The OA Knee: Exploring the Potential for Rapid Change

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OHSS, LHSC

? “OA Knee” & “Rapid Change”

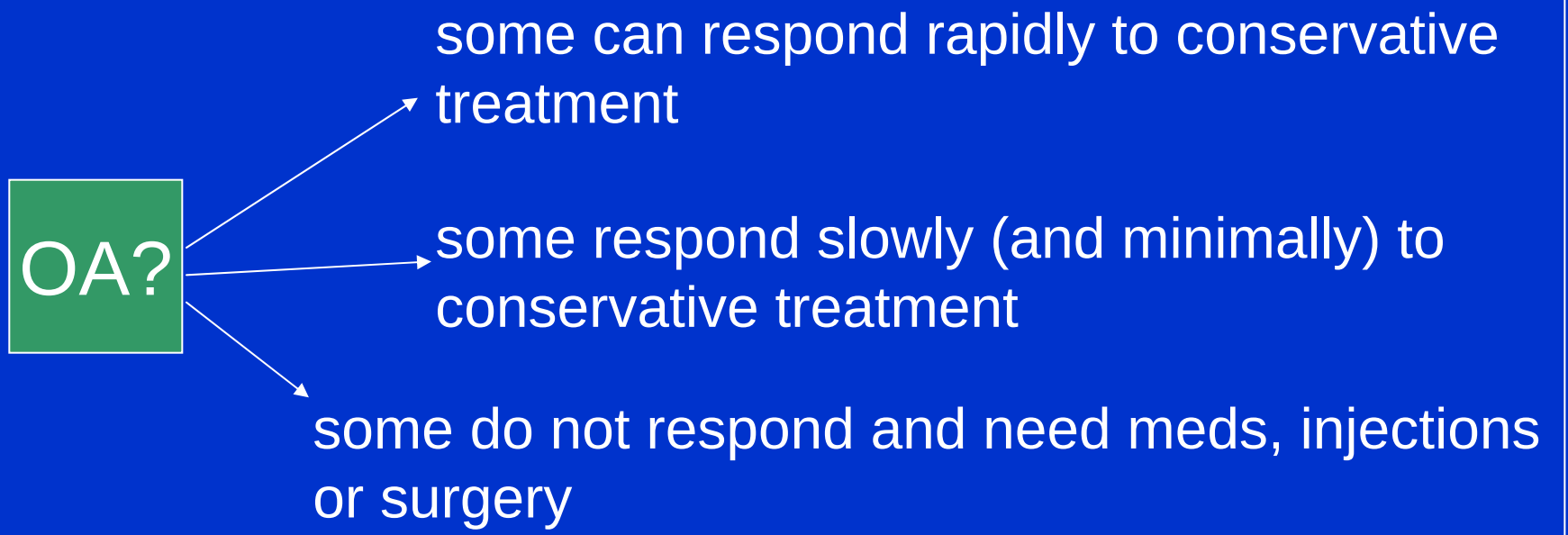
What are our Expectations?

- Weeks?, months?, years?....never?
- Slow gain in strength?
- Maintain flexibility?
- Maintain ROM?
- Maintain function?
- Pain?: Temporary relief or lasting changes?

Are these expectations too low?

- Evidence suggests maybe not !
- What about those rapid responders?

The problem with the “OA Knee”?



Can we tell who the responders will be and what they will respond to?

Who is physiotherapy appropriate for?

" If certain patient characteristics could identify either responders or non-responders to physiotherapy…much wasted effort could be avoided and physiotherapy might become more accessible to those patients most likely to benefit"

Fransen 2004, Best Practice & Research Clinical Rheumatology, Vol 18,4

If OA doesn’t tell us…is being more precise about pathology the answer?

How good are we at doing that?....

Physical Examination Tests for Assessing a Torn Meniscus in the Knee: A Systematic Review With Meta-analysis

ERIC J. HEGEDUS, PT, DPT, MHSc, OCS, CSCS[1] • CHAD COOK, PT, PhD, MBA, OCS, FAAOMPT[1] • VICTOR HASSELBLAD, PhD[2]
ADAM GOODE, PT, DPT, CSCS[3] • DOUGLAS C. MCCRORY, MD, MHSc[4]

JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 37 | NUMBER 9 | SEPTEMBER 2007 | 541

Commonly used tests not diagnostic:

> “diagnostic accuracy of special tests to detect a torn meniscus shows that Apley’s, McMurray’s and joint line tenderness tests are not diagnostic”

A meta-analysis examining clinical test utilities for assessing meniscal injury

Brent B. Meserve, Joshua A. Cleland and Thomas R. Boucher

Clin Rehabil 2008; 22; 143

"Clinical tests studied demonstrated low to moderate diagnostic utility overall"

MRI efficacy in diagnosing internal lesions of the knee: a retrospective analysis

S. Nikolaou *Journal of Trauma Management & Outcomes* 2008, **2**:4

Data analysis for the clinical examination:

	Medial meniscus tears	Lateral meniscus tears	ACL injuries
Accuracy	60%	55%	72%
Sensitivity (95% CI)	65% (44 – 82)	30% (13 – 54)	68% (46 – 84)
Specificity (95% CI)	50% (26 – 73)	75% (53 – 89)	77% (54 – 91)
PPV	65%	50%	80%
NPV	50%	56%	68%
LR+	1.30	1.2	2.99
LR-	0.69	0.93	0.41
AUC	0.57	0.525	0.726

Patients with Suspected Meniscal Tears: Prevalence of Abnormalities Seen on MRI of 100 Symptomatic and 100 Contralateral Asymptomatic Knees

