

Knee Injuries and Imaging

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1. Knee injuries and priority

2. Patellofemoral instability

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Knee injuries and priority

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Differences in knee injuries

Contact vs non-contact

Low vs High energy

Concomitant injuries

Age (child or adult)



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Orthopedic Approach

- History
- Try to imagine injury mechanism
- Clinical examination



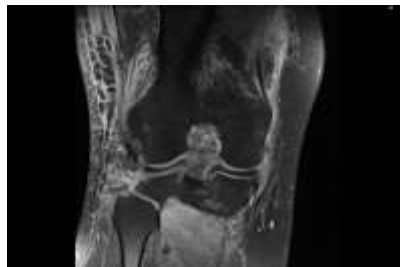
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Orthopedic Approach

Assesment of potential injury/injuries

Imaging → Verify suspected injury/injuries
and rule-out others



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The Use of MRI and Clinical Exam in Evaluation of Knee Injuries

Table 2 Diagnostic values of MRI

Sensitivity (%)		Specificity (%)		PPV (%)		NPV (%)		Accuracy (%)	
Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears
95	67	60	88	83	57	86	91	83	83

Sensitivity, specificity, positive predictive value (PPV), Negative predictive value (NPV), and accuracy for medial meniscus tears and lateral meniscus tears

Table 3 Diagnostic values of clinical examination

	Sensitivity (%)		Specificity (%)		PPV (%)		NPV (%)		Accuracy (%)	
	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears	Medial meniscus tears	Lateral meniscus tears
Experienced knee surgeon	95	33	90	92	95	50	90	85	93	80
Specialist in general orthopedics	95	80	70	92	86	60	88	92	83	83
Senior resident	85	50	60	92	81	60	67	88	77	83
Fourth-year resident	84	50	60	88	80	50	67	88	75	80

Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy for medial meniscus tears and lateral meniscus tears

Ercin: Knee Surg Sports Traumatol Arthrosc (2012) 20:851–856

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Importance of early diagnosis

- Bucket Handle
- Root lesion
- Osteochondral lesions
- Eminentia fracture / avulsion
- Fractures
- Knee dislocations



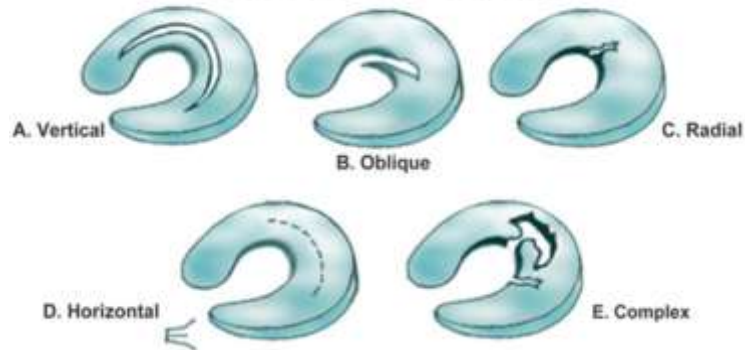
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Meniscus lesion

Meniscus Tear Patterns



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Bucket Handle tear

Locking of the knee
Extention deficit

Treatment:
Suture if possible

75-80 % healing rate...

Grant: Am J Sports Med 2012 40: 459



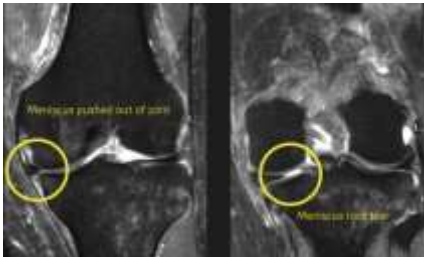
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Meniscal root tear

Timing of surgery?
Still remains to be answered



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Osteochondral lesion

Clinic:

Pain and swelling
Locking, possibly extension deficits
Previous history of **OCD** or **PF** instability



