Pain in Rheumatology

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Learning Objectives

At the end of this session, participants will be able to:

- Understand the application of the biopsychosocial model as it relates to pain assessment and management
- Explain a pain assessment integrating the relevant components from the history, physical exam and measures/scales
- Recall the different types of pain mechanisms involved with arthritis
- Identify the pharmacological and non pharmacological management strategies
- Understand the evidence for the effectiveness of these pain management strategies
- Recall the particular barriers and challenges in engaging in exercise for individuals with chronic pain
- Identify strategies to overcome barriers and promote engagement in therapeutic exercise and activities

Pain in Rheumatology

Recommendation

EULAR recommendations for the health professional's approach to pain management in inflammatory arthritis and osteoarthritis

Rinie Geenen,[1] Cécile L Overman,[1] Robin Christensen,[2,3] Pernilla Åsenlöf,[4] Susana Capela,[5,6] Karen L Huisinga,[7] Mai Elin P Husebø,[8] Albère J A Köke,[9] Zoe Paskins,[10,11] Irene A Pitsillidou,[12] Carine Savel,[13] Judith Austin,[1] Afton L Hassett,[14] Guy Severijns,[15] Michaela Stoffer-Marx,[16,17] Johan W S Vlaeyen,[18,19] César Fernández-de-las-Peñas,[20] Sarah J Ryan,[11] Stefan Bergman[21]

ABSTRACT

Pain is the predominant symptom for people with inflammatory arthritis (IA) and osteoarthritis (OA) mandating the development of evidence-based

Therefore, practitio
should have the kn
help people with IA
pain. Rheumatology

Arthritis Care & Research
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SPECIAL ARTICLE

Report of the American College of Rheumatology Pain Management Task Force

AMERICAN COLLEGE OF RHEUMATOLOGY PAIN MANAGEMENT TASK FORCE

INTRODUCTION

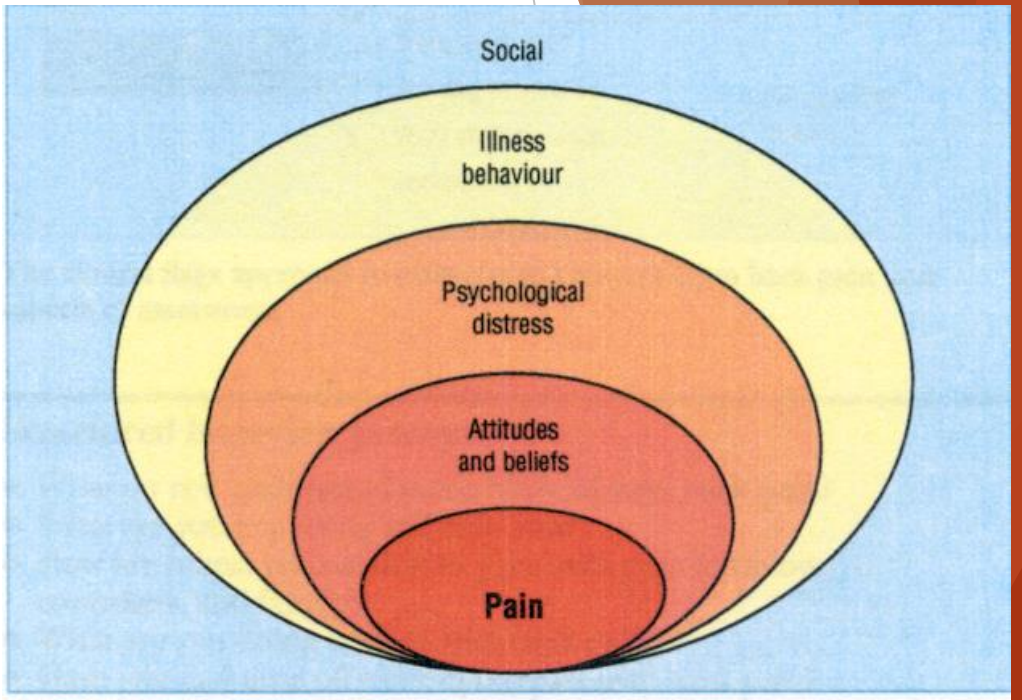
Pain is the most common symptom of patients with rheumatic disorders and can occur in both inflammatory and noninflammatory conditions. As a complex phenomenon

predisposition (biologic and psychological), as well as environmental and psychosocial factors that impact the pain experience. In the management of patients with musculoskeletal disease, therefore, the characterization of pain

Biopsychosocial Model

Biopsychosocial Model:

- Biopsychosocial approach is widely accepted as the most heuristic perspective to understanding and treating chronic pain disorders
- Focusses on both disease & illness
- Illnesses such as pain is viewed as the complex interaction between the:
  - Biological
  - Psychological (involves emotion and cognition)
  - Social factors



Biopsychosocial model of the clinical presentation and assessment of low back pain and disability at a point in time

(Main & Williams 2002; Gatchel et al 2007)

Assessment

Pain Assessment: History

General History:

- Demographics, comorbidities, previous medical history, medications, family history, social history, function, risk history

Pain history

- **Location:** neck, thoracic, lumbar, whole body, joint vs soft tissue
- **Intensity:** use scale, pain right now, worst in 24hs.
- **Quality:** aching, dull, burning, tingling, electrical shocks
- **Onset:** Acute/Subacute/Chronic, accident, fall, fracture
- **Radiation:** does the pain travel?
- **Timing/Frequency:** when did it start, how long does it last, constant vs intermittent
- **Alleviating factors:** sitting, lying down, heat/cold, exercise
- **Aggravating factors:** bad posture, walking, going up stairs, cold, psychological stress
- **Associated symptoms:** fever, chills, joint pain, numbness, motor weakness, bowel and bladder incontinence

Psychosocial risk factors

- Exploring the patients cognitions, perceptions, beliefs and experiences regarding their pain

Identifying the Psychosocial Risk Factors

Table 1. Potential questions for psychosocial risk factors in a patient utilizing the ABCDEFW criteria.

Topic area	Question	Information gained
Attitudes and Beliefs	What do you think is the cause of your pain?	• Fear/avoidance • Catastrophization • Maladaptive beliefs • Passive attitude toward rehabilitation • Expectations of effect of activity or work on pain
Behaviors	What are you doing to relieve your pain?	• Use of extended rest • Reduced activity levels • Withdrawal from ADLs and social activities • Poor sleep • Boom–bust behavior • Self-medication – alcohol or other substances
Compensation Issues	Is your pain placing you in financial difficulties?	• Lack of incentive to return to work • Disputes over eligibility for benefits, delay in income assistance • History of previous claims • History of previous pain and time off work
Diagnosis and Treatment	You have been seen and examined for your pain? Are you worried that anything may have been missed?	• Health professional sanctioning disability • Conflicting diagnoses • Diagnostic language leading to catastrophizing and fear • Expectation of "fix" • Advice to withdrawal from activity and/or job • Dramatization of back pain by health professional producing dependency on passive treatments
Emotions	Is there anything that is upsetting or worrying you about the pain at this moment?	• Fear • Depression • Irritability • Anxiety • Stress • Social anxiety • Feeling useless or not needed
Family	How does your family react to your pain?	• Over-protective partner/spouse • Solicitous behavior from spouse • Socially punitive responses from spouse • Support from family for return to work • Lack of support person to talk to
Work	How is your ability to work affected by your pain?	• History of manual work • Job dissatisfaction • Belief work is harmful • Unsupportive or unhappy current work environment • Low educational background • Low socio-economic status • Heavy physical demands of work • Poor workplace management of pain issues • Lack of interest from employer

PHYSIOTHERAPY THEORY AND PRACTICE
http://dx.doi.org/10.1080/09593985.2016.1194648
Taylor & Francis
Taylor & Francis Group

PERSPECTIVE

Listening is therapy: Patient interviewing from a pain science perspective

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Diagnostic Evaluation- Red Flags

Rule out red flag conditions

Symptoms:

N
- ❒ Neurological: major motor weakness, disturbance of bowel or bladder control, saddle numbness

I
- ❒ Infection: fever, risk of UTI, IV drug use, immune suppressed

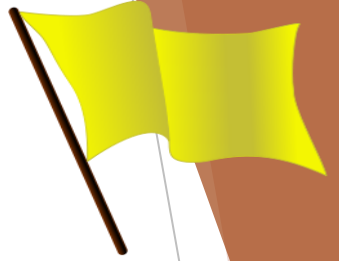
F
- ❒ Fracture: trauma, osteoporosis risk

T
- ❒ Tumor: history of cancer, weight loss, fever, pain worse supine or at night

I
- ❒ Inflammation: morning stiffness > 1 hour, Age: < 20 years or > 50 years

Adapted from: The Peterborough Back Rules chart template. G. Powell and The Peterborough Back Rules Working Group. September, 1997.

Yellow Flags



- The following factors are important and consistently predict poor outcomes:

1. Presence of a belief that back pain is **Harmful** or potentially severely disabling
2. Fear-**Avoidance** behaviour and reduced activity levels
3. Tendency to low **Mood** and withdrawal from social interaction
4. An expectation that **Passive** treatments rather than active participation will help.

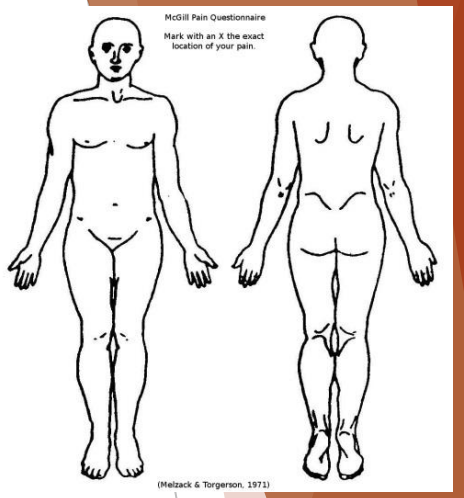
Mnemonic: HAMPered

Pain Assessment: Physical exam

- **Observation:**
  - Posture, gait, joint alignment/deformities, muscle asymmetry, edema, scars etc
- **Palpation:**
  - Tenderness-bone/joint, ligaments, myofascial trigger points
  - Warmth/temperature
  - Edema
- **Range of motion**
- **Neurological:**
  - Motor and Sensory (segmental vs peripheral nerves):
    - Myotome testing
    - Dermatomes
    - Quantitative sensory exam (assessing sensory and pain perception)
      - Light touch, pin prick, temperature, vibration
      - Noting for signs of hyper/hypoalgesia or allodynia
  - Reflexes
  - Upper motor neuron (e.g. Babinski, Hoffmans)
- **Special tests**

Tools to support pain assessment & management

- Pain diagrams
- SMART functional goal setting & motivational interviewing
- Outcome measures (BRIEF Pain Inventory)
- Scales: (Tampa Scale for Kinesiophobia, Pain catastophizing scale, scales for depression etc)