Zanetti et al. AJR:181, September 2003

"In conclusion, horizontal or oblique meniscal tears are frequently encountered in both asymptomatic and symptomatic knees and may not always be related to symptoms"

The NEW ENGLAND JOURNAL of MEDICINE

SEPTEMBER 11, 2008

ORIGINAL ARTICLE

Incidental Meniscal Findings on Knee MRI in Middle-Aged and Elderly Persons

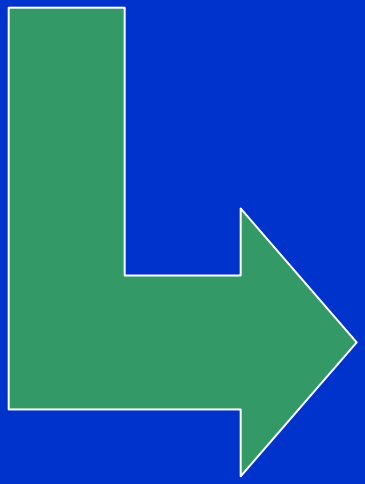
Martin Englund, M.D., Ph.D., Ali Guermazi, M.D., Daniel Gale, M.D., David J. Hunter, M.B.,B.S., Ph.D., Piran Aliabadi, M.D., Margaret Clancy, M.P.H., and David T. Felson, M.D., M.P.H.

"Prevalence of a tear or destruction on MRI ranged from 19% among women aged 50 to 59, to 56% among men aged 70 to 90"

"61% of the subjects with meniscal tears had not had any pain, aching, or stiffness during the previous month"

Even if we could be precise…

- Would it tell us the prognosis?
- Would it tell us what treatment to use?

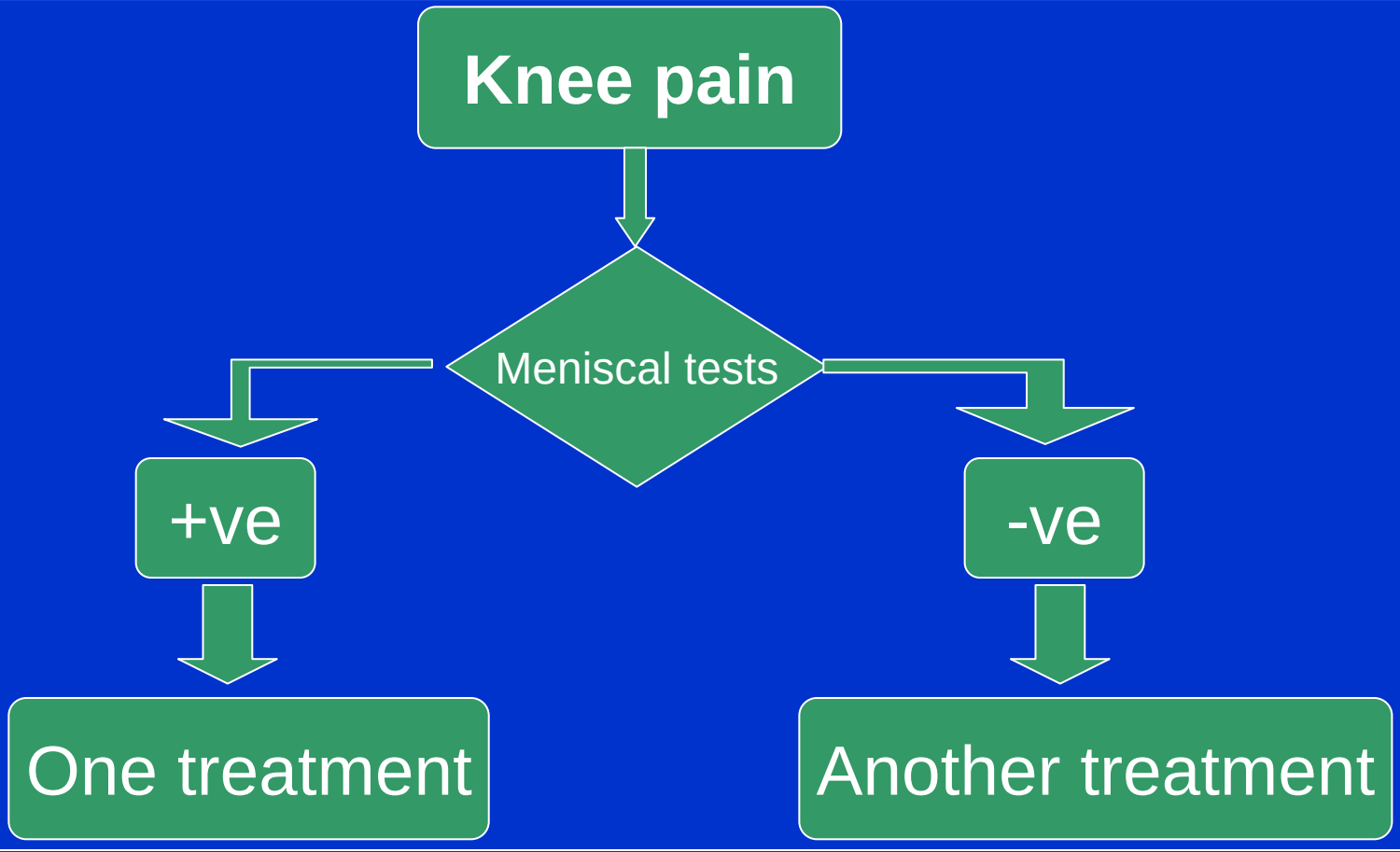


How useful are pathoanatomical diagnoses?

