High value management of hip pain and hip OA - what works and how can this be delivered?

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Australian Government
National Health and Medical Research Council
NHMRC

Meet Simon and Ken

Simon

27 year old player at VFL level

Never played at AFL level

Playing history 8 years at VFL

Onset of hip and groin pain right side 1 month into 2016 season

Played on for 3 weeks and then stopped playing

Had not played for 6 months at time of initial assessment due to immediate onset of pain with running

1st episode of hip/groin pain

“I have had **pain** in my hip for over 6 months. I tried to rest and then go back to training but **it made no difference**. It is now **keeping me awake at night** as well. I am hoping to move to the USA for work but am **worried** about the flight. My wife is getting **frustrated** as she really wants to go…..

……**I think I may never play football again**”

Simon, August 2016, at initial physiotherapy consultation

Ken

Ken is a 50 year old man
Suffered hip injury playing football as 25 yo
Had first hip arthroscopy aged 45 yo for “clean out and to stop OA developing”
Since then has had additional hip arthroscopy, including complete labral resection
Now has constant pain, unable to squat, sit or walk >30 minutes
Has joint-space narrowing and osteophytes on imaging
Has seen multiple sports medicine people including physios
Has been offered synvisc or CSI to prevent THA, as this is his “only option now”

Ken

“I do not do any exercise as I don’t want to cause more damage, and cause the cartilage to wear out”

HAS NEVER BEEN OFFERED EXERCISE-BASED TREATMENT

Simon and Ken… similar patients?

Simon

What is causing pain?

Doha agreement meeting on terminology and definitions in groin pain in athletes

Adam Weir,[1] Peter Brukner,[2] Eamonn Delahunt,[3,4] Jan Ekstrand,[5] Damian Griffin,[6] Karim M Khan,[1,7] Greg Lovell,[8] William C Meyers,[9] Ulrike Muschaweck,[10] John Orchard,[11] Hannu Paajanen,[12] Marc Philippon,[13,14,15] Gilles Reboul,[1,16] Philip Robinson,[17] Anthony G Schache,[18] Ernest Schilders,[19] Andreas Serner,[21] Holly Silvers,[20] Kristian Thorborg,[21] Timothy Tyler,[22] Geoffrey Verrall,[23] Robert-Jan de Vos,[24] Zarko Vuckovic,[1] Per Hölmich[1,21]

▶ Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bjsports-2015-094869).

For numbered affiliations see end of article.

Correspondence to
Dr Adam Weir, Aspetar Orthopaedic and Sports Medicine Hospital, P.O. Box 29222, Doha, Qatar;

ABSTRACT

Background Heterogeneous taxonomy of groin injuries in athletes adds confusion to this complicated area.

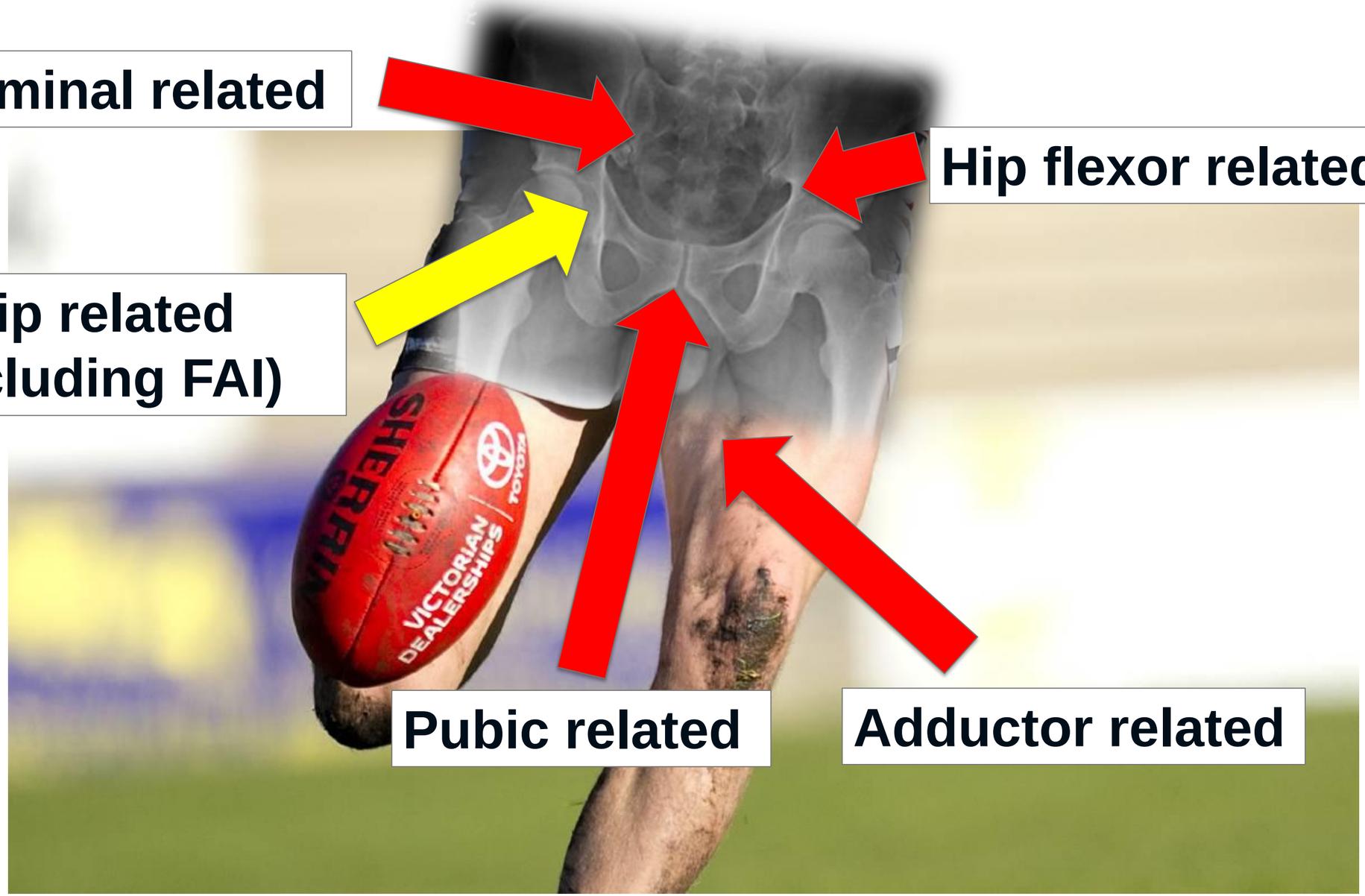
Aim The 'Doha agreement meeting on terminology and definitions in groin pain in athletes' was convened to attempt to resolve this problem. Our aim was to agree on a standard terminology, along with accompanying definitions.

Methods A one-day agreement meeting was held on 4 November 2014. Twenty-four international experts from 14 different countries participated. Systematic

The 'Doha agreement meeting on terminology and definitions in groin pain in athletes' was convened to attempt to resolve this problem. Our aim was to agree on a standard terminology, along with accompanying definitions.

BACKGROUND TO THE MEETING

The First World Conference on Groin Pain in Athletes was held in Doha, Qatar in November 2014. In the lead-up to this conference, 24 experts from a variety of backgrounds were invited to par-


Abdominal related
Hip flexor related
Hip related (including FAI)
Pubic related
Adductor related

How do we know Simon’s hip pain is FAI?

The Warwick Agreement on femoroacetabular impingement syndrome (FAI syndrome): an international consensus statement

D R Griffin,[1,2] E J Dickenson,[1,2] J O'Donnell,[3,4] R Agricola,[5] T Awan,[6] M Beck,[7] J C Clohisy,[8] H P Dijkstra,[9] E Falvey,[10,11] M Gimpel,[12] R S Hinman,[13] P Hölmich,[9,14] A Kassarjian,[15,16] H D Martin,[17] R Martin,[18,19] R C Mather,[20] M J Philippon,[21] M P Reiman,[20] A Takla,[3,22,23,24] K Thorborg,[14] S Walker,[25] A Weir,[9,26] K L Bennell[23]

► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bjsports-2016-096743).

