bpacnz
PRIMARY CARE
UPDATE SERIES

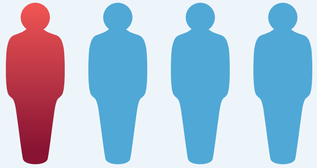
03

OSTEOARTHRITIS

EPISODE 1: DIAGNOSIS

FEBRUARY 2021
VER 1.1

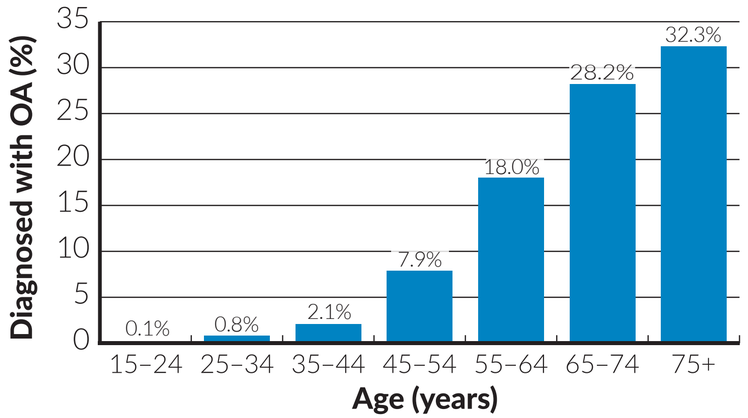
A closer look at osteoarthritis (OA)



Approximately **1 in 4 people aged over 55 years** in NZ report having been diagnosed with OA

This is likely to be an underestimate of true prevalence; many people are not diagnosed or are unsure of their "type" of arthritis when surveyed

Prevalence of OA in New Zealand (2019)



33% more women were diagnosed with OA than men

OA diagnosis by ethnicity:

	Raw prevalence:	Age-adjusted Prevalence ratio:*
European	12.2%	–
Māori	6.8%	1.07
Pacific	3.5%	0.71
Asian	2.9%	0.65

* Versus all other ethnic groups, e.g. Māori versus non-Māori.

Data for European group is not available. Source: NZ Health Survey (2018-19), Ministry of Health

OA nomenclature matters:

Traditionally OA has been labelled a degenerative "wear and tear" process

In reality…

Call it what it is: the pathogenesis of OA is much more complicated than just "wear and tear"

OA pathogenesis includes:

Biomechanical factors

Proteases (enzymes that breakdown proteins)

Pro-inflammatory mediators

Metabolic factors (see next slide)

1. New Zealand Health Survey – Annual Data Explorer. 2019. Ministry of Health. Available at: https://minhealthnz.shinyapps.io/nz-health-survey-2018-19-annual-data-explorer/ (Accessed Feb, 2021);
2. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 3. Sellam J, Berenbaum F. Joint Bone Spine. 2013;80:568–73; 4. Dickson BM, Roelofs AJ, et al. Arthritis Res Ther.. 2019;21:289

A closer look at osteoarthritis (OA)

Metabolic regulation of inflammation in Osteoarthritis

Over the past couple decades, a number of studies have demonstrated a clear association between metabolic factors, low grade systemic inflammation and the development of osteoarthritis; however, the precise mechanism and pathophysiology of this relationship requires more investigation (evidence currently relies primarily on *in vitro* analysis and animal studies).

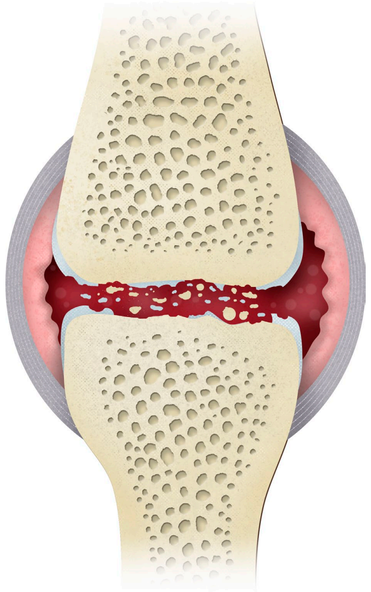
A proposed link between cardiometabolic factors,* their associated mediators, and OA pathophysiology:

Cardiometabolic factors

- Excess adipose tissue
- High blood triglycerides
- Low blood HDL cholesterol
- High fasting blood sugar
- High blood pressure

Dysregulates the activity of…

Key effector cells	Signalling factors
Adipocytes	Leptin, adiponectin, eNAMPT, IL-6, Resistin, free fatty acids
Adipose tissue macrophages	Cytokines: IL-1, IL-8, TNF
Hepatocytes	Glucose, HDL, LDL, triglycerides
β cells	Insulin
Endothelial cells	Selectins, PAI-1, VEGF



Articular joint tissues affected

- Synovium
- Intra-articular adipose tissue
- Meniscus, ligaments, tendons
- Articular cartilage
- Subchondral and periarticular bone

May directly impact the activity of cells involved in producing and maintaining…

* These factors are more common in obese patients, however, they are thought to trigger joint damage or disrupt bone and cartilage metabolism in the absence of obesity

IL, interleukin; eNAMPT, extracellular nicotinamide phosphoribosyltransferase; HDL, high-density lipoprotein; LDL, low-density lipoprotein; PAI-1, plasminogen activator inhibitor-1; TNF, tumour necrosis factor; VEGF, Vascular endothelial growth factor.

Adapted from: Berenbaum F, Griffin TM, *et al*. Arthritis Rheumatol. 2017;69:9–21.

2. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 3. Sellam J, Berenbaum F. Joint Bone Spine. 2013;80:568–73; 4. Dickson BM, Roelofs AJ, et al. Arthritis Res Ther.. 2019;21:289

Multiple pathways lead to OA

Biomechanical factors	Metabolic factors	Non-modifiable risk factors
• Physical activity • Muscle strength • Incorrect movements • Joint injury • Joint alignment • Body length bone inequity • Occupation	• Diet • Obesity • Metabolic factors, including dyslipidaemia, hypertension, hyperglycaemia, diabetes • Bone and cartilage metabolism (which itself may be affected by other metabolic disturbances)	• Age • Sex • Genetics • Ethnicity

Some risk factors we have control over; others we cannot modify before OA develops, e.g. genetics, damage to the joints as a result of injury

The **relative contribution** of individual **risk factors varies** between patients

If joint injury is the major contributing factor, then the time until symptom onset varies based on the nature of the event and patient specific factors, e.g. energy of impact, location of fracture, blood supply issues and excess weight post-event

1. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311.

Identifying and diagnosing OA

A diagnosis is usually made clinically in **people aged ≥45 years if they have activity-related joint pain with no other explanation**, e.g. recent trauma

- **Patients should have no morning stiffness**, or **morning stiffness that lasts for less than 30 min** (>30 min would be more likely to be indicative of RA)
- People with OA may also exhibit **a reduced range of motion, joint tenderness/swelling** and **bone deformations** (in the longer-term)
- Inflammatory features such as redness or acute swelling should prompt suspicion of alternative diagnoses, particularly inflammatory arthropathies

OA, osteoarthritis, RA, rheumatoid arthritis. 1. Osteoarthritis: care and management. National Institute of Care and Excellence (NICE). Available at: https://www.nice.org.uk/guidance/cg177 (Accessed Feb, 2021); 2. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 3. Abhishek A, Doherty M. Rheum Dis Clin N Am. 2013;39:45–66.

Identifying and diagnosing OA

The **most common anatomical locations** affected by OA (*in descending order*):