Knee pain

- History of trauma
- Limited range
- Swelling
- Reduced function

Implications of testing



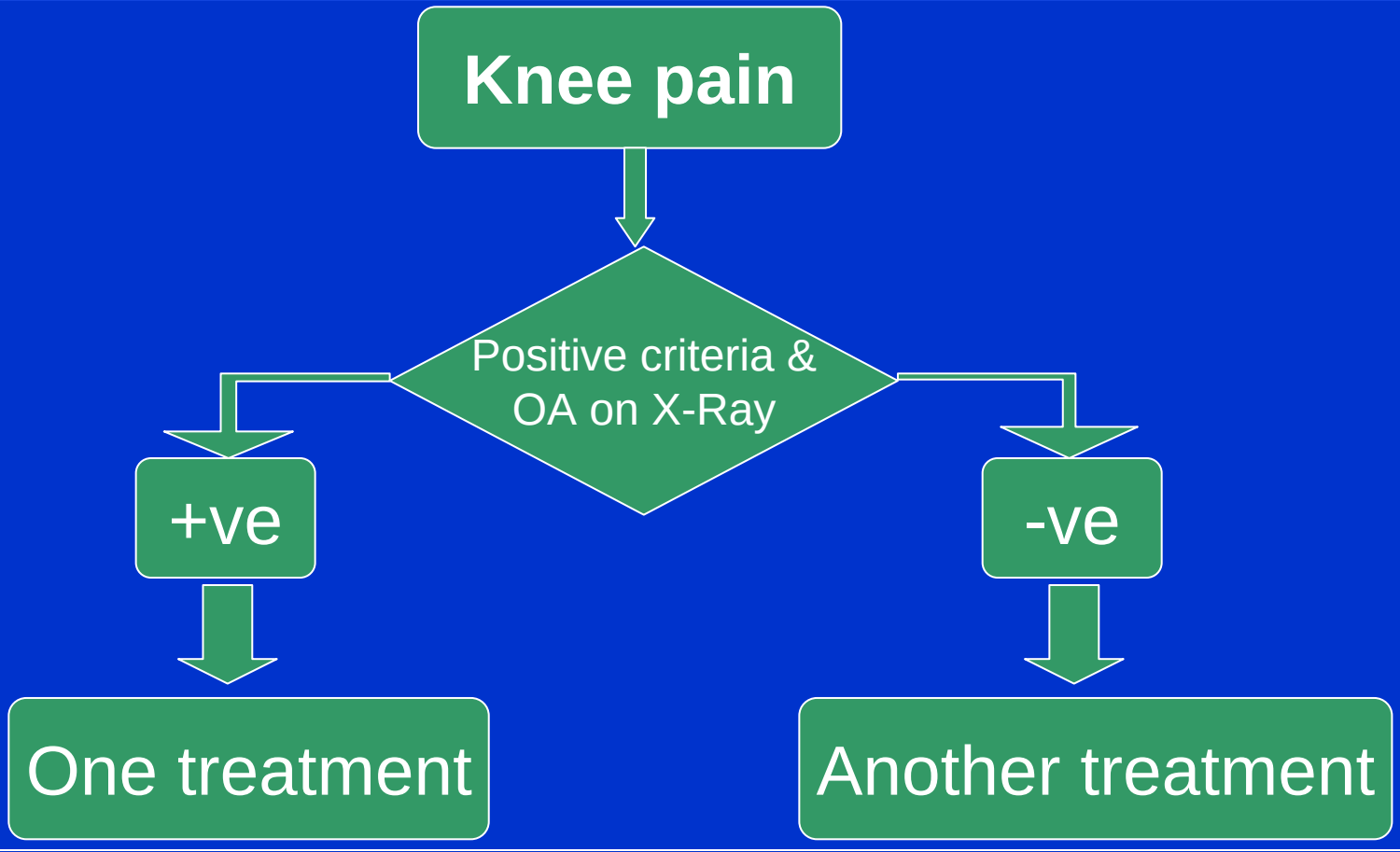
OA Knee Diagnosis

- age >50 years,
- morning stiffness <30m
- crepitus
- bony enlargement

89% sensitivity
88% specific
for OA

Jackson JL. Ann Intern Med. 2003 Oct 7;139(7):575-88

Implications of testing



The discordance between clinical and radiographic knee osteoarthritis: a systematic search and summary of the literature

BMC Musculoskeletal Disorders 2008, **9**:116 doi:10.1186/1471-2474-9-116

John Bedson (j.bedson@cphc.keele.ac.uk)
Peter R Croft (p.r.croft@cphc.keele.ac.uk)

"There is a large variation in the proportion of those with radiographic knee OA who experienced pain, ranging from 15% - 81%"

"Radiographic knee osteoarthritis is likewise an imprecise guide to the likelihood that knee pain or disability will be present"

How useful for therapists is the diagnosis of OA knee?

About as useful as the diagnosis of "DDD" is in the spine

Useless

No its not!!

JAMA®

Online article and related content current as of February 23, 2009.

Guideline Provides Evidence-Based Advice for Treating Osteoarthritis of the Knee

Rebecca Voelker

JAMA. 2009;301(5):475-476 (doi:10.1001/jama.2009.31)

Which Treatments Work for Osteoarthritis (OA) of the Knee

In its new guideline on treating OA of the knee, the American Academy of Orthopaedic Surgeons recommends

- Reduction of at least 5% of body weight in patients with OA of the knee and a body mass index greater than 25
- Low-impact aerobic fitness exercises
- Quadriceps strengthening

Cochrane Review 2009

Best estimate of what happens to people with OA who exercise:

In the short term, a supervised exercise program:

Reduces knee pain by 1 point on a scale of 0 to 20; and

Improves knee function by 3 points on a scale of 0 to 68.

