

FIS YOUTH SEMINAR
DUBLIN
The knee joint of young athletes
in ski racing

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The knee joint's anatomy



Bone

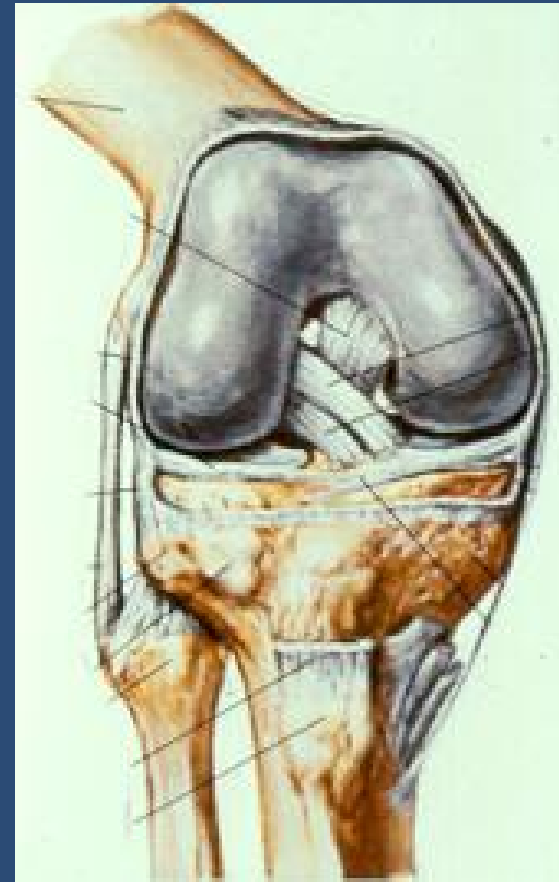
Growing seams

Musculature

Cartilage

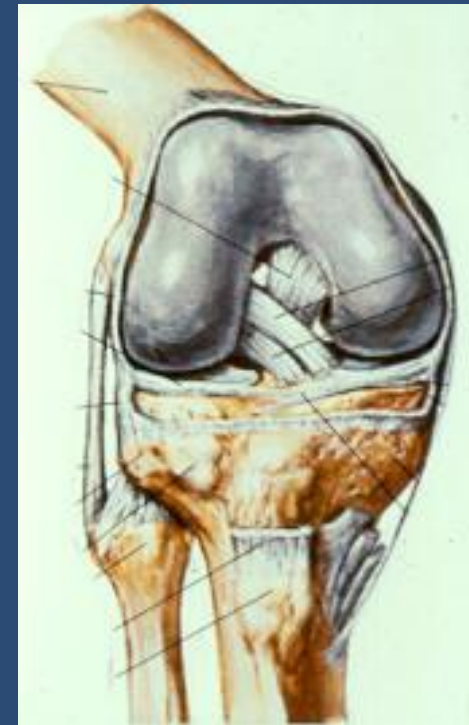
Ligaments

Meniscus



As the knee joint lacks a bony guide, the capsular ligament apparatus, the menisci and the muscular sinew groups serve to bring about stability.

The more the knee joint is bent, the more relaxed the passive ligament guide gets and the more frequent the rotation movements occur.

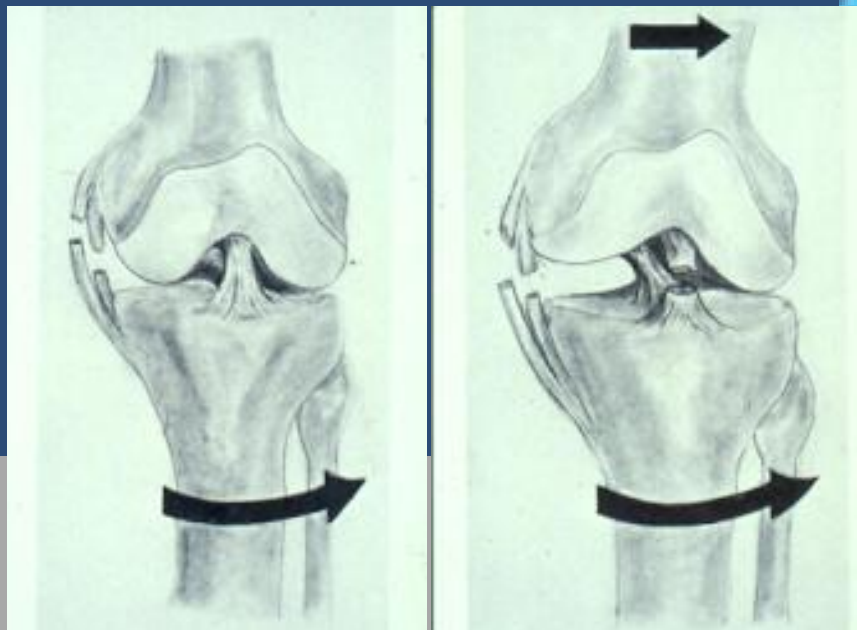


The knee joint's flexor and extensor cushion off most of the load.

Please take into account the still immature and thus weaker musculature of young ski racers.