Treatment:

Fixation of detached chondral lesion must
be within 2 weeks of injury



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Avulsion fracture

Eminentia fracture

Tibial spine avulsion

Arcuate sign

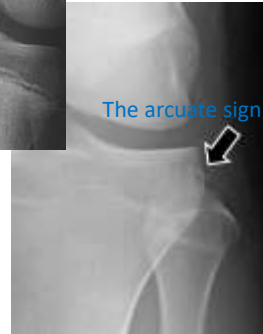
Avulsion fracture of the LCL and/or biceps tendon from the tip of the proximal fibula
Suspect ACL tear (~80-90%)

Treatment:

Depending on grade of displacement
Non-displaced → conservative treatment

Displaced → Surgical treatment within 2 weeks

Strub WM. The arcuate sign. Radiology. 2007;244 (2): 620-1.



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Knee dislocation

Very serious

Often involment of multiple structures

Vascular injury

Nerve injury

**Radiograph and MRI and possibly CT
angio**

Important for preoperative planning

Treatment:

Surgery within 10-14 days after injury

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Summery 1

Indication for early **Radiographs** or **MRI** on suspicion for the following injuries...

- Bucket handle lesions
- Root lesion
- Osteochondral lesions
- Eminentia fracture / avulsion
- Fractures
- Knee dislocations

Most of these injuries require surgical intervention within 2 weeks of injury

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Patellofemoral Instability

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Patellofemoral Dislocation

"Rule of thumb"

Approx. 50% of 1. time dislocation can manage with rehab.

Approx. 50% will experience redislocation/instability and should be examined by an orthopedic surgeon, and possibly surgically treated.

- Clinic
- Radiographs
- MRI



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Predictors of Recurrent Instability After Acute Patellofemoral Dislocation in Pediatric and Adolescent Patients

Laura W. Lewallen,^{*} MD, Amy L. McIntosh,^{†1} MD, and Diane L. Dahm,^{*} MD
Investigation performed at the Department of Orthopedic Surgery, Mayo Clinic, Rochester, Minnesota

Non-dysplasi

31 % re-dislocate

Dysplasi

69 % re-dislocate

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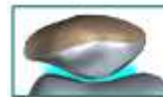
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Patellofemoral Dysplasia



