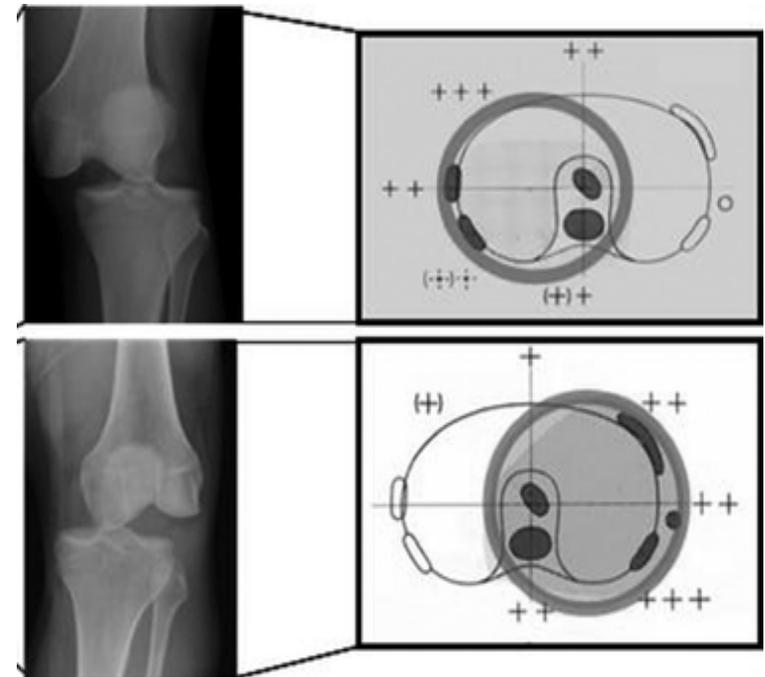


# Multi-ligament injuries

## Classifications and epidemiology



# Overview

- **Classification of multi-ligament injuries and knee dislocations**
- **Epidemiology of multiligament injuries**



# Injury mechanisms

- **Low energy**
  - Sports injuries (10-20 %)
- **High energy**
  - Traffic injury, dashboard, motorcycle
  - 50-60 %

## Ultra low energy

Morbidly obese patients

< 5 %



# Definition of multi-ligament injuries

*Multiple Ligament Injuries*

## **Definition**

### **Spectrum of Injury**

- **Single cruciate (ACL or PCL)** → **Bicruciate**  
+  
**Collateral (s)** +  
**Collateral**  
**“dislocated”**
- **Ligaments can be partially injured (G I or II) and can heal (especially MCL and PCL)!**

***Every knee is different!***

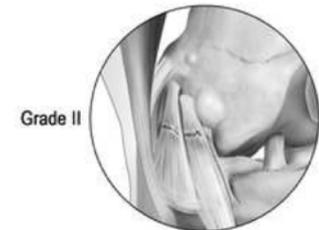


# Ligament injury degree evaluation

- **Grade 1 :**
  - Sprain, subtotal fiber lesion,
  - no to minor laxity clinically
- **Grade 2:**
  - Total fiber lesion of specific ligament,
  - Clear laxity
- **Grade 3:**
  - Total ligament lesion + adjacent capsular lesions and combined lesion.
  - Marked laxity + rotational laxity

# Example: MCL lesion classification

MCL injury grading	Injured structures	30° Laxity	0° Laxity	Rotational instability
Grade I	Microscopic tear to sMCL and dMCL	None IKDC A	none	none
Grade II	Complete tear to sMCL	5-15° Joint opening IKDC B-C	none	none
Grade III	Complete tear tear to sMCL and dMCL, capsule and POL	> 15° Joint opening No endpoint IKDC C-D	present	present



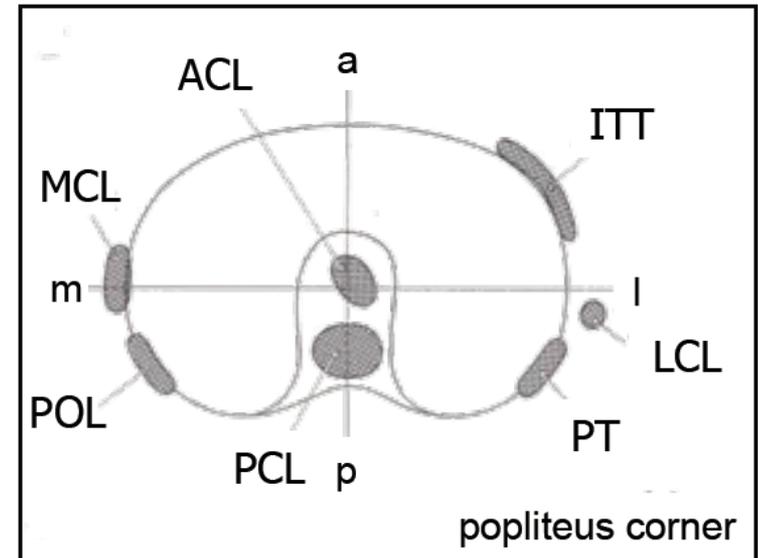
# Posterolateral instability classification