For numbered affiliations see end of article.

Correspondence to
Professor DR Griffin, Clinical Sciences Research Institute, University Hospitals Coventry and Warwickshire, Coventry, CV2 2DX, UK;

The Warwick Agreement on femoroacetabular impingement syndrome has been endorsed by the following 25 clinical societies: American Medical Society for Sports Medicine (AMSSM), Association of Chartered Physiotherapists in Sports and Exercise Medicine (ACPSEM), Australasian College of Sports and Exercise Physicians (ACSEP), Austian Sports Physiotherapists, British Association of Sports and Exercise Medicine (BASEM), British Association of Sport Rehabilitators and Trainers (BASRaT), Canadian Academy of Sport and Exercise Medicine (CASEM), Danish Society of Sports Physical Therapy (DSSF), European College of Sports and Exercise Physicians (ECOSEP), European Society of Sports Traumatology, Knee Surgery and Arthroscopy (ESSKA), Finnish Sports Physiotherapist Association (SUFT), German-Austrian-Swiss Society for Orthopaedic Traumatologic Sports Medicine (GOTS), International Federation of Sports Physical Therapy (IFSPT), International Society for Hip Arthroscopy (ISHA), Groupo di Interesse Specialistico dell'A.I.F.I., Norwegian Association of Sports Medicine and Physical Activity (NIMF), Norwegian Sports Physiotherapy Association (FFI), Society of Sports Therapists (SST), South African Sports Medicine Association (SASMA), Sports Medicine

Warwick Consensus agreement

For a patient to be diagnosed with FAI Syndrome, must have

1. Positive imaging findings
2. Symptoms of hip or groin pain
3. Signs of FAI, including physical impairments and NO negative impingement tests.

Simon’s presentation…

For a patient to be diagnosed with <u>FAI Syndrome</u>, must have

Positive imaging findings

- AA on Dunn view 85 R, 86 L

Symptoms of hip or groin pain

- right sided hip and groin pain (70mm on VAS) with all running-related activity including football, and nightly pain (60mm on VAS)

Signs of FAI, including physical impairments and positive impingement tests

- positive FADIR and IR@90 pain>6/10;
- reduced strength adductors (33%), extensors (45%), abductors 22%);
- reduced flexion ROM R=85 L=112;
- reduced SB (30%); reduced SL sq (9 reps), reduced hop (33% and painful)

How do we know Ken’s hip pain is hip OA?

Ken

Checklist for diagnosing osteoarthriti

Symptoms		Risk factors	
Use-related pain	☐		☐
Functional limitati			☐
Morni			☐
		Prior joint injury	☐
	☐	Hard physical work	☐
ovement	☐	Overuse in spare time	☐
ony enlargement	☐	Family history of OA	☐

Zhang W, Doherty M, Peat G, Bierma-Zeinstra MA, Arden NK, Bresnihan B, et al. EULAR evidence-based recommendations for the diagnosis of knee osteoarthritis. Ann Rheum Dis. 2010; 69:483-489.

Applies even if X-rays appear normal.

Any one of these

= Must have

Ken’s presentation…

For a patient to be diagnosed with <u>hip OA</u>, must have

Pain with use

- pain in right hip/groin (70mm on VAS) with squatting to pick up items off floor

Functional limitations

- right sided hip and groin pain (80mm on VAS) when walks or sits for >30 minutes

Aged >40 years

- Ken is 50 years old

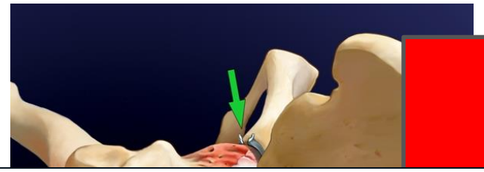
Clinical findings: restricted movement

- hip flexion range 70˚ right side (105˚ left side); hip IR 5˚ right side (15˚left side).

Are FAI and OA part of the same disease?

Likely abnormal premature contact between femur and acetabulum leading to soft tissue pathology seen in FAI

