Knee Disorders: ICF practice guidelines

Orthopaedic Section of the American Physical Therapy Association

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Knee Classification

- Risk factors
- Diagnosis/Classification
- Examination
- Interventions
Stability and Movement Coordination Impairments

Body functions
- stability of single joint
- control of complex voluntary movement

Activities and Participation
- completing daily routine
- moving around, specified as direction changes while walking or running

Body structures
- knee joint
- muscles of thigh
- muscles of lower leg
- structures of lower leg, specified as ligaments

Stability and Movement Coordination Impairments

Most literature has focused on injuries to the anterior cruciate ligament

Incorporates both acute injury/non-operative care and post-surgical management
- Up to 250,000 injuries/year in US
- ~ 100,000 ACL reconstructions
- 70% noncontact
- Greater in sports with multidirectional movement
- 20% athletic knee injuries

Risk factors-noncontact ACL

Clinicians should consider as predisposing factors for the risk of sustaining a noncontact anterior cruciate ligament (ACL) injury. (Recommendation based on moderate evidence.)

Environmental
- Shoe-surface interaction

Anatomical
- Increased body mass index
- Narrow femoral notch width
- Increased joint laxity

Hormonal
- Preovulatory phase of the menstrual cycle in females

Neuromuscular
- Combined loading pattern
- Strong quadriceps activation during eccentric contractions

Clinical course

Non-operative care

Outcomes
- Improve over time

Previous level of activity
- Up to 42% resume pre-injury activity w/in 3 years
- Select group (potential coper): 72% returned for limited period

Post-operative care

Outcomes
- Improve over time
- Up to 25% may have knee extension loss
- Quadriceps strength deficits may persist

Previous level of activity
- Up to 92% resume pre-injury activity by 1 year

Diagnosis/Classification

- Deceleration/acceleration w/ valgus load at or near full extension
- Hear or feel a "pop"
- Hemarthrosis w/ 0-2 hours
- Hx of give way
- Loss of end range knee extension
- Lachman test w/ nondiscrete endfeel and increased anterior tibial translation
- Positive pivot shift test
- 6-m timed hop test ≤ 80%
- MVIC quadriceps strength ≤ 80%
Diagnosis/Classification
Small % successfully return to sport w/o ACL surgery in short term

Screening exam

<table>
<thead>
<tr>
<th>Classification</th>
<th>Classification status</th>
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<tbody>
<tr>
<td>Giving way episodes ≤ 1</td>
<td>Potential coper: Meets all criteria</td>
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<tr>
<td>6-meter timed hop ≥ 80% limb symmetry index</td>
<td>Non-coper: Does not meet at least one criteria</td>
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<tr>
<td>KOS-ADLS &gt; 80%</td>
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<tr>
<td>CRS &gt; 80%</td>
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Examination
Outcome measures
- Self reported knee injury scales
  - Health questionnaire
    - SF-36
  - Patient-reported outcome measure
    - KOS-ADLS - Lysholm Knee Scale
    - KOOS - Cincinnati Knee Rating Scale
    - IKDC 2000
  - Activity scale
    - Tegner Activity Level Scale
    - Marx Activity Level Scale

Activity limitation/Participation restriction measures
- Single-limb hop testing

Physical impairment measures
- Effusion
- Range of motion
- Ligament stability
- Muscle strength

Interventions
Continuous Passive Motion
- Clinicians can consider using continuous passive motion in the immediate postoperative period to decrease postoperative pain. (Recommendation based on weak evidence.)

Early Weight Bearing
- Early weight-bearing can be used for patients following ACL reconstruction without incurring detrimental effects on stability or function. (Recommendation based on weak evidence.)

Knee bracing
- The use of functional knee bracing appears to be more beneficial than not using a brace in patients with ACL deficiency. (Recommendation based on weak evidence.)
- The use of immediate postoperative knee bracing appears to be no more beneficial than not using a brace in patients following ACL reconstruction. (Recommendation based on moderate evidence.)
- Conflicting evidence exists for the use of functional knee bracing in patients following ACL reconstruction. (Recommendation based on conflicting evidence.)
Interventions
Immediate vs delayed mobilization
- Clinicians should consider the use of immediate mobilization following ACL reconstruction to increase range of motion, reduce pain, and limit adverse changes to soft tissue structures. (Recommendation based on moderate evidence.)

