

# Idrettsfysioterapi for barn og ungdom

Håvard Moksnes  
Sport physiotherapist, PhD



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IDRETTENS HELSESENTER

Idrettens skadetelefon – Idrettens forsikringssenter – Idrettens sykehus – Idrettshelse – Helse og arbeid



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## Om Idrettens Helsecenter

IHS er et heleid datterselskap av Norges Fotballforbund.

Idrettens Helsecenter skal bidra til økt deltagelse i idrett og arbeid.



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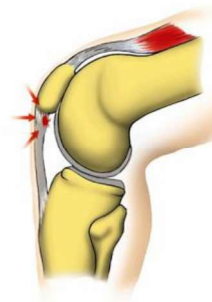


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## Case 1

Boy 13 years old playing football 4 times per week + in school every day. Anterior knee pain since December 2023. Ultrasound with neovascularisation @ apex patella

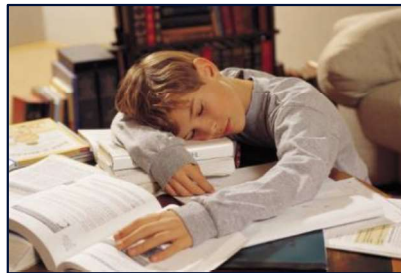
- A. Radial shockwave therapy?
- B. Injection therapy?
- C. Eccentric strength training?
- D. Other?



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## Pediatric overuse injuries



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**Vanlige fallgruver:**

Frykt for å legge på seg

Spise "for sunt"

Frokost

Mellommåltid

Kveldsmat

Lunsj

droppe måltider

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**NÅR ENERGIEN MANGLER**  
RELATIVE ENERGY DEFICIENCY IN SPORT (REDS)

**TEGN**

LAV ENERGI-TILGJENGELIGHET

EN UBALANSE MELLOM TRENING OG MAT

**Ojennatte skader og/eller hyppig sykdom**  
Spesielt stressreaksjoner i skjelettet eller tretthetsbrudd.

**Menstruasjonsforstyrrelser eller lav sexlyst**  
Jenter kan oppleve fravær av, eller uregelmessig menstruasjon. Gutter kan oppleve nedsatt sexlyst.

**Humørsvingninger eller ofte i dårlig humør**  
Utøveren er ofte lei seg, irritert, eller opplever store humørsvingninger.

**Stagnerende treningsresultater**  
Resultatutviklingen har stanset uten en klar årsak.

**Mangelfull restituasjon**  
Utøveren er mer støt enn vanlig og klarer ikke å hente seg inn mellom treningsøkter.

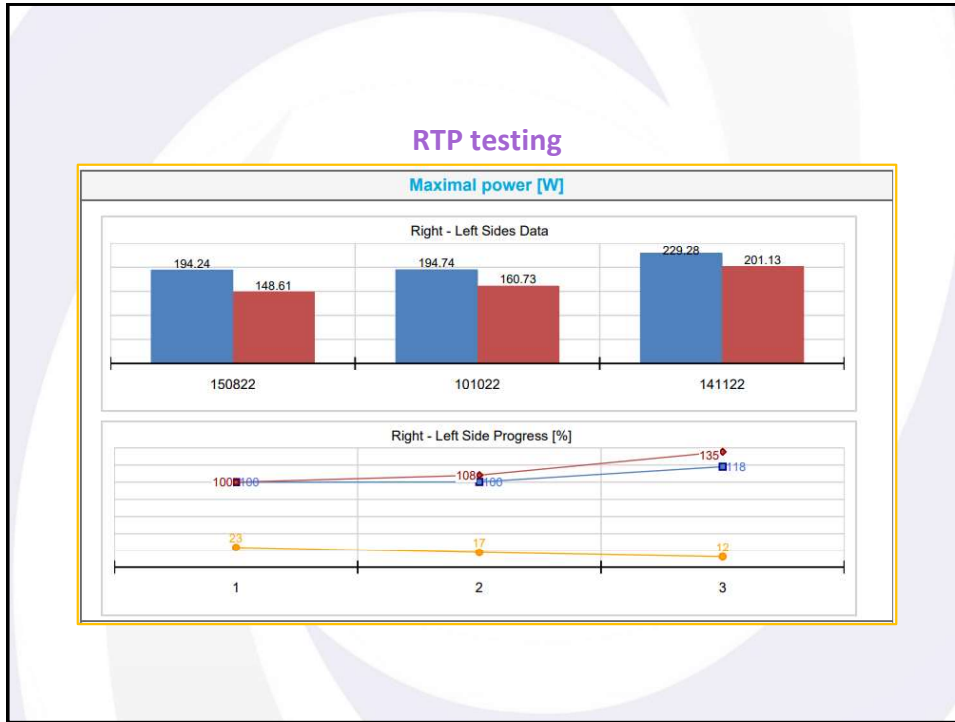
**Trett til tross for nok søvn**  
Utøveren sover nok (over 8 timer per natt) men føler seg likevel trett og sliten.

