

EVALUATION AND MANAGEMENT OF KNEE OSTEOARTHRITIS IN THE PRIMARY CARE SETTING

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I HAVE NO FINANCIAL DISCLOSURES.

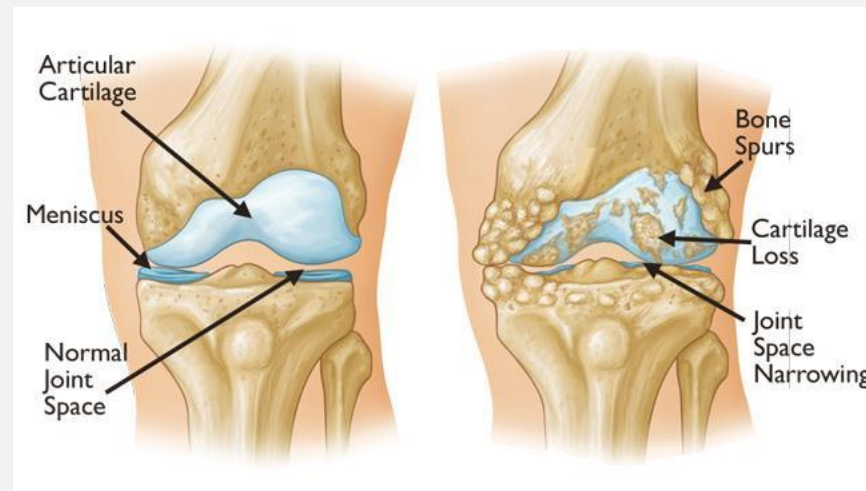
OBJECTIVES

- Define knee osteoarthritis (OA)
- Discuss classification systems and commonly used clinical outcome measures
- Explore risk factors for knee OA
- Compare and contrast most recent AAOS and ACR recommendations for non-operative treatment of knee OA
- Review the literature for evidence behind current non-operative treatment options

DEFINITION

- Inflammation of the knee joint resulting from **articular cartilage loss** and **mechanical friction** of bones with movement
- Knee OA can be defined
 - Pathologically
 - Radiographically
 - Clinically

ANATOMY



<https://orthoinfo.aaos.org/en/diseases--conditions/arthritis-of-the-knee/>

CLASSIFICATION SYSTEMS

INTERNATIONAL KNEE DOCUMENTATION COMMITTEE (IKDC)

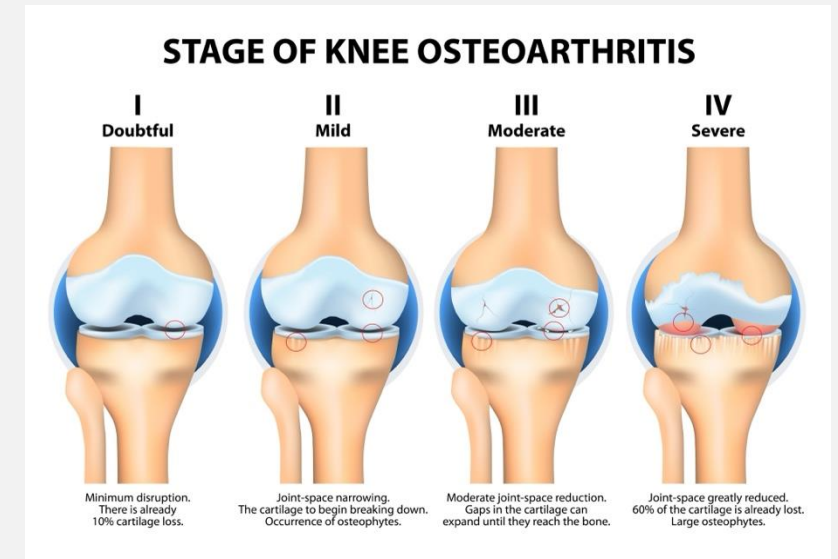
- Knee-specific patient-reported outcome measure
- Developed in 1987, used widely in the literature to define knee OA clinically
- Three overall categories:
 - Symptoms
 - Sports activities
 - Knee function
- Total 10 questions, scores reported 0 to 100
 - Higher scores = higher function

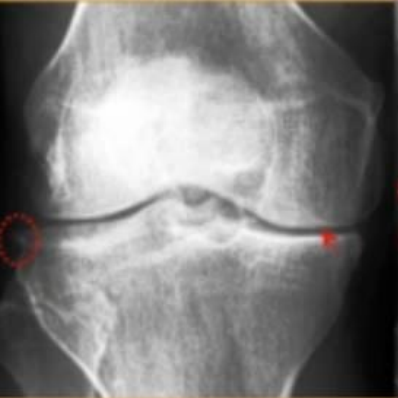
WESTERN ONTARIO AND MCMASTER UNIVERSITIES OSTEOARTHRITIS INDEX (WOMAC)

- Self-administered questionnaire designed to measure the **clinical** impact of knee and hip OA
- Developed in 1982, available in >65 languages
- Three overall categories:
 - Pain
 - Stiffness
 - Physical function
- Total 24 questions, scores for each reported 0 to 4
 - **Higher scores = lower function**

