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Case Study – Femoro patellar syndrome – Integrating the KneeKG™

Clinical information

- 29-year-old man who practices recreational sports
- Has been suffering from anterior knee pain for about 1 year
- Previously consulted his family doctor:
  - Suspects a patellofemoral syndrome
  - Returned home with an MRI referral
  - Recommended: rest, ice, general muscle strengthening
  - Recommended additional investigation to identify the mechanical etiology of the symptoms

Recommendations following the KneeKG™ exam
(see results on reverse side)

1. Physical therapy treatments to address the identified biomechanical deficiencies:

Knee flexum

➜ Flexed position increases the pressure between the patella and the femur

External rotation of the tibia with regards to the femur

➜ Biomechanical deficiency typically associated with tight iliotibial band and/or lateral hamstring, which alter the patella tracking; therefore during non-weight baring the patella is pulled laterally over the femur

Specific recommendations for physical therapists :

- Hamstring (with a focus on the lateral side) and iliotibial band stretching
- Quadriceps stretching to decrease the tension applied on the patella
- Quadriceps strengthening (focus on the medial side to help the patella tracking)
- Exercises to reach full functional extension
- Exercises to increase muscle control (step-up and step-down)
- Assessment of the hip abductors to ensure proper frontal plane alignment
- Assess the pertinence of McConnell taping to relieve symptoms

2. Referral for orthotics to address the following biomechanical deficiency:

Significant internal tibial rotation during loading phase

➜ Biomechanical deficiency affecting the tracking of the patella by shifting it medially while the knee is loaded. It is generally linked to hyper pronation of the feet which induces an internal rotation of the tibia

- Foot orthotics to prevent subtalar pronation

3. Referral for knee X-rays:

- to assess the presence of patellar chondropathy

4. Re-evaluate the need of an MRI with the general practitioner

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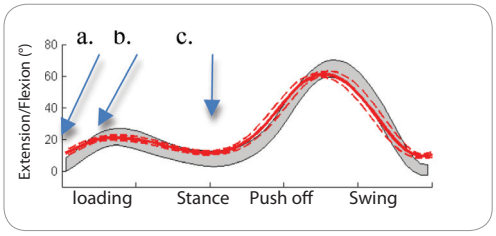
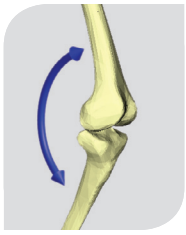
KneeKG™ results coincide with femoropatellar syndrome biomechanical patterns

1) Knee flexum at initial contact (see a.) and during terminal stance phase (see c.) of the gait cycle.
2) Decreased knee flexion excursion during loading phase (see b.)[1]
3) Significant internal tibial rotation during the loading phase (see d.)[2]
4) Tibia is in external rotation relative to the femur at initial contact and during the swing phase (non weight bearing condition) (see e.)[3]

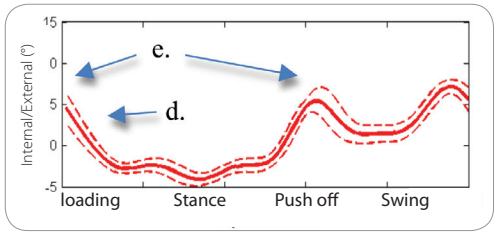
Flexion/extension of the knee

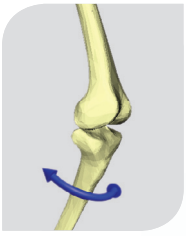




(grey curve represent the normal)

Internal/external tibial rotation





Benefits of using the KneeKG™

- Identification and quantification of 3 biomechanical deficiencies associated with femoropatellar syndrome
- Precise information concerning the mechanical etiology of the syndrome during a dynamic and weight bearing condition
- Optimization of the treatment plan and a more specific patient management4 to treat the cause and not only the symptoms allowing a faster functional recovery
- Patient educational tool to understand the biomechanical deficiencies causing the symptoms
- Higher patient satisfaction

[1]Nadeau et al. 1997 Gait &Post 5(1) p.21; [2] Barton et al. 2009 Gait &Post 30(4) p.405; [3]Merican et al. 2009 J Biomec 42(10) p.1539;
[4]Powers 2003 J Orthop Sports Phys Ther. 33(11) p.639