**Avvik i blodprøver**  
Lave nivåer av kjønns- og stoffskilte hormoner, samt økt kolesterol og LDL.

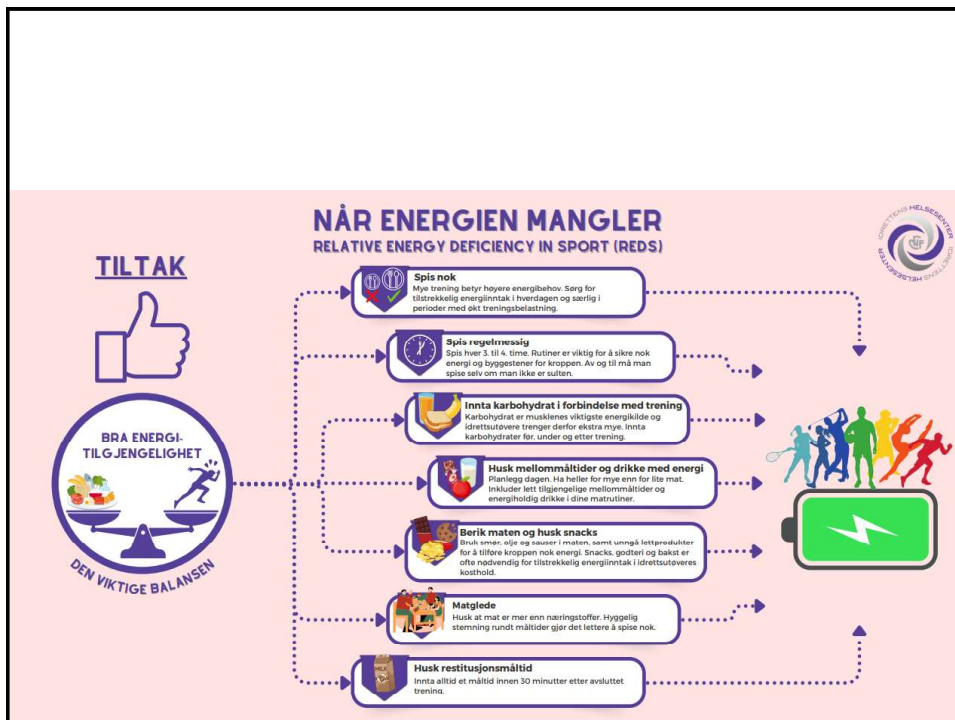
KJENNER DU DEG IG-JEN? MELD INN SKADE

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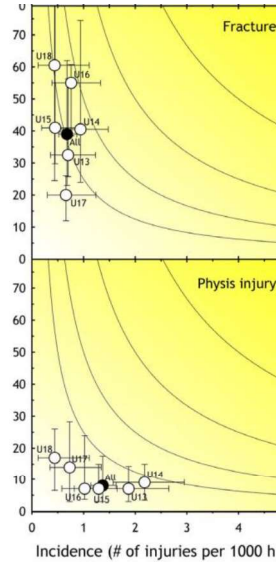
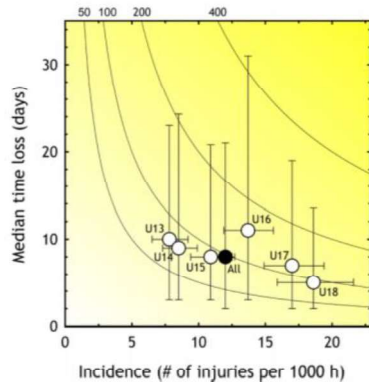


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# Injury patterns youth football

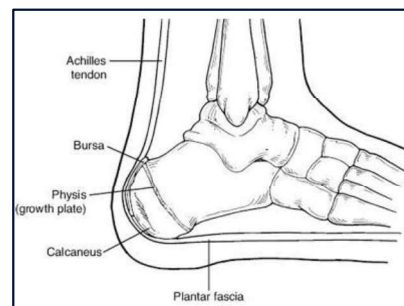
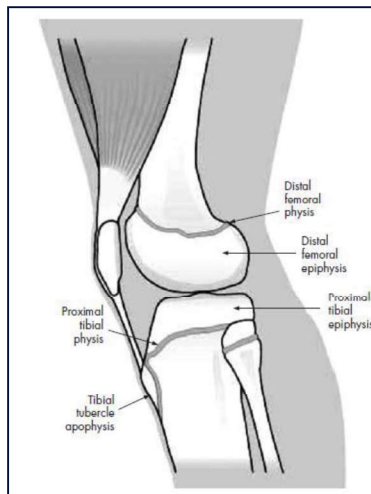


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Wik et al BJSM 2020

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# What is a physis?



From Caine et al. (2006)

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## Adaptation to load

- Adaptation into (mal)function?
- Monitoring?
- Alternate loading during growth spurt?