KELLGREN AND LAWRENCE SYSTEM FOR CLASSIFICATION OF OSTEOARTHRITIS

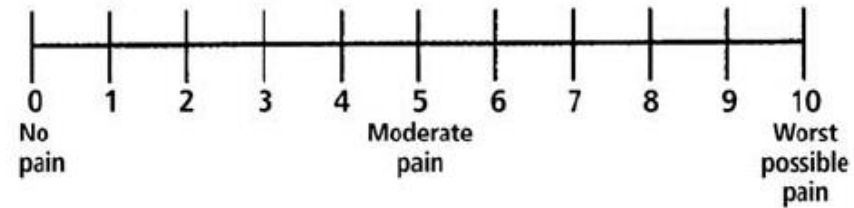
- Commonly used system to grade OA **radiographically**
- Developed in 1961, not specific to just the knee
- Five total grades:
 - Grade 0 (None) – **absence** of radiographic changes
 - Grade 1 (Doubtful) – possible **osteophytic lipping**
 - Grade 2 (Minimal) – osteophyte formation, possible **joint space narrowing**
 - Grade 3 (Moderate) – osteophytes, joint space narrowing, some **sclerosis**
 - Grade 4 (Severe) – severe sclerosis and **deformity of bone ends**



Grade 0 No OA	Grade 1 Doubtful OA	Grade 2 Mild OA	Grade 3 Moderate OA	Grade 4 Severe OA
				
No Osteophytes	Possible Osteophytes	Definite Osteophytes	Moderate Osteophytes	Large Osteophytes 
No JSN	Doubtful JSN	Possible JSN	Definite JSN	Great JSN 

VISUAL ANALOG SCALE (VAS) FOR PAIN

Numeric Pain Rating Scale



Wong-Baker FACES Pain Rating Scale



PATHOGENESIS

- Complex disease process involving interactions of multiple joint tissues, not just articular cartilage alone
- Primary change:
 - Loss of articular cartilage
- Secondary changes:
 - Subchondral **bone remodeling**
 - Formation of **osteophytes**
 - Development of bone marrow lesions
 - Changes in synovium, joint capsule, ligaments, and periarticular muscles
 - **Meniscal tears** and extrusion

EPIDEMIOLOGY

- Most common type of arthritis of the knee
- Leading cause of activity limitation and absenteeism in working-age adults
- Symptomatic knee OA occurs in **10% of men** and **13% of women** older than 60
- Radiologic knee OA is even more prevalent
 - 19.2% of adults ≥ 45 (Framingham Study)
 - 27.8% of adults ≥ 45 (Johnston County Osteoarthritis Project)
- Murphy et al estimates a lifetime risk of developing symptomatic knee OA to be 40% in men and 47% in women
 - Lifetime risk may be as high as 60% with BMI >30

RISK FACTORS

- Systemic
 - Age: ↑ age = ↑ OA (cumulation of risks)
 - Gender: ↑ prevalence and severity in women (**hormones??**)
 - Race: ↑↑ Asian women compared to white women
 - Genetics: heritable component of 50-65% (twin studies)
 - Congenital Conditions: more for hip than knee
 - Diet: vitamin

RISK FACTORS

- Local
 - Obesity: 5kg weight loss = 50% reduction in symptomatic knee OA
 - Injury/Surgery: transarticular fracture, meniscectomy, ACL reconstruction, etc
 - Occupation: >2x ↑ risk for jobs requiring carrying, kneeling, or squatting in mid-life
 - Physical Activity: ?conflicting data
 - Mechanical Factors: surrounding muscle weakness may both contribute to and result from knee OA
 - Alignment/Laxity: varus or valgus alignment, laxity = accelerated OA

TREATMENT ALGORITHM

1. Health and behavior modifications
2. Drug therapy
3. Intra-articular treatment
4. Surgery

HEALTH AND BEHAVIOR MODIFICATIONS

- Patient education
- Physical therapy and exercise
- Weight loss
- Braces and orthoses

AAOS RECOMMENDATIONS (2021)

- Supervised exercise, unsupervised exercise, and/or aquatic exercise are recommended over no exercise to improve pain and function for treatment of knee osteoarthritis (**Strong**)
- Self-management programs are recommended to improve pain and function for patients with knee osteoarthritis (**Strong**)
- Patient education programs are recommended to improve pain in patients with knee osteoarthritis (**Strong**)
- Sustained weight loss is recommended to improve pain and function in overweight and obese patients with knee osteoarthritis (**Moderate**)
- Neuromuscular training (i.e. balance, agility, coordination) programs in combination with traditional exercise could be used to improve performance-based function and walking speed for treatment of knee osteoarthritis (**Moderate**)

AAOS RECOMMENDATIONS (2021)

- Canes could be used to improve pain and function in patients with knee osteoarthritis (**Moderate**)
- Brace treatment could be used to improve pain, function, and quality of life in patients with knee osteoarthritis (**Moderate**)
- Modalities that may be used to improve pain and/or function in patients with knee osteoarthritis include acupuncture, manual therapy, massage, laser therapy, transcutaneous and percutaneous electric nerve stimulation, pulsed electromagnetic field therapy, and extracorporeal shockwave therapy (**Limited**)
- Lateral wedge insoles are not recommended for patient with knee osteoarthritis (**Strong**)

ACR RECOMMENDATIONS (2019)

- **Strong** Recommendations For
 - Exercise
 - Self-efficacy and self-management programs
 - Weight loss
 - Tai Chi
 - Cane
 - Tibiofemoral knee brace
- **Strong** Recommendations Against
 - TENS

ACR RECOMMENDATIONS (2019)

- **Conditional** Recommendation For
 - Therapeutic heat/cooling
 - CBT
 - Acupuncture
 - Kinesiotaping
 - Balance training
 - Patellofemoral knee brace
 - Yoga
 - Radiofrequency ablation
- **Conditional** Recommendation Against
 - Manual therapy
 - Massage therapy
 - Modified shoes
 - Lateral and medial wedged insoles
 - Pulsed vibration therapy