Tampa Scale for Kinesiophobia - 11

(Goubert et al., 2004; Woby, Roach, Urmston, & Watson, 2005)

1 = strongly disagree
2 = disagree
3 = agree
4 = strongly agree

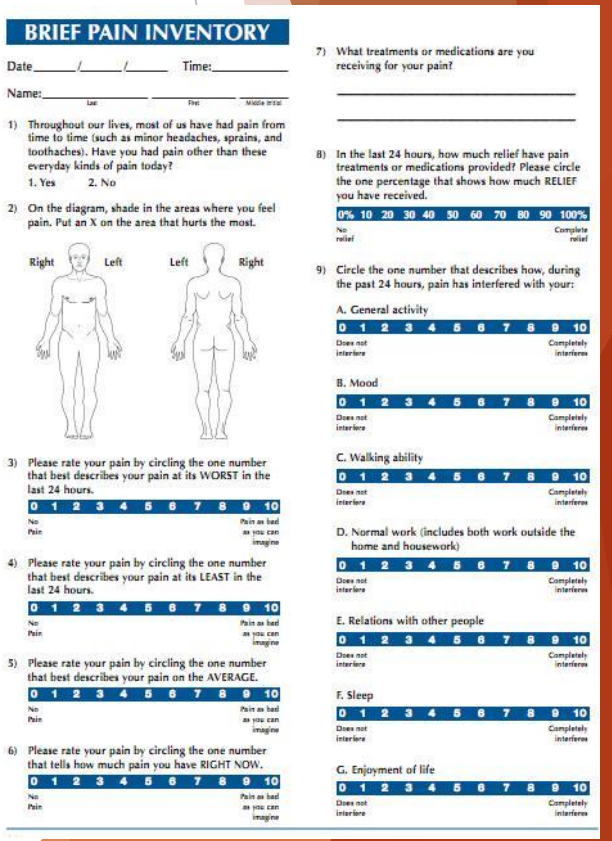
A	1. I'm afraid that I might injure myself if I exercise	1	2	3	4
A	2. If I were to try to overcome it, my pain would increase	1	2	3	4
H	3. My body is telling me I have something dangerously wrong	1	2	3	4
H	4. People aren't taking my medical condition seriously enough	1	2	3	4
H	5. My accident has put my body at risk for the rest of my life	1	2	3	4

Pain Catastrophizing Scale

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feeling that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time
I worry all the time about whether the pain will end	0	1	2	3	4
I feel I can't go on	0	1	2	3	4
It's terrible and I think it's never going to get any better	0	1	2	3	4
It's awful and I feel that it overwhelms me	0	1	2	3	4
I feel I can't stand it anymore	0	1	2	3	4
I become afraid that the pain will get worse	0	1	2	3	4
I keep thinking of other painful events	0	1	2	3	4
I anxiously want the pain to go away	0	1	2	3	4
I can't seem to keep it out of my mind	0	1	2	3	4
I keep thinking about how much it hurts	0	1	2	3	4
I keep thinking about how badly I want the pain to stop	0	1	2	3	4
There's nothing I can do to reduce the intensity of the pain	0	1	2	3	4
I wonder whether something serious may happen	0	1	2	3	4



Diagnosing the type of Pain

- Acute vs. Subacute vs. Acute on Chronic vs. Chronic
- Cancer vs. Non-Cancer
- Mild, Moderate and Severe
- Nociceptive vs. Neuropathic vs. Nociplastic vs. mixed

Types of pain

	Nociceptive	Neuropathic	Nociplastic
IASP Definition	"Pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors."	"Pain caused by a lesion or disease of the somatosensory nervous system."	"Arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain." (IASP, 2017)
Pain location and intensity	Pain localized at site of injury/disease Pain intensity is proportionate to the nature and extent of the injury or pathology	Pain and sensory dysfunctions are neuroanatomically logical (e.g. dermatomal or cutaneous distribution) Pain intensity can be proportionate or disproportionate	Pain is neuroanatomically illogical Pain intensity is disproportionate (diffuse pain distribution)

Types of pain

	Nociceptive	Neuropathic	Nociplastic
Pain descriptors	Sharp, dull, aching, stabbing or throbbing	Burning, shooting, electric, tingling, numbness	Pain most frequently described as vague and dull
Physical exam findings	Varies depending on injury/disease (edema, hematoma, skin colorations, weakness etc)	Sensory and/or motor abnormalities	Sensory abnormalities (allodynia, hyperalgesia)
Pharmacological options	Traditional analgesics, opioids, muscle relaxants, anti-inflammatories	Anticonvulsants, antidepressants, opioids, cannabinoids	Anticonvulsants, antidepressants, cannabinoids
Examples	Sprains, strains, fractures	Carpal tunnel, diabetic neuropathy	Fibromyalgia, central sensitization with OA/RA

Patients with arthritis can have any one (or all) of these types of pain

Pain and Arthritis

- Nociceptive input from pain sensitive structures in the joint and soft tissues:
  - Subchondral bone-remodeling and sclerosis
  - Joint capsule
  - Synovium-synovial hypertrophy, synovitis
  - Outer third of the meniscus-meniscal damage
  - Periosteal ligaments and muscle-ligament laxity, muscle weakness, tendinitis, enthesitis
  - Bursae-bursitis
- Neuropathic pain- complications of arthritis impacting on the nerves (e.g. wrist swelling-carpal tunnel)
- Nociplastic pain-there is evidence for hypersensitivity of the CNS (central sensitization) in rheumatic diseases (Amarins et al 2016; Lluch et al, 2014)
- Comorbid chronic pain conditions (e.g. diabetic neuropathy, LBP)





Pharmacological

Choosing an Analgesic

Type of pain

- Acute vs Chronic; acute on chronic
- Nociceptive vs Neuropathic vs Nociplastic
- Baseline vs breakthrough

Severity and pattern of pain

- Mild/Moderate/Severe
- Constant vs Intermittent
- Localized vs radiating vs widespread

Patient characteristics

- Co-morbidities (e.g. Liver/Kidney function)
- Allergies
- Previous experience (medications that have worked in the past)
- Sleep abnormality
- Mood disorder(s)
- Risk of opioid overdose or addiction

Pharmacological Options for Chronic Pain

- Non-acidic antipyretic analgesics (e.g. acetaminophen)
- Acidic antipyretic anti-inflammatory analgesics, or non-steroidal anti-inflammatory drugs (NSAIDs) (Selective Cox-2 inhibitor anti-inflammatory)
- Muscle relaxants
- Antidepressant analgesics
- Anticonvulsant medications
- Opioids
- Cannabinoids (e.g. nabilone, medical marijuana)
- Topical analgesics (e.g. capsaicin cream or lidocaine patch)
- Steroids (systemic or local)
- Injections (steroid, HA, PRP, Nerve blocks)

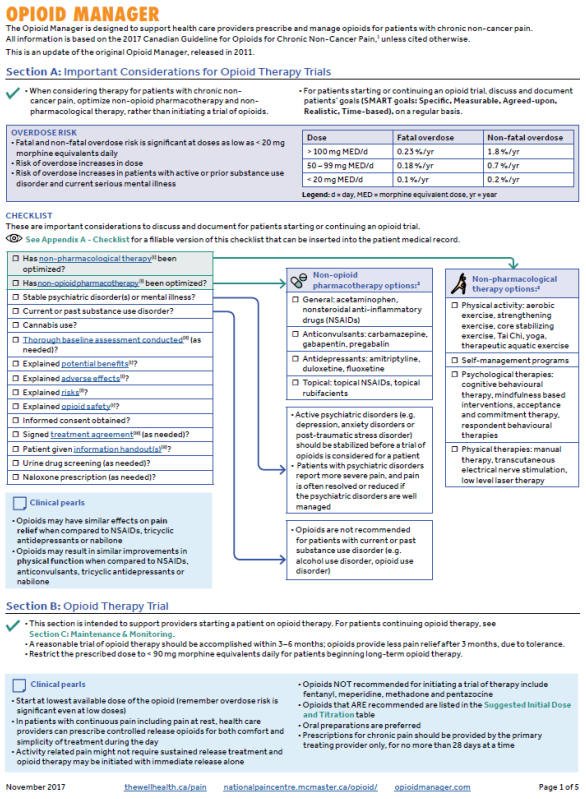
WHO Analgesic Ladder

Non-opioid analgesics: aspirin and acetaminophen
Adjuvants NSAIDs, antidepressants or anticonvulsants

WHO pain ladder (http://www.who.int/cancer/palliative/painladder/en/)

Considering Opioids?

- For opioid titration/tapering guidelines refer to Opioid Manager
- My opioid Manager is to educate your patients



OPIOID MANAGER

The Opioid Manager is designed to support health care providers prescribe and manage opioids for patients with chronic non-cancer pain.
All information is based on the 2017 Canadian Guideline for Opioids for Chronic Non-Cancer Pain,[1] unless cited otherwise.
This is an update of the original Opioid Manager, released in 2011.

Section A: Important Considerations for Opioid Therapy Trials

- When considering therapy for patients with chronic non-cancer pain, optimize non-opioid pharmacotherapy and non-pharmacological therapy, rather than initiating a trial of opioids.
- For patients starting or continuing an opioid trial, discuss and document patients' goals (**SMART goals: Specific, Measurable, Agreed-upon, Realistic, Time-based**), on a regular basis.

OVERDOSE RISK

- Fatal and non-fatal overdose risk is significant at doses as low as < 20 mg morphine equivalents daily
- Risk of overdose increases in dose
- Risk of overdose increases in patients with active or prior substance use disorder and current serious mental illness

Dose	Fatal overdose	Non-fatal overdose
> 100 mg MED/d	0.23 %/yr	1.8 %/yr
50 – 99 mg MED/d	0.18 %/yr	0.7 %/yr
< 20 mg MED/d	0.1 %/yr	0.2 %/yr

Legend: d = day, MED = morphine equivalent dose, yr = year

CHECKLIST

These are important considerations to discuss and document for patients starting or continuing an opioid trial.
See Appendix A - Checklist for a fillable version of this checklist that can be inserted into the patient medical record.

- ☐ Has non-pharmacological therapy[B] been optimized?
- ☐ Has non-opioid pharmacotherapy[B] been optimized?
- ☐ Stable psychiatric disorder(s) or mental illness?
- ☐ Current or past substance use disorder?
- ☐ Cannabis use?
- ☐ Thorough baseline assessment conducted[B] (as needed)?
- ☐ Explained potential benefits[B]?
- ☐ Explained adverse effects[B]?
- ☐ Explained risks[B]?
- ☐ Explained opioid safety[B]?
- ☐ Informed consent obtained?
- ☐ Signed treatment agreement[BB] (as needed)?
- ☐ Patient given information handout(s)[BB]?
- ☐ Urine drug screening (as needed)?
- ☐ Naloxone prescription (as needed)?