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Agricola et al 2014

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**«Demise of the fittest; are we destroying our biggest talents?»**



British Journal of  
**Sports Medicine**

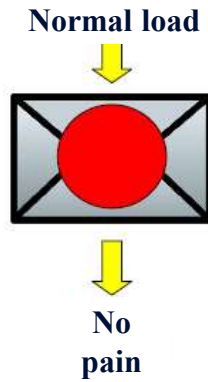
Editorial from  
Prof Roald Bahr  
May 2014

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## Envelope of load acceptance

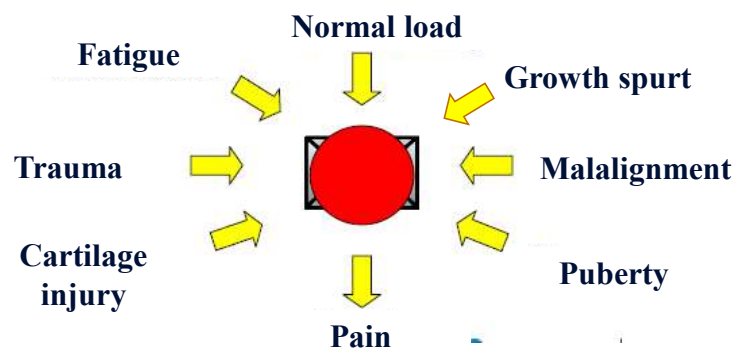


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Dye 2005

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## Envelope of load acceptance

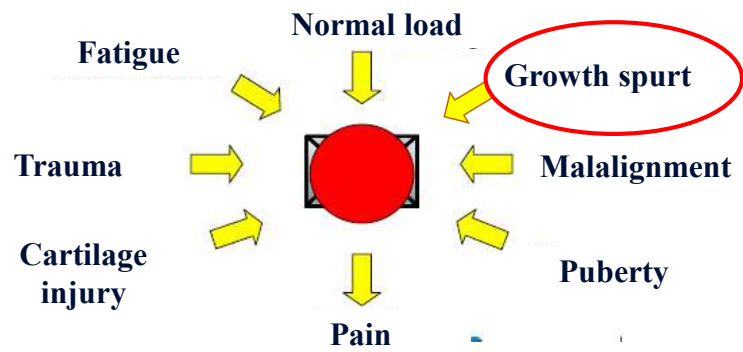


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Dye 2005

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# Envelope of load acceptance



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Dye 2005

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**Et ID**

## Vekst og Modning

Forskjeller i fysisk utvikling blant ungdom kan ha stor innflytelse på både talentutvikling, seleksjon og skadeutsatthet.

Prosjektet skal i første fase bygge relevant kompetanse, og komme med konkrete anbefalinger til hvordan vi kan adressere disse utfordringene bedre i årene fremover.