Fransen, The Cochrane Library

Are there more useful subgroups?

Low Back Pain

↓

Decades of RCT deadlock

↓

Subgrouping seen as the “Holy Grail”

Bouter, Cochrane Review Group, 2003

Does subgrouping affect outcomes?

If patients are subgrouped

Treatment matched to subgroup

Superior outcomes

Fritz 2003, Long 2006, Brennan 2006

Brennan 2006

Conclusions. Nonspecific low back pain should not be viewed as a homogenous condition. Outcomes can be improved when subgrouping is used to guide treatment decision-making.

Criteria for LBP subgroup

Attempting to identify a pathoanatomical source will infrequently be useful in guiding decision making, especially for physiotherapists

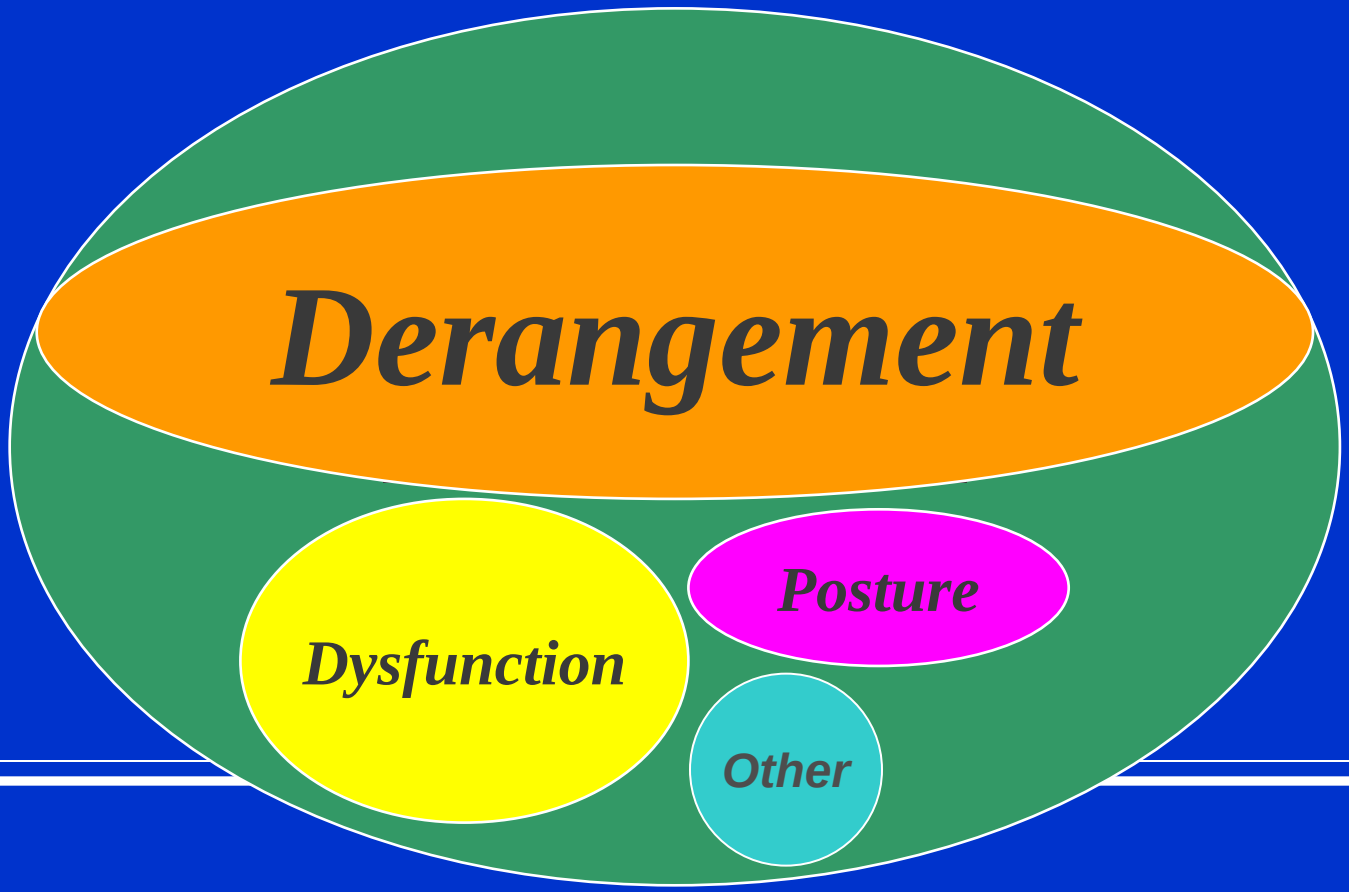
If we don't use pathoanatomical diagnoses what should we use?

Symptom response to testing is the most reliable way of conducting a physical examination