Femoro-acetabular Impingement



Labral path

FAI = probably early hip OA

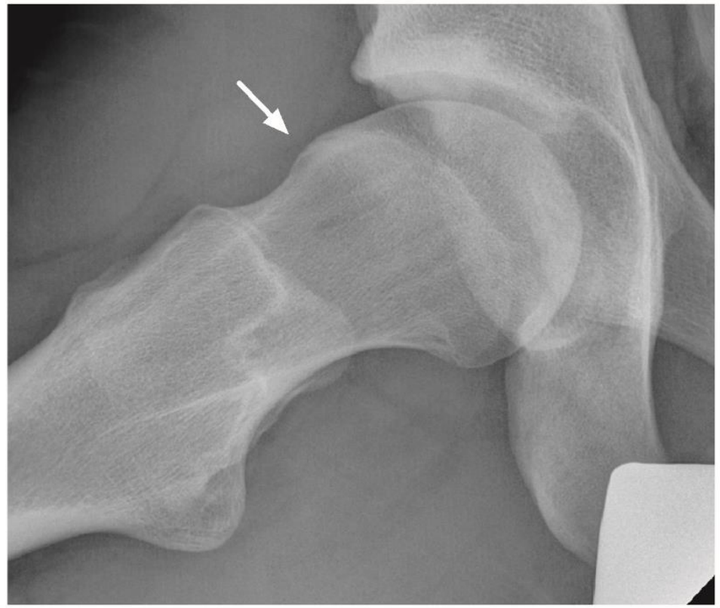
FAI = FA impingement pa

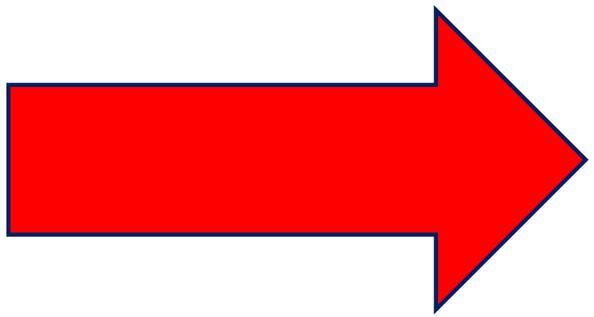
associated

with have chondral and labral pathology

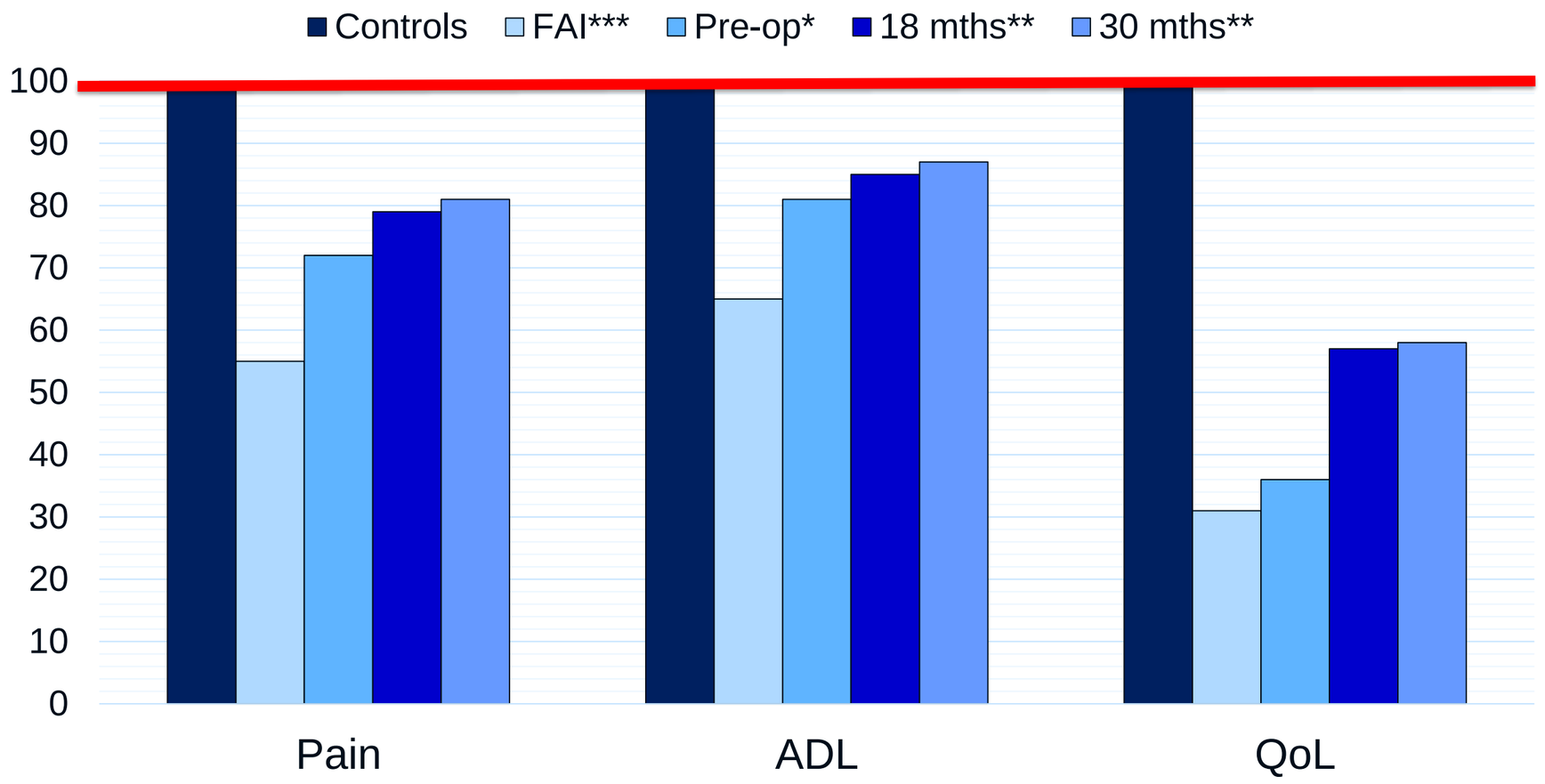

camFAI
5-20 years
Agricola 2013, 2013, Nicholls 2011
Hip OA

Previous studies have shown that larger cam lesions (alpha angle >83) are associated with 10-fold increased risk of hip osteoarthritis (OA) and progression to hip arthroplasty within 5 years Agricola 2013





Patient-reported outcomes FAI and hip OA



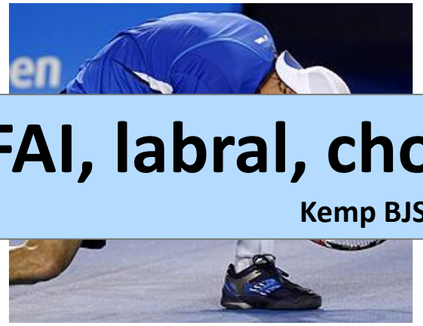
*Hinman et al, BJSM, 2014
n=30

**Kemp et al, BJSM, 2014
n=72

***Clohisy AJSM, 2014
n=1076

cam – develops 13-15 years

Agricola AJSM 2014, Siebenrock 2011, Pollard 2010

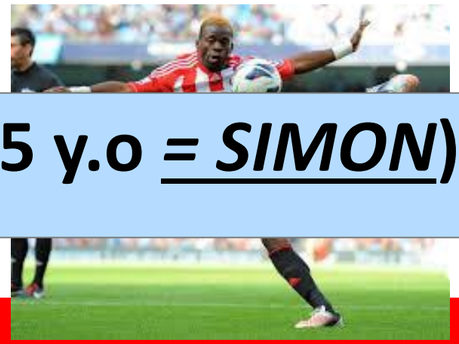


FAI, labral, chondral (35 y.o)

Kemp BJSM 2013

camFAI

Pain, poor PROs, physical impairments



Painful FAI +/- labral (25 y.o *= SIMON*)

Kemp BJSM 2012

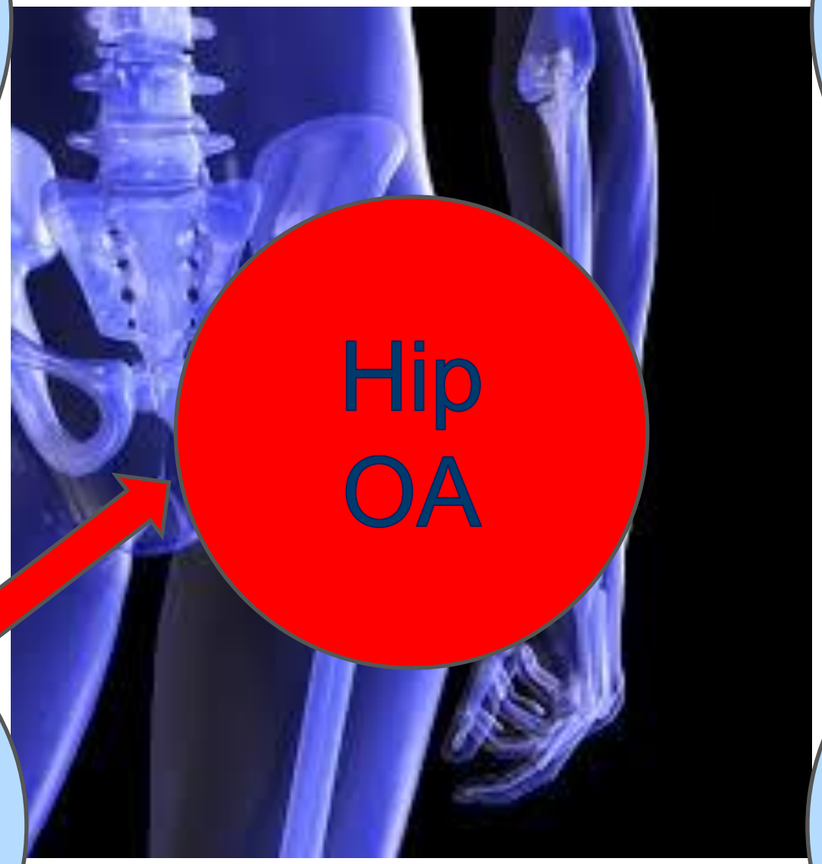
Clinical hip OA (40+ y.o *= KEN*)

McCarthy 2011, Tuominen 2009

What are possible mechanisms?