PATIENT EDUCATION

- Focuses on understanding the disease and treatment options available
- Assists in developing **individualized** exercise and cognitive pain management programs
- Attempts to improve **self-efficacy**

Do Exercise and Self-Management Interventions Benefit Patients with Osteoarthritis of the Knee? A Metaanalytic Review

LORAIN DEVOS-COMBY, TERRY CRONAN, and SCOTT C. ROESCH

- American Journal of Rheumatology, 2006
- Metanalysis of 16 studies reporting exercise and/or self-management interventions on patients with knee OA
- Primary outcomes: perceived psychological health
- **CONCLUSIONS**
- Perceived psychological health remained unchanged by exercise
- Statistically significant **improvement in psychological outcomes** with **self-management** interventions
 - Education, pain-coping skills, self-help course

Review

Educating patients about the benefits of physical activity and exercise for their hip and knee osteoarthritis. Systematic literature review



C. Gay^{a,b,c}, A. Chabaud^{a,b}, E. Guilley^a, E. Coudeyre^{a,b,c,*}

- Annals of Physical and Rehabilitation Medicine, 2016
- Analysis of 13 RCTs, 8 societal recommendations
- Primary outcomes: pain and function
- **CONCLUSIONS**
- Education, exercise, and weight loss are effective in **reducing pain** and **improving function** long-term
- **Reduced** medical visits and **health care costs** after 12 months of self-management programs

PHYSICAL THERAPY AND EXERCISE PRESCRIPTION

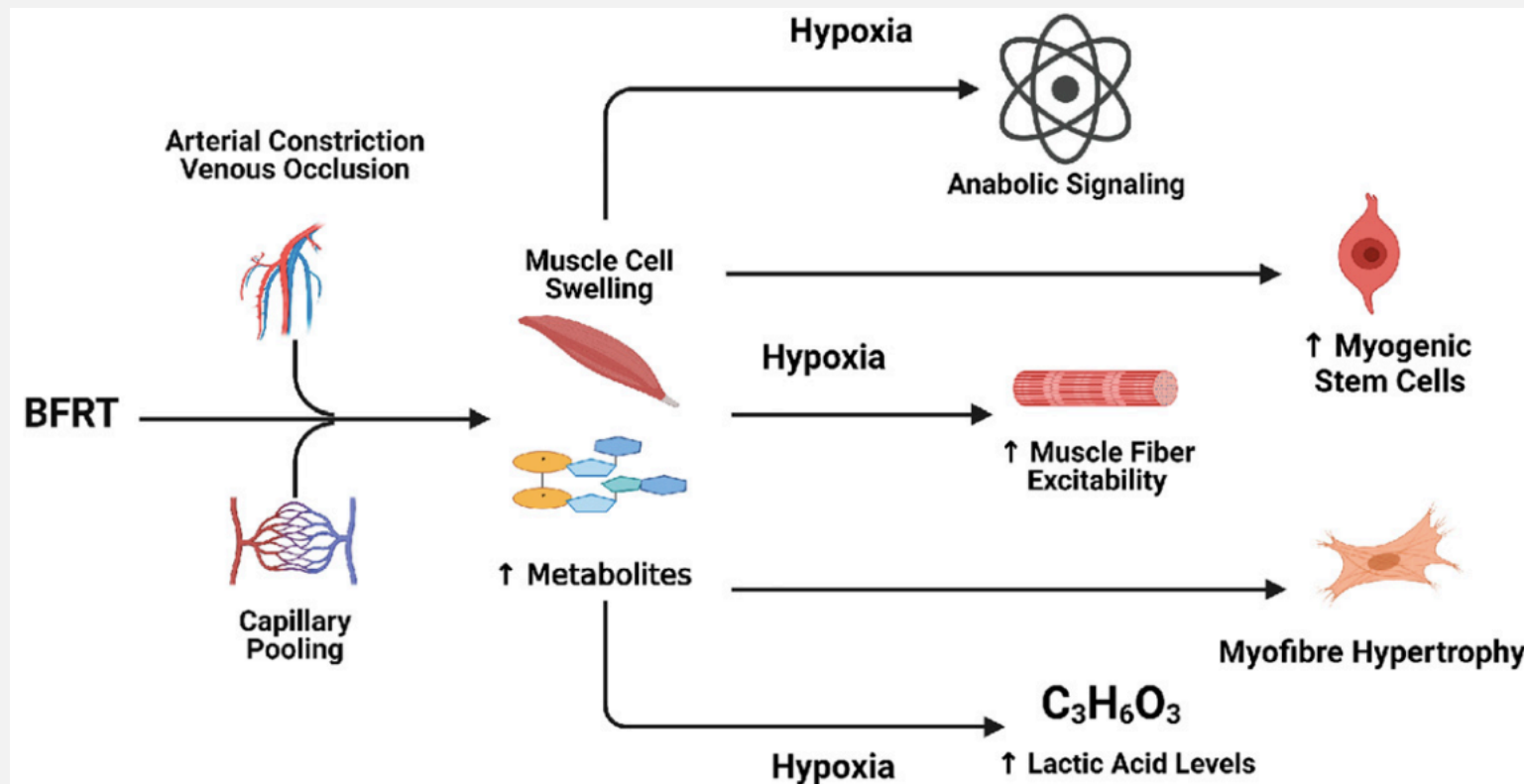
- Major components
 - Strengthening (hips, core)
 - Stretching
 - Aerobic conditioning
 - Modalities (topical medications, bracing)
- Additional benefits
 - Weight loss, cardiovascular benefits
 - Psychological well-being
 - Maintains cartilage integrity
 - Improves bone density

