
# The ACL injury severity scale (ACLISS) is an effective tool to document and categorize the magnitude of associated tissue damage in knees after primary ACL injury and reconstruction

Romain Seil, Charles Pioger, Renaud Siboni, Annunziato Amendola, Caroline Mouton

CHL
Centre Hospitalier de Luxembourg
EICH

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LUXEMBOURG INSTITUTE OF RESEARCH IN ORTHOPEDICS, SPORTS MEDICINE AND SCIENCE

# Disclosure

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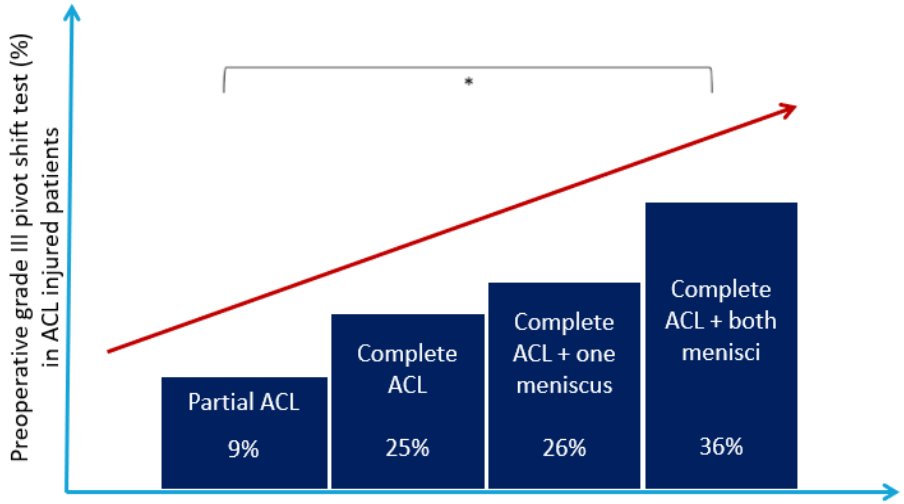
# Introduction

Up to **75% of patients** undergoing primary ACL reconstruction **display concomitant tissue damage** including chondral lesions, meniscal tears and further ligament injuries[7].

These complex injuries cannot be compared with isolated ACL injuries, particularly with regard to the postoperative outcomes[5].

To date, no documentation tool exists to fully document the damage in an ACL injured knee.



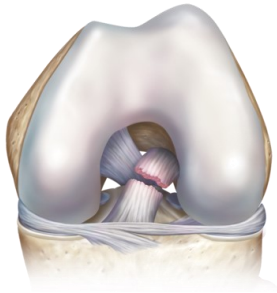

Magosch et al. KSSTA 2021

- Frequently overlooked injuries[1,2,4]
  - Medial meniscus ramp lesions (MMRL)
  - Posterolateral meniscus root tears (PLMRT)
  - Medial collateral ligament (MCL) injuries
- Bone bruise as indicator for more severe injury[9]

# Introduction

## Purpose

To develop a tool allowing to describe and classify the magnitude of structural tissue damage occurring in primary ACL injured patients undergoing reconstruction



**The anterior cruciate ligament injury severity scale (ACLISS)**

## Hypothesis

To provide an easy description and classification of the wide spectrum of injuries in patients undergoing primary ACL reconstruction, ranging from isolated ACL tears to ACL tears with a complex combination of concomitant injuries.

- Selection of items for menisci, subchondral bone, articular cartilage, collateral ligaments: literature review / consensus between authors
- Retrospective analysis of 100 patients with primary ACLR
- Reduction of the number of items to avoid a floor or ceiling effect in the final score
- Analysis of the scale distribution → **3 ACL injury severity profiles: mild, moderate and severe.**

**Item selection according to**

- Clinical importance
- Reliability and reproducibility
- Applicability to daily clinical practice
- Assess ability by MRI or arthroscopy

**Selection criteria for retrospective analysis**

- Primary ACL reconstruction in adults
- Non-multiligament or -realignment surgery
- No history of prior knee surgery
- 1.5T MRI performed within 8 weeks of injury

Final scoring system: 12 points → 6 points attributed to the medial / lateral tibiofemoral compartment

## Medial compartment – 6 points

### MRI

**Ligament** (acc. to Rasenberg et al.)

0 – No medial collateral ligament (MCL) injury
1 – MCL injury grade 1-2

**Subchondral bone**

0 – No bone bruise
1 – Bone bruise tibial plateau OR femoral condyle
2 – Bone bruise tibial plateau AND femoral condyle

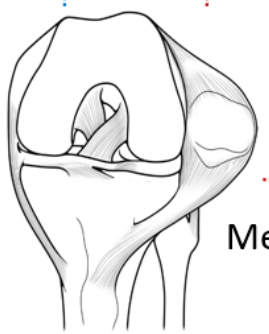
### Arthroscopy

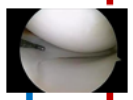
**Meniscus**

0 – No medial meniscus (MM) tear
1 – Minor unstable MM tear
2 – Major unstable MM tear (e.g. ramp, bucket handle,…)

