Knee: History and Examination

Andrew McCaskie / Alasdair Mackie

INTRODUCTION

Clinical Teaching in the UK

Alan Graham Apley FRCS

1914 - 1996

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British orthopaedic surgeon and educator known for his textbook, Apley's System of Orthopaedics and Fractures, and for the Apley grind test in meniscal injury.

After completing his training, he became a consultant at the Rowley Bristow Orthopaedic Hospital, Pyrford, where he started his FRCS course in 1948. The "Pyrford Postgraduate Course", which became known as the "Apley Course", continued twice yearly for many years, with over 5,000 trainees attending them. Satellite courses were also set up in New York and Toronto, also running for over 15 years.[2] Notes from this course were turned into a textbook, Apley's System of Orthopaedics and Fractures, which was first published in 1959.

Wikipedia

HISTORY

Setting & History

- Setting
  - Patients should feel at ease
  - Assured of respect and confidentiality
- History
  - Doctor should listen
  - Allow story to develop

Pain

- Where
  - Remember anatomical knowledge varies between patient and doctor
  - Anatomy
    - Patellofemoral
    - Joint line
  - Diffuse / Localised
  - Generalised

Pain

- When
  - Stairs Seat - PFJ
  - Flat – OA
  - Dashboard – PCL / Dislocation
  - Pop – Ligament
  - Constant
  - Increasing - infection
- Severity

History

- Stiffness
  - Mechanical
  - Pattern of stiffness e.g. in the morning
  - Limp
- Locking
  - Block to extension (and pseudolocking)
  - Meniscus
- Weakness/Instability
  - "Giving way"
    - Laxity
    - PFJ
    - Meniscus

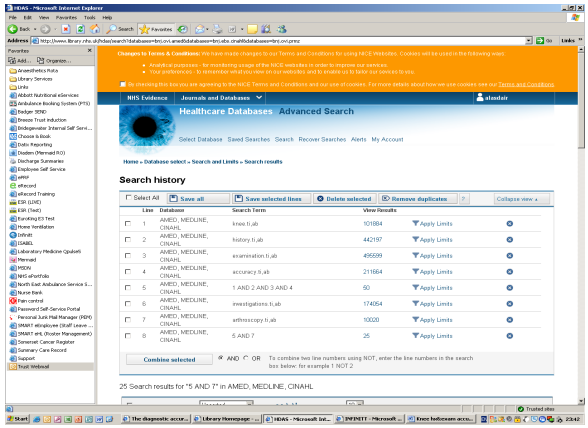
History

- Swelling
  - After injury
    - Ligament
    - Fracture
    - Capsule
  - Hours
    - meniscus
  - Chronic
    - Inflammatory
    - OA
    - Tumour
- Deformity
  - Knock knees
  - Bow legs
  - Children and older people

History

- Sensation
- Loss of function
  - Limp
  - Sport
  - Stairs
- ***Mechanism of Injury***

History and exam vs Investigations



The Diagnostic Accuracy of History, Physical Examination, and Radiographs in the Evaluation of Traumatic Knee Disorders Am J Sports Med March 1996 24 164-167; KJ O'Shea, KP Murphy, RD Heekin

- **Method:**
- Prospectively looked at the diagnostic accuracy of clinical examination of the knee in patients with arthroscopically documented knee injuries.
- The study included 156 patients with 156 knee injuries (72 acute and 84 chronic) seen during 1 year at Martin Army Hospital at Fort Benning Georgia.
- All patients were given a primary diagnosis based on their history, physical examination, and routine radiographs.
- Fifty-seven patients were also given one or more secondary diagnoses.
- MRI scans and arthrograms were not used in the evaluation of these patients.

- **Results:**
- Primary diagnosis was correct in 83% of the knees.
- Of 57 secondary diagnoses given, 54% were correct and 31% were incomplete.
- An incorrect diagnosis was made in 14% of knees for both primary and secondary diagnoses.
- 4 patients with no identifiable lesion other than synovitis.
- **Conclusion:**
- With increasing cost of medical care, the need for expensive diagnostic studies such as MRI needs to be evaluated.
- Cost of a MRI scan ranges between $600 to $1200 depending on the institution.
- MRI as a routine diagnostic aid in the clinical examination of the knee is unnecessary. Arthroscopic surgery of the knee should be based on the patient's history, physical examination, and radiographs.

The accuracy of the clinical knee examination documented by arthroscopy: A prospective study Am J Sports Med December 1993 21 773-778; MA Oberlander, RM Shalvoy

- **Method**:
- The diagnostic accuracy of the clinical examination for intraarticular injuries of the knee was documented by arthroscopy over a 6-month period.
- 290 patients (296 knees) were evaluated by history, physical examination, and standard radiographs.
- Supplemental diagnostic studies included 41 MRI, 2 arthrograms, and 1 previous arthroscopy that had been recently performed.