Mayer 1992
Van Dillen 1998
Seffinger 2004
Euro LBP guidelines 2004
May 2006

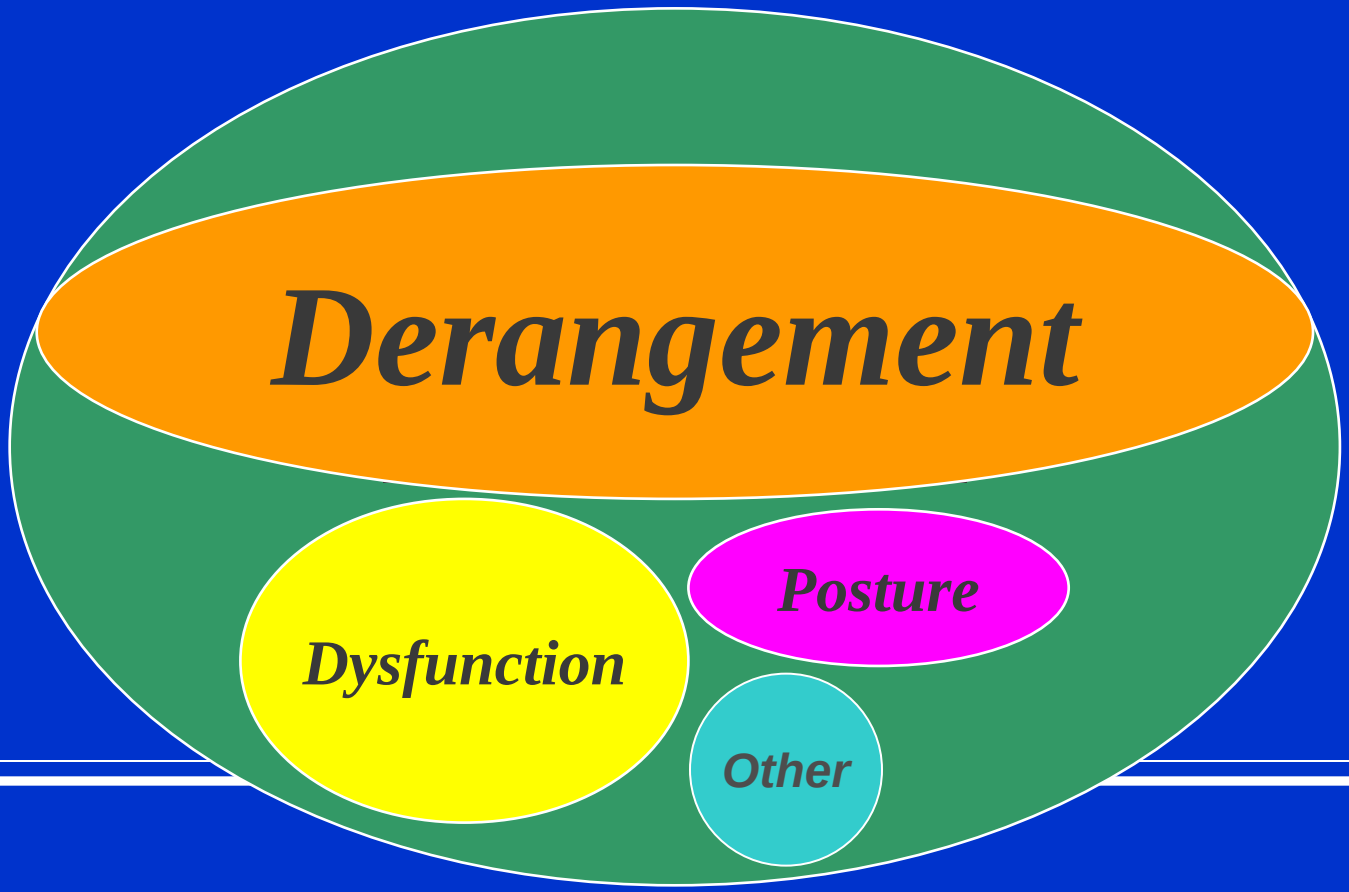
LBP: Subgrouped by symptomatic response

- McKenzie (MDT) Classification System



Extremity Subgroups

- MDT System applies same classification



Reliability

- MDT in the Extremities:

Kappa: 0.86 (Kelly 2008)

0.84 (May and Ross 2009)

Derangement

- Obstruction to movement
- Has a directional preference
- Ability to change rapidly
- Can be made lasting changes in pain, range and function

“Rapid Responders”

May 2006 (78%)
Hefford 2008 (80-87%)
Long 2004 (74%)
Aina 2004

How do we explore the potential for rapid response?

Active 51 year old

- 1 Year knee pain
- Constant
- Pain increase with walk, squat, stairs
- Hx: Knee scope in early 1980s

Examination:

Minimal painful loss of flexion and extension

Pain on walking

Pain on squatting

MRI IMPRESSION:

1)Complex tear posterior horn and body medial meniscus. Small bubbly cyst noted adjacent to the anterior horn of the lateral meniscus likely representing small meniscal cyst associated with a subtle complex tear near the meniscotibial attachment.

2)Mild to moderate medial compartment osteoarthritis.

3)8 mm subcortical cyst anterior intercondylar region proximal tibia.

4) Extensive trochlear groove chondromalacia.

5) Large knee joint effusion with mild to moderate nonspecific synovitis.

Question:
What's the prognosis?

Answer:
Depends on the Classification

- Repeated Extension (x40): Increase knee pain: “Better”

Less pain on walking
Less pain with squat

“Derangement”

Derangement = Good Prognosis

Next visit (48 hours): “50% Better”, squat with no pain

2 week follow up: Back to basketball, pain- free, “100% better”

3 month follow up: (verbal) “No problems with knee”

MRI IMPRESSION:

1)Complex tear posterior horn and body medial meniscus. Small bubbly cyst noted adjacent to the posterior horn of the lateral meniscus likely representing small meniscal cyst associated with a small complex tear near the meniscotibial attachment.

2)Mild to moderate medial compartment osteoarthritis.

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4) Extensive trochlear groove chondromalacia.

5) Large knee joint effusion with mild to moderate nonspecific synovitis.