A flexion-valgus lateral rotation position puts the greatest risk to the knee joint.



Also hyperdistension and superflexion might result in ligament injuries and/or fractures of bone/cartilage.

Bone bruise



Overuse



When the knee is flexed, the back of the knee cap must tolerate substantial pressure values.

Particularly when the piste is icy, three to four times the pressure values may occur.



Due to the tilt of the ski boot's leg, standing and walking in the boots can cause overuse, too.



Risk of injury



- ❑ The risk for children to be injured when doing alpine skiing is significantly lower than that of adult skiers.
- ❑ For the 10 to 14 years age group the risk factor is approx. 50% less the overall skiers' average.
- ❑ There is no difference between girls and boys.
- ❑ You encounter a higher risk of injury when playing football, handball, basketball or volleyball

Risk of injury



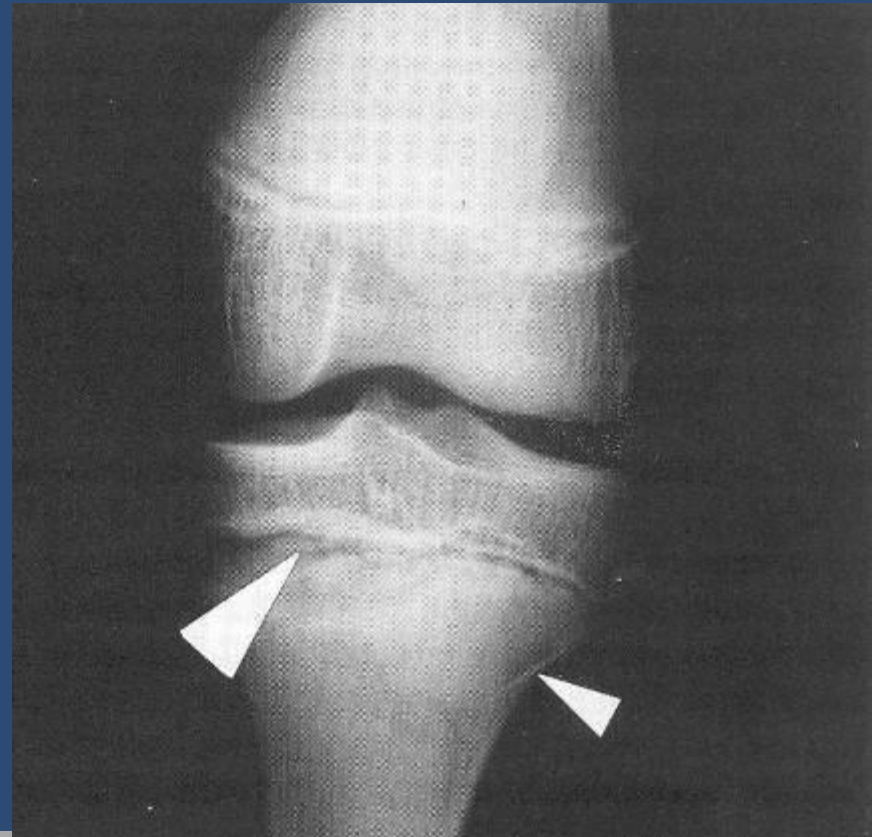
Over the past 25 years the risk of injury experienced a decline of approx. 37%.

Injuries in general



Making up for approx. 50%, the fractures take the lead.

Ligament ruptures are rather scarce.



Overuse injuries of the knee joint



- ❑ Badly developed muscular apparatus
- ❑ Lacking technical skills (backward lean)
- ❑ Icy pistes
- ❑ Wrong training
 - Frequency – intensity – heavy exercises (leg curl)
- ❑ Ski boots

Knee injury prophylaxis



- Well developed muscles (particularly the flexors)
- Skiing technique
- Taking notice of signs of fatigue
- No heightening of the plates (shearing)
- Routing – piste (big bump – flat landing)
- Weather conditions (low visibility etc.)
- Route fencing

Knee damage prophylaxis

- ❑ Correct training of the musculature
(leg curl – isokinetics)
- ❑ Technical know-how
(only slight backward lean tendency)
- ❑ Ski boots
(standing and walking mechanism)
- ❑ Rehabilitation-regeneration



Take home message



- ❑ The risk for children to be injured when doing alpine skiing is significantly lower than that of adult skiers.
- ❑ There is no difference between girls and boys.
- ❑ Fractures occur more frequently – ligament rupture are rather seldom.
- ❑ Threat to the knee joint - in flexion-valgus lateral rotation
 - hyperdistention
 - and big bump/ flat landing
- ❑ Knee injury/ damage prophylaxis derived from:
 - Musculature – skiing technique – material- routing/ route fencing –
 - observance of signs of fatigue

- ❑ In order to prevent children from suffering from the so called civilisation diseases, their natural urge to move is to be backed by skiing.
- ❑ The critical views on competitive skiing for children are frequently unjustified. For the later yield of record performances the early start of a sporting career is inevitable.
- ❑ For young ski racers the execution of periodic sports orthopedic examinations is of special importance.



Thank you!