Non-opioid pharmacotherapy options:[2]

- ☐ General: acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs)
- ☐ Anticonvulsants: carbamazepine, gabapentin, pregabalin
- ☐ Antidepressants: amitriptyline, duloxetine, fluoxetine
- ☐ Topical: topical NSAIDs, topical rubifacients

- Active psychiatric disorders (e.g. depression, anxiety disorders or post-traumatic stress disorder) should be stabilized before a trial of opioids is considered for a patient
- Patients with psychiatric disorders report more severe pain, and pain is often resolved or reduced if the psychiatric disorders are well managed

- Opioids are not recommended for patients with current or past substance use disorder (e.g. alcohol use disorder, opioid use disorder)

Non-pharmacological therapy options:[2]

- ☐ Physical activity: aerobic exercise, strengthening exercise, core stabilizing exercise, Tai Chi, yoga, therapeutic aquatic exercise
- ☐ Self-management programs
- ☐ Psychological therapies: cognitive behavioural therapy, mindfulness based interventions, acceptance and commitment therapy, respondent behavioural therapies
- ☐ Physical therapies: manual therapy, transcutaneous electrical nerve stimulation, low level laser therapy

Clinical pearls

- Opioids may have similar effects on pain relief when compared to NSAIDs, tricyclic antidepressants or nabilone
- Opioids may result in similar improvements in physical function when compared to NSAIDs, anticonvulsants, tricyclic antidepressants or nabilone

Section B: Opioid Therapy Trial

- This section is intended to support providers starting a patient on opioid therapy. For patients continuing opioid therapy, see Section C: Maintenance & Monitoring.
- A reasonable trial of opioid therapy should be accomplished within 3–6 months; opioids provide less pain relief after 3 months, due to tolerance.
- Restrict the prescribed dose to < 90 mg morphine equivalents daily for patients beginning long-term opioid therapy.

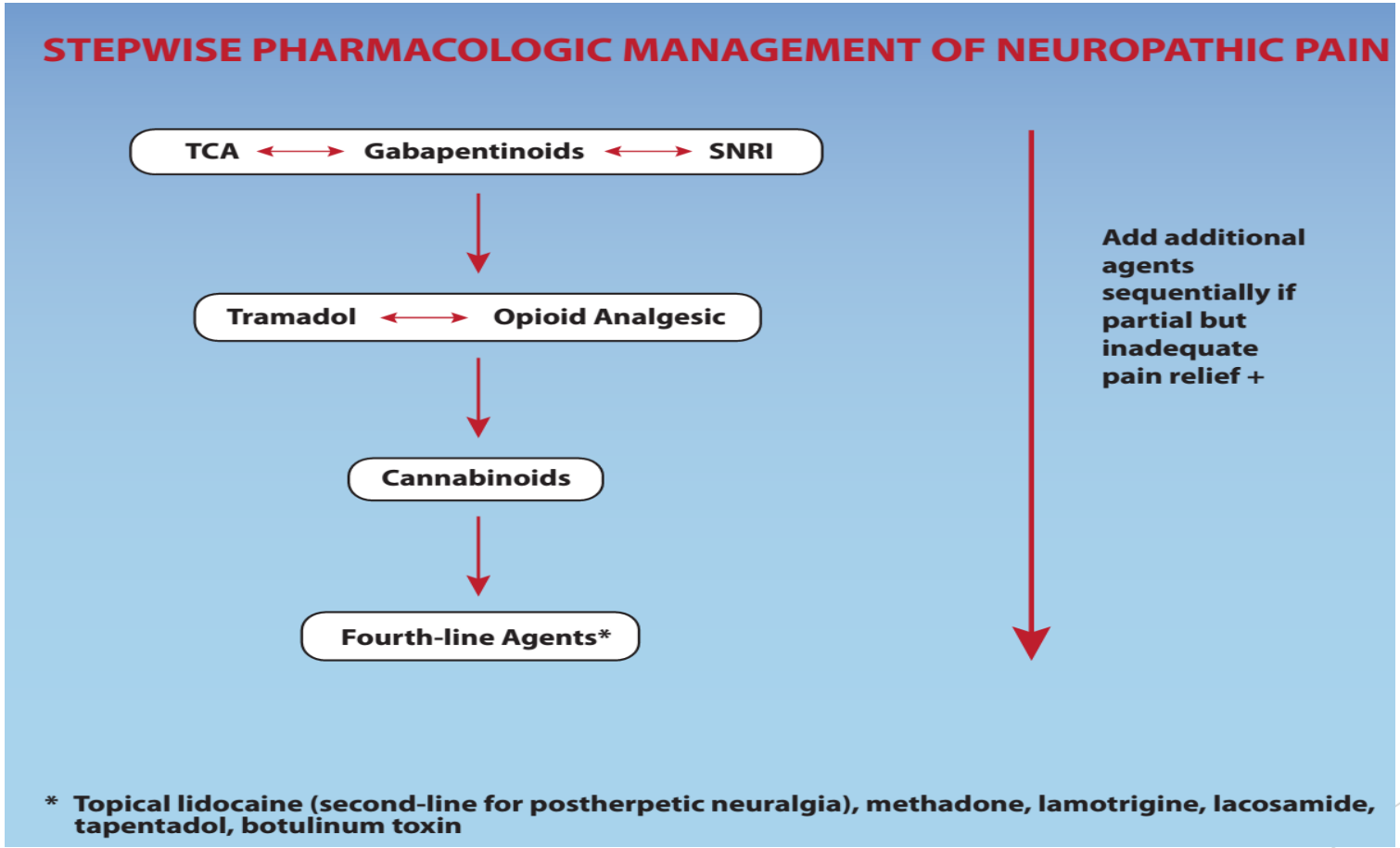
Clinical pearls

- Start at lowest available dose of the opioid (remember overdose risk is significant even at low doses)
- In patients with continuous pain including pain at rest, health care providers can prescribe controlled release opioids for both comfort and simplicity of treatment during the day
- Activity related pain might not require sustained release treatment and opioid therapy may be initiated with immediate release alone
- Opioids NOT recommended for initiating a trial of therapy include fentanyl, meperidine, methadone and pentazocine
- Opioids that ARE recommended are listed in the Suggested Initial Dose and Titration table
- Oral preparations are preferred
- Prescriptions for chronic pain should be provided by the primary treating provider only, for no more than 28 days at a time

November 2017 thewellhealth.ca/pain nationalpaincentre.mcmaster.ca/opioid/ opioidmanager.com Page 1 of 5

https://www.opioidmanager.com/

Pharmacological Management of Neuropathic Pain from the Canadian Pain Society



Moulin et al 2014

Cannabinoids

Position Statement: A Pragmatic Approach for Medical Cannabis and Patients with Rheumatic Diseases

Mary-Ann Fitzcharles, Omid Zahedi Niaki, Winfried Hauser, and Glen Hazlewood, and the Canadian Rheumatology Association

ABSTRACT. ***Objective.*** Pain is one reason some rheumatology patients may consider use of medical cannabis, a product increasingly perceived as a safe and neglected natural treatment option for many conditions. Legalization of recreational cannabis in Canada will promote access to cannabis. Physicians must therefore provide patients with the best evidence-based information regarding the medicinal effects and harm of cannabis.

Methods. The Canadian Rheumatology Association (CRA) mandated the development of a position statement for medical cannabis and the rheumatology patient. The current literature regarding the effects of medical cannabis for rheumatology patients was assessed, and a pragmatic position

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ORIGINAL ARTICLE

Efficacy, Tolerability, and Safety of Cannabinoid Treatments in the Rheumatic Diseases: A Systematic Review of Randomized Controlled Trials

MARY-ANN FITZCHARLES,[1] PETER A. STE-MARIE,[1] WINFRIED HÄUSER,[2] DANIEL J. CLAUW,[3] SHAHIN JAMAL,[4] JACOB KARSH,[5] TARA LANDRY,[6] SHARON LECLERCQ,[7] JASON J. MCDOUGALL,[8] YORAM SHIR,[1] KAM SHOJANIA,[9] AND ZACH WALSH[4]

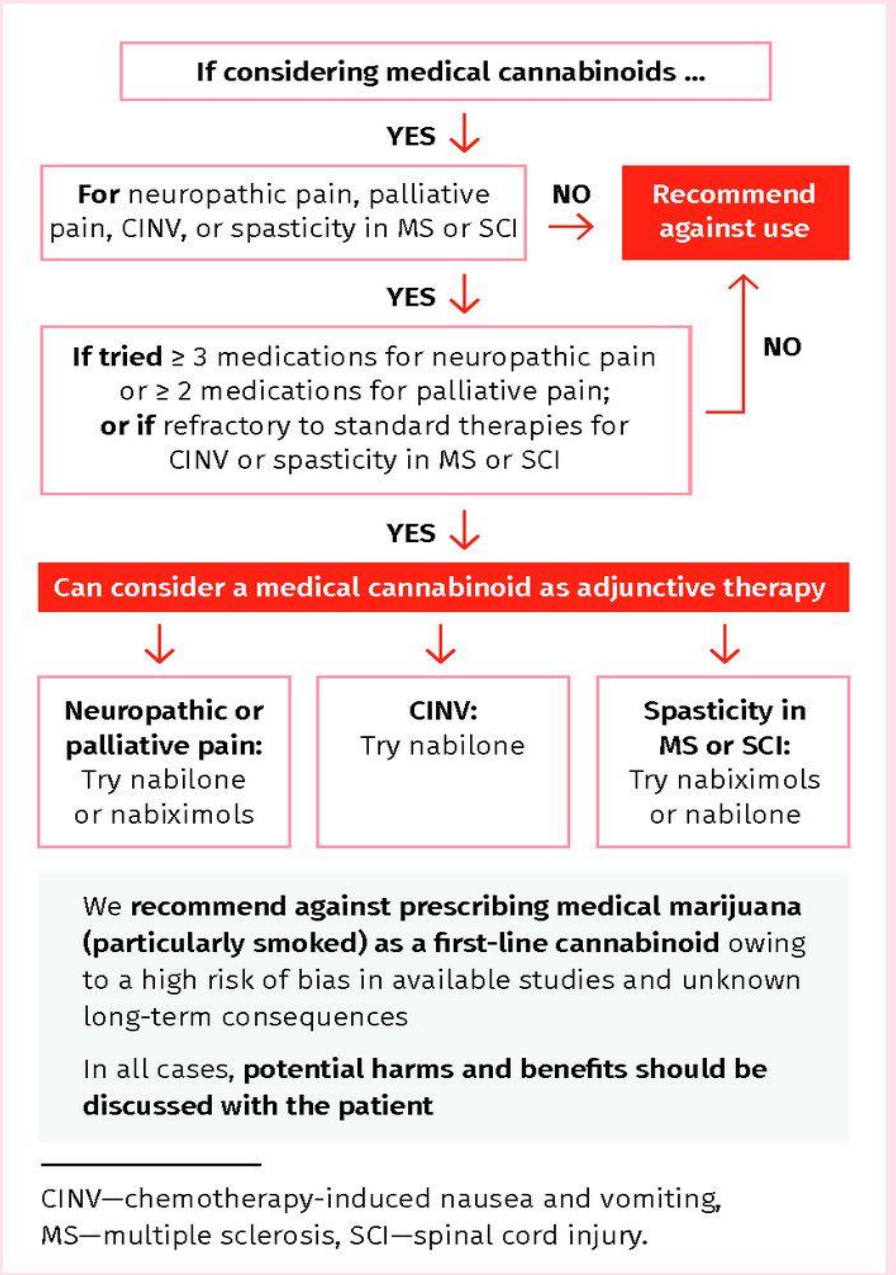
Objective. To assess the efficacy, tolerability, and safety of cannabinoids (phyto- and syntheto-) in the management of rheumatic diseases.