Hughston/Norwood grading	Varus laxity	External rotation laxity (Dial test)
Grade I	0	< 10 degrees
Grade II	Grade 1-2	> 10 degrees
Grade III	Grade 3-4	> 20 degrees



# Anatomical classification (Harner)

- Timing
  - Acute vs Chronic
- Anatomy
  - Cruciates
  - Collaterals
  - Meniscus
- Associated injuries
  - Tendon
  - Bone
  - Nerve
  - Vascular



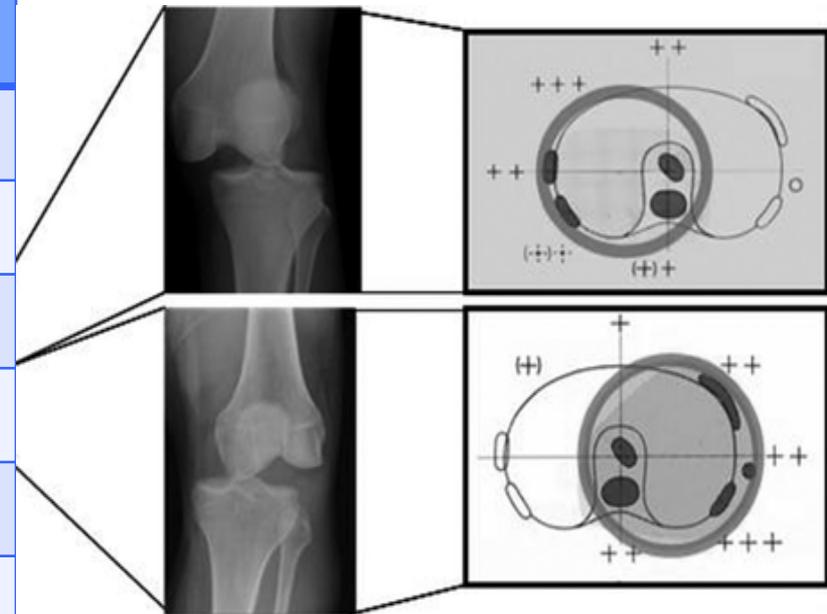
# Scheck knee dislocation classification (1992)

<b>Schenck classification</b>	
KD-I	ACL or PCL + collateral
KD-II	ACL + PCL
KD-III M	ACL + PCL + MCL
KD-III L	ACL + PCL + LCL
KD IIII	ACL + PCL + MCL + LCL
KD-V	Fracture dislocation
	V= arterial injury, N = nerve injury



# Scheck knee dislocation classification (1992)

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# Epidemiology (knee dislocation)

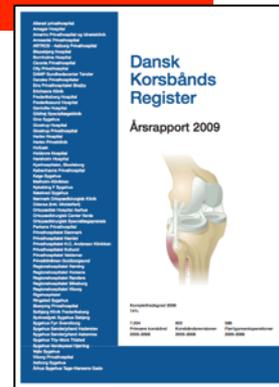
- **Acute: Rare 2/100.000/year**
- **Overlooked:**
  - Due to spontaneous reduction knee dislocations can be overlooked. Estimated 50 % overlooked
  - Be aware of injury mechanism and multidirectional instability.
  - If in doubt, acute MRI
- **Chronic:**
  - Overlooked injuries, lack and failure of proper non operative treatment.



# Danish ACL registry multiligament reconstruction incidence 2005-2016

Knee dislocation reconstructions in 1214 out of 26450 knee ligament reconstructions

**Not frequent overall (4,5 %)**



Reconstruction type	Number	%
KD I (ACL + coll)	660	54.0
KD I (PCL + coll)	157	13.0
KD II PCL + ACL	78	6.4
KD III M PCL + ACL + MCL	61	5.0
KD III L PCL + ACL + LCL	89	7.3
KD IIII PCL + ACL + MCL + LCL	12	1.0
Total knee dislocation multiligament	1214	

# Take home messages

- **Multiligament injuries are rare. Knee dislocations less than 5 % of all knee ligament injuries**
- **Early precise diagnosis is important. Use acute MRI if knee dislocation mechanism is suspected**
- **Classify lesions for treatment strategy and prognosis**

