were compared with data from:
    - Intact
    - ACL deficient
    - ACL deficient with meniscocapsular lesion
    - ACL deficient with meniscotibial lesion
    - ACL deficient with both lesions noted above

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CONCLUSIONS

1. Cutting those two ligaments significantly increased anterior tibial translation in ACL deficient knees
2. Cutting those two ligaments significantly increased tibial internal and external rotation in ACL deficient knees
3. Reconstruction of the ACL in the presence of meniscocapsular and meniscotibial tears restored anterior tibial translation but did not restore external or internal rotation nor the pivot shift.
4. To restore the pivot shift, ACL reconstruction and repair of the meniscocapsular and meniscotibial ligaments was necessary.

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MARX SCALE (ENGLISH VERSION)

Please indicate how often you performed each activity in your healthiest and most active state, in the past year. Kindly put a (☑) mark on the appropriate space after each item.

	Less than one time in a month	One time in a month	One time in a week	2 or 3 times in a week	4 or more times in a week
Running: running while playing a sport or jogging	0	1	2	3	4
Cutting: changing directions while running	0	1	2	3	4
Deceleration: coming to a quick stop while running	0	1	2	3	4
Pivoting: turning your body with your foot planted while playing sport; For example: skiing, skating, kicking, throwing, hitting a ball (golf, tennis, squash), etc.	0	1	2	3	4

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Knee Injury and Osteoarthritis Outcome Score (KOOS)

Pain

P1 How often is your knee painful?	☐ Never	☐ Monthly	☐ Weekly	☐ Daily	☐ Always

What degree of pain have you experienced the last week when…?

P2 Twisting/pivoting on your knee	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P3 Straightening knee fully	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P4 Bending knee fully	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P5 Walking on flat surface	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P6 Going up or down stairs	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P7 At night while in bed	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P8 Sitting or lying	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
P9 Standing upright	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme

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Symptoms

Sy1 How severe is your knee stiffness after first wakening in the morning?	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sy2 How severe is your knee stiffness after sitting, lying, or resting later in the day?	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sy3 Do you have swelling in your knee?	☐ Never	☐ Rarely	☐ Sometimes	☐ Often	☐ Always
Sy4 Do you feel grinding, hear clicking or any other type of noise when your knee moves?	☐ Never	☐ Rarely	☐ Sometimes	☐ Often	☐ Always
Sy5 Does your knee catch or hang up when moving?	☐ Never	☐ Rarely	☐ Sometimes	☐ Often	☐ Always
Sy6 Can you straighten your knee fully?	☐ Always	☐ Often	☐ Sometimes	☐ Rarely	☐ Never
Sy7 Can you bend your knee fully?	☐ Always	☐ Often	☐ Sometimes	☐ Rarely	☐ Never

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Activities of daily living

What difficulty have you experienced the last week…?

A1 Descending	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A2 Ascending stairs	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A3 Rising from sitting	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A4 Standing	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A5 Bending to floor/picking up an object	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A6 Walking on flat surface	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A7 Getting in/out of car	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A8 Going shopping	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A9 Putting on socks/stockings	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A10 Rising from bed	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A11 Taking off socks/stockings	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A12 Lying in bed (turning over, maintaining knee position)	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A13 Getting in/out of bath	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A14 Sitting	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A15 Getting on/off toilet	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A16 Heavy domestic duties (shovelling, scrubbing floors, etc)	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
A17 Light domestic duties (cooking, dusting, etc)	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme

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Sport and recreation function

What difficulty have you experienced the last week…?