Altered hip joint loads

Shearing within cartilage
Retchford 2013, Wilson 2013

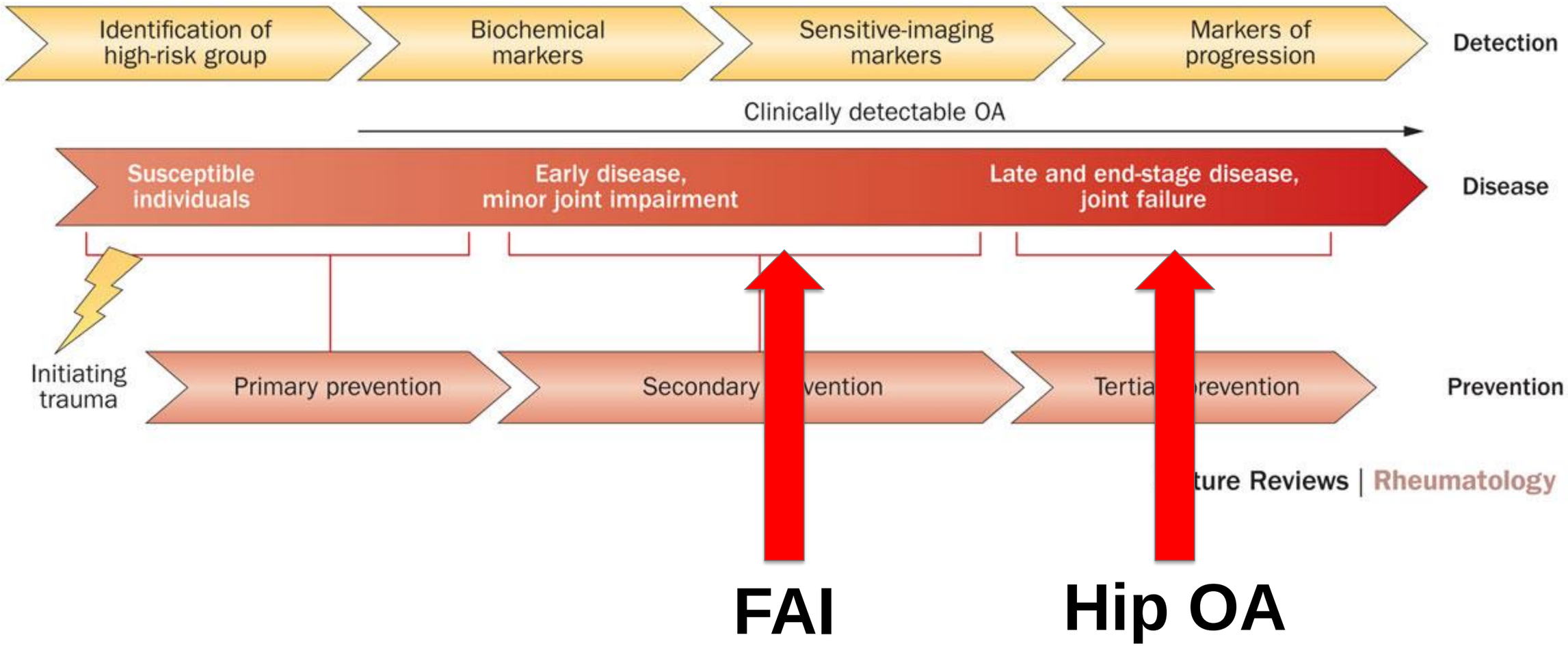


Hip OA

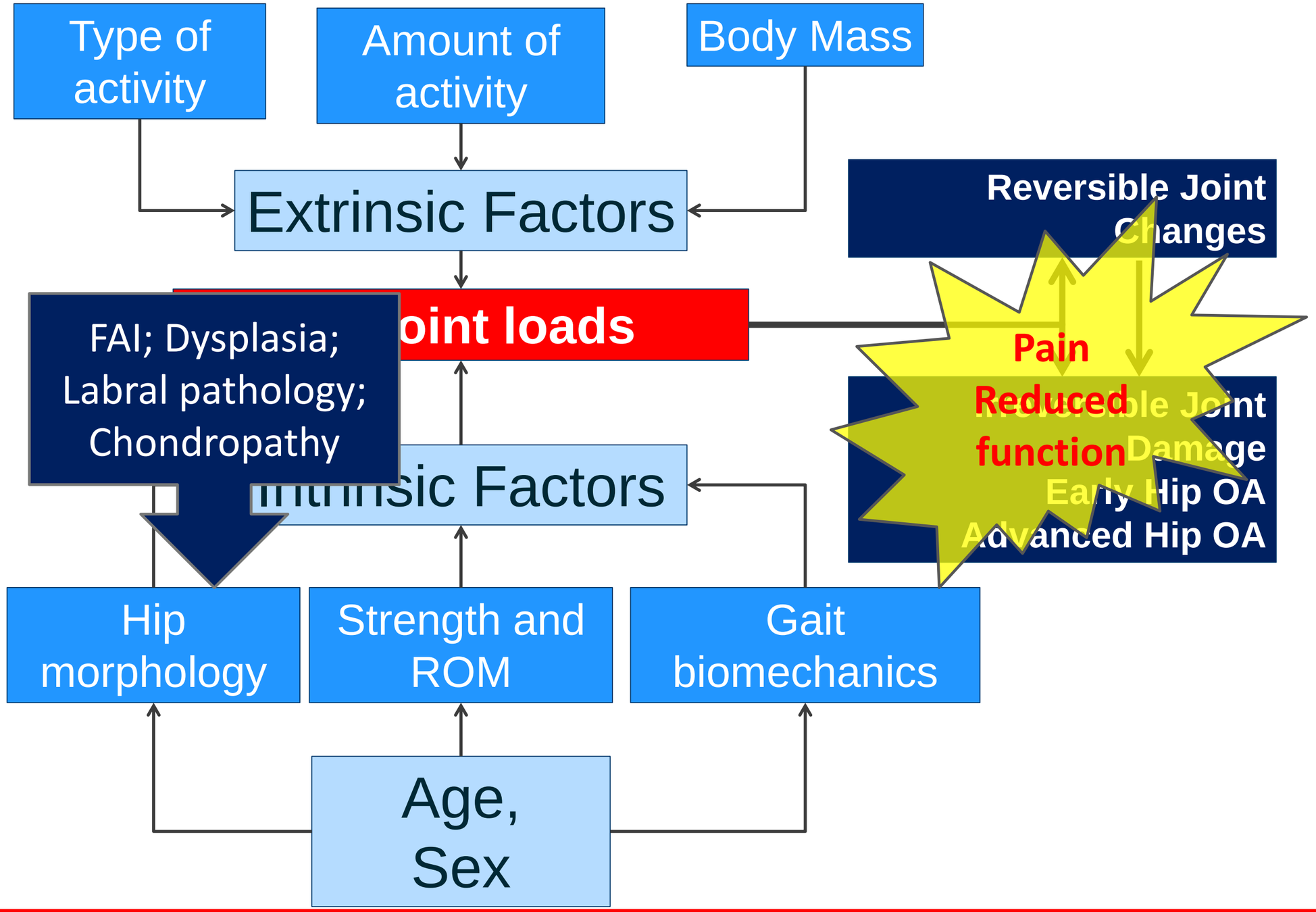
Breakdown of chondral integrity

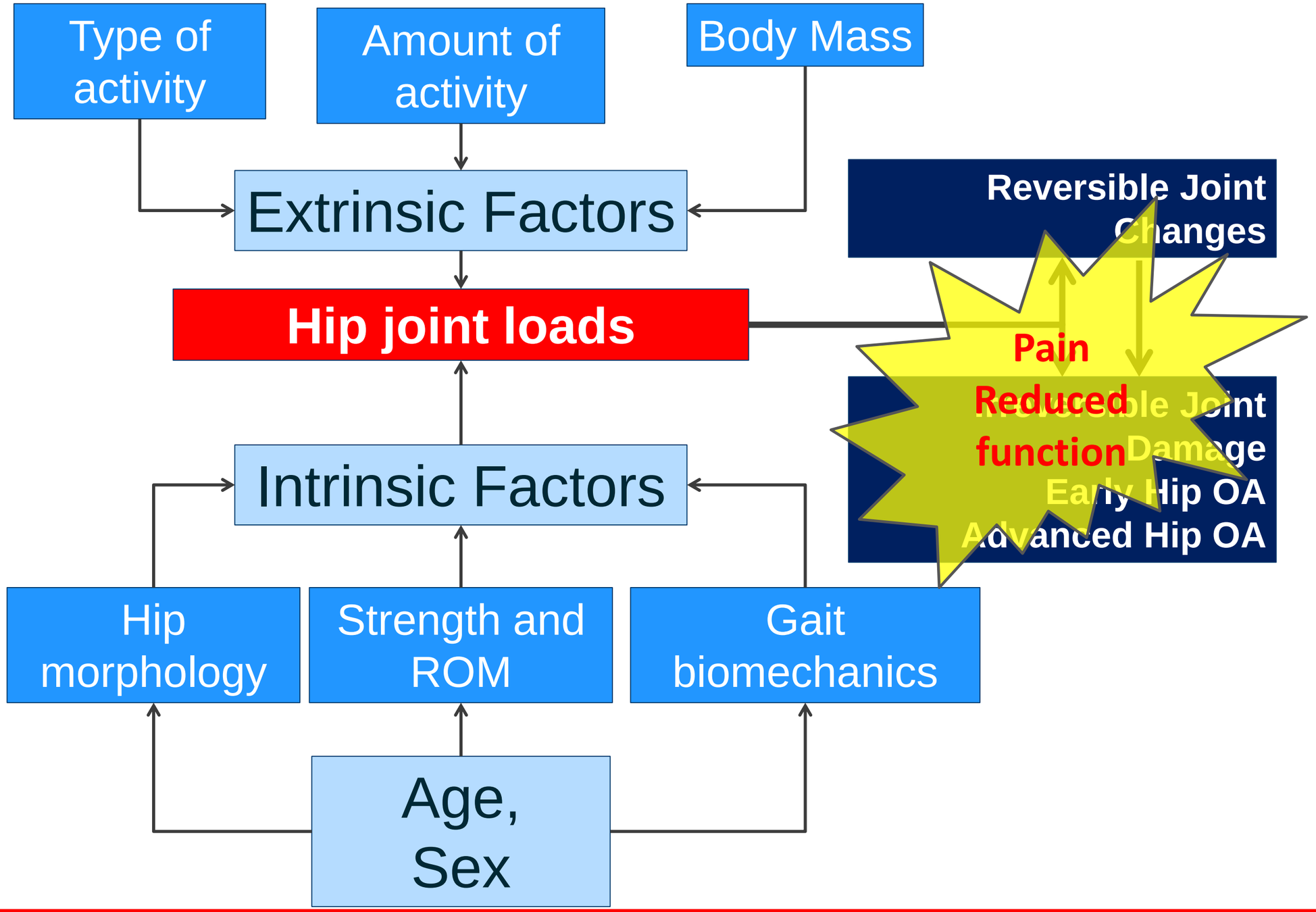
Alteration extra-cellular matrix
Zuscik 2008