Cryotherapy
- Clinicians should consider the use of cryotherapy to reduce postoperative knee pain immediately post-ACL reconstruction. (Recommendation based on weak evidence.)

Supervised rehabilitation
- Clinicians should consider the use of exercises as part of the in-clinic program, supplemented by a prescribed home-based program supervised by a physical therapist in patients with knee stability and movement coordination impairments. (Recommendation based on moderate evidence.)

Therapeutic exercise
- Clinicians should consider the use of non-weight-bearing (open chain) exercises in conjunction with weight-bearing (closed chain) exercises in patients with knee stability and movement coordination impairments. (Recommendation based on strong evidence.)

Neuromuscular electrical stimulation
- Neuromuscular electrical stimulation can be used with patients following ACL reconstruction to increase quadriceps muscle strength. (Recommendation based on moderate evidence.)

Neuromuscular reeducation
- Clinicians should consider the use of neuromuscular training as a supplementary program to strength training in patients with knee stability and movement coordination impairments. (Recommendation based on moderate evidence.)

“Accelerated” rehabilitation
- Rehabilitation that emphasizes early restoration of knee extension and early weight bearing activity appears safe for patients with ACL reconstruction. No evidence exists to determine the efficacy or safety of early return to sports. (Recommendation based on moderate evidence.)

Eccentric strengthening
- Clinicians should consider the use of an eccentric exercise ergometer in patients following ACL reconstruction to increase muscle strength and functional performance. (Recommendation based on moderate evidence.)

Pain and Mobility Impairments
Body functions
- pain in joints
- mobility of single joint
- gait pattern functions

Activities and Participation
- completing daily routine
- moving around, specified as direction changes while walking or running

Body structures
- bones of thigh
- bones of lower leg
- knee joint
- structures of lower leg, specified as fibrocartilage/hyaline cartilage
Pain and Mobility Impairments
Incorporates both acute injury/non-operative care and post-surgical management

Meniscus
- Incidence 12-14%, prevalence 61/100,000 persons
- 10-20% all orthopaedic surgeries

Articular cartilage
- 32-58% lesions due to traumatic, noncontact
- Medial femoral condyle, patella articular surface
- Medial meniscus tears (37%), ACL tears (36%)
Examination
Activity limitation/Participation restriction measures
- Single-limb hop testing
- 6-minute walk
- Timed up-and-go
- Stair measure

Examination
Physical impairment measures
- Effusion
- Range of motion
- Strength
- Joint line tenderness
- Other tests

Interventions
Progressive knee motion
- Clinicians may utilize early progressive knee motion following knee meniscal and articular cartilage surgery. (Recommendation based on weak evidence.)

Interventions
Progressive weight bearing
- There are conflicting opinions regarding the best use of progressive weight bearing for patients with meniscal repairs or chondral lesions. (Recommendation based on conflicting evidence.)

Interventions
Progressive return to activity
- Clinicians may utilize early progressive return to activity following knee meniscal repair surgery. (Recommendation based on weak evidence.)
- Clinicians may need to delay return to activity depending on the type of articular cartilage surgery. (Recommendation based on theoretical evidence.)

Interventions
Supervised rehabilitation
- There are conflicting opinions regarding the best use of clinic-based programs for patients following arthroscopic meniscectomy to increase quadriceps strength and functional performance. (Recommendation based on conflicting evidence.)

Interventions
Therapeutic exercise
- Clinicians should consider strength training and functional exercise to increase quadriceps and hamstrings strength, quadriceps endurance, and functional performance following meniscectomy. (Recommendation based on moderate evidence.)

Interventions
Neuromuscular electrical stimulation
- Neuromuscular electrical stimulation can be used with patients following meniscal or chondral injuries to increase quadriceps muscle strength. (Recommendation based on moderate evidence.)

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