Methods. Multiple databases, including Medline, Embase, and CENTRAL, were searched. Randomized controlled trials with outcomes of pain, sleep, quality of life, tolerability (dropouts due to adverse events), and safety (serious adverse events), with comparison of cannabinoids with any type of control, were included. Study methodology quality was evaluated with the Cochrane risk of bias tool.

Results. In 4 short-term studies comprising 203 patients (58 with rheumatoid arthritis, 71 with fibromyalgia, and 74 with osteoarthritis [OA]), cannabinoids had a statistically significant effect on pain in 2, sleep in 2, and improved quality of life in 1, with the OA study prematurely terminated due to futility. The risk of bias was high for all 3 completed studies. Dizziness, cognitive problems, and drowsiness, as well as nausea, were reported for almost half of the patients. No serious adverse events were reported for cannabinoids during the study duration. No studies of herbal cannabis were identified.

Conclusion. Extremely small sample sizes, short study duration, heterogeneity of rheumatic conditions and products, and absence of studies of herbal cannabis allow for only limited conclusions for the effects of cannabinoids in rheumatic conditions. Pain relief and effect on sleep may have some potential therapeutic benefit, but with considerable mild to moderate adverse events. There is currently insufficient evidence to recommend cannabinoid treatments for management of rheumatic diseases pending further study.

Figure 1. Medical cannabinoid prescribing algorithm



CINV—chemotherapy-induced nausea and vomiting, MS—multiple sclerosis, SCI—spinal cord injury.

Overview of Pharmacological Therapies for Osteoarthritis

Drug Name	Mechanism of Action	Usual Dosage	Metabolism	Side Effects	Comments
Acetaminophen	Exact mechanism unknown	500-1000mg tid, <3g/day	Liver	Hepatotoxicity if >4g/day or with alcohol	Analgesic of choice
Tramadol	μ opioid receptor agonist interacts with GABA, norepinepherine and serotonin systems	50-100mg qid, <400mg/day	Liver, excreted in urine	CNS depression, may potentiate seizures in combination with other drugs	May be expensive
Opioids	Opioid receptor agonist	Varies by dosage form	Liver	CNS and respiratory depression	Requires license to prescribe, high addiction potential
NSAIDs	Inhibition of cyclooxygenase enzymes	Varies by dosage form	Liver	Gastrointestinal, renal, cardiovascular	
Capsaicin	Depletion of substance P	Very thin layer topically tid-qid 0.025% or 0.075%	Not absorbed	Local skin irritation and burning	Wear gloves to apply, wash hands with soap and water, avoid contact to sensitive areas of the body
Lidocaine (topical)	Inhibition of nociceptive nerve fibers	Moderate amount 5% cream or ointment for 2 hrs BID	Liver but minimal systemic absorption	Local irritation, numbness	Transdermal patch is expensive
Intra-articular steroids	Local anti-inflammatory	Varies by dosage form	Some systemic absorption, multiple sites of metabolism	Local skin atrophy and depigmentation, risk for muscle and tendon rupture	Generally less beneficial when there is no joint effusion present Limit to ≤4 injections per site per year
Hyaluronic acid	Surface lubricant	Varies by product, 3-5 weekly injections of 16-30 mg each	Remains intra-articular	Pain at injection site	Very Expensive, benefit is controversial
Glucosamine	Nutritional supplement	500mg tid-qid	Liver	Mild GI discomfort	Benefit is controversial
Chondroitin	Nutritional supplement	300-1500mg /day	Liver	Mild GI discomfort	Benefit is controversial

Pharmacological Evidence-OA

(McAlindon et al, 2014)

Treatment	√ vs ?	Evidence
Acetaminophen	√	Systematic reviews found low level effect of acetaminophen on OA pain-useful for short term analgesia
NSAIDS	√	Appropriate for individuals without comorbidities, uncertain for those with moderate comorbidity risk, not appropriate in those with high comorbidity risk
Opioids	√	Cochrane reviews show that oral or transdermal opioids have a small effect on pain or function for people with OA of the knee or hip
Duloxetine SNRI-cymbalta	√	Found to be an appropriate treatment for knee-only OA patients without comorbidities and all multi-joint OA patients
Topicals NSAIDS and Capsaicin	√	Appropriate for knee only OA, uncertain for multiple joint OA, Cochrane review showed comparable efficacy of topical and oral NSAIDS, topical is safer and better tolerated compared to oral Appropriate for knee OA, Topical capsaicin superior to placebo with 50 % pain reduction
Hyaluronic Acid	?	Uncertain for knee OA, not appropriate for multiple joint OA
Intra-articular steroids	√	Appropriate, clinically significant short term decreases in pain
Glucosamine Chondroitin	?	Glucosamine-Uncertain for symptom relief, not appropriate for disease modification Chondroitin-uncertain for symptom relief, results are mixed regarding disease modification

Legend: √ Evidence Supports
? Evidence-conflicting/lacking

Non-pharmacological

Non-Pharmacological Management

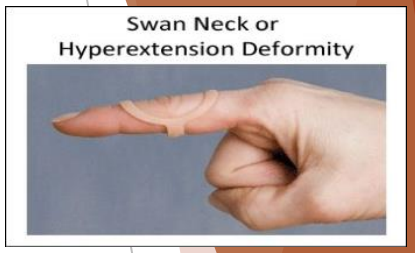
- Conservative
  - Braces, Taping, Orthotics, Footwear
  - Assistive devices for ambulation & activities of daily living
  - Weight loss, dietary adjustments, supplements, herbal therapy
  - Patient education and self management strategies
  - Psychological interventions-e.g. CBT, ACT, Stress management
  - Modalities
  - Exercise

- Non-conservative:
  - Surgery

(Geenen et al 2018; McAlindon et al 2014 Hochberg et al, 2012; Nelson et al; 2014; Fernandes et al, 2013)

Splints and Braces-benefits and indications

- Rest
  - Reduce motion to help decrease inflammation and pain
  - Immobilize inflamed joint
- Protection
  - Minimize the effort and force on the joint
  - Protect against deforming forces
- Positioning
  - Provide joint stability
  - Prevent/correct deformities
  - Maintain/improve alignment
- Mobility
  - Maintain tissue length
  - Prevent or minimize soft tissue contractures
- Aid in maximizing functional use
- Compensate for weak or absent muscles



Splints-Upper Extremity

Upper extremity splint/example	Purpose	Examples/images	Evidence
• **Dynamic splints (eg flexion contracture dynamic splint)**	Correct an existing deformity, provide controlled motion, aid in joint alignment, substitute for loss of neuromotor function, gives mobility to the patients joint by providing forces that substitute for absent muscle power		Wrist splints • Preliminary evidence suggests that resting hand and wrist splints do not effect ROM or pain-although participants preferred wearing a resting splint to not wearing one • Working wrist splints reduce pain and improve grip in RA, effect on function is unclear, insufficient evidence to make conclusions about the effectiveness of working wrist splints Thumb CMC splint • Application of splints for the thumb base are effective for pain and disability
• **Static resting splints (eg. Carpal tunnel night splint)**	Maintain the joint in the optimum position, used to provide support or rest, indicated for active joints, night pain, prolonged AM stiffness, or progressive deformities		
• **Static working splints (eg. Thumb CMC splint)**	Allow the patient to use the limb functionally while the splint is in place, indicated when there is pain with function, ligament laxity/deformities	 	

References:(Egan et al 2010; Kloppenburg, 2014; Kjeken et al, 2011; Ramsey et al, 2014)

Braces-Lower Extremity

Lower extremity Braces/orthotic	Actions	Examples/images	Evidence
Off loader knee brace	Applies gentle pressure to the unaffected side and unloads stress from the affected side		• Knee braces were effective in decreasing pain and improving function in knee OA, long term adherence is low • May be a greater effect on gait when both knee brace and foot orthotic are used together • Soft bracing for knee OA results in moderate improvements in pain and small improvements in function both short and long term
Knee sleeve	Increases joint proprioception, decreases joint load, increases joint stability, mild compression, increases skin temperature-decreasing pain and increasing physical function		

References: (Bennell et al, 2011; Malvankar et al, 2012; Egan et al, 2010; Moyer et al, 2015; McAlindon et al 2014; Moyer et al 2017; Cudejko et al 2018)

Braces-Lower Extremity

Lower extremity splint/orthotic	Indication/Actions	Examples/images	Evidence
Insoles/orthotics	Provides arch support, redistributes weight, lessens pressure at tender points, corrects abnormal foot motions, provides stability		• Foot orthoses- effective in decreasing pain • Lateral wedge insoles may be an alternative to valgus bracing • Supported insoles may be effective in preventing progression of hallux abductor angle in RA but do not appear to have any impact on pain • Extra depth shoes and molded insoles decrease pain during weight bearing activities for people with RA
Proper footwear	Proper fit is important, need room to accommodate deformities, corns, bunions, arch support, roomy toe box, shock absorption etc		

References: (Bennell et al, 2011; Malvankar et al, 2012; Egan et al, 2010; Moyer et al, 2015; McAlindon et al 2014)

Assistive devices

Intervention	Types/Indication	Examples/images	Evidence
Assistive devices for **ambulation**	• Canes-widen base of support and improve balance, decrease loading on the joint • Walkers-improve balance and relieve weight bearing • Crutches-improve balance and relieve weight bearing		• A cane can be used to diminish pain, improve function and some aspects of quality of life in patients with knee osteoarthritis (Jones et al, 2011; McAlindon et al 2014)
Assistive devices for **activities of daily living**	• Self care-long handled shoe horn, raised toilet seat, grab bars in the bathroom • Meal preparation-built up grips on cooking and eating utensils, adapted lid opener • Dressing-button hooks, sock aides • Home environment modifications-chair lifts, ramps		• There is limited evidence for the effect of assistive technology in RA (Tuntland et al, 2009) • Provision of assistive devices are effective for pain and disability in hand OA (Kloppenburg, 2014)

Education & Self Management

Patient Education in Chronic Pain

Patient Beliefs

- Peoples beliefs about chronic pain shape their attitudes and behaviours about how to manage their pain

- Qualitative study looking at OA patients and their beliefs about their knee pain (Darlow et al 2018)
  - OA was downplayed by some clinicians which gave patients the impression they don't need to manage it, beliefs perpetuated by clinicians language and explanations
  - Beliefs impacted their activity levels. They believed their arthritis pain was an inevitable part of aging, worried about the wear and tear, worried weight bearing would exacerbate things and many thought a joint replacement was inevitable and the only way to fix it

- Patient beliefs and exercise interventions (Hurley et al 2018):
  - Without adequate info and advice from HCPs people do not know what they should and shouldn't do and as a consequence avoid activity for fear of causing harm
  - Providing reassurance in exercise programs may encourage participation.