?Significance

Case 2: 67 yr. old active female

- 2-3 month Hx of right knee pain, giving out 2-3x/day
- Dx – “OA knee with meniscal tear”
- Unchanging since onset
- Unable to play squash, squat or sit cross legged

Examination

- Unable to fully extend right knee, end range pain
- Loss of full flexion, end range pain
- Unable to fully squat or sit on heels – increase in pain
- Unable to sit cross legged because of pain
- Resisted strength: strong, painless

MRI Right Knee

- Large horizontal **tear** of the medial meniscus superimposed on a background of **degenerative change**
- Probable post-traumatic **attrition** of the anterior horn of the lateral meniscus
- **Advanced degeneration** at the patellar cartilage
- Lesser degrees of cartilage abnormally involving the medial and lateral femoral condyle
- Large joint **effusion** and small **intra-articular body**
- Prior **partial tear** of the ACL

Possible Diagnoses

- OA Knee
- Mensical tear with loose body
- ACL Tear
- Non-pathoanatomical classification of “Derangement”

What's the prognosis?

- OA Knee – Progressive loss of range and strength affecting overall function
- Meniscal Tear with loose body – Progressive enlargement of tear with continuing impairment of function
- ACL Tear – Continued impairment of function with gradual degenerative changes secondary to instability
- Derangement – Rapid change symptomatically and mechanically

Examination

- Repeated knee flexion - Painful but “No Worse”
- With continued repeated movements, produced less pain, “No Worse”
- As a result: Less pain with knee flexion
  Increase ROM of knee flexion

“Derangement”

Treatment

- Repeated knee flexion – kneeling and sitting back on heels
- 2-3x/day, 30-50 repetitions
- Continue with all daily activities as tolerated

Derangement = Good Prognosis

- **One week follow-up**: “50% better”, only 2 episodes of knee giving out over 1 week, able to fully squat with end range pain, able to sit on heels with minimal pain

- **Four week follow-up**: Playing squash with no pain, no episodes of knee giving out, full squat minimal discomfort, able to sit cross legged with some discomfort, hyperextension of knee with no pain

Case 3: 34 yr. old female

- 4 year Hx of intermittent left knee pain
- Night pain
- Progressively worsened over years
- Unable to squat at all, run and pain / unsteadiness with walking
- Pain with ascending/descending stairs

34 Year old female

- Injection 2 years ago: no help
- Scope left knee 5/12 ago @ St.Elsewhere
- Continued pain post scope, “worse than pre-surgery”
- FKSC…Referred to PT

Post scope Dx

- Osteochondral lesion from lat femoral condyle,
- Unrepairable displaced chronic bucket handle tear of the lateral meniscus

- Scope: removal lesion and debridement
  partial lat menisectomy

Post scope MRI Findings

- Complete absence of normal lateral meniscus, “flipped” with multiple fragments in joint space
- Thickening of patellar tendon, consistent with partial tear
- Suspected partial tear of quad tendon and ITB
- Osteochondral injury and fragmentation of the subchondral region with fragment (1.1x1.7cm)
- Joint effusion and Bakers cyst

Examination

- Knee flexion 135 degrees: painful lack of 5-8 degrees
- Full and painfree extension
- Squat painful and less WB on left
- Resisted strength strong, painless

Repeated Movement Exam

- Repeated flexion increased knee pain at time
- As a result: Increased range

  “50% less pain” on squatting

Diagnosis

“Derangement”

Treatment

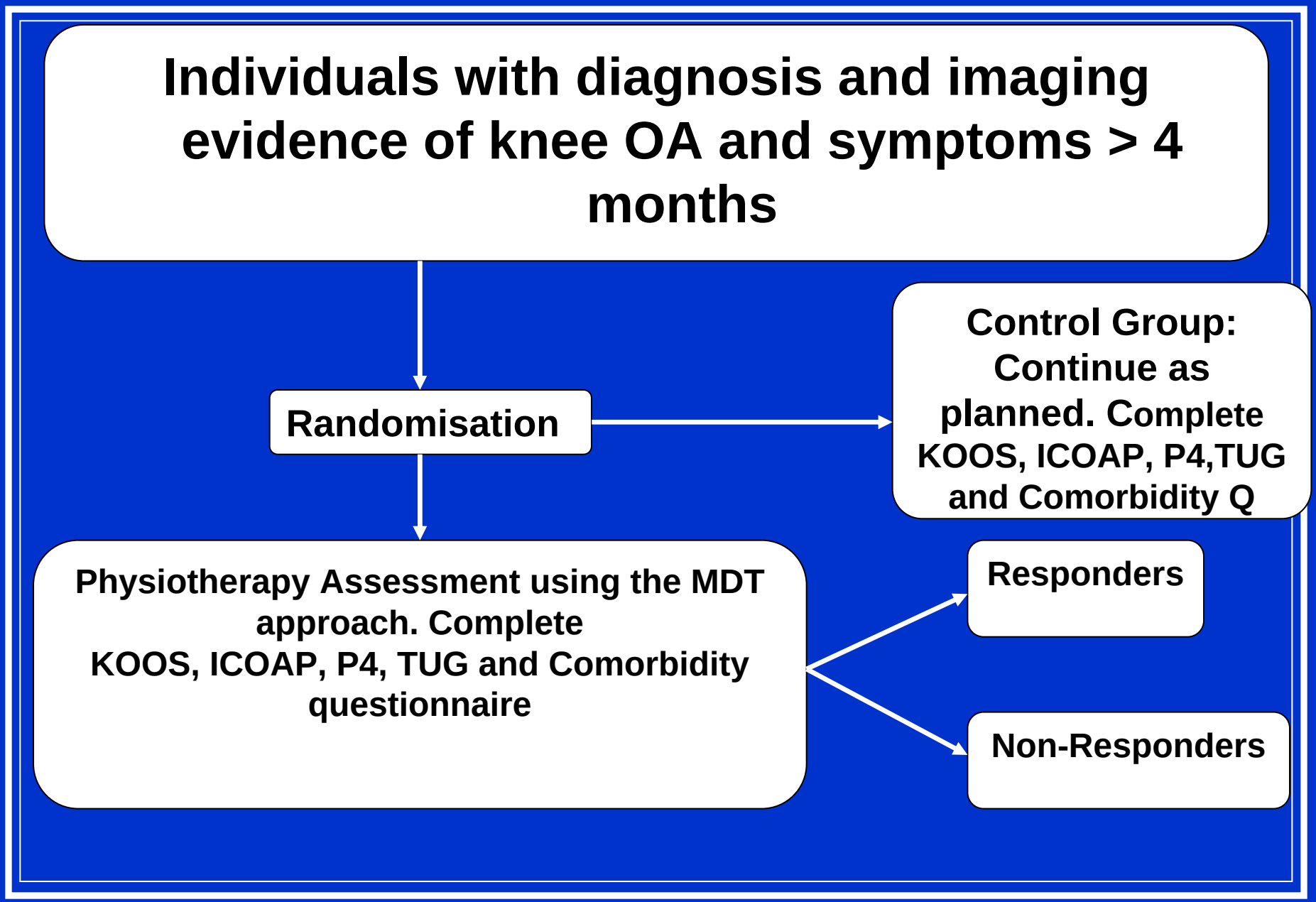
- Repeated Knee Flexion 10-15 repetitions 5-6x per day