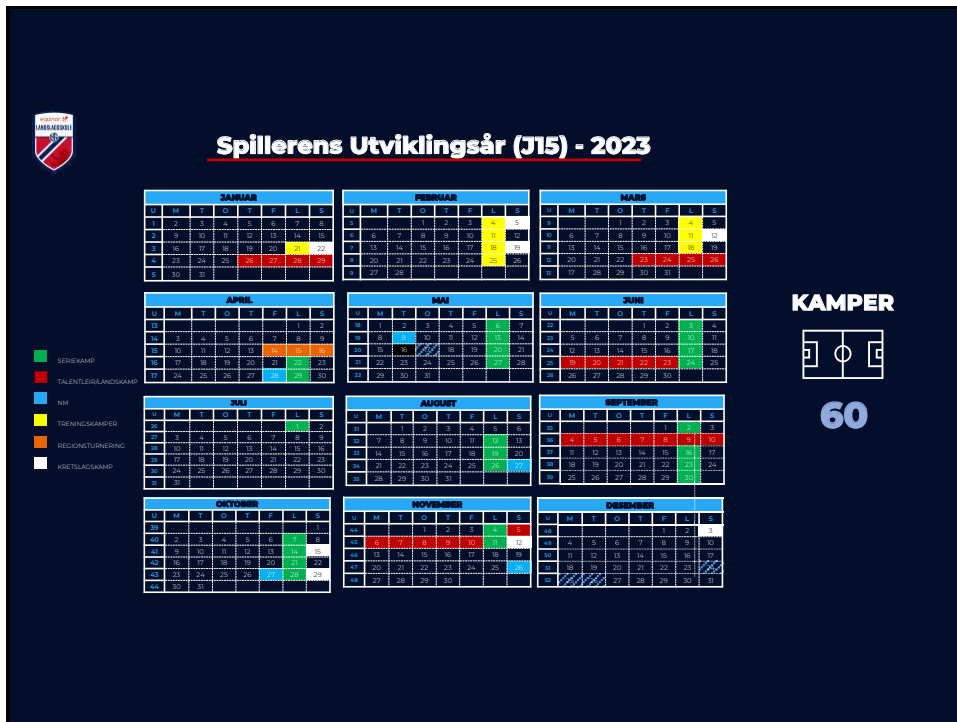



  
 Seleksjon

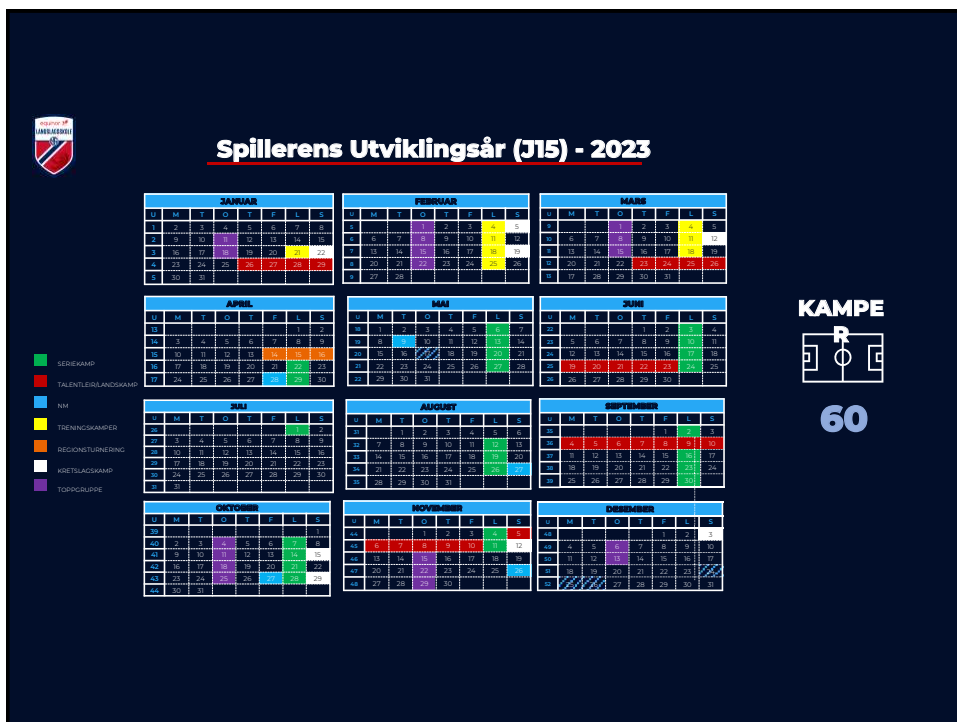
  
 Utvikling

  
 Skaderisiko

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### Spillerens Utviklingsår (J15) - 2023 - Case

- SERIEKAMP
- TALENTERLANDSKAMP
- NM
- TRENINGSKAMPER
- REGIONTURNERING
- TOPPGRUPPE
- KRETSLAGSKAMP

MAI							
U	M	T	O	T	F	L	S
18	1	2	3	4	5	6	7
19	8	9	10	11	12	13	14
20	15	16	17	18	19	20	21
21	22	23	24	25	26	27	28
22	29	30	31				

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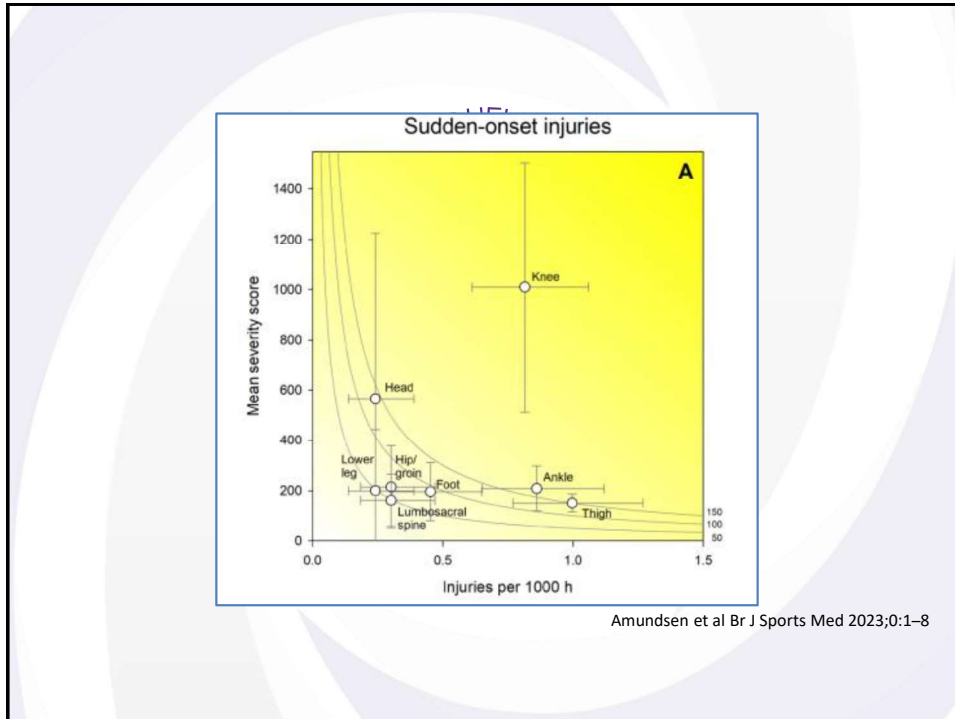


### Spillerens Utviklingsår (J15) - 2023 - Case

- SERIEKAMP
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- REGIONTURNERING
- TOPPGRUPPE
- KRETSLAGSKAMP

SEPTEMBER							
U	M	T	O	T	F	L	S
35					1	2	3
36	4	5	6	7	8	9	10
37	11	12	13	14	15	16	17
38	18	19	20	21	22	23	24
39	25	26	27	28	29	30	

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## Individuell oppfølging



Landslagskolen styrker den individuelle oppfølgingen av talentene på jentesiden

Utdanning
Totalbelastning
Styrketrening

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## Children with anterior knee pain

### Diagnosis

- Tendinopathy
- Mb.Sinding-Larsen
- Mb.Osgood-Schlatter
- PFP
- Patella instability
- Osteochondritis dissecans
- Osteosarcoma
- Rheumatoid illness

### Treatment

Main rule:

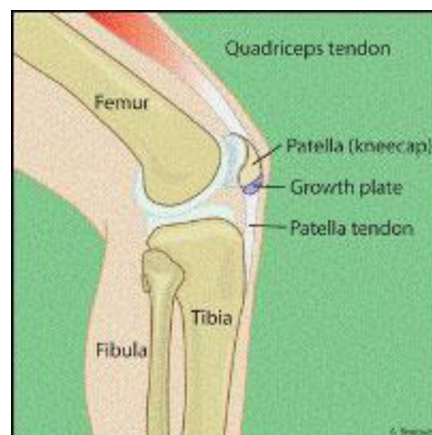
- ✓ Overload of soft tissue or growth zones
- ✓ Adjust total load!