Physical therapy for patients with knee and hip osteoarthritis: supervised, active treatment is current best practice

S.T. Skou^{1,2}, E.M. Roos¹

- Clinical and Experimental Rheumatology, 2019
- Literature review of RCTs, current best practice recommendations
- **CONCLUSIONS**
- Exercise therapy and education, typically delivered by physical therapists, are core, first line, and universally recommended treatment guidelines for OA alongside weight loss, if needed
- Exercise therapy should be individualized, but at least **12 supervised sessions (2 per week)** are required initially to obtain sufficient clinical benefit

BLOOD FLOW RESTRICTION (BFR)



Benefits of Resistance Training with Blood Flow Restriction in Knee Osteoarthritis

RODRIGO BRANCO FERRAZ¹, BRUNO GUALANO^{1,2}, REYNALDO RODRIGUES², CECI OBARA KURIMORI², RICARDO FULLER², FERNANDA RODRIGUES LIMA², ANA LÚCIA DE SÁ-PINTO², and HAMILTON ROSCHEL^{1,2}

- American College of Sports Medicine, 2018
- RCT of 48 patients, three treatment groups over 12 weeks: BFRT, HI-RT, LI-RT
- Primary outcomes: I RM, quadriceps cross sectional area, timed-up-and-go, WOMAC
- **CONCLUSIONS**
- **BFRT** and **HI-RT** were similarly effective but both more effective than LI-RT in all domains
- BFRT did so while inducing **less joint stress**

Is aquatic exercise more effective than land-based exercise for knee osteoarthritis?

Rui Dong, MD^{a,b}, Yunyao Wu, MD^c, Shibing Xu, MD^d, Lei Zhang, MD^e, Jun Ying, MD^{a,b}, Hongting Jin, MD^{a,b}, Pinger Wang, MD^{a,b}, Luwei Xiao, MD^{a,b}, Peijian Tong, MD^{a,b,f,*}

- Medicine Journal, 2018
- Systematic review of 8 RCTs (579 patients) comparing aquatic exercise (AQE) to land-based exercise (LBE)
- Primary outcomes: pain relief, physical function, quality of life
- **CONCLUSIONS**
- No significant difference between AQE and LBE (short- or long-term)
- Compared to no intervention, AQE mildly improved daily function and significantly improved sporting/recreational function

Exercising with Osteoarthritis



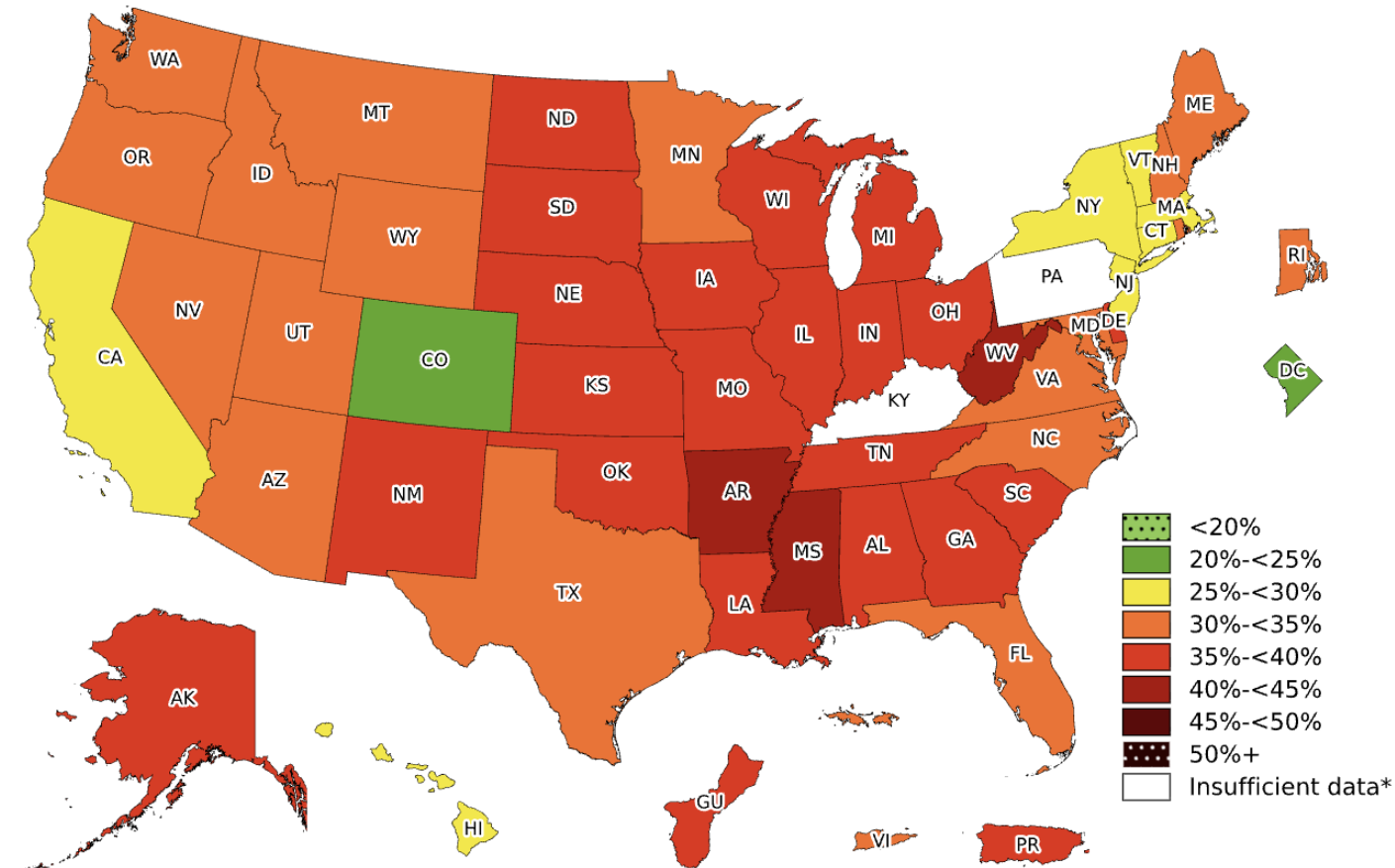
Around 27 million Americans have osteoarthritis (OA), a degenerative joint disease. Ongoing loss of cartilage causes joint pain and reduced range of motion. This often leads to physical disability and reduced quality of life.