Patient Education in chronic pain

- Patients beliefs and risk factors serve as the target when educating a patient about the biology and physiology of their pain experience
- Explaining pain-pain neuroscience education-explaining to the patient the biological processes underlying their pain condition
- Challenging maladaptive pain cognitions/behaviors, reconceptualizing chronic pain in a way that is no longer regarded as threatening
- Examples of areas potentially needing focus:
  - Exercise and activity is safe
  - Hurt versus harm
  - Boom/bust cycle
  - Expecting flares

(Booth et al 2017; Lluch et al 2013; Louw et al 2016; Wijma et al 2016)

Patient Education-what does the evidence say?

- Patient education had short term effects on disability, joint counts, patient global assessment, psychological status and depression in RA, no evidence of long term benefit in RA (Riemsma et al 2009)
- Strong evidence for the efficacy of instruction on joint protection in a cochrane review examining effectiveness of OT interventions (Steultjens et al, 2009)
- Education and self management in OA-cochrane reviews concluded that the results were either of no benefit or small benefits (Kroon et al, 2014)
- Therapeutic education was found to be valuable in RA (Forestier et al, 2009)
- Educating patients about self management is effective for pain and disability in hand OA (Kloppenburg, 2014)
- Pain neuroscience education has positive effects on pain, disability, catastrophizing and physical performance in patients, education as a stand-alone intervention is not enough (Lluch et al 2013; Geneen et al, 2015)

Modalities and other treatment approaches that affect the tissues

- **Modalities:** Any physical agent applied to produce therapeutic changes to biologic tissues; includes but not limited to thermal, acoustic, light, mechanical, or electric energy. *(aota.org)*

Modalities:
- Heat
- Cold
- TENS
- Ultrasound

Other treatments:
- Acupuncture
- Massage
- Hydrotherapy

Often the goal with any of these more passive modalities is to provide enough pain relief to help the person progress to an active exercise program or engage in activity.

Heat

Clinical Indication	Effects/How it relieves pain	Considerations	Evidence
• Used to control pain, increase soft tissue extensibility and to accelerate healing • used for chronic sprains, adhesive capsulitis, joint contractures, muscle spasms, chronic tendonitis or bursitis or to promote relaxation or increase tissue pliability.	• Gating of pain transmission • Decreased muscle spasm • Reduced ischemia • Increased collagen extensibility • Decreased joint stiffness • Dilates blood vessels • Increases blood flow • Improves metabolism & oxygen flow • Increased nerve conduction	Contraindications: • Acute injury or inflammation • Impaired sensation or mentation • Malignancy or recent or potential hemorrhage Precautions: • Pregnancy • Poor circulation • Poor thermal regulation • Edema • Cardiac insufficiency • Metal in the area • Over an open wound	• Application resulted in mild improvements in pain, function and Q of L in knee OA • Improved pain, strength recovery and movement in chronic knee pain • Improvements in neck pain • Effective for short term relief of LBP and greater relief from DOMS than cold

References:(Aciksov et al 2017; Petrofsky et al 2017; Petrofsky et al 2016; Malanga et al 2015)

Cold

Clinical Indication	Effects/How it relieves pain	Considerations	Evidence
• Used to control inflammation and pain, edema and muscle spasm • Inhibit spasticity • Treat burns	• Gating of pain transmission • Decreased swelling • Decreased muscle spasms • Slows nerve conduction • Decreased blood flow • Decreased collagen extensibility • Increased joint stiffness • Decreased spasticity	Contraindications: • Hypersensitivity to cold • Regenerating peripheral nerves • Raynaud's disease • Over an area with circulatory compromise Precautions: • Open wound • Hypertension • Poor sensation/mentation • Very young or older patients	• Application resulted in mild Improvements in pain, function and Q of L in knee OA • Cold application to the trapezius muscles of patients with fibromyalgia decreased their pain • Short term improvements with cold mist shower in inflammatory arthritis

References: (Aciksov et al 2017; Yilmaz & Kiyak, 2017; Hinkka et al 2017)

TENS

Clinical indication	Effects/How it relieves pain	Considerations	Evidence
• Used for mild to moderate acute pain and chronic pain such as low back pain, arthritis, and neuropathic pain.	• Interferes with the pain transmission at the spinal cord • Endorphin theory: stimulate the production & release of endorphins & enkephalins known as endogenous opiates • Acupuncture theory: electrodes on acupuncture points stimulates energy flow along the meridians	Contraindications: • Cardiac pacemaker or arrhythmias • Placement of electrodes over carotid sinus (neck) • Areas of venous or arterial thrombosis or thrombophlebitis • Pregnancy Precautions: • Cardiac disease • Decreased sensation/mentation • Malignant tumour • Areas of skin irritation or open wounds	• Insufficient evidence to support/refute in fibromyalgia (may have short term benefit) • Previous studies reported it was not recommended for LBP, recent reviews report significant pain reduction • Uncertain for neuropathic pain • Significant pain reduction in CRPS type 1 • Decreased pain in post hepatic neuralgia • May relieve pain in knee OA-effectiveness could not be confirmed in cochrane reviews, conflicting effects on pain outcomes in RA

References: (Johnson et al 2017; Dailey et al 2013; Chou & Huffman 2007; Dubinsky & Miyasaki 2010; Jauregui et al 2016; Gibson et al 2017; Bigili et al 2016 ; Malcolm et al 2015; Rutjes 2009; Brosseau et al 2010; Chen et al 2016; McAlindon et al 2014)

Ultrasound

Clinical Indication	Effects/How it relieves pain	Considerations	Evidence
• Soft tissue lesions (tendons, bursa, ligaments) • Small joint contractures • Soft tissue calcification	Thermal effects: • Increased blood flow • Reduction in muscle spasms • Increased tissue extensibility of collagen fibers • Pro inflammatory response Non-thermal effects: • Cavitation and acoustic microstreaming stimulates tissue repair	Contraindications/precautions: • Local malignancy • Metal implants below the area being treated • Local acute infection • Vascular abnormalities • Abdomen of a pregnant woman • Avoid growth plates in children • Avoid eyes, skull, genitals, • Spinal cord in the area of a laminectomy	• May be beneficial for OA of the knee • Shown to be effective in RA of the hands (increasing grip strength, decreasing stiffness, and decreasing the # of swollen joints and # of tender joints)- poor quality studies • Reduced pain in OA of the hand

References: (Zhang et al 2016; Yildiz et al 2015; Kiraly et al 2017; Paolillo et al 2015; Rutjes et al 2010; Zeng et al 2014; Casmiro et al 2010; McAlindon et al 2014)

Acupuncture

Clinical Indications	Effects/How it relieves pain	Considerations	Evidence
• Myofascial pain • Trigger points • Chronic back & neck pain • Neuropathic pain • Post op pain • Arthritis • Extensive indications outside of pain management (e.g. internal medicine conditions, fertility, urological problems etc)	• Gate control theory • Endorphin release • Meridians-needling restores balance in the energy flow	Contraindications/precautions: • Extreme frailty • Febrile illness • Local skin infection • First trimester of pregnancy • Cardiac pacemaker • Individuals on anticoagulants	• Alleviates pain and function in knee OA (short term) • May be beneficial in reducing knee pain in RA • Favorable effect on pain and function in LBP • Low to moderate evidence for improving pain in fibromylagia • Low quality evidence for a moderate effect on MSK pain

References: (Chen et al 2017; Lin et al 2016; Dimitova et al 2017; Yeganeh et al 2017; Yuan et al 2016; Casmiro et al 2010; McAlindon et al 2014)

Massage

Clinical Indications	Effects/How it relieves pain	Considerations	Evidence

• Used to promote relaxation
• Decrease muscle tension
• Treats painful muscular conditions
• Improve circulation
• Reduces anxiety
	• Confuses the body's pain signals
	• Increases production of body's natural pain killers (endorphins)
	• Relieves muscle tension
	• Improves circulation to the muscle:
	  • More oxygen
	  • More nutrients
	  • Waste removal
	• Relieves mental stress and anxiety
		Contraindications:
		• Burns
		• Deep vein thrombosis
		• Tumors/Malignancies
		
		Precautions:
		• Undiagnosed mole or lump
		• Pregnancy
		• Infection Diseases
		• Areas of edema
		• Broken Skin
			• Decreases pain short term in people with shoulder pain, and knee OA
			