The OA continuum



Can physiotherapy treatment impact on this disease continuum?


Type of activity
Amount of activity
Body Mass
Extrinsic Factors
oint loads
FAI; Dysplasia;
Labral pathology;
Chondropathy
Intrinsic Factors
Reversible Joint Changes
Pain
Reduced function
Irreversible Joint Damage
Early Hip OA
Advanced Hip OA
Hip morphology
Strength and ROM
Gait biomechanics
Age, Sex


Type of activity
Amount of activity
Body Mass
Extrinsic Factors
Hip joint loads
Intrinsic Factors
Hip morphology
Strength and ROM
Gait biomechanics
Age, Sex
Reversible Joint Changes
Pain
Reduced function
Irreversible Joint Damage
Early Hip OA
Advanced Hip OA

What do we know about physiotherapy management of hip pain (FAI) and hip OA?

Evidence for physiotherapy management of FAI

The efficacy of physiotherapy interventions for hip pain: A systematic review of the literature.

Kemp, Mosler, Hart, Bizzini, Scholes, Chang, Crossley, 2018 (unpublished)

Aim: Identify the effectiveness of physiotherapy interventions in improving pain and function in young and middle aged adults experiencing hip pain (FAI).

1750 studies retrieved in search

12 studies included, 8 RCTs, 4 case series

No full-scale RCT evidence supporting non-surgical management for FAI

Best results for PROMs seem to be > 3 month strength-based programs

Best results for strength and functional performance seem to be >3 month strength-based programs

But, in absence of full-scale RCTs, best evidence to guide appropriate physiotherapy treatment involves targeting characteristic impairments seen in FAI[2,4,5]

[2] Kemp et al in Clinical Sports Medicine 2017 [4] Freke et al BJSM 2016 [5] Kemp et al KSSTA 2017

What are typical impairments in FAI?

BJSM Online First, published on June 14, 2016 as 10.1136/bjsports-2016-096152

Knee Surg Sports

[RESEARCH REPORT]

JOANNE L. KEMP, PT, PhD[1,2] • MAY ARNA RISBERG, PT, PhD[3] • ANTHONY G. SCHACHE, PT, PhD[4]
MICHAEL MAKDISSI, MD, PhD[5] • MICHAEL G. PRITCHARD, MD, PhD[6] • KAY M. CROSSLEY, PT PhD[2]

Patients With Chondrolabral Pathology Have Bilateral Functional Impairments 12 to 24 Months After Unilateral Hip Arthroscopy: A Cross-sectional Study

Hip arthroscopy is commonly performed in patients with hip pain attributable to intra-articular conditions such

is limited evidence to underpin the development of rehabilitation

...opy (ESSKA) 2015

[1]Fr

Physical impairments in FAI

Patients with FAI are impaired pre-op or no-op and remain impaired post-op compared to controls

Impairments include

1. reduced hip muscle strength (sex specific),
2. reduced functional task performance,
3. increased impingement in SL squat,
4. reduced trunk function,
5. reduced dynamic balance,
6. alterations in gait,

What should a physiotherapy program for FAI include?

Goal of treatments = optimise hip joint loads to allow RTP, targeting known impairments[2]

Hip strength[4]

Trunk strength[9]

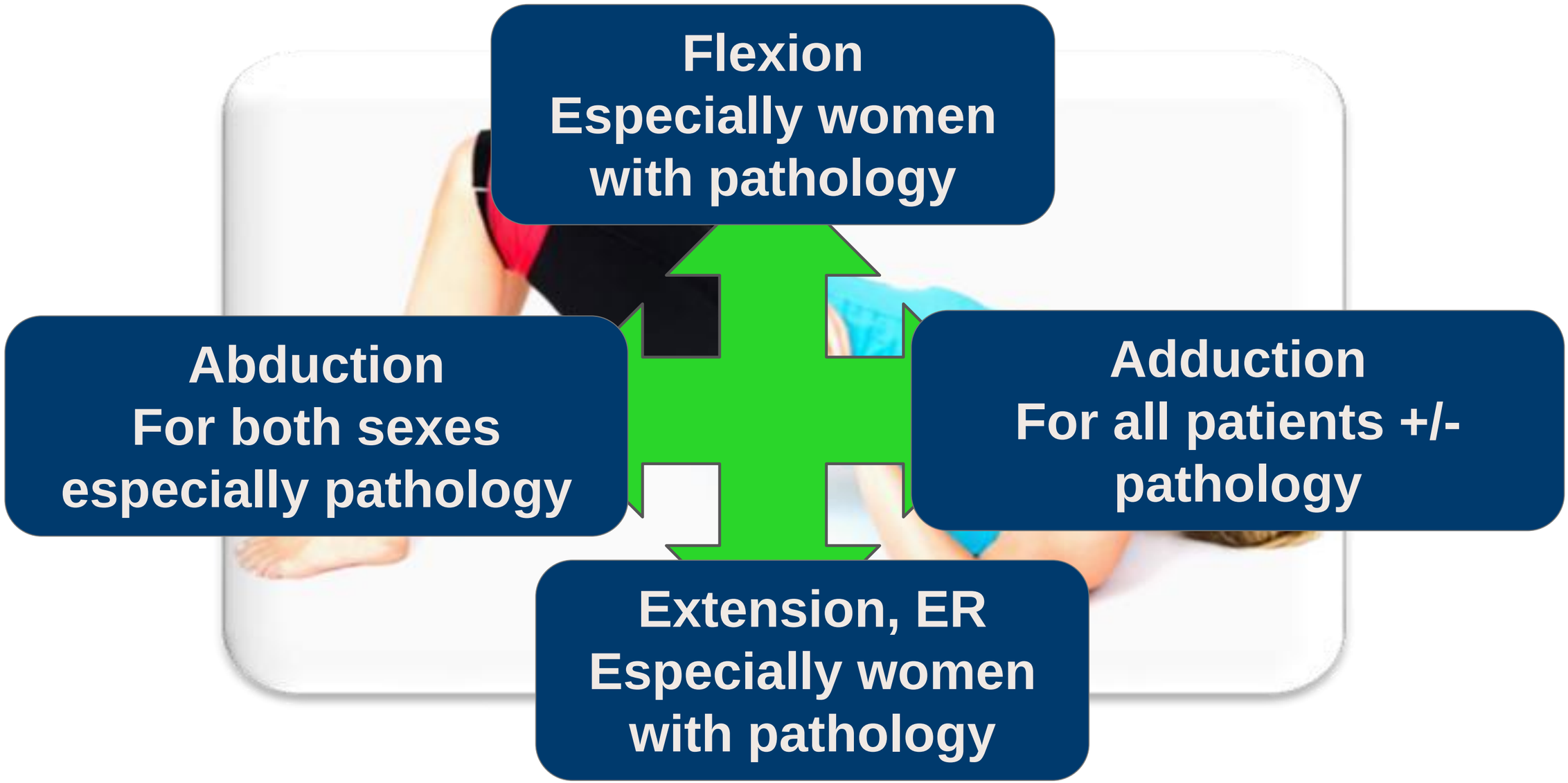
Functional[9] and balance retraining[10]