- Aerobic
 - 150min/week moderate intensity, 75min/week vigorous intensity, or combo of both
 - Total exercise time is more important than intensity
- Resistance
 - Light-to-moderate resistance training, 2-3days/week
 - Start with 10-15 repetitions, build to 15-20 repetitions before adding another set
- Other
 - Yoga, Pilates, tai-chi improve strength and flexibility

WEIGHT LOSS

- Weight reduction decreases stress on weight-bearing joints (hips, knees)
- Every 1-unit weight loss is associated with a 4-unit reduction in knee joint forces
- Obesity (BMI >30) is becoming an increasing issue in the United States

OBESITY TRENDS (CDC, 2024)



Weight loss: the treatment of choice for knee osteoarthritis?

A randomized trial

R. Christensen M.Sc.^{†‡}, Prof. A. Astrup D.M.Sc., M.D.[‡] and Prof. H. Bliddal D.M.Sc., M.D.^{†*}

[†] *The Parker Institute, H:S Frederiksberg Hospital, Denmark*

[‡] *The Department of Human Nutrition, The Royal Veterinary and Agricultural University, Frederiksberg, Denmark*

- Osteoarthritis and Cartilage, 2005
- 80 patients with knee OA (mean BMI 35, mean age 62), 2 groups: low energy diet (LED) and control
- Primary outcome: WOMAC
- **CONCLUSIONS**
- In patients with knee OA, weight loss of 10% improved function by 28%

BRACING AND ORTHOTICS

- Wearable medical devices
 - Support
 - Alignment
 - Assist muscle weakness
 - Improve proprioception
- Decrease load through an arthritic compartment
- Risks
 - Discomfort
 - Skin irritation
 - Stiffness

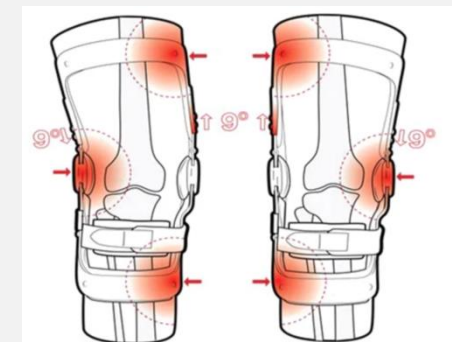
An Update on Unloading Knee Braces in the Treatment of Unicompartmental Knee Osteoarthritis from the Last 10 Years: A Literature Review

Dylan A. Mistry¹ Amit Chandratreya, MB, MS, DNB, MCh, FRCS² Paul Y. F. Lee, MBBCh, MFSEM, MSc, PhD, FEBOT, FRCS^{3,4}

- The Surgery Journal, 2018
- Literature review of 14 published articles on bracing for unicompartmental knee OA
- Primary outcomes: pain, function, quality of life
- **CONCLUSIONS:**
- Almost all studies found some benefit with offloading brace to **improve quality of life and delay surgery**



<https://orthoinfo.aaos.org/en/treatment/unicompartmental-knee-replacement/>



<https://www.nature.com/articles/s41598-018-28782-3>

DRUG THERAPY

- Topical
 - Capsaicin
 - Lidocaine
 - Diclofenac
- Systemic
 - Glucosamine, chondroitin
 - Acetaminophen
 - NSAIDs
 - Tramadol
 - Opioids

AAOS RECOMMENDATIONS (2021)

- Oral NSAIDs, topical NSAIDs, and acetaminophen are recommended to improve pain and function in the treatment of knee osteoarthritis when not contraindicated (**Strong**)
- The following supplements may be helpful in reducing pain and improving function for patients with mild to moderate knee osteoarthritis; however, the evidence is inconsistent/limited and additional research clarifying the efficacy of each supplement is needed: turmeric, ginger extract, glucosamine, chondroitin, vitamin D (**Limited**)
- Oral narcotics, including tramadol, result in significant increase of adverse events and are not effective in improving pain or function for treatment of osteoarthritis of the knee (**Strong**)

ACR RECOMMENDATIONS (2019)

- **Strong** Recommendations For
 - Oral NSAIDs
 - Topical NSAIDs
- **Strong** Recommendations Against
 - Bisphosphonates
 - Glucosamine
 - Chondroitin
 - Hydroxychloroquine
 - Methotrexate
 - IL-1 receptor antagonists
 - TNF inhibitors