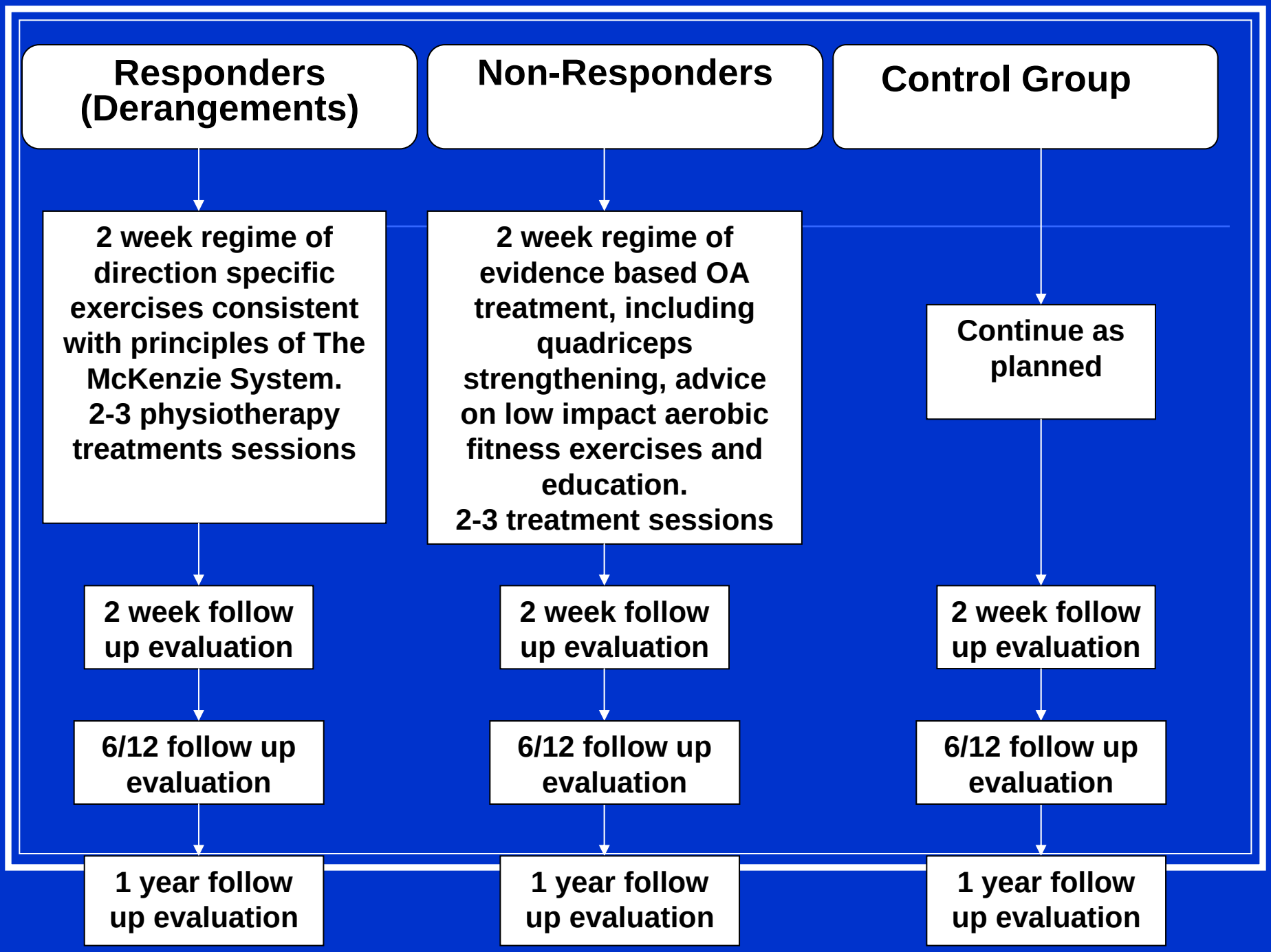
Outcome

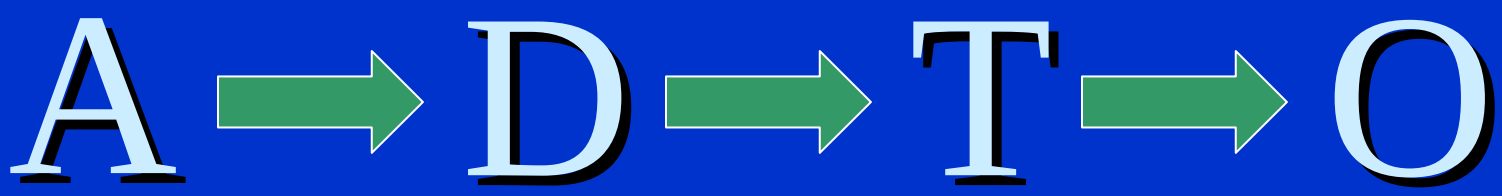
- 24 hours: “walking is much better”
  “best its been in the past few months”
  jogging on treadmill with no pain
  pain-free squat
- 1 week follow up: “80% better since initial visit”
  full range knee movement
  pain-free squat (still WB less on left)
- 3 week follow up: full squat, “not experiencing pain”

The McKenzie System's (MDT) derangement classification in OA knees: Efficacy of MDT treatment versus evidence based care A randomized controlled trial

- Richard Rosedale
- Ravi Rastogi
- Bert Chesworth
- Frank Filice
- Rhonda Masek
- Sean Willis


Individuals with diagnosis and imaging evidence of knee OA and symptoms > 4 months
Randomisation
Control Group: Continue as planned. Complete KOOS, ICOAP, P4,TUG and Comorbidity Q
Physiotherapy Assessment using the MDT approach. Complete KOOS, ICOAP, P4, TUG and Comorbidity questionnaire
Responders
Non-Responders


Responders (Derangements)
Non-Responders
Control Group
2 week regime of direction specific exercises consistent with principles of The McKenzie System. 2-3 physiotherapy treatments sessions
