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General practitioner diagnosis and management of acute knee injuries: summary of an evidence-based guideline

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Abstract

Aims To summarise evidence and key recommendations for general practitioner diagnosis and management of acute soft-tissue knee injuries, based on the New Zealand guideline.

Methods A multidisciplinary team developed the guideline by critically appraising and grading retrieved literature using the Graphic Appraisal Tools for Epidemiology, Clinical decision rules and the Scottish Intercollegiate Guideline Network. Recommendations were derived from resulting evidence tables.

Results For both diagnosis and management there is a paucity of good evidence to support diagnosis and treatment of internal derangements of the knee, hence some aspects of the guideline are guideline team consensus. Good evidence supports the use of the Ottawa Knee rules to guide decisions about the use of X-ray, and the Lachman test in diagnosing anterior cruciate ligament (ACL) tears. Evidence supports inclusion of proprioceptive training in rehabilitation programmes following ACL reconstruction and in people with ACL-deficient knees. There is good evidence that ultrasound is of little benefit, and there is no evidence that physiotherapy be routinely advocated following meniscectomy.

Conclusion This guideline provides an evidence-based framework for diagnosis and management of internal derangements of the knee following acute injury. Moreover, its development highlights significant gaps in the evidence base and identifies priorities for new research.

In 2001, the Accident Compensation Corporation (ACC) of New Zealand (NZ) identified nationwide variation in practice in the diagnosis and management of acute soft-tissue knee injuries. At that time, the American Academy of Orthopaedic Surgeons' "Clinical Guideline on Knee Injury" was the only available published guideline. This guideline had a broad scope, including patella dislocation/subluxation, contusion, and quadriceps tendon rupture in addition to ligament and meniscal injuries. However it was published as an algorithm with only a brief supporting document stating that it was developed by a multi-

professional team of physicians and based on both evidence from the literature and consensus.¹ This guideline was limited to internal derangements of the knee and was developed following explicit guideline methodology.

The ACC scheme provides personal injury cover for all NZ citizens, residents, and temporary visitors to NZ on a no-fault basis. Knee injuries ranked second for new claims and on-going claims after low back injuries in their injury statistics for the 2000/2001 period, and the ACC Injury Statistics 2004 (Third Edition) for “sport claims” shows that the knee joint ranks within the top five injury sites for nearly all major sport and recreational activities.

Since these injuries represent a significant cost, ACC commissioned a specific acute soft-tissue knee injury guideline. This was developed by a multidisciplinary team, led by the EPIQ Group (Effective Practice, Informatics and Quality Improvement) University of Auckland, under the auspices of the New Zealand Guidelines Group (NZGG).

The objective of the guideline is to provide evidence-based recommendations for the diagnosis and management of internal derangements of the knee in adults involving acute injuries to the menisci, collateral, and cruciate ligaments. It is primarily aimed at general practitioners and other primary contact practitioners such as physiotherapists.

Methods

A broad-based multidisciplinary team (orthopaedic surgery, general practice, physiotherapy, musculoskeletal radiology, musculoskeletal medicine, sports medicine) was convened in 2002 including nominated professionals and representatives for Māori, Pacific people (mostly of Samoan, Tongan, Niuean, or Cook Islands origin), and consumers. The team met twice over 12 months, with a teleconference to concur on the final draft of the guideline. There were also numerous consultations between members of the group during the guideline development process.

The Royal New Zealand College of General Practitioners (RNZCGP) endorsed the guideline, and the full document is available on the NZGG website (<http://www.nzgg.org.nz>).

The following diagnostic questions were considered by the team:

- The accuracy of the history and physical examination in diagnosing internal derangements in primary and secondary care settings.
- Indications for the use of X-ray in acute knee injuries.
- The accuracy and role of MRI in the diagnosis of internal derangements of the knee.