ACR RECOMMENDATIONS (2019)

- **Conditional** Recommendation For
 - Acetaminophen
 - Tramadol
 - Topical capsaicin
 - Duloxetine
- **Conditional** Recommendation Against
 - Opioids (non-tramadol)
 - Colchicine
 - Fish oil
 - Vitamin D

GLUCOSAMINE AND CHONDROITIN

- Glucosamine: **stimulates** the **repair** of articular cartilage in our bodies
- Chondroitin sulfate: **prevents** the enzymatic **breakdown** of cartilage
- Popular OTC supplement advertised to preserve joint health
- No current evidence that either product slows the arthritic process or creates new articular cartilage
- No current FDA regulation of what goes in products

Effects of glucosamine in patients with osteoarthritis of the knee: a systematic review and meta-analysis

Toru Ogata¹ · Yuki Ideno² · Masami Akai³ · Atsushi Seichi⁴ · Hiroshi Hagino^{5,6} · Tsutomu Iwaya⁷ · Toru Doi^{1,8} · Keiko Yamada⁸ · Ai-Zhen Chen⁹ · Yingzi Li¹⁰ · Kunihiko Hayashi⁹

- Clinical Rheumatology, 2018
- Metanalysis of 18 RCTs (2003—2016) in patients taking glucosamine with knee OA
- Primary outcomes: pain (VAS), function (WOMAC)
- **CONCLUSIONS**
- Marginally favorable benefit for **pain**
- No improvement in function

NSAIDS FOR KNEE OA

- In 2018, JAAOS ranked oral NSAIDs for pain relief and improved function in knee OA (evidence from 53 RCTs, minimum 30 participants in each trial)

Naproxen ranked most effective among conservative treatments of KOA and should be considered when treating pain and function because of its relative safety and low cost. The best available evidence was analyzed, but there were instances of inconsistency in the design and duration among articles, potentially affecting uniform data inclusion.

Table 1: The degree of inhibition of COX-2 relative to COX-1 for various NSAIDs

NSAID type	COX-2 selectivity*
COX-2 selective inhibitors	
Rofecoxib	80
Etodolac	23
Meloxicam	11
Celecoxib	9
Nonselective NSAIDs	
Diclofenac	4
Sulindac	3
Piroxicam	2
Ibuprofen	0.4
Naproxen	0.3
Indomethacin	0.2
Ketorolac	0.003

Note: COX = cyclooxygenase, NSAID = nonsteroidal anti-inflammatory drug.

*The 80% inhibitory concentration ratios of COX-2 relative to COX-1 in human whole blood assays.¹²

ADVERSE EFFECTS OF NSAIDS

- Gastric
 - Inhibition of prostaglandins that protect gastric mucosa (COX-1)
 - Gastric ulcers, bleeds
- Renal
 - Altered renal hemodynamics (COX-1 and COX-2)
 - Elevated blood pressure, acute renal dysfunction, fluid and electrolyte disorders, renal papillary necrosis, and nephrotic syndrome/interstitial nephritis
- Cardiovascular
 - Increased risk of thromboembolic events, MI, and atrial fibrillation (COX-2)
 - Highest risk with **diclofenac**

Acetaminophen for osteoarthritis

Tanveer Towheed¹, Lara Maxwell², Maria Judd³, Michelle Catton⁴, Marc C Hochberg⁵, George A Wells⁶

- Cochrane, 2006
- Systematic review of 15 RCTs (7 comparing Tylenol vs. placebo, 10 comparing Tylenol vs. NSAIDs in patients with knee and hip OA)
- Primary outcomes: pain, function
- **CONCLUSIONS**
- Acetaminophen > placebo in pain reduction (NNT 4-16)
- **NSAIDs > acetaminophen** in pain reduction, improved function
 - Slightly high adverse GI events in the NSAID group (19% vs. 13% in 6 weeks)

Efficacy and safety of diclofenac sodium 2% topical solution for osteoarthritis of the knee: a randomized, double-blind, vehicle-controlled, 4 week study

L. Tyler Wadsworth, Jeffrey D. Kent & Robert J. Holt

- Current Medical Research and Opinion, 2015
- 4-week double-blinded RCT of 249 patients (ages 40-85) with primary knee OA comparing topical diclofenac vs. vehicle control BID
- Primary outcome: WOMAC
- **CONCLUSIONS**
- Diclofenac 2% topical solution BID resulted in significantly greater improvement in pain and function vs. control with no serious adverse side effects

Comparative pain reduction of oral non-steroidal anti-inflammatory drugs and opioids for knee osteoarthritis: systematic analytic review

S.R. Smith †^a, B.R. Deshpande †^a, J.E. Collins †‡, J.N. Katz †‡§||, E. Losina †‡§¶*

- Osteoarthritis and Cartilage, 2016
- Systematic review of 17 RCTs with 27 treatment arms, including celecoxib, diclofenac, naproxen, tramadol, and oxycodone, among others, for knee OA
- Primary outcome: WOMAC
- **CONCLUSIONS**
- **No significant difference** in pain reduction between NSAIDs, low potency opioids (tramadol), or high potency opioids (oxycodone)

INTRAARTICULAR TREATMENT

- Corticosteroids
- Viscosupplementation
- PRP

AAOS RECOMMENDATIONS (2021)