- **Results**:
- Correct diagnosis was made in 165 knees (56%).
- An incomplete diagnosis in 92 (31%).
- An incorrect diagnosis in 39 (13%).
- There were only 2 knees (0.07%) with no discernable lesions.
- When a single lesion was present in the knee, the diagnosis was made correctly in 72% of cases.
- When more than 2 were discovered, the diagnosis was correct in only 30%.
- However, all individual lesions were diagnosed with an accuracy of greater than 90%.
- **Conclusion**:
- Lesions most difficult to diagnose were chondral fractures, fibrotic fat pads, tears in the anterior cruciate ligament, and loose bodies.
- Knees with acute lesions and those with a single diagnosis proved to be significantly easier to diagnose ($P < 0.01$). V
- ariables that proved to be insignificant were age, sex, MRI, surgeon, workers' compensation, or pending litigation.

Dignostic Performance of Clinical Examination and Selective Magnetic Resonance Imaging in the Evaluation of Intraarticular Knee Disorders in Children and Adolescents Am J Sports Med May 2001 29 292-296; MS Kocher, J DiCanzio, D Zurakowski

- **Methods**:
- A consecutive series of pediatric patients (≤16 years old). Stratification effects by patient age and magnetic resonance imaging center were examined.
- There were 139 lesions diagnosed clinically, 128 diagnosed by MRI, and 135 diagnosed arthroscopically.
- **Results**:
- There was no significant difference between clinical examination and MRI with respect to agreement with arthroscopic findings (clinical examination, 70.3%; MRI, 73.7%), overall sensitivity (clinical examination, 71.2%; MRI, 72.0%), and overall specificity (clinical examination, 91.5%; MRI, 93.5%).

- **Results contd:**
- Stratified analysis by diagnosis revealed significant differences only for sensitivity of lateral discoid meniscus (clinical examination, 88.9%; magnetic resonance imaging, 38.9%) and specificity of medial meniscal tears (clinical examination, 80.7%; MRI, 92.0%).
- For MRI, children younger than 12 years old had significantly lower overall sensitivity (61.7% versus 78.2%) and lower specificity (90.2% versus 95.5%) compared with children 12 to 16 years old. There was no significant effect of MRI center.
- **Conclusion**:
- Selective MRI does not provide enhanced diagnostic utility over clinical examination, particularly in children.
- Should be used judiciously in cases where the clinical diagnosis is uncertain and MRI input will alter the treatment plan.

Correlation of Arthroscopic and Clinical Examinations With Magnetic Resonance Imaging Findings of Injured Knees in Children and Adolescents Am J Sports Med January 1998 26 2-6 CL Stanitski

- **Method:**
- 28 patients aged 8 to 17 years (average, 14.4) with knee injuries. Meniscal, anterior cruciate ligament, and articular surface injuries were evaluated.
- **Results:**
- A highly positive correlation (78.5%) was found between clinical and arthroscopic findings.
- A highly negative correlation was found between arthroscopic and magnetic resonance imaging findings (78.5%) and between clinical and magnetic resonance imaging findings (75%).

- **Conclusion:**
- In this series, accuracy, positive predictive value, negative predictive value, sensitivity, and specificity data were much more favorable from clinical examination than from MRI. Overall, MRI diagnoses added little guidance to patient management and at times provided spurious information.

The value of clinical examination versus magnetic resonance imaging in the diagnosis of meniscal tears and anterior cruciate ligament rupture; Arthroscopy: The Journal of Arthroscopic and Related Surgery Volume 20, Issue 7 , Pages 696-700, September 2004. Y Kocabey, O Tetik, WM Isbell, ÖA Atay

- **Methods:**
- Prospectively evaluated 50 consecutive patients (37 male, 13 female) with 65 pathologies of medial meniscal tears, lateral meniscal tears, and/or ACL rupture.
- The average preoperative period for the patients was 5 weeks (range, 5 days to 5 months) and mean age was 22 years (range, 12 to 42 years).
- After initial clinical examination, same sports medicine fellowship-trained orthopaedic surgeon (10-year practice profile of 100% sports medicine) evaluated MRI of the patients and performed their arthroscopic procedure.
- Accuracy, sensitivity, specificity, and positive and negative predictive values were calculated comparing clinical examination, MRI, and arthroscopic evaluation.

- **Results:** There was no statistical difference between MRI or clinical examination in diagnosing medial or lateral meniscal tears or ACL tears (*P* > .05).
- The accuracy of the clinical examination and MRI evaluation was equal for diagnosing meniscal tears and ACL ruptures.
- **Conclusion:** A well-trained qualified surgeon can safely rely on clinical examination for diagnosing meniscal and ACL injuries.
- Clinical examination is at least as accurate as MRI in the skilled orthopaedic surgeon's hand.
- MRI should be reserved for more complicated and confusing cases.
- The routine ordering of an MRI scan of the knee before examination by a well-trained orthopaedic surgeon is not recommended.