The following treatment questions involving effectiveness were considered by the team:

- “RICE” (rest, ice, compression, elevation).
- Aspiration in the first 24 hours for haemarthrosis.
- Medication: nonsteroidal anti-inflammatory medication (NSAID) or paracetamol.
- Bracing in the early non-operative management of acute knee injury.
- Physiotherapy modalities (aspects of rehabilitation and electrotherapy).
- Complementary therapies (acupuncture, chiropractic and osteopathy).
- Operative versus non-operative management of internal derangements.
- Postoperative management including bracing and aspects of rehabilitation (proprioceptive training, open versus closed kinetic

chain exercise, and home-based programmes versus supervised physiotherapy)

Chronic and recurrent knee injuries, overuse injuries, arthritic conditions, injuries to the patella ligament and patellofemoral joint, bone bruises, fat pad impingement and entrapment, the iliotibial band syndrome, and surgical methods for managing meniscal and ligament injuries were excluded from the guideline.

For each clinical question, a comprehensive literature search was undertaken in the major electronic databases (Medline, CINAHL, EMBASE, AMED, SPORT Discus and Current Contents). Searching also was undertaken using the Cochrane Database of Systematic Reviews, the Controlled Trials Register, Database of Abstracts of Reviews of Effectiveness (DARE), and the Cochrane Complementary Medicine Field Trials register.

Relevant internet sites were searched including PEDro (Physiotherapy Evidence Database), NHS clinical trials, Health Technology Assessments for NHS, and the National Guideline Clearing House. Reference lists of included studies were checked for additional studies.

For diagnostic questions, studies had to have a minimum of 35 participants;2 blind assessment of the new test and the reference standard; a comparison of a reference test with the new test in >90% of people; and an appropriate spectrum of participants.

For management questions, only systematic reviews, meta-analyses, randomised trials, or quasi-randomised trials of interventions were included. The evidence from the relevant studies was summarised into evidence tables (available on the NZGG website). Each study was critically appraised and graded using the Graphic Appraisal Tools for Epidemiology (GATE) (<http://www.epiq.co.nz>). Evidence statements relating to interventions were graded according to the NZGG “Grading system for guidelines”. Clinical decision rules were graded according to the criteria described by McGinn et al.³

For each question, recommendations were developed based on all included studies using a “considered judgment” process (SIGN Guideline development process:

<http://www.sign.ac.uk/guidelines/fulltext/50/compjudgement.html>).

Grading of the recommendations is based on the strength of the evidence and does not indicate the relative importance of the recommendations.

Results

Results are presented according to the grade of recommendation placed under these headings:

- Diagnosis,
- Referral to a specialist,
- Acute and postoperative management recommendations for internal derangements of the knee due to injury,

Recommendations

Diagnosis recommendations

“A” recommendations (supported by good evidence)

1. The Ottawa knee rule is a valid tool to guide the use of x-rays for excluding fractures in people with acute knee injuries in an emergency department setting.^{4,7} The Ottawa rule is that knee x-ray series to exclude fracture are only required for acute knee injury in people with one or more of the following:
 - Aged 55 or older
 - Tenderness at the head of the fibula
 - Isolated tenderness of the patella

- Inability to flex the knee to 90 degrees
 - Inability to walk four weight-bearing steps at time of injury and at examination.⁴
2. Lachman test in a secondary care setting is reasonably accurate in the diagnosis of anterior cruciate ligament tears and more accurate when acute pain and swelling have subsided at about 10 days.⁸⁻¹² The accuracy of the Lachman test in a primary care setting has not yet been established. The Lachman test is performed with the patient supine and the knee flexed to 20° - 30°. The femur is stabilised by grasping just above the knee with one hand, while the other hand grasps the proximal tibia and gives a brisk forward tug. A positive test is when there is an increased anterior translation of the tibia on the femur and/or absence of a discrete end-point.¹³

“C” recommendations (supported by expert opinion only)

1. In patients with a haemarthrosis, X-ray is appropriate to check for fractures, otherwise the routine use of X-rays is not recommended.
2. There is insufficient evidence that any aspect of the history or clinical test other than the Lachman test for ACL tears is valid. However, familiarity with the typical mechanisms of injury and presenting symptoms for each diagnosis may assist clinicians in differentiating between common internal derangements.
3. Some clinical tests are likely to be useful in confirming a diagnosis in the context of an appropriate history.
4. The diagnosis of meniscal and cruciate ligament injuries to the knee can be made by MRI with a reasonable level of accuracy.^{8, 14-19} However, many patients can be diagnosed without the need for this expensive investigation.
 - a. Where there is an equivocal diagnosis specialists may consider MRI to clarify the diagnosis and inform treatment decisions.
 - b. MRI should generally be used ahead of diagnostic arthroscopy.