- Intra-articular corticosteroids could provide short-term relief for patients with symptomatic osteoarthritis of the knee (Moderate)
- Hyaluronic acid intra-articular injection is not recommended for routine use in the treatment of symptomatic osteoarthritis of the knee (Moderate)
- Platelet-rich plasma (PRP) may reduce pain and improve function in patients with symptomatic osteoarthritis of the knee (Limited)

ACR RECOMMENDATIONS (2019)

- **Strong** Recommendations For
 - Intraarticular glucocorticoid injection
- **Strong** Recommendations Against
 - PRP
 - Stem cell injections

ACR RECOMMENDATIONS (2019)

- **Conditional** Recommendations For
 - None
- **Conditional** Recommendations Against
 - Intraarticular hyaluronic acid injections
 - Intraarticular botox
 - Prolotherapy

CORTICOSTEROID INJECTIONS

- Philip **Hench**, Edward **Kendall**, and Tadeus **Reichstein** received the Nobel Prize in Physiology or Medicine in 1950 for their “investigations of the hormones of the adrenal cortex”
- They first realized its therapeutic potential in patients with rheumatoid arthritis in **1929**
- Cortisone was first produced commercially by Merck & Co in **1948**

The Nobel Prize in Physiology or Medicine 1950



Photo from the Nobel Foundation archive.

Edward Calvin Kendall

Prize share: 1/3



Photo from the Nobel Foundation archive.

Tadeus Reichstein

Prize share: 1/3



Photo from the Nobel Foundation archive.

Philip Showalter Hench

Prize share: 1/3

BENEFITS OF CORTISONE INJECTIONS

- Reduced pain and inflammation for weeks to months
 - Decreased need for anti-inflammatories
- Improved mobility and exercise tolerance
- Low cost

Review Article

The Efficacy and Duration of Intra-articular Corticosteroid Injection for Knee Osteoarthritis: A Systematic Review of Level I Studies

- JAAOS, 2009
- Systematic review of 6 level I studies (279 total patients) comparing corticosteroid injection to placebo, as well as comparing different types of corticosteroid injections
- Primary outcomes: pain (VAS), duration
- **CONCLUSIONS**
- 22% reduction in pain compared to placebo at 1 week
- No significant difference in pain at 3-4 weeks or at 6-8 weeks
- Triamcinolone was more effective than betamethasone in 2 studies

MATERIALS

- Topical Betadine
- Alcohol Swabs
- Ethyl chloride spray
- Sterile gauze sponges
- 10 cc syringe
- 22g 1.5” needle
- Bandage



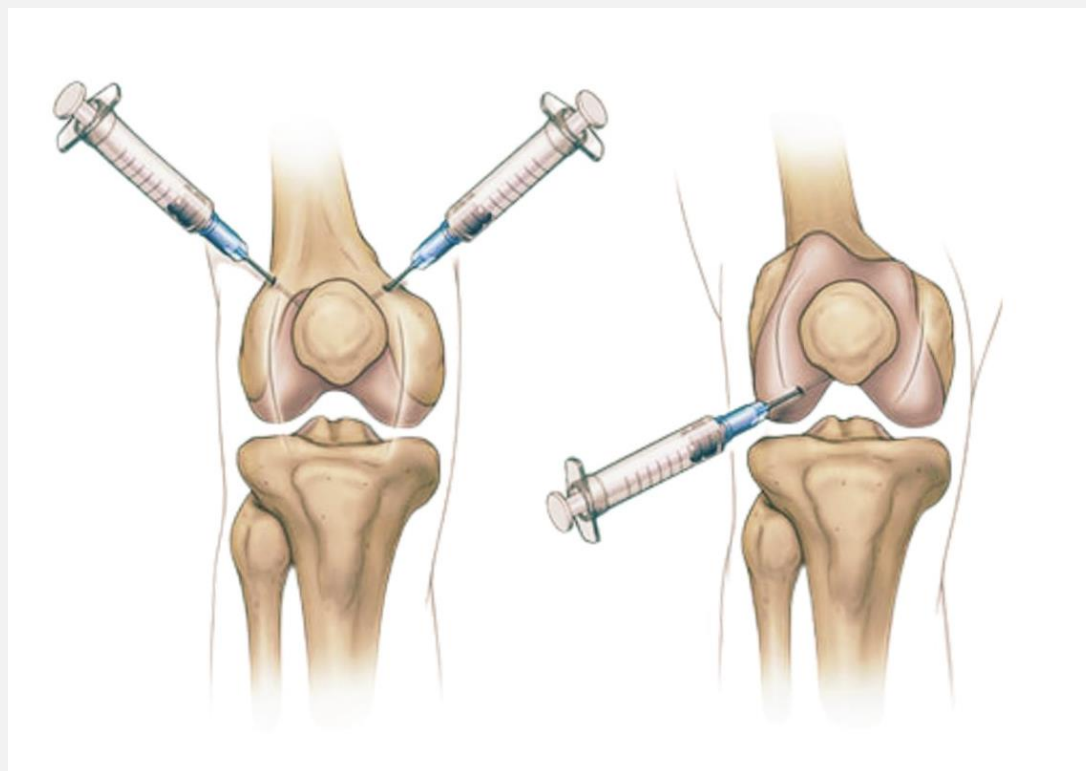
- 2:2:1 Ratio
 - 1% Lidocaine
 - 0.5% Bupivacaine
 - Triamcinolone 40mg/mL
- Some studies have suggested longer relief with higher doses of steroid
 - Up to 16-24 weeks