Cardiovascular loading and gait retraining[2]

Education/Counselling/Shared decision making[2]

[2] Kemp et al in Clinical Sports Medicine 2017 [4] Freke et al BJSM 2016 [5] Kemp et al KSSTA 2017 [9] Kemp et al JOSPT 2017
[10] Hatton et al ACR 2014

Hip strength


Flexion
Especially women with pathology
Abduction
For both sexes especially pathology
Adduction
For all patients +/- pathology
Extension, ER
Especially women with pathology

Strength and conditioning principles[11]

Number of reps and sets

Rest between reps and sets

Load applied

Time under tension

Progressive strength program starting with low load, safe positions progressing to high load challenging positions

Allowed to progress when VAS <20mm and Borg perceived exertion ≤5 (moderate)

[11] Toigo and Boutellier 2006

Progressive strength - adduction

1

2

3

4

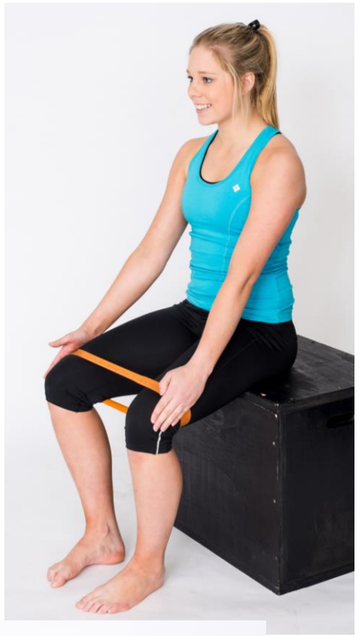
5

6

Progressive strength - abduction

1

2



3

4

5

6

7

Progressive strength - extension

1

2

3

4

5

6

7

8

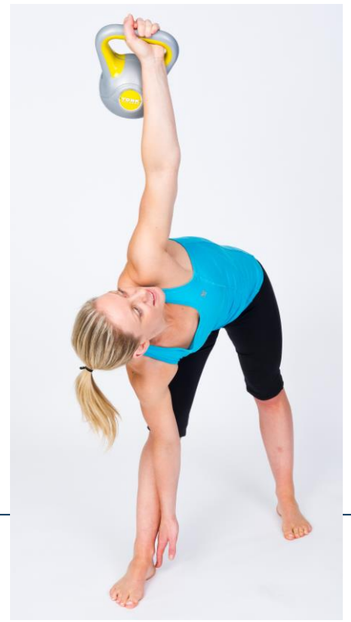
Trunk strength

Progressive strength – trunk

1

2

3



4

5

Retrain both sides

Watch overactivity in hip flexors

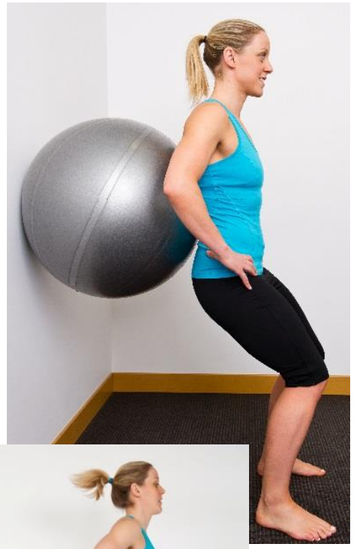
(avoid crunches and sit ups)

Focus on endurance

Function and balance

Progressive functional and balance retraining

1



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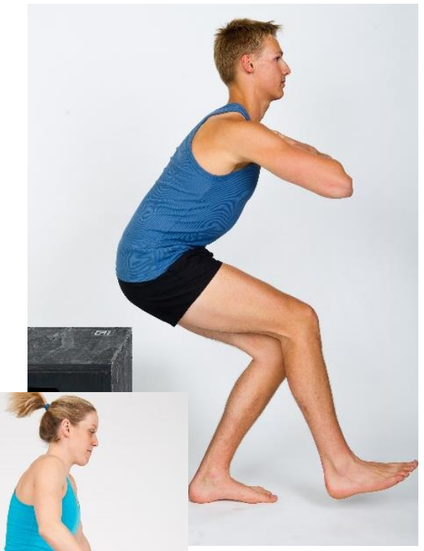

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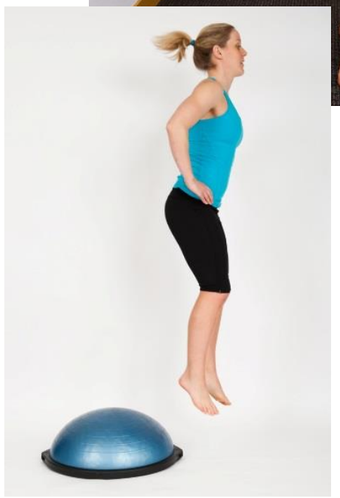

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7

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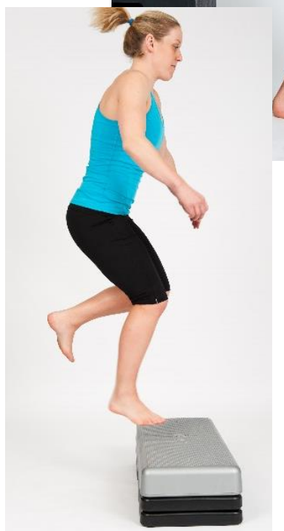


9

Retrain both sides
Specific to sports
Focus on strength and endurance
Restore full load requirements

Cardiovascular loading

Progressive CV loading program

Start = low impact high intensity (eg: swimming)
Finish = running including speed and direction change

Progress duration, intensity, impact, complexity, sports specific loading, tailored to suit preferences (weather, equipment, enjoyment, and ultimate goals)

Progress when current phase is completed successfully, VAS <30mm and Borg perceived exertion ≤5 (moderate)

Phase	Description/examples	Dosage and progression
1	Cycling (stationary or road bike, no MTB); swimming (no breaststroke); other aquatic activity (water aerobics, water jogging no egg beater kick); walking (on flat terrain, no beach or bush walking); kayaking; rowing (if flexion ROM >100); elliptical cross trainer.	10 minutes every second day 20 minutes every second day 30 minutes every second day 30 minutes total, including 5x60 seconds high intensity every second day 30 minutes including up to 10x60secs or 5x2 minutes high intensity every second day 45 minutes including up to 15 minutes total high intensity every second day
2	Dance, running, MTB, athletics, bush walking, netball, football (all codes), hockey, racquet sports	15 mins every second day (can be combined with 30 mins level 1 activity) 20 mins every second day (can be combined with 25 mins level 1 activity) 30 mins every second day (can be combined with 20 mins level 1 activity) 45 mins every second day, including 10 mins higher intensity (can be combined with 15 mins level 1 activity) 50 mins every second day, including 20 minutes high intensity (can be combined with 10 mins level 1 activity). Up to 1 hour, 3 time/week, full load

Education

Education/Counselling/Shared decision making

Discuss FAI patients have early hip OA and need to manage accordingly

Need to maintain cardiovascular load throughout the rehabilitation process

Will have flare ups of symptoms, and will NOT be painfree with exercise (acceptable level of pain ok)