Table 1. History and physical examination

History	Test	Diagnosis
Valgus injury Medial pain Tackling injury	Valgus laxity at 30° flexion Tenderness along course of MCL	Suspect MCL tear
Pivot or leap Sense of disruption Audible pop Instability Early swelling (1–2 hours)	+ve Lachman +ve anterior drawer +ve pivot shift* loss of hyperextension	Suspect ACL tear
Squatting, cutting, twisting injury Giving way Trivial twisting injury in older persons Locking and catching	Joint line tenderness McMurray +ve effusion Loss of extension (locked knee)	Suspect meniscal tear / reconsider ACL

Direct injury to anterior tibia (e.g. MVA) Forced hyperflexion / hyperextension injury Posterior pain Pain with kneeling	+ve sag test +ve posterior drawer mild swelling / slow onset posterior swelling painful limitation flexion 10°–20°	Suspect PCL tear
Significant athletic trauma or MVA Forced hyperflexion / hyperextension injury Posterior pain	Varus laxity at 30° and in extension Increased external rotation tibia	Suspect posterolateral complex

*The pivot shift test is best performed and interpreted by an experienced clinician.

Referral to specialists recommendations

There is no evidence relating to the appropriateness and timeliness of referral to specialists for people with knee injuries, however the nature and extent of injury as well as the practitioner’s training and experience influence the need for referral.

1. Injuries to the anterior cruciate ligament (ACL), combined ACL and collateral ligament injuries, posterior cruciate ligament (PCL) and posterolateral complex are frequently missed in primary care. Early referral for these injuries is therefore recommended to clarify the diagnosis and discuss treatment options.
2. Early referral is also recommended for people with a locked knee due to a meniscal tear, and where the diagnosis is equivocal.

Acute management recommendations

“A” recommendations (supported by good evidence)

1. In the initial non-operative management of an acute internal derangement of the knee, there is good evidence that topical NSAIDs are effective and safe for relieving pain.²⁰

“B” recommendations (supported by fair evidence)

1. Proprioceptive training can enhance functional stability and should be included in rehabilitation programmes for people with ACL deficient knees.²¹
2. Ultrasound is of little additional benefit and should not be used.²²⁻²⁹

“C” recommendations (supported by expert opinion only)

1. There is no evidence that “RICE” (rest, ice compression elevation) is effective for acute musculoskeletal injuries. However it is widely accepted as standard management.
2. Paracetamol is probably the most cost-effective and

potentially least harmful choice of analgesic for soft tissue knee injuries.

3. Bracing is not generally required for the conservative management of most soft tissue knee injuries. 30-34
4. Rehabilitation based on functional activity is important for some sub-groups of people with identifiable impairments due to a knee injury.
5. All grades of isolated medial ligament injuries can be successfully managed without surgery. 35-40
 - a. Grade I and II injuries best managed with early functional rehabilitation without the need for bracing. Return to sport can be expected in 6-8 weeks.
 - b. Management of Grade III MCL injuries is similar but bracing is recommended for the first 4-6 weeks to stabilise the knee and facilitate initiation of rehabilitation and early return to activity.
6. Operative management has the most to offer those people with recurrent instability who must perform multidirectional activity as part of their occupation or sport. Age should not be considered a barrier for the older athlete who wishes to pursue a more active lifestyle. 41-44
7. Non-operative management is preferred for the treatment of clinical stable meniscal tear where there is potential for healing and symptoms are mild, however this decision may need to be modified for people whose occupations demand a stable knee and the time frame required for repair is not appropriate. People with a suspected meniscal tear should be referred for a trial of rehabilitation for 6-8 weeks, and if symptoms persist, referred to a specialist.
8. Non-operative management is generally indicated for Grade I and II posterior cruciate ligament (PCL) tears.
9. For isolated Grade III PCL tears, there is insufficient evidence to establish the relative benefits of operative versus non-operative management. Early specialist referral for further evaluation is recommended.