Sp1 Squatting	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sp2 Running	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sp3 Jumping	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sp4 Turning/twisting on your injured knee	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme
Sp5 Kneeling	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme

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Knee-related quality of life

Q1 How often are you aware of your knee problems?	☐ Never	☐ Monthly	☐ Weekly	☐ Daily	☐ Always
Q2 Have you modified your lifestyle to avoid potentially damaging activities to your knee?	☐ Not at all	☐ Mildly	☐ Moderately	☐ Severely	☐ Totally
Q3 How troubled are you with lack of confidence in your knee?	☐ Not at all	☐ Mildly	☐ Moderately	☐ Severely	☐ Totally
Q4 In general, how much difficulty do you have with your knee?	☐ None	☐ Mild	☐ Moderate	☐ Severe	☐ Extreme

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The Moon Knee Group
(for authors see text)
Anterior Cruciate Ligament Reconstruction in High School and College – Aged Athletes

American Journal of Sports Medicine, 48(2) pp 298-309, 2020

STUDY DESIGN

Inclusion Criteria

- Age 14 – 22, injured in sports
- Scheduled to undergo unilateral primary ACL reconstruction using BTB or hamstring autographs
- Followed for six (6) years
- Six year outcome was the incidence of subsequent ACL reconstruction in either knee

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RESULTS

- 839 patients eligible, 770 available for follow-up and six (6) years (92%).
- Median age: 17
- BTB: 64%
- Hamstring: 36%
- Subsequent reconstruction at six (6) years was 9.2% in the ipsilateral knee and 11.2% in the contralateral knee.

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CONCLUSIONS

- Three most influential predictors of ACL revision in the ipsilateral knee are:
  - ❖High-grade preoperative knee laxity
  - ❖Age
  - ❖Graft type
- ACL revision at six years after index surgery was 2.1 x higher for the hamstring autograft 13% compared to BTB 7%

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(for authors see text)

Incidence and Predictors of Subsequent Surgery After Anterior Cruciate Ligament Reconstruction: A 6-Year Follow-up Study

American Journal of Sports Medicine, 48(10) pp 2418 - 2428, July 2020

STUDY DESIGN

- 3276 Patients completed a questionnaire before index ACL surgery and were followed up in two and six years later.
- Patients were contacted to determine whether they underwent additional surgery since baseline.
- Operative reports were obtained and all surgical procedures were categorized and reported.

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RESULTS

- Six year follow-up in 91.5% of participants
- **20.4%** of patients underwent at least one subsequent surgery after the index ACL reconstruction.
- The most common subsequent surgical procedures were related to:
  - Meniscus 11.9%
  - Revision ACL 7.5%
  - Loss of motion 7.8%
  - Articular cartilage 6.7%

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- Risk factors for subsequent meniscus-related surgery
  - ❖ Medial meniscus repair at the time of index surgery
  - ❖ Younger age
  - ❖ Higher baseline activity level
  - ❖ Reconstruction using hamstring autograft
- Risk factors for subsequent ACL revision
- Risk factors for loss of motion
  - ❖ Younger age
  - ❖ Female
  - ❖ Lower baseline KOOS symptoms subscore

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- Risk factors for subsequent surgery involving articular cartilage
  - ❖Higher body mass index
  - ❖ Higher Marx activity level
  - ❖ Meniscal Repair at the time of index surgery
  - ❖ Grade 3 / 4 articular cartilage abnormality at the time of index surgery

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CONCLUSIONS

These findings should be used to identify patients who are at the greatest of undergoing subsequent surgery following ACL reconstruction.

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Gauffin, H., Arden, C.L., et al
Radiographic and Symptomatic Knee Osteoarthritis 32 to 37 Year after acute ACL Rupture

American Journal of Sports Medicine, 48(10) pp 2387 – 2394, 2020

STUDY DESIGN

- Patients 15 to 40 years of age at the time of ACL injury were allocated to a surgical or nonsurgical treatment within 14 days of injury.
- 32 to 37 years after the initial injury, 153 participants were followed with weigh-bearing radiographs (using Kellgren and Lawrence grading) and a functional assessment using KOOS (knee injury and osteoarthritis outcome score)
- Symptomatic OA was defined as radiographic OA **PLUS** knee symptoms measured with the KOOS.

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CONCLUSIONS

1. Patients in the ACL surgery groups had a lower prevalence of tibiofemoral **radiographic** OA at 32 to 37 years follow-up than patients without ACL surgery.
2. The prevalences of **symptomatic** OA, radiographic patellofemoral OA and knee symptoms were similar irrespective of ACL treatment.
3. The incidence of OA after ACL injury was high.

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Thank You!

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