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## Mb.Sinding-Larsen-Johansson

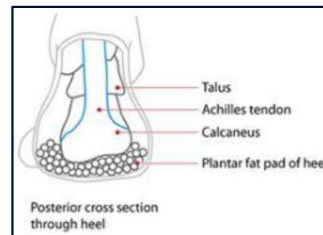
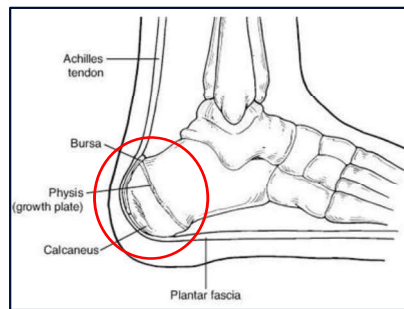
- ✓ Occurs early growth spurt
- ✓ Adjust load
- ✓ Remove «unnecessary» running first



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## Mb. Sever



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## Det enkleste er en pistol!



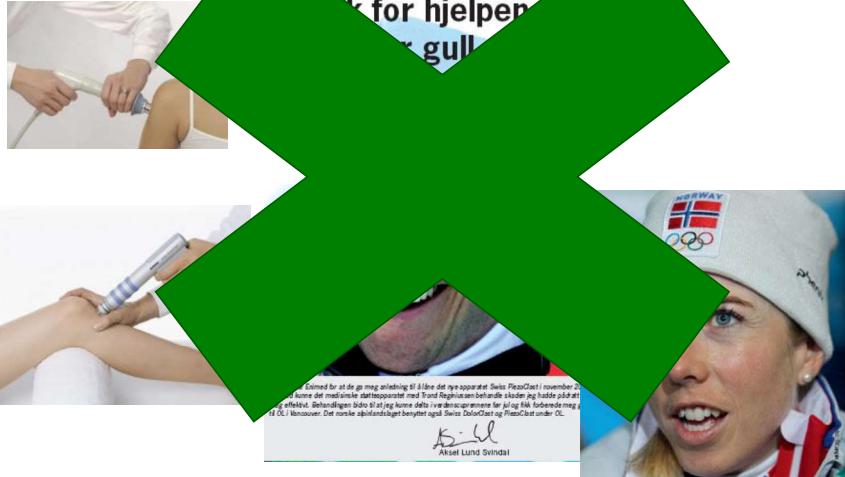
- Takk for hjelpen.  
Den var gull verd!



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## Det enkleste er en pistol!



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## Rehabilitation

- ✓ Reduce total load
- ✓ Help kids stay social with their team!
- ✓ Bring the parents into the rehab!!



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## Rehabilitation algorithm

1. Review training/match exposure past 6 months
2. Review weekly schedule
3. Remove «unnecessary» load
4. Implement symptom coping strategies
5. Active rehab aimed at impairments

## 1. Review training/match exposure past 6 months

- ✓ Increased frequency?
- ✓ Increased intensity?
- ✓ Changed environment?
- ✓ Playing several teams?
- ✓ “Did you have a holiday this summer?”

## 2. Review weekly schedule

- ✓ Write it down on paper
- ✓ When do you rest?
- ✓ Which sessions can be removed?

## 3. Remove «unnecessary» load

- ✓ Remove “unnecessary” runs and hops
- ✓ Change from running to cycling
- ✓ School sessions vs club sessions
- ✓ Leisure time activities

## 4. Implement symptom coping strategies

- ✓ RICE after loading
- ✓ Rest days
- ✓ Reduced playing time
- ✓ One game per week
- ✓ Play and train with only one team!

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## 5. Active rehab aimed at impairments

- Increase the size of the envelope
- Shock absorption
- Hip, hamstring and kinetic chain



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## Take home messages RTP with overuse injuries

- ✓ Assess and tweak total load
- ✓ Include the parents and coaches
- ✓ Give a structured progression plan

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## Acute injuries

- Rare < 12 years
- Adolescents:
  - Overload leading to increased risk?
  - Fatigue in the best players?
  - Parents?



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Hewitt et al 2006,  
Froholt et al 2009

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# Management and treatment of pediatric ACL injuries

**Håvard Moksnes**  
Sports physiotherapist, PhD

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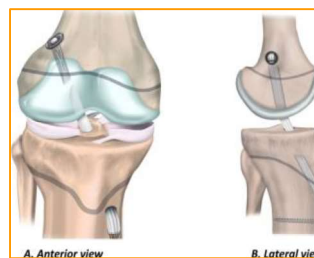
Ardern CL, Ekås GR, Grindem H, *et al*  
**2018 International Olympic Committee consensus statement on prevention, diagnosis and management of paediatric anterior cruciate ligament (ACL) injuries**  
*Br J Sports Med* 2018;52:422-438.