			• Improved function short term in LBP

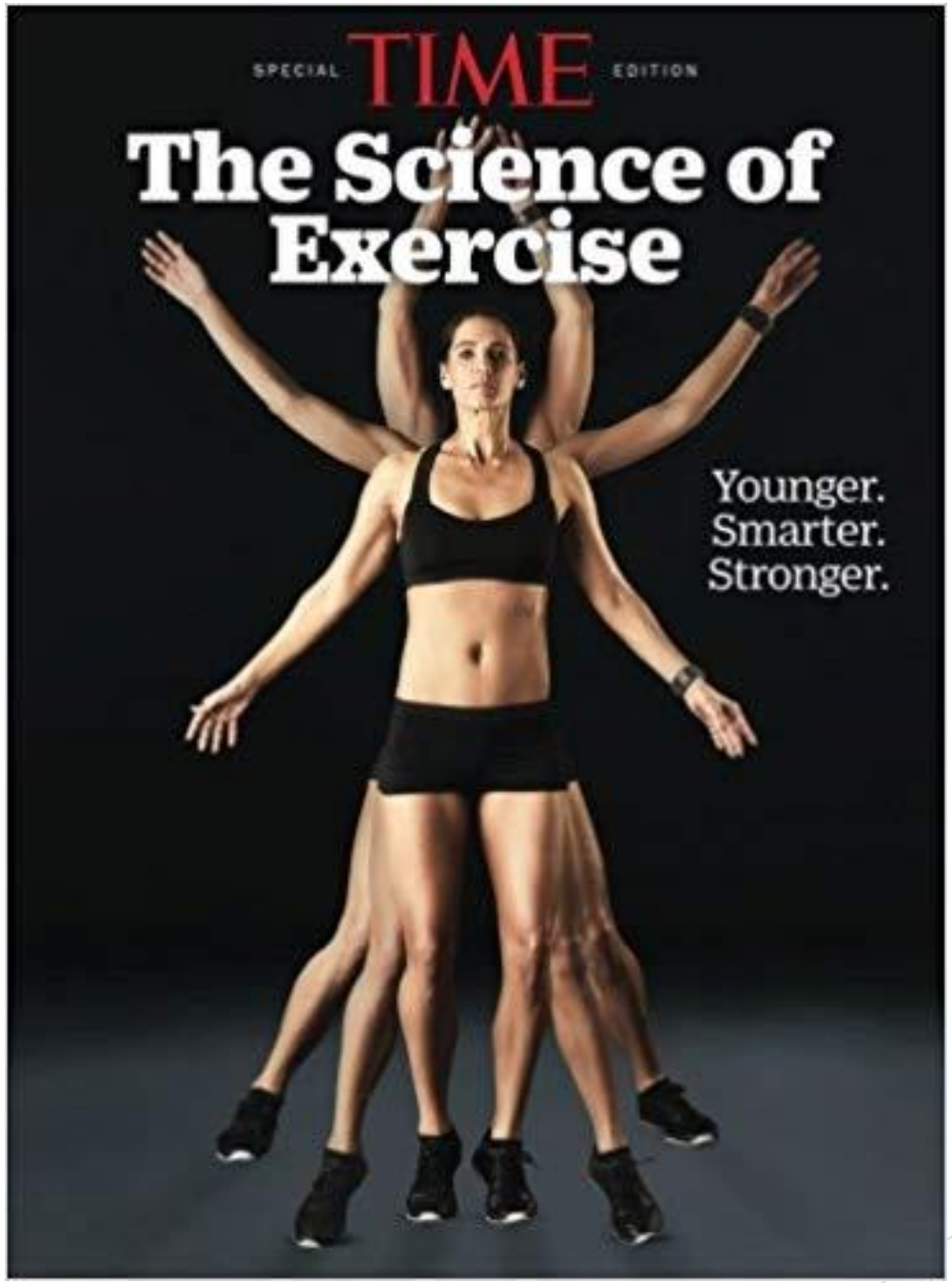
References: (Bervoets et al, 2015)

Hydrotherapy

Clinical indications	Effects/How it relieves pain	Considerations	Evidence

• Reduction of pain
• Reduction of swelling
• Increasing range of motion
• Gait retraining
• Improve balance
• Strengthening
• Functional retraining
• Can be used with numerous conditions including arthritis, neurological and MSK conditions
	• Competes with pain signals in the nervous system-gate control theory
	• Hydrostatic pressure has a calming effect on the sympathetic nervous system
	• Decreased weight bearing on joints and ease of movement
	• Physiological properties of water:
	  • buoyancy
	  • warmth of the water
	  • translocation of fluid reduces swelling
		Contraindications:
		• Cardiac instability
		• Infectious conditions that may be spread by water
		• Bowel & bladder incontinence
		• Severe or uncontrolled epilepsy
		• Respiratory problems
		• Multiple sclerosis
		• Poor thermal regulation
		
		Precautions:
		• Pregnancy
		• After ingestion of alcohol
			• Improves pain and function in hip and knee OA
			
			• Decreases pain and improves health status in RA
			
			• Low to moderate quality evidence that aquatic training is beneficial for improving wellness, symptoms and fitness in adults with fibromyalgia

References: (Bartels et al 2007; Waller et al 2014; Al-Qubaeissy et al 2013; Bidonde et al 2014; Barker et al 2014)


SPECIAL TIME EDITION
The Science of Exercise
Younger.
Smarter.
Stronger.

Physical Activity and Exercise

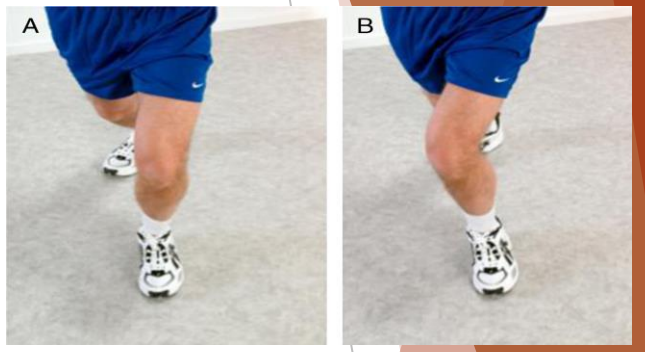
- **Physical Activity:** any bodily movement produced by skeletal muscles that requires energy expenditure

- **Exercise:** physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective

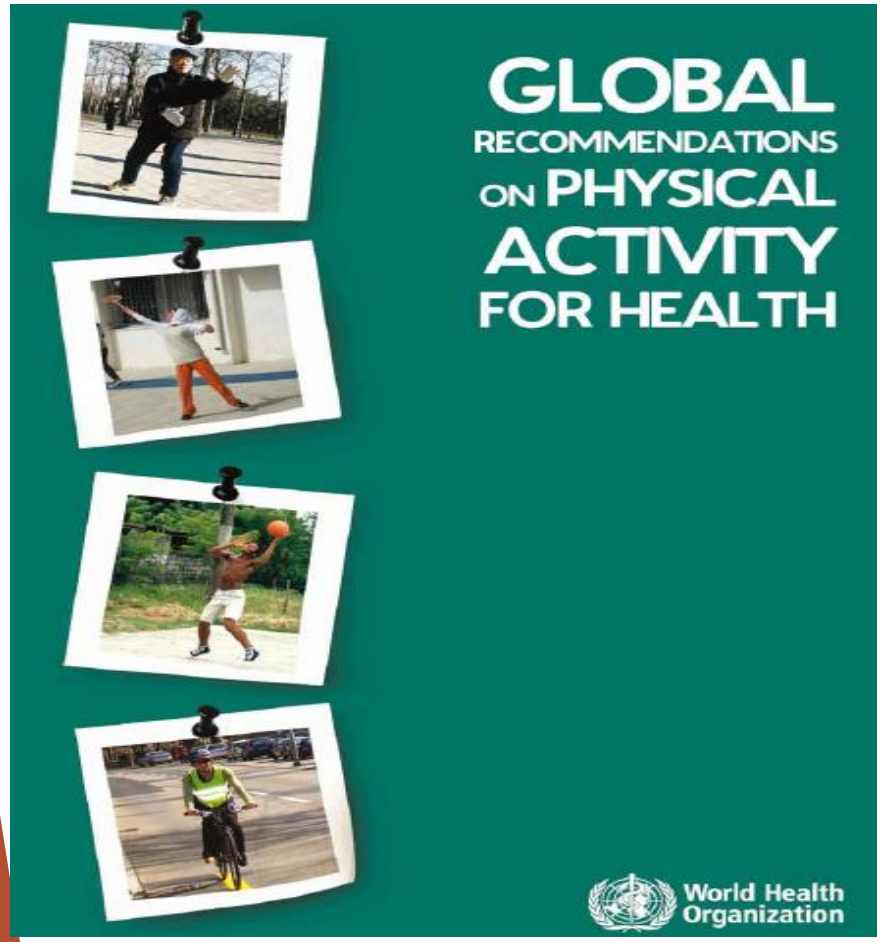
(http://www.who.int/dietphysicalactivity/pa/en/)

Options for Exercise

- Strength Training
- Aerobic Conditioning
- Stretching/flexibility
- Range of motion
- Neuromuscular exercise
- Aquatic Exercise/Hydrotherapy
- Mindful Movement
  - Yoga
  - Tai Chi
  - Pilates
- Structured Physical Activity



Physical Activity Guidelines



≥ 150 minutes moderate intensity aerobic physical activity/week

OR

≥ 75 minutes high intensity aerobic physical activity/week

OR

Equivalent combination of above

PLUS

Muscle strengthening activities ≥ 2 days per week

AMERICAN COLLEGE of SPORTS MEDICINE LEADING THE WAY

CDC Centers for Disease Control and Prevention

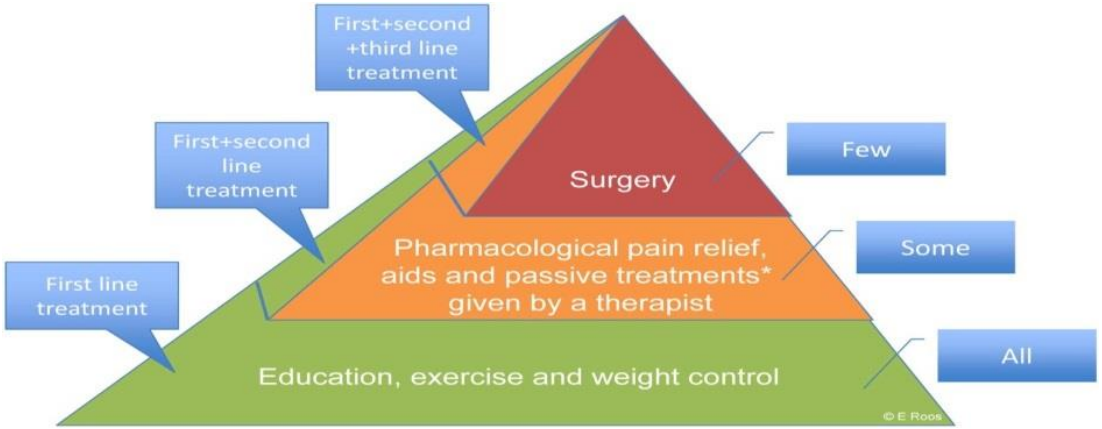
CSEP | SCPE THE GOLD STANDARD IN EXERCISE SCIENCE AND PERSONAL TRAINING

CANADIAN SOCIETY FOR EXERCISE PHYSIOLOGY

World Health Organization

GLA:D™ CANADA

Good Life with osteoArthritis from Denmark (adapted for Canada)



Roos and Juhl. Osteoarthritis and Cartilage, 2012

Consists of 3 parts:

1) 2 Education sessions
2) 12 individually tailored NEuroMuscular Exercise (**NEMEX**) in a group setting
3) Database collects patient outcomes at baseline, 3 and 12months (quality monitoring)

- For anyone who has a chief complaint of hip/knee osteoarthritis, or who is experiencing symptoms of hip/knee osteoarthritis.
- In Denmark, over 25,000 people have access the program. Results show a 27% reduction in pain, 30% increase in self-reported physical activity levels, and reduced use of pain medication and days on sick leave.
  (GLA:D® was piloted in Canada showing very similar results)
- Available across Ontario and Canada; visit www.gladcanada.ca for a list of clinic locations.