2 week regime of evidence based OA treatment, including quadriceps strengthening, advice on low impact aerobic fitness exercises and education. 2-3 treatment sessions
Continue as planned
2 week follow up evaluation
2 week follow up evaluation
2 week follow up evaluation
6/12 follow up evaluation
6/12 follow up evaluation
6/12 follow up evaluation
1 year follow up evaluation
1 year follow up evaluation
1 year follow up evaluation


A
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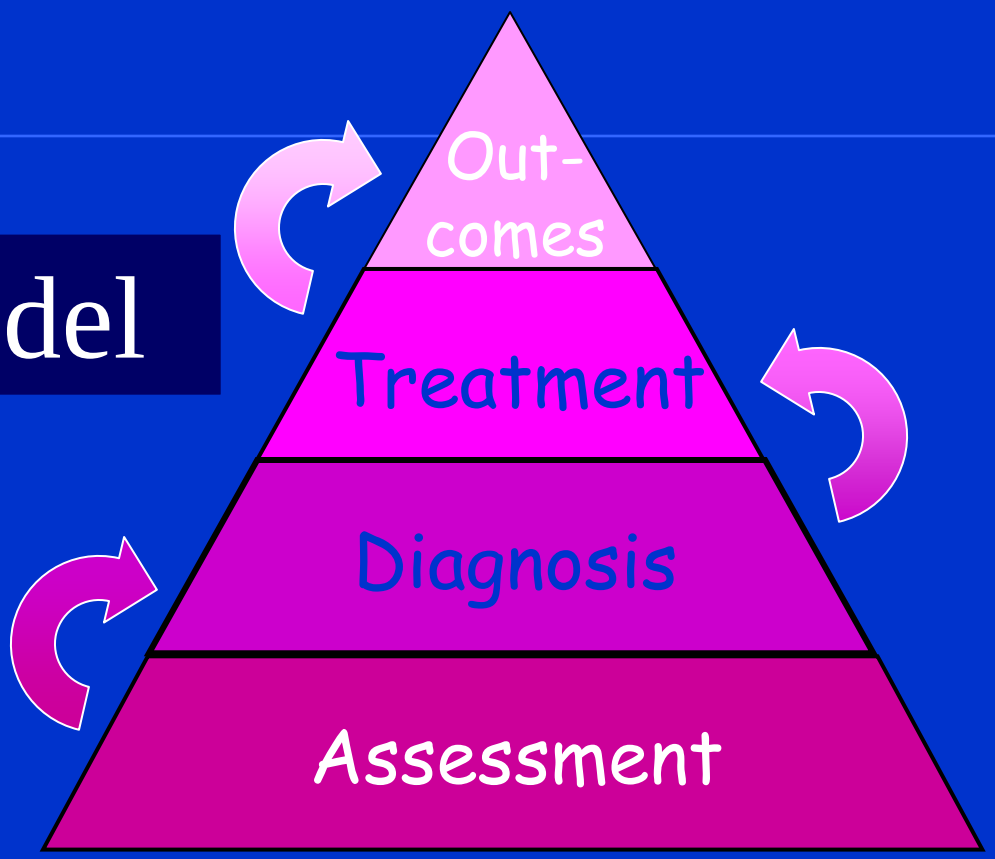
“Statistical Relevance”
K. Spratt, Ph.D.

The ADTO Model



The single most important thing: establishing the validity of any one link requires that all previous links have been established.”

Book: Orthopaedic Knowledge Update Spine ‘02, AAOS, p497-505

How do you explore the potential for rapid change in the OA Knee?

- Don’t be guided by pathological diagnoses!
- Classify your patients into subgroups that direct your treatment
- Assess to explore the potential for rapid change?

Where to start?

Baseline

Most obstructed movement

RMs to end range

Recheck baseline

Don’t let pathology set your limits!

Choose a system of classification and use it!