APPROACH

Suprapatellar

Anterolateral



RISKS OF CORTISONE INJECTIONS

- Bleeding
- Infection
- Pain
 - Cortisone flare
- Systemic Effects
 - Headache, flushing, elevated blood sugar, elevated blood pressure
- Cartilage Damage

JAMA | Original Investigation

Effect of Intra-articular Triamcinolone vs Saline on Knee Cartilage Volume and Pain in Patients With Knee Osteoarthritis

A Randomized Clinical Trial

Timothy E. McAlindon, DM, MPH; Michael P. LaValley, PhD; William F. Harvey, MD; Lori Lyn Price, MAS; Jeffrey B. Driban, PhD; Ming Zhang, PhD; Robert J. Ward, MD

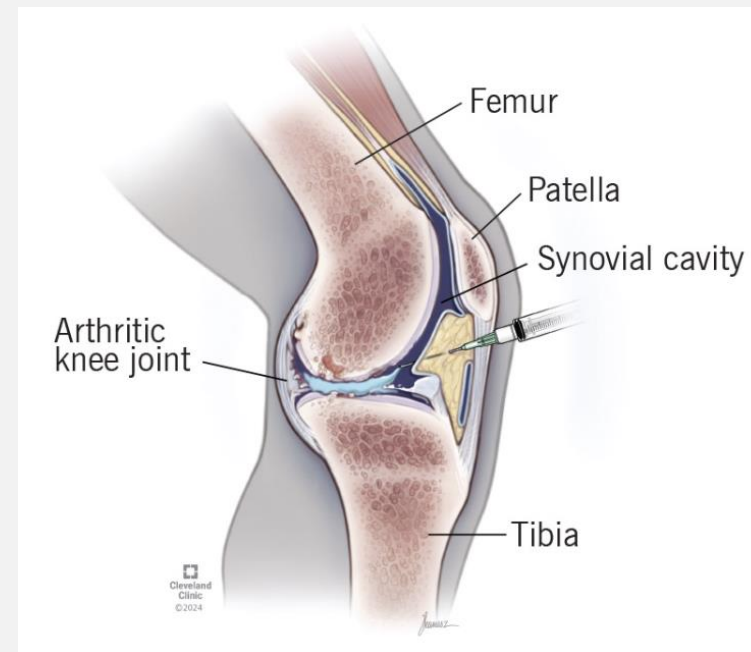
- JAMA, 2017
- 2-year randomized, placebo-controlled, double-blind RTC comparing intraarticular triamcinolone vs. saline every 12 weeks in 140 patients with primary symptomatic knee OA
- Primary outcomes: WOMAC, cartilage volume (determined by annual MRI)
- **CONCLUSIONS**
- Triamcinolone injections resulted in significantly **greater cartilage volume loss** with **no significant difference in pain** improvement when compared to saline injections

- Exogenous hyaluronic acid injected into joints with the goal of **restoring rheological properties of synovial fluid**
- Stimulates production of hyaluronic acid by synoviocytes and has anti-inflammatory and analgesic properties, among other effects

	Compound				
	Hyalgan ^{®41}	Supartz ^{®42}	Synvisc ^{®40}	Orthovisc ^{®44}	Euflexxa ^{™43}
Generic name	Sodium hyaluronate	Sodium hyaluronate	Hylan G-F 20	High-molecular-weight hyaluronan	Sodium hyaluronate
Manufacturer	sanofi-aventis	Smith & Nephew	Genzyme Corporation	DePuy Mitek	Ferring Pharmaceutical
Molecular weight (kDa)	500–730	620–1170 20% hylan B (>6000)	80% hylan A (6000),	1000–2900	2400–3600

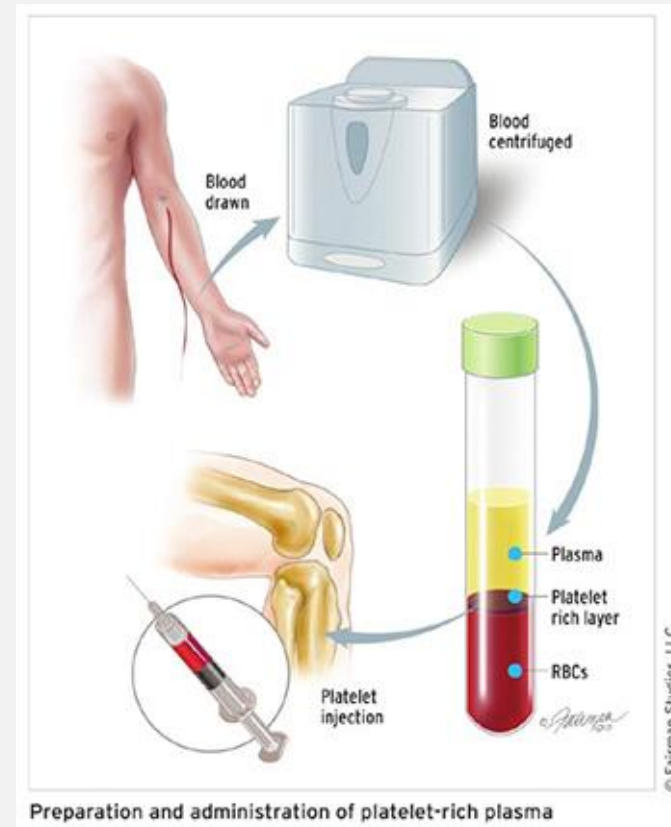
RISKS OF VISCOSUPPLEMENTATION

- Bleeding
- Infection
- Allergic reaction
- Pseudoseptic arthritis