“I” recommendation (no recommendation can be made because of insufficient evidence)

1. There is insufficient evidence of effectiveness for any physiotherapy intervention,⁴⁵ including electrotherapy modalities such as NMES (neuromuscular electrical stimulation),⁴⁶⁻⁴⁹ Laser (light amplification by stimulated emission of radiation),⁵⁰ TENS (transcutaneous electric nerve stimulation)⁴⁹ and EMG (electromyography or biofeedback).⁵¹⁻⁵⁴
2. No recommendations can be made about the use of acupuncture chiropractic or osteopathy due to lack of good quality evidence. There is no evidence for the efficacy of osteopathy or chiropractic. The effectiveness of acupuncture has not been consistently demonstrated.⁵⁵

Postoperative management recommendations

The postoperative management following knee surgery varies according to the specific protocols of the operating surgeon. However some evidence can guide treatment.

“A” recommendation (supported by good

evidence)

Physiotherapy should not be routinely advocated following meniscectomy.⁵⁶

“B” recommendations (supported by fair evidence)

1. Bracing is not effective in the early management following ACL reconstructive surgery.⁵⁷⁻⁶⁵
2. Proprioceptive training should be included in the post-operative rehabilitation programmes for people with ACL deficient knees.²¹
3. Open kinetic chain exercises should be included from about 4-6 weeks, in a restricted range of knee flexion from 45-90 degrees.⁶⁶⁻⁷⁰

“C” recommendations (supported by expert opinion only)

1. Rehabilitation following ACL reconstruction should be based on Shelbourne’s accelerated rehabilitation programme.^{71, 72}
2. For meniscal repairs and repairs or reconstruction of the PCL or posterolateral complex, the advice of the operating surgeon should be followed for any post-operative rehabilitation programme.

Discussion

Summary of main findings

There is a lack of good quality evidence to support accurate diagnosis and treatment decisions in the management of internal derangements of the knee, therefore most recommendations are based on consensus rather than more robust evidence. These results are similar to the guideline for acute knee injuries developed by the American Academy of Orthopaedic Surgeons (AAOS), although there is insufficient information in the support document to evaluate their guideline methodology.⁷³

Our guideline offers guidance for some aspects of the diagnosis and management of internal derangements of the knee based on good evidence (A recommendations): the use of the Ottawa Knee rules to guide decisions about the use of X-ray; the Lachman test in the diagnosis of ACL tears; topical NSAIDs for acute sprains and soft tissue injuries and that physiotherapy not be routinely advocated following meniscectomy.

All these recommendations are supported by more recent evidence published since the development of the guideline.^{13,74–76} Other relevant evidence includes a systematic review on the use of ice the treatment of acute soft tissue injury, which found little evidence to suggest a significant effect.⁷⁷

While our guideline did not specifically focus on the post-operative management following ACL reconstruction, we did review some aspects of management. A comprehensive systematic review on the evidence for the post-operative rehabilitation following anterior cruciate ligament reconstructions has consistent conclusions to ours except that they support the use of NMES.⁷⁸

Further high quality research is needed to guide the diagnosis and treatment of internal derangements of the knee, in particular the optimal use of physiotherapy in the non-operative and post-operative management of knee injuries.

Dissemination and implementation

A summary document containing the key messages and the diagnostic and management algorithm was sent to all NZ GPs and ACC registered physiotherapists. The complete version of the guideline and its supporting documents was made available on the NZGG website:

http://www.nzgg.org.nz/guidelines/0009/ACC_Soft_Tissue_Knee_Injury_Fulltext.pdf

Further dissemination included two ACC reviews (one on diagnosis, the other on management of soft tissue knee injuries) distributed to all of ACC's treatment providers; a DVD on management of knee Injuries produced for all health providers; a case study on a knee injury for GPS plus a health provider-mediated information sheet ('Caring for your knee injury') for patients. There has been no evaluation conducted of the guideline implementation.

Priorities for future research are validity of the knee examination in primary care and physiotherapy settings, and a trial of RICE versus control.

View diagnostic and management algorithms at:

http://www.nzgg.org.nz/guidelines/0009/Diagnostic_Management_Algorithm.pdf

Appendix 1. Working party for guideline for diagnosis and management of acute soft tissue knee injuries

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