**Cartilage** (acc. the Outerbridge classification)

0 – No grade 3 or 4 lesion
1 – At least one grade 3 or 4 lesion (tibial and/or femoral)





## Lateral compartment – 6 points

### MRI

**Subchondral bone**

0 – No bone bruise
1 – Bone bruise tibial plateau OR femoral condyle
2 – Bone bruise tibial plateau AND femoral condyle

0 – No associated fracture
1 – At least one associated fracture (Segond's fracture or posterolat. tibial plateau fracture)

### Arthroscopy

**Meniscus**

0 – No lateral meniscus (LM) tear
1 – Minor unstable LM tear
2 – Major unstable LM tear (e.g. root, bucket handle,…)

**Cartilage** (acc. the Outerbridge classification)

0 – No grade 3 or 4 lesion
1 – At least one grade 3 or 4 lesion (tibial and/or femoral)

Median scale value in the study population : 4.5 (lower quartile 3.0; higher quartile 7.0)

Categorisation of ACL injury severity

Score < 4 = **mild** (grade I),

Score ≥ 4 and ≤ 7 = **moderately** (grade II)

Score > 7 = **severe** (grade III)


**Prevalence of structural damage increased with the ACLISS grades**

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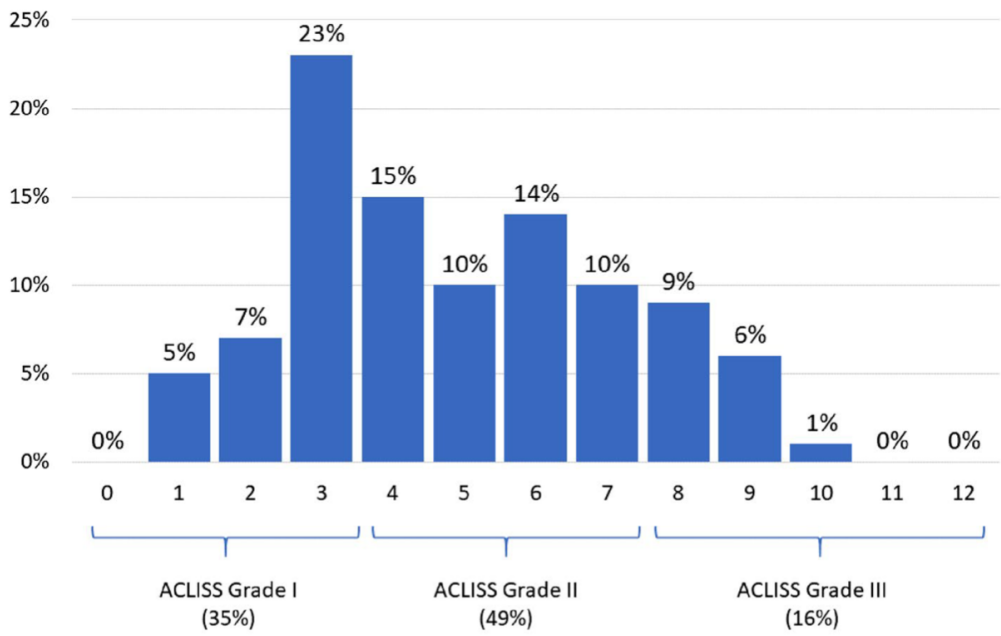
## ACLISS distribution in 100 patients with primary ACL reconstruction

| | |
|---|---|
| **ACLISS Grade I** | • Predominantly lateral compartment<br>• No bimeniscal lesions<br>• ¼ MCL grade 1 or 2 |
| **ACLISS Grade II** | • As many medial as lateral lesions<br>• ⅓ bimeniscal lesions<br>• ½ MCL grade 1 or 2<br>• 25% of medial ramp lesions |
| **ACLISS Grade III** | • Predominantly medial compartment<br>• 80% of bimeniscal lesions<br>• ¾ MCL grade 1 or 2<br>• 75% of medial ramp lesions |




Overall, damage to the lateral compartment was predominant ($p<0.01$) but proportional involvement of medial compartment increased with ACLISS ($p<0.01$)

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With increasing ACLISS

↗ associated lesions

↗ involvement of the medial compartment

→ should convince surgeons to be systematic in the exploration of structural damage in ACL-injured knees.

→ high involvement of the medial tibiofemoral compartment in ACLISS grade III may be a consequence of high energy trauma with medial subluxation profiles[3]

**Strenghts and possibilities**

- Combination of 2 diagnostic modalities and several parameters
- Basis for future comparison of different cohorts (3 severity profiles)
- Basis for the outcome prediction

**Limitations**

- Requirement of acute preoperative MRI and systematic arthroscopy
- Item selection not yet validated for other cohorts

The ACLISS allowed to asses the magnitude of structural damage in primary ACL-injured and reconstructed knees and to distinguish 3 injury severity profiles based on preoperative MRI and a systematic arthroscopy.

➔ Unique, quick and easy documentation tool

➔ Reproducible comparison of clinical data in ACL injured patients

Knee Surgery, Sports Traumatology, Arthroscopy
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Contact: mouton.caroline@chl.lu