Must be prepared for maintenance program that includes strength, balance, neuromotor control

Impingement position modification for ADL (90% time) = less overall impingement time = allows full sport load (10% time)

They will improve but will not be the same as a healthy age-matched control

Evidence for physiotherapy management of hip OA

Review

Effects of exercise and manual therapy on pain associated with hip osteoarthritis: a systematic review and meta-analysis

Lucy Beumer,[1] Jennie Wong,[1] Stuart J Warden,[2] Joanne L Kemp,[3] Paul Foster,[1] Kay M Crossley[1,4]

▶ Additional material is

ABSTRACT

In particular, exercise and manual therapies are fre-

Short term (<3 months) outcomes

Water exercise better than control at 3 months for pain & function

Land exercise better than control at 3 months for pain

Land exercise ?better than control at 3 months for function

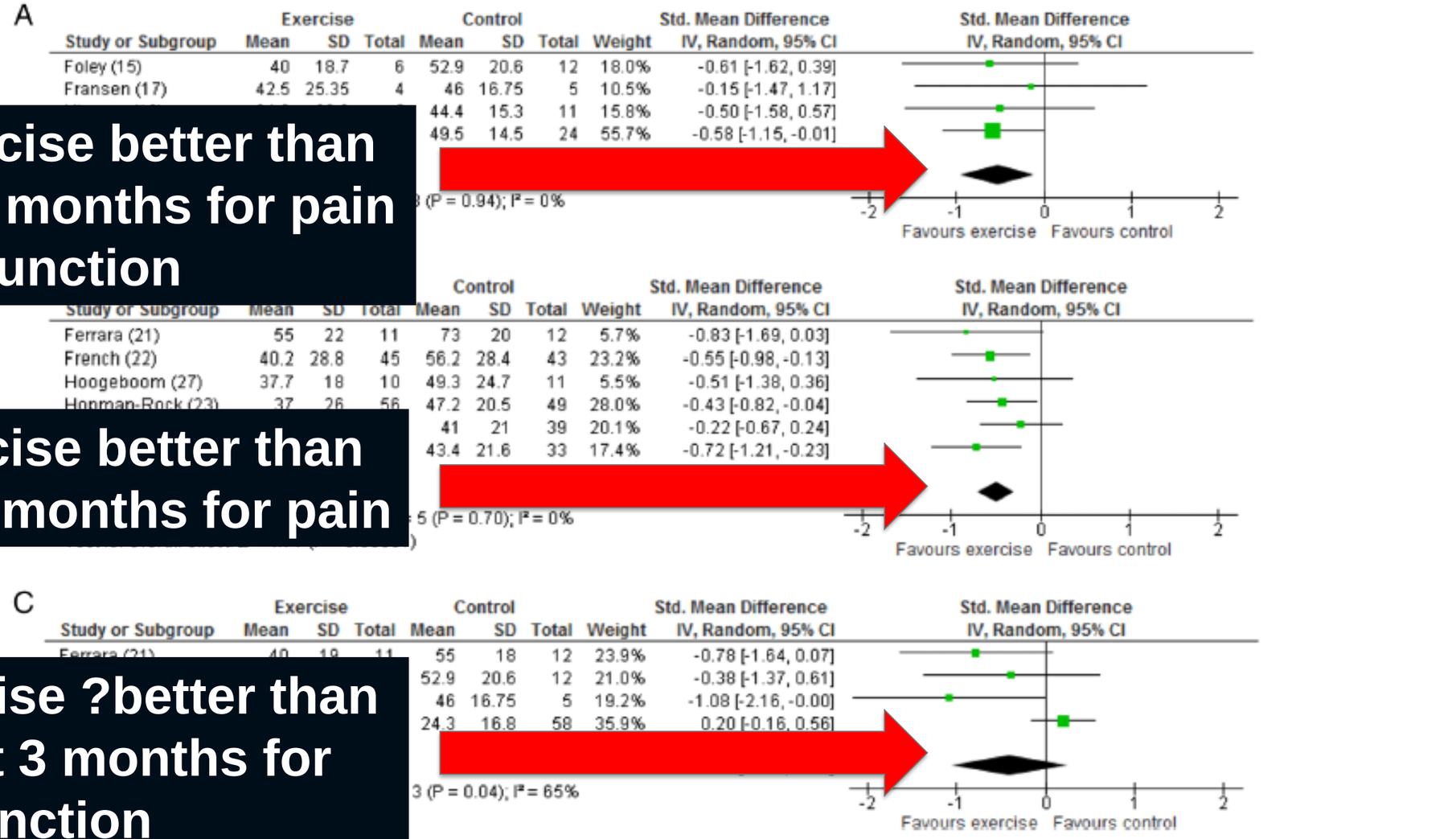


Figure 2 Forest plots of the short-term (<3 months or 13 weeks) effects of exercise therapy on pain associated with hip OA. (A) Effect of water-based exercise compared to minimal control when pain outcomes were assessed using the WOMAC pain subscale. (B) Effect of land-based exercise compared to minimal control when pain outcomes were assessed using the VAS. (C) Effect of land-based exercise compared to minimal control when pain outcomes were assessed using the WOMAC pain subscale. Data are presented as standardised mean difference, with differences

Medium (4-12 month) and longer term (>12 months) outcomes

Figure 3 Forest plots of the: (A) medium-term (4–12 months) and (B) long-term (>12 months) effects of land-based exercise therapy compared to minimal control on pain associated with hip OA when pain outcomes were assessed using the WOMAC pain subscale. Data are presented as standardised mean difference, with differences <0 favouring exercise therapy. OA, WOMAC, Western Ontario and McMaster Universities Arthritis Index.

ARD Online First, published on November 20, 2013 as 10.1136/annrheumdis-2013-203628

OPEN ACCESS

EXTENDED REPORT

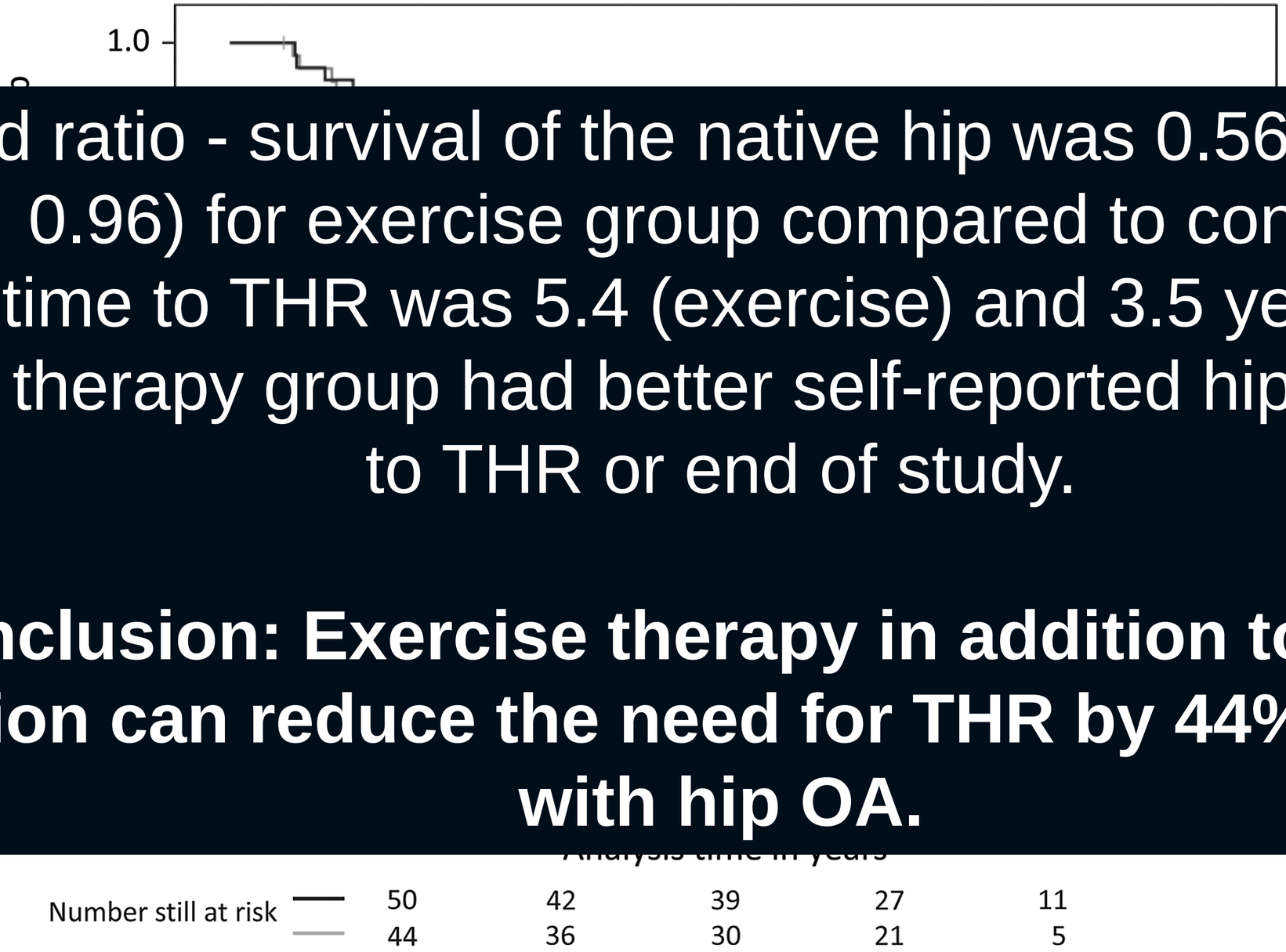
Exercise therapy may postpone total hip replacement surgery in patients with hip osteoarthritis: a long-term follow-up of a randomised trial