**PAEDIATRIC ACL INJURIES**  
Prevention, Diagnosis & Management  
Reference: Ardern et al. *BJSM* 2018. IOC Consensus Statement. Designed by @LMSportScience

The number of ACL injuries in children is rising...  
...and the long-term outcomes after ACL injury in childhood, including development of osteoarthritis, is unknown

**ADVICES**

- 1 Completing the FIFA 11+ for Kids can reduce football-related lower limb injuries by over half!
- 2 Combine history, examination findings and imaging to inform diagnosis and treatment decision-making.
- 3 High-quality rehabilitation alone or ACL reconstruction + high-quality rehabilitation are both reasonable treatment options.
- 4 Consider skeletal maturity, injuries to other knee structures and potential adverse events following treatment when advising children and their parent(s)/guardian(s).
- 5 Use a generic health-related quality of life measure, a self-reported knee function measure and an activity level measure to monitor outcomes.
- 6 Encourage coaches, teams, clubs and federations to prioritise injury prevention.



Clare L. Ardern et al. *Br J Sports Med* 2018;52:1297-1298

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## Indication for surgery



1. The child has repairable associated injuries that require surgery
2. The child has recurrent, symptomatic knee giving way after completing high-quality rehabilitation
3. The child experiences unacceptable participation restrictions after completing high-quality rehabilitation

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## Indication for surgery



1. The child has repairable associated injuries that require surgery
2. The child has recurrent, symptomatic knee giving way after completing high-quality rehabilitation
3. The child experiences unacceptable participation restrictions after completing high-quality rehabilitation

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## Indication for rehabilitation

2018 International Olympic Committee consensus statement on prevention, diagnosis and management of paediatric anterior cruciate ligament (ACL) injuries

1. The child does not have repairable associated injuries that require immediate surgery
2. The child has recurrent, symptomatic knee giving way after completing high-quality rehabilitation
3. The child experiences unacceptable participation restrictions after completing high-quality rehabilitation

Arden et al 2018

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## Injury prevention programs

- 'should be implemented early in the athlete's developmental process.'

Clare L Arden et al. Br J Sports Med 2018



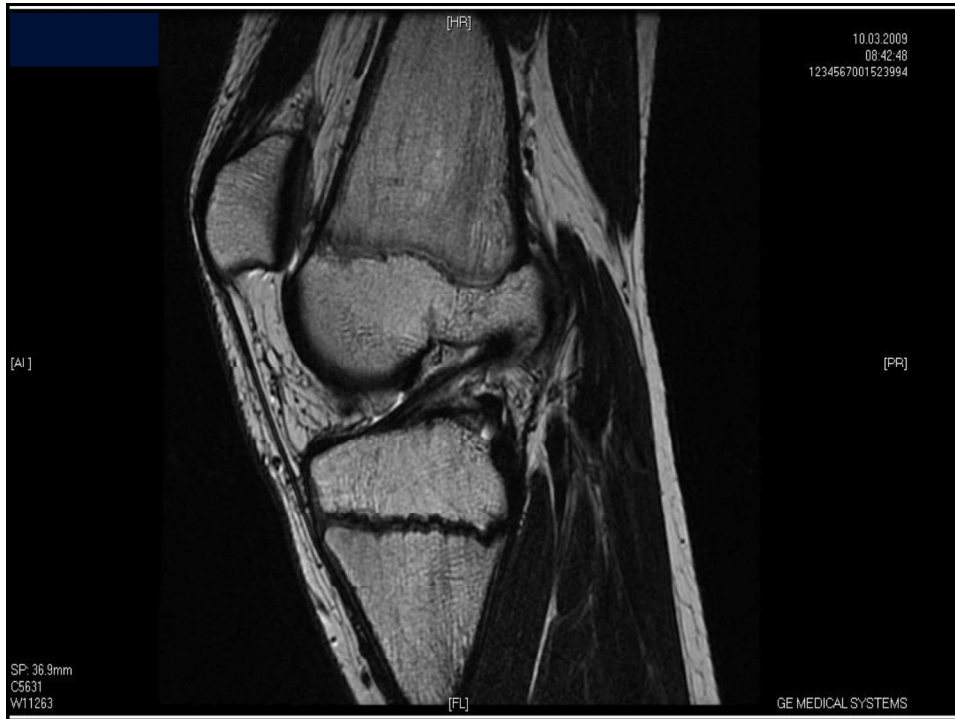
FIFA 11+ for KIDS ↓ injuries

↑ motor skills, balance and agility


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Beaudouin 2019, Rossler 2016 and 2017

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### Activities at time of injury (n=47)

Alpine skiing	n=23
Soccer	n=10
Trampoline	n=3
Playground	n=3
Cycling	n=2
Handball	n=2
Motocross	n=1
Skateboard	n=1
Cross-country skiing	n=1
Ski-jumping	n=1