Visit www.glaid.dk for GLA:D® Annual Report

For more information, visit:

www.gladcanada.ca
www.glaid.dk

BONE and JOINT CANADA

Canadian Orthopaedic Foundation

Osteoporosis Canada
Ostéoporose Canada

Exercise and Activity Recommendations for OP

Locate a Bone Fit trained instructor: **English: 1-800-463-6842 / French: 1-800-977-1778** or www.bonefit.ca

Exercise	Frequency	Examples/Comments
Strength Training	≥ 2x/week	• Exercises for legs, arms, chest, shoulders, back • Use body weight against gravity, bands, weights* • 8-12 repetitions maximum per exercise
Balance Training	~ 20mins daily	• Standing still: one-leg stand, semi-tandem stance, shift weight between heels and toes while standing • Dynamic movements: Tai Chi, tandem walking, dancing • Progress from standing still to dynamic
Aerobic physical activity	≥ 5x/week (30min/day)	• Do bouts of 10 min or more • Accumulate ≥ 30 min per day • Moderate- or vigorous-intensity (5-8 on 0-10 Borg scale)*
Posture/ Back Extensor Training	5-10mins daily	• Lie face up on firm surface, knees bent, feet flat. Use pillow only if head doesn't reach floor. Do this 5-10 min/day. • Progressions 1) lying with gentle head press, without changing chin position, perform 3-5 seconds "holds"; 2) Core activation in standing (see intro to theraband: **Videos:** www.osteoporosis.ca/after-the-fracture/videos/)
Spine Sparing Strategies	During daily activities	• Learn a "hip hinge" and "step to turn" so that you can modify activities that flex (bending forward) or twist spine

**In presence of vertebral fracture, consult Bone Fit trained physiotherapist/kinesiologist , and emphasize good alignment, and moderate over vigorous intensity aerobic activity*

Giangregorio LM, et al. Osteoporos Int 2014; 25: 821-835

Exercise evidence

Exercise type	Evidence
Walking	• Effective for low back pain(Lawford et al 2016) • Associated with significant improvements in chronic MSK pain (O'Connor et al 2015) • Feasible and safe in RA (Baxter et al, 2016) • Adherence to a walking program in Fibromyalgia was more likely when their doctor recommended it (Sanz-Baros et al, 2018) • Walking and swimming had similar beneficial effects on pain in fibromyalgia (Fernandes 2016)
Aerobic	• Effective for OA and RA for decreasing pain and improving function (Baillet et al 2010) • Improves function and pain in fibromyalgia (Hauser et al 2010; Thomas & Blotman 2010) • Improves pain & function in LBP (Meng & Yue 2015)
Resistance training	• Safe & effective in OA, RA and AS (Souza et al 2017; Liang 2018; Pecourneau, 2018) (Regnaux et al 2015; Baillet et al 2012) • Beneficial effects in LBP (Searle et al 2015)
Dynamic/ multicomponent	• Combining strengthening, flexibility and aerobic are most likely to improve pain and function in OA (Uthman et al 2014) • Aerobic exercise combined with resistance training led to decreased pain in knee OA (Kabiri et al 2018) • Aerobic capacity training combined with muscle strength training has a positive effect on aerobic capacity and muscle strength in RA (Lange et al 2019) (Hurkmans et al 2009) • Multimodal approach supported in AS (Zao 2017)-exercise shows significant statistical outcomes for BASFI, BASDI, BASMI, home based & supervised exercise programs can improve Q of L in AS (Dagfinrud et al, 2009; Liang et al, 2015;Martins et al, 2014; Ward et al, 2016) • Aerobic and muscle strengthening most effective at decreasing pain in fibromyalgia (Sosa-Reina 2017)

Exercise Evidence

Exercise type	Evidence
Neuromuscular	• As effective as traditionally used strength or aerobic exercise for people with degenerative knee disease (Ageberg et al, 2015) • GLA:D program has had significant impact on patient symptoms, function, intake of painkillers, sick leave for people with osteoarthritis, results maintained at one year(Skou et al, 2017)
Hydrotherapy /Aquatic	• Evidence suggests it has a positive role in decreasing pain and improving health status in RA for the short term (Al-Quaeissy et al 2013) • Aquatic exercise offers short term benefit for hip and knee OA, long term effects have not been documented(Bartels et al 2007; Waller et al 2014; Bartels et al, 2016) • Aquatic exercise improved pain, function, strength, self efficacy in people with OA (Kars Fertelli et al 2018; De Mattos et al 2016; Taglietti et al 2018) • Aquatic exercise supported in AS (Zao et al 2017)
Tai Chi	• Tai Chi –benefits found in OA (Ye et al, 2014; Lee et al 2007; Han et al 2010) • Debatable in RA (Akyuz 2018) • Effective for pain, balance, fatigue and strength in fibromyalgia, similar or greater improvements than aerobic exercise (Wong et al 2018)
Yoga Pilates	• Yoga may improve pain and function in fibromyalgia and LBP (Langhorst et al, 2013; Saragiotto et al 2014; Kelley & Kelley, 2015; Cramer et al, 2013) • Yoga improved pain, function and mobility in people with knee OA (Kuntz 2018) • Yoga-effective at decreasing pain in RA, only one small study in SpA (Akyuz 2018) • Pilates more effective than conventional PT in knee OA (Mazloum 2018)

Summary of Exercise Evidence

Exercise type	OA	RA	AS	FM	LBP
Walking	√	√		√	√
Aerobic	√	√	√	√	√
Resistance training	√	√	√		
Dynamic	√	√	√	√	
Neuromuscular	√				
Hydrotherapy	√	√	√	√	
Tai Chi	√	?	?	√	
Pilates	√			√	
Yoga			?	√	√

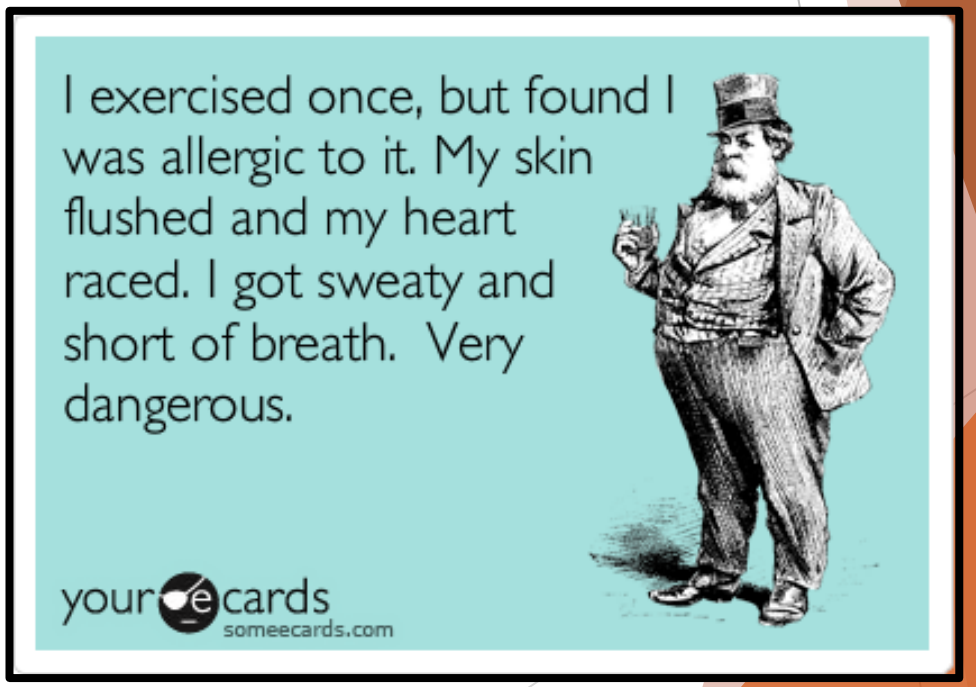
Legend: √ Evidence Supports
? Evidence is conflicting or lacking

Benefits of Exercise

- Exercise increases endorphins released-less pain and better mood
- Reduces the secondary effects of pain disorders (eg mood, anxiety, fear, catastrophization)
- Lowers blood pressure
- Improves cholesterol and blood sugar levels
- Better physical fitness
- Stronger better nourished muscles
- Increased bone density
- Cartilage requires dynamic load to regenerate
- Improved body weight
- Socialization
- Sense of accomplishment

Challenges with Exercise Engagement

- Lack of Motion
- Deconditioning
- Requires Investment (time/effort)
- Delayed Effect
- Fear of Movement
- Altered physiological response to exercise



Overcoming Obstacles: Motivation

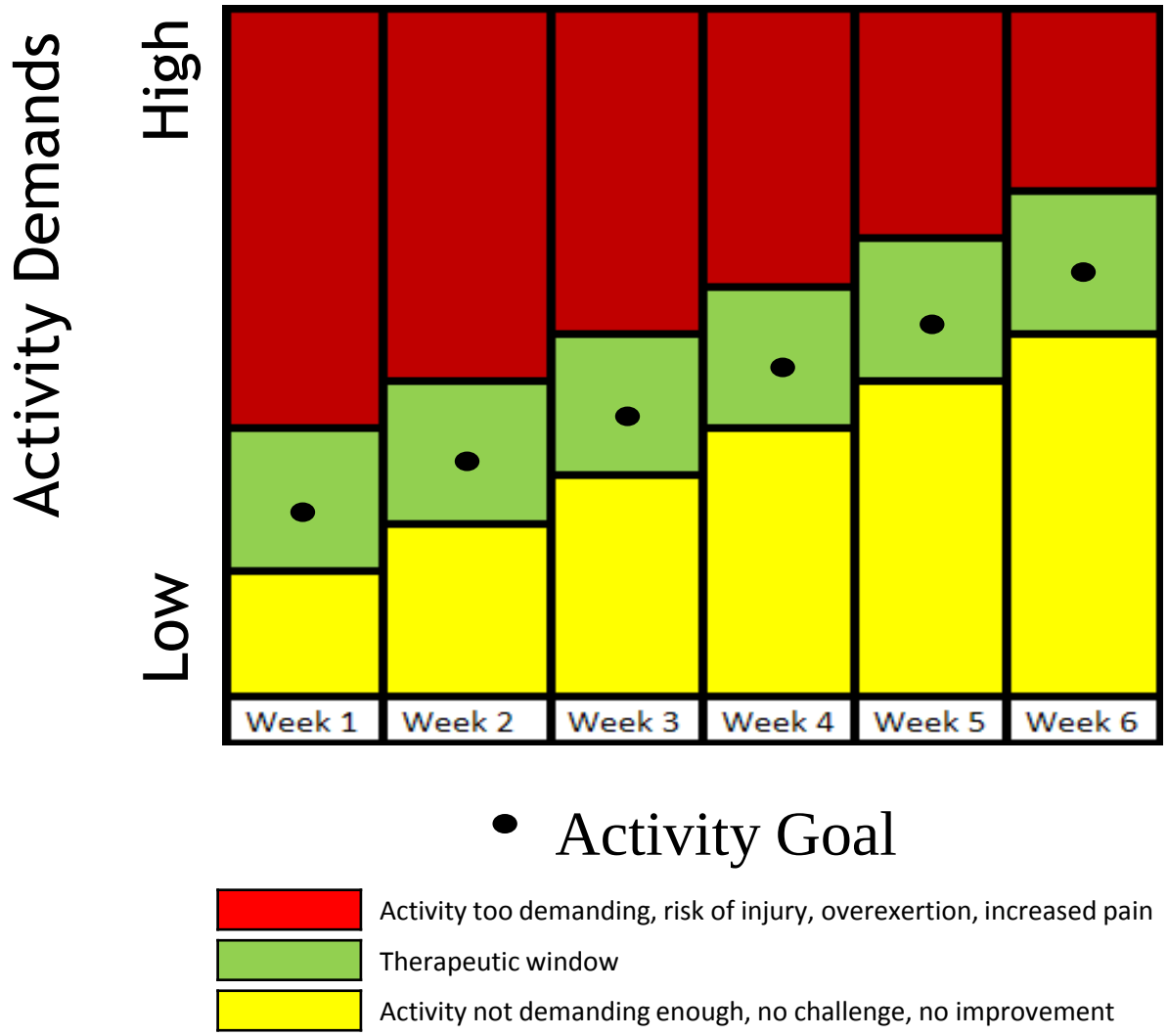
- Use meaningful/rewarding activity
- Assess readiness for change/employ motivational interviewing, SMART goals
- Tempo-pace synchronized music
- Interventions to increase adherence to exercise:
  - Education and goal setting
  - Behavioral counselling
  - Positive feed back and reinforcement of patients efforts
  - Advice about posting self-reminders at home to complete exercises
  - Self monitoring techniques (fitness trackers, use of an exercise diary)
  - Supervision of exercises, booster sessions (ongoing contact and reinforcement)