	Usual location and features	Usual pattern
Knee	• Patellofemoral joint and/or medial tibiofemoral joint most often affected • Isolated lateral tibiofemoral joint OA is relatively rare • Pain location is usually indicative of the affected knee compartment	Unilateral; sometimes presents bilaterally but pain may be more severe on one side
Hip	• Deep pain in the groin, aching, stiffness, restricted movement • Pain may spread to anteromedial/upper lateral thigh; more distal radiation may occur • Pain is often exacerbated when rising from seated position • Limited internal rotation of the affected hip is often present	Unilateral
Hand	• Distal interphalangeal (DIP) joints most common (~50%), followed by carpometacarpal (CMC), proximal interphalangeal (PIP) joints, and second and third metacarpophalangeal (MCP) joints	Bilateral and symmetric; often only one or a few joints are affected
Spine (facet joints)	• The hallmark is lumbar pain; however, spinal OA often coexists with intervertebral disc degeneration which causes additional patterns of pain/symptoms, making a diagnosis difficult • Lumbar facet OA: symptoms may get worse with stress, exercise, rotary motions, lumbar spine extension, and standing or sitting; lying flat/flexion of lumbar spine provides relief • Cervical facet OA: pain is worsened by neck rotation/extension	• Isolated lumbar OA may cause pain that radiates unilaterally/bilaterally to the knee • Cervical spine OA pain generally does not radiate past the shoulder unless associated with other degenerative changes causing nerve compression, e.g. cervical radiculopathy
Toe (first metatarsophalangeal joints most common; ankle/other foot joints can be affected too)	• Causes localised pain mainly on standing or when walking • Bony enlargement/deformation may be present	Bilateral
Shoulder (glenohumeral joint)	• More common in people aged >70 years and women • Often associated with history of rotator cuff tear or other trauma	Unilateral; usually a gradual onset of symptoms over months or years

OA, osteoarthritis, RA, rheumatoid arthritis. 1. Osteoarthritis: care and management. National Institute of Care and Excellence (NICE). Available at: https://www.nice.org.uk/guidance/cg177 (Accessed Feb, 2021); 2. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 3. Abhishek A, Doherty M. Rheum Dis Clin N Am. 2013;39:45–66.

Identifying and diagnosing OA

Initially assess patients using the four P's:

- **Pain:** ask open-ended questions about the nature and occurrence of pain
- **Performance/function:** how does the pain affect daily living, sleep, activities, mobility and self-care
- **Psychological:** ask about the emotional impact of any pain and the support they have in place
- **Past medical history:** consider co-morbidities; *are they affecting functional capacity/treatment choices?*

Clinical assessment

The "Victorian Model of Care" recommends the 30-second chair test as the primary assessment for assessing the impact that hip or knee OA has on physical performance (in addition to patient reported outcomes). For more information, see: **https://oarsi.org/research/physical-performance-measures**

Other clinical assessments to consider	
Knee	Gait assessment, balance and range of motion testing
Hip	Gait assessment, balance and range of motion testing (particularly internal/external rotation), Stinchfield test (patient lies in a supine position with the knee extended and is asked to elevate the leg while gentle manual resistance is added by the examiner)

OA, osteoarthritis.

1. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 2. Abhishek A, Doherty M. Rheum Dis Clin N Am. 2013;39:45–66; 3. Imaging for osteoarthritis: an overview. Hospital for Special Surgery (HSS). Available at: https://www.hss.edu/conditions_osteoarthritis-imaging-overview.asp (Accessed Dec, 2020); 4 Victorian Model of Care for Osteoarthritis of the Hip and Knee. Victorian musculoskeletal clinical leadership group. 2018. Available at: http://www.acsep.org.au/content/Document/MOVE_MoC_WebVersion_WithHyperlinks.pdf (Accessed Feb, 2021).

Identifying and diagnosing OA

Radiographic (x-ray) imaging is not required to confirm a diagnosis but can be helpful

Request x-rays:

- If orthopaedic referral is likely (e.g. they have significant functional impairment, joint changes, severe pain)
- To rule out differential diagnoses

An x-ray within the last six months is generally required as part of the referral for orthopaedic assessment

	Key x-rays (to request from primary care)	Additional x-rays (may be requested by an orthopaedic surgeon)
Knee	✔ Weight bearing anteroposterior (AP) ✔ Lateral of affected knee	❶ Posteroanterior (PA) flexion view looking down the joint line, ❷ skyline view looking at the patellofemoral articulation
Hip	✔ AP of pelvis showing both hips ✔ Lateral of affected hip	❶ Lowenstein lateral, ❷ cross-table lateral, ❸ false-profile view, ❹ elongated femoral neck view (also known as “Dunn view”; similar to frog leg lateral view but better visualises the anterior femoral head-neck junction)
Hands	Depends on joints affected, e.g. PA, oblique, lateral	

OA, osteoarthritis.

1. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 2. Abhishek A, Doherty M. Rheum Dis Clin N Am. 2013;39:45–66; 3. Imaging for osteoarthritis: an overview. Hospital for Special Surgery (HSS). Available at: https://www.hss.edu/conditions_osteoarthritis-imaging-overview.asp (Accessed Dec, 2020); 4 Victorian Model of Care for Osteoarthritis of the Hip and Knee. Victorian musculoskeletal clinical leadership group. 2018. Available at: http://www.acsep.org.au/content/Document/MOVE_MoC_WebVersion_WithHyperlinks.pdf (Accessed Feb, 2021).

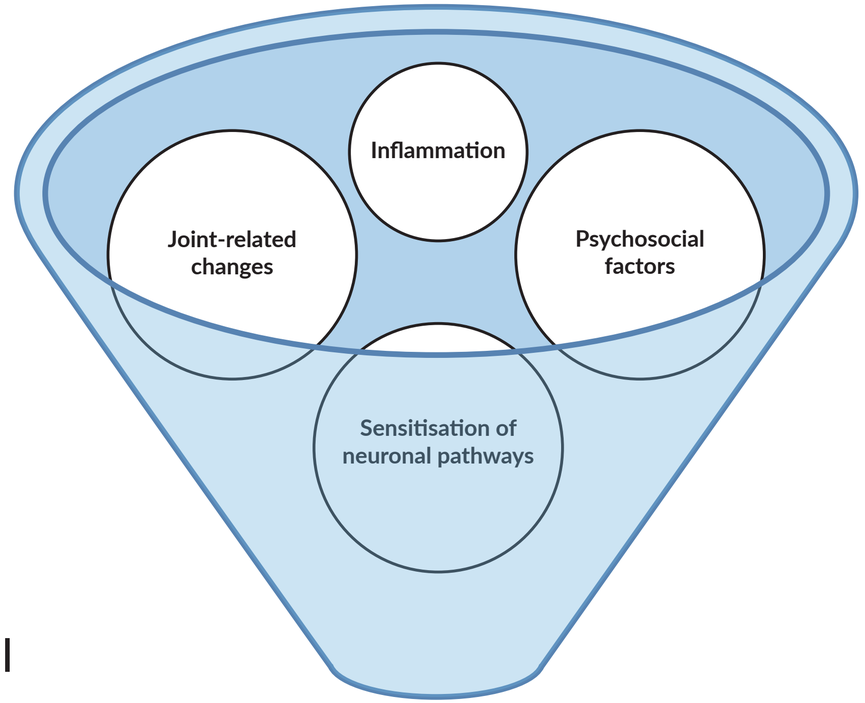
Identifying and diagnosing OA

Remember: pain is a subjective experience

- Clinical features may not always “match” with reported pain
- Much like the pathogenesis of OA, there are multiple pathways associated with pain and its persistence

Digging deeper

- An x-ray may ultimately be required to further evaluate patients with substantial chronic pain that doesn’t match their clinical presentation or history
- If there is still disconnect, a repeat x-ray 3–6 months later may be required, or a bone scan or MRI can be performed



Pain

Negative impact on:

- Functional capacity (occupational/ recreational)
- Mood
- Anxiety/depression
- Sleep

MRI, magnetic resonance imaging; OA, osteoarthritis.

1. Majeed MH, Sherazi SAA, *et al*. Curr Rheumatol Rep. 2018;20:88.

OA, osteoarthritis.

1. Abramoff B, Caldera FE. Med Clin N Am. 2020;104:293–311; 2. Abhishek A, Doherty M. Rheum Dis Clin N Am. 2013;39:45–66; 3. Imaging for osteoarthritis: an overview. Hospital for Special Surgery (HSS). Available at: https://www.hss.edu/conditions_osteoarthritis-imaging-overview.asp (Accessed Dec, 2020); 4 Victorian Model of Care for Osteoarthritis of the Hip and Knee. Victorian musculoskeletal clinical leadership group. 2018. Available at: http://www.acsep.org.au/content/Document/MOVE_MoC_WebVersion_WithHyperlinks.pdf (Accessed Feb, 2021).