Ida Svege,[1] Lars Nordsletten,[2,3] Linda Fernandes,[1,4] May Arna Risberg[1]

Handling editor Tore K Kvien

ABSTRACT

to evaluate disease progression.[10–14] It is unknown



Hazard ratio - survival of the native hip was 0.56 (CI 0.32 to 0.96) for exercise group compared to control.
Median time to THR was 5.4 (exercise) and 3.5 years (control).
Exercise therapy group had better self-reported hip function prior to THR or end of study.

Conclusion: Exercise therapy in addition to patient education can reduce the need for THR by 44% in patients with hip OA.

Summary of evidence: Physiotherapy for hip OA

Water or land based exercise good

Exercise-based therapy can postpone THA for 6 years and reduce risk of THA by 44%

How can we deliver a physiotherapy program for hip OA?

Development of a Therapeutic Exercise Program for Patients With Osteoarthritis of the Hip

Linda Fernandes, Kjersti Storheim, Lars Nordsletten, May Arna Risberg

L. Fernandes, PT, MSc, is a PhD student, Norwegian Research Center for Active Rehabilitation

Background and Purpose. No detailed exercise programs specifically for

Fernandes et al Phys Ther 2010

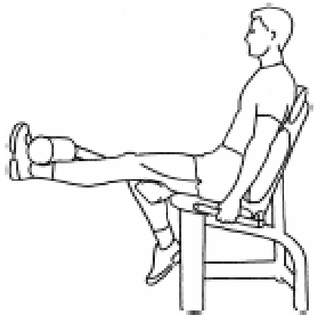
Exercise programs for hip OA

- 2-3x week supervised progressive program
- 12 week duration
- Targets include
    - Hip strength
    - Knee strength
    - Trunk strength
    - Functional strength and control
    - Flexibility
- Progressed when achieved with pain ≤3/10

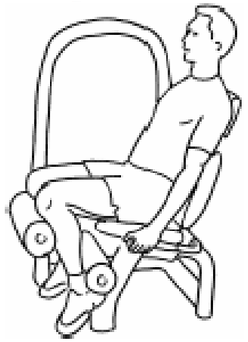
eAppendix.
Continued

2. Strength exercises (3 sets, 8 repetitions)

2 A) Leg extension

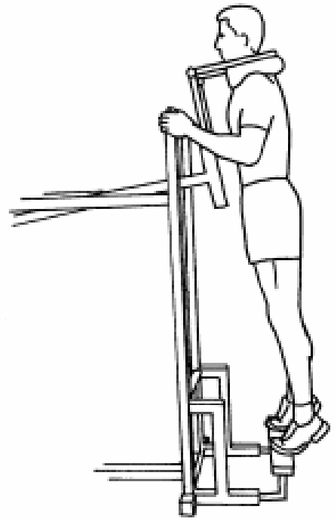


2 B) Leg curl



2 C) Hip extension

2 D) Heel-raise



2 E) Crunches

Therapeutic Exercise Program for Patients With Osteoarthritis of the Hip

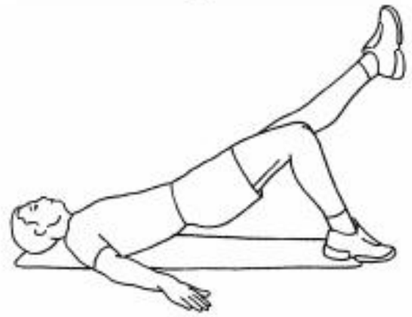
eAppendix.
Continued

2. Strength exercises (continued)

2 F) Bridging

a. Two-legged

b. One-legged



2 G) Hip abduction

a. Side-lying hip abduction

b. Side-lying plank exercise with knee support

c. Side-lying plank exercise with straight knees

Hip, knee and trunk strength

Fernandes et al 2010

eAppendix.
Continued

3. Functional exercises (3 sets, 10 repetitions)

3 A) Squats

a. Squat with feet on the floor using a 45-cm-high chair

b. Squat on balance pad

c. Squat with weights

3 B) Squat and single-leg stance

a. Single-leg stance on balance pad

b. Single-leg squat

3 C) Lunges

a. Lunge

eAppendix.
Continued

3. Functional exercises (continued)

3 D) Sideways lunge

3 E) Step-up/step-down

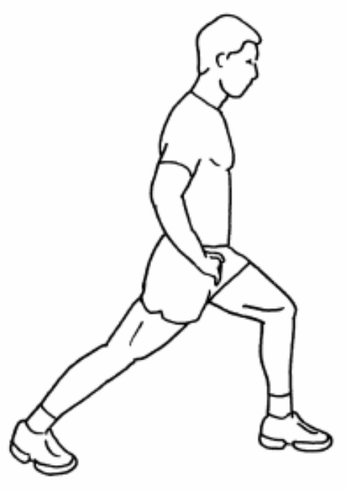
Functional strength & Neuromotor control

Fernandes et al 2010

eAppendix.
Continued

5. Stretching (hold for 30 s)

5 A) Extension



5 C) External rotation

5 B) Abduction

5 D) Internal rotation and flexion

Flexibility

Fernandes et al 2010

RESEARCH ARTICLE

Good Life with osteoArthritis in Denmark (GLA:D™): evidence-based education and supervised neuromuscular exercise delivered by certified physiotherapists nationwide

Søren T. Skou[1,2*] and Ewa M. Roos[1]

GLA:D™ AUSTRALIA

GLA:D = Good living with arthritis from Denmark

Real world evidence based treatment package for patients with hip and knee OA

Physiotherapist-led, supervised exercise and education program (minimum 2x week for 6 weeks)

Focused on

- Hip and knee strength
- Trunk strength
- Functional strength and neuromotor control
- Education – disease understanding and self management strategies

Excellent results in >30,000 patients

Final take home message

What are high-value treatments for hip pain and hip OA?

- Exercise-based interventions should always be first choice for these patient groups
- Exercise programs should have strength component, ideally>12 weeks duration

How do we implement these?

- FAI does not have full scale level 1 evidence yet to support effectiveness.
- Best practice physiotherapy treatment should target known impairments to optimise joint loads and improve outcomes
- RCT evidence supporting exercise for hip OA, can be implemented with programs like GLA:D Australia

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