(Nicolson et al 2017)

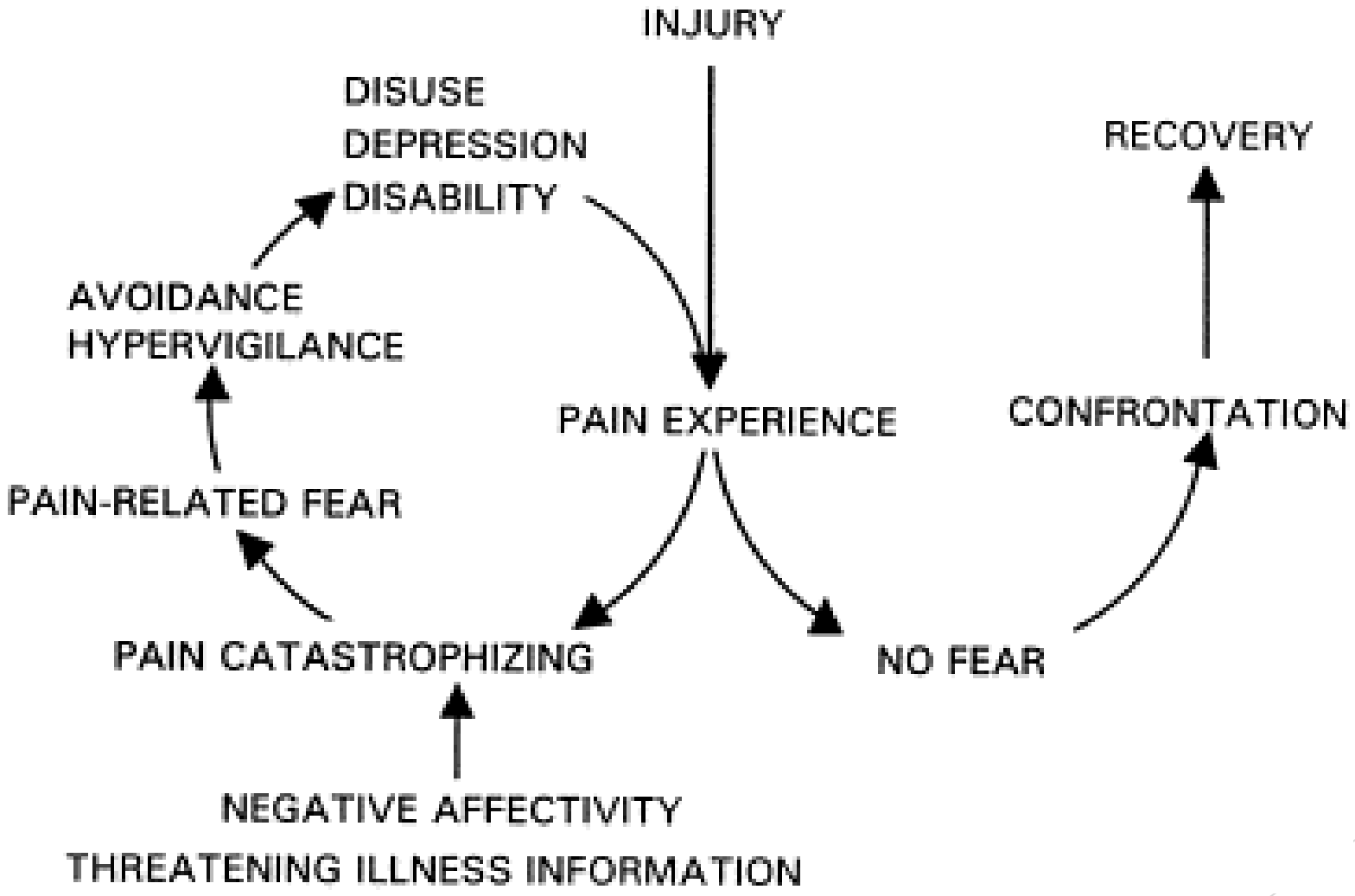
Overcoming Obstacles: Deconditioning

- Clearly identify exercise and other physical activity, and accommodate both
- Balance rest and activity simplification with activation
- Graded activity

Graded Activity



Fear-Avoidance Model



(Vlaeyen and Linton, 2000)

Overcoming Obstacles: Fear of Movement

- Education regarding hurt vs. harm; short term effects (acute discomfort) vs. long term effects (improved function, less pain)
- Graded exposure
- Cognitive approach, checking assumptions, journaling

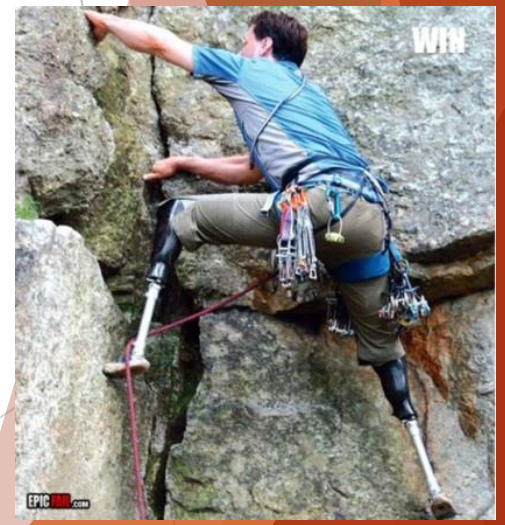
Altered Exercise Induced Analgesic Response

- Exercise Induced Analgesia = Decreased pain sensitivity following exercise (moderate-intense aerobic or resisted exercise) in healthy individuals.
- Local and systemic.
- Remains intact with some pain-related conditions (osteoarthritis & rheumatoid arthritis).
- Reduced or absent in patients with fibromyalgia and other conditions involving central sensitization.
- The analgesic response may be preserved in non-affected portions of the body.

(Nijs et al., 2012)

Overcoming Obstacles: Physiological changes

- Simplify / modify activities to accommodate current tolerances
- Avoid or reduce eccentric or isometric strengthening exercise for patients with centralized pain
- Exercising non-painful muscles/areas can produce a benefit, with less acute pain
- Low intensity training may be more easily tolerated
- Graded activity – low baseline, slow graduation
- Multiple, long recovery breaks
- Rest before exhaustion
- Expect and accept symptom flares if minor, limited in duration, and are not increasing



(Nijs et al., 2012)

Cognition targeted exercise therapy

- Systematic desensitization or graded repeated exposure to generate a new memory of safety in the brain replacing or bypassing the old and maladaptive movement related pain memories
- Integrate pain neuroscience education with exercise interventions
- Address patient perceptions about exercise
- Address movement related pain memories applying exposure without danger principle (graded exposure/graded activity)

(Nijs et al, 2014)

RCT comparing pain neuroscience education combined with cognition targeted motor control training appears to be more effective than current best-evidence PT for improving:

- Pain
- Symptoms of central sensitization
- Disability
- Mental and physical function
- Pain cognitions

(Malfliet et al 2018)

Exercise & Chronic Pain: Key principles

- Biopsychosocial approach-acknowledges and aims to address the physical, psychological and social factors
- Understanding the patients thoughts, beliefs and behaviours concerning physical activity and pain –assists clinicians to implement combined patient tailored exercise and targeted education
- Education-pain neuroscience, self management principles, addressing maladaptive beliefs, hurt versus harm, safe to move and exercise, expect flares etc
- Exercise prescription:
  - Individualized, meaningful, based on goals
  - Low intensity
  - Graded exercise-time contingent-as opposed to pain contingent
  - Graded exposure

(Booth et al, 2017; Diener et al, 2016)

Summary

- Biopsychosocial approach is widely accepted as the most heuristic perspective to understanding and treating chronic pain disorders
- A comprehensive pain assessment integrating data from the history and physical exam is required to identify the relevant clinical features and diagnose pain
- Differentiating between types of pain is critical to direct optimal management
- There are various pharmacological and non-pharmacological options for the management of rheumatic diseases and chronic non-cancer pain
- Nonpharmacological approaches are often a component of first line treatment recommendations for the management of patients with arthritis (and most have received support in the literature for their effectiveness in managing patients symptoms and improving function)
- Exercise is the cornerstone of conservative management and is well supported in the literature-There is consistent evidence that exercise can improve symptoms, decrease disability and improve function in a range of chronic pain conditions
- It important to understand and address the barriers and challenges in engaging in exercise and activity for patients with chronic pain

Resources

Rheumatology resources

- American College of Rheumatology (ACR)
- The Arthritis Society (TAS)
- The European League Against Rheumatism (EULAR)
- National Institute for Health and Care Excellence (NICE)
- Osteoarthritis Research Society International (OARSI)
- Bone and Joint Canada
- Osteoporosis Canada
- GLA:D

Chronic pain resources

- Work Wellness and Disability Prevention Institute (WWDPI)
- Canadian Pain Society (CPS)
- Chronic Pain Association of Canada
- Action Ontario
- International Association for the Study of pain (IASP)

Thank You!!

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