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Normal

Flattened
femoral
groove and
patellar
dislocation



Anatomical factors

Soft tissue abnormality

- Mediale stabilisors
- Laterale retinacle
- Patella alta
- Hypermobile

Bony abnormality

- Patella dysplasia
- Trochlea dysplasia
- Femoral anteversion



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Patella Index

- **Insall-Salvati**
1.3 > pathologic
- **Caton-Deschamp**
1.2 > pathologic

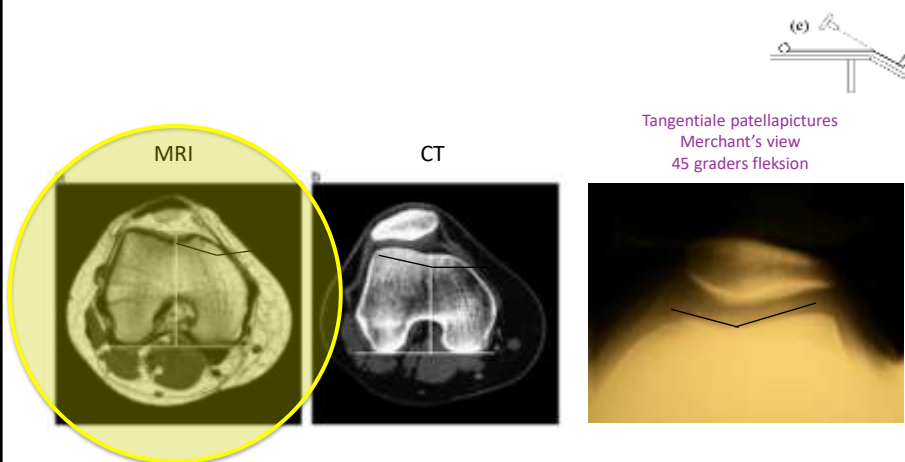


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Methods of Investigation

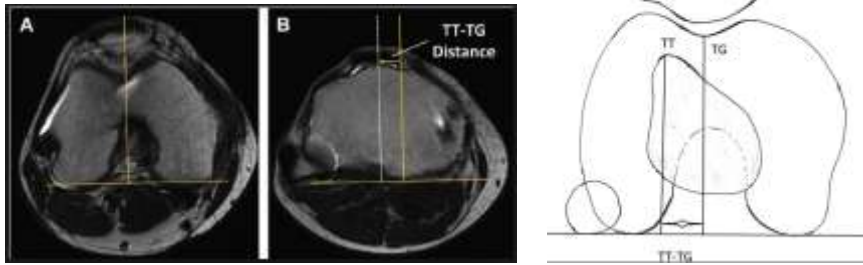


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Tuberositas Tibia – Trochlea Groove

TT-TG > 20 mm = pathologic



Schoettle: The Knee 13 (2006) 26 – 31

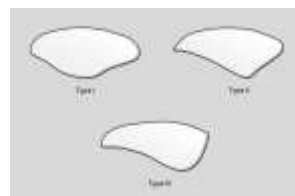
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Dysplasia

- Patella classification
 - **Wiberg** (1941)
- Trochlea classification
 - **Dujour**
 - 1987 Crossing sign
 - 1998 Classification



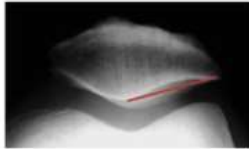
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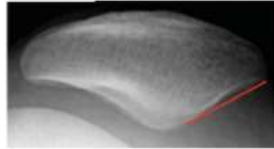


Patella Dysplasia

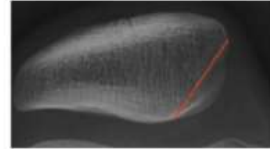
Wiberg classification



Type I



Type II



Type III

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Trochlea Dysplasia

Dujour classification

- Type A-D
- Crossing sign



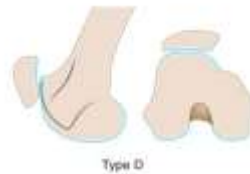
Type A



Type B



Type C



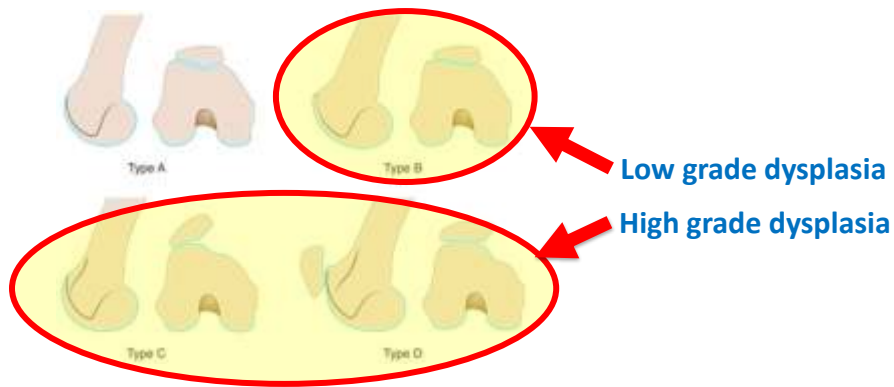
Type D

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Trochlea Dysplasia



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Summery 2

- Chondral lesion or degenerative changes
- Patella index
- TT-TG
 - Important: TT is included on the MRI
 - Coronal images
- Description/grading of Trochlea Dysplasia

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Thank you



**"Your x-ray showed a broken rib,
but we fixed it with Photoshop."**

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