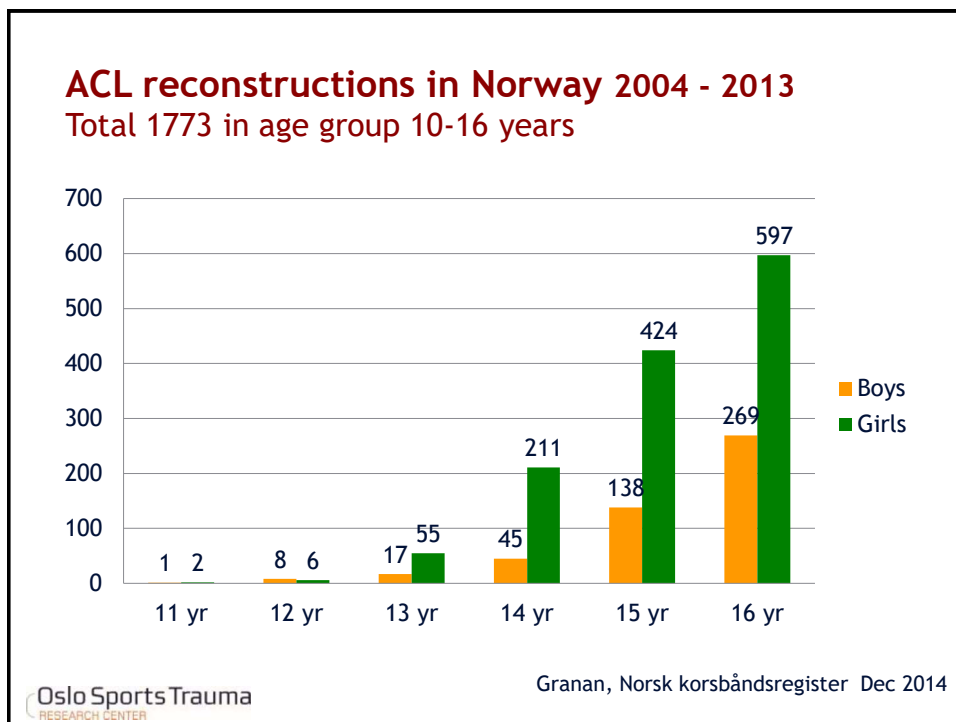
Moksnes et al 2013

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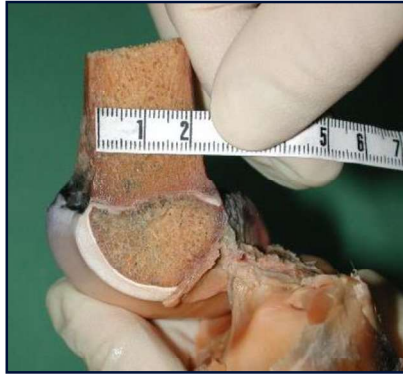


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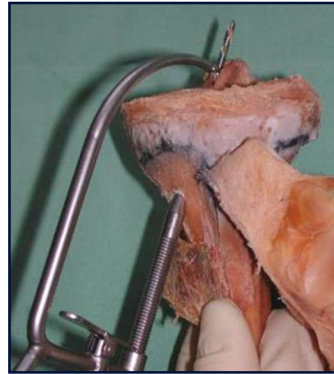


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## Surgery in skeletally immature



Small dimensions!



Tuberositas tibia apofyses far down 3-4 cm

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Photos: Romain Seil

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## The clinical challenge

The risk of growth disturbance, the fate of the graft, and the child's adherence to rehabilitation after an ACL reconstruction

versus

The possible increased risk of early osteoarthritis subsequent to secondary injuries after non-operative management

 NORWEGIAN SCHOOL OF SPORT SCIENCES

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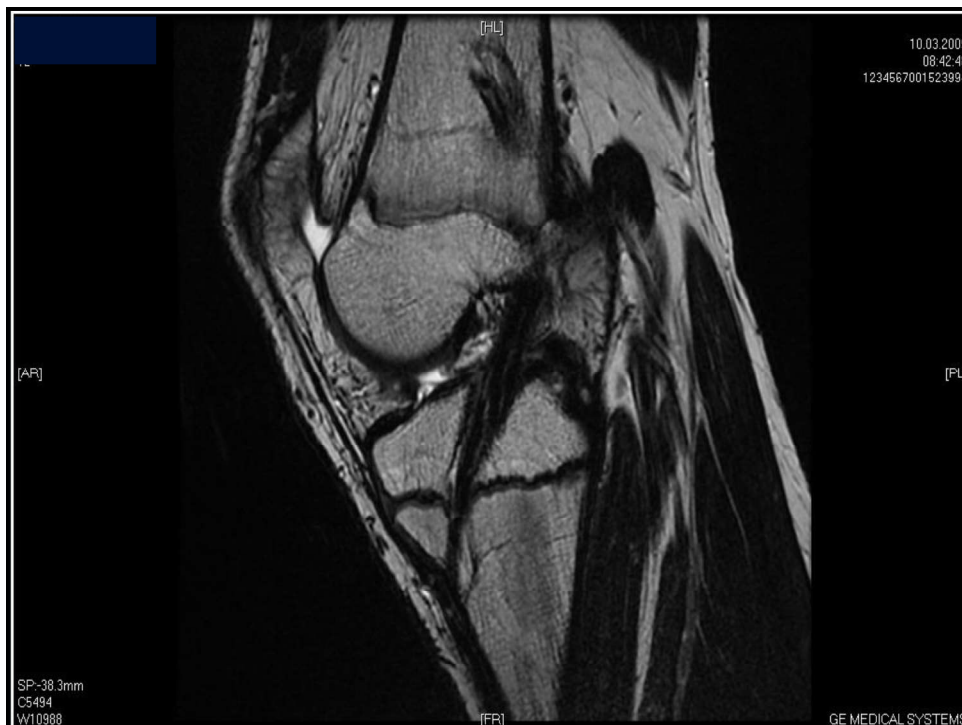
## What can go wrong?

- Arrest distal lateral femur epiphysis -> valgus knee
- Arrest tuberositas tibia -> Recurvatum
- Arrest medial tibial epiphysis -> Varus knee

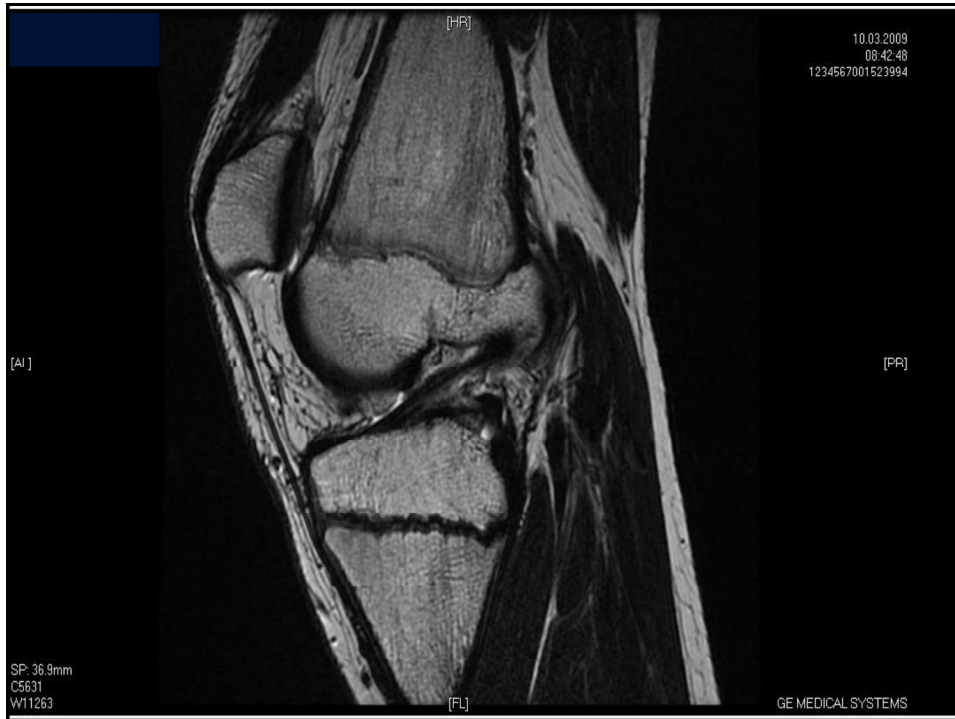


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## Treatment algorithm

- ✓ Non-operative treatment until skeletal maturity
- ✓ Physical therapist 1-2/month
- ✓ Brace when performing pivoting sports
- ✓ Surgical treatment was considered with:
  - Repeated giving way episodes after exhausting active rehabilitation
  - Repairable meniscus injury

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# Rehabilitation

Home based exercises 3-7/week

- Max 3 exercises
- Max 10 minutes

Functional approach

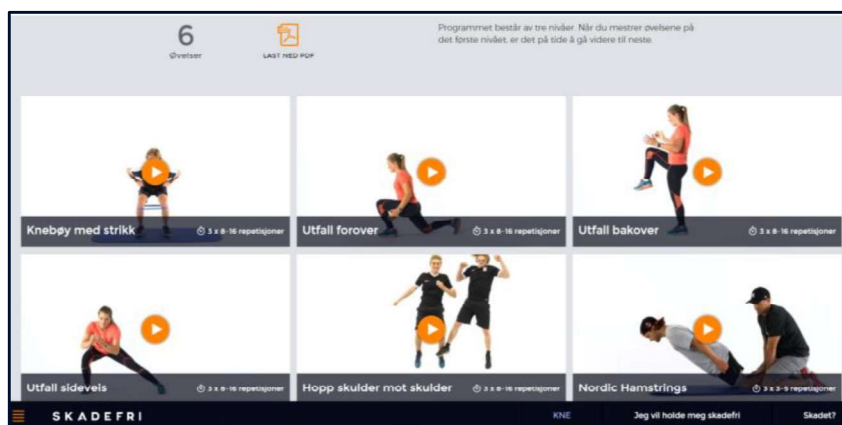
- Neuromuscular training
- Dynamic stability through hopping and landing
- Variation



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# Rehabilitation - [www.skadefri.no](http://www.skadefri.no)



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The Oslo Sports Trauma Research Center  
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the Norwegian School of Sport Sciences  
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Culture, the South-Eastern Norway Regional Health Authority,  
the International Olympic Committee, the Norwegian Olympic  
Committee & Confederation of Sport, and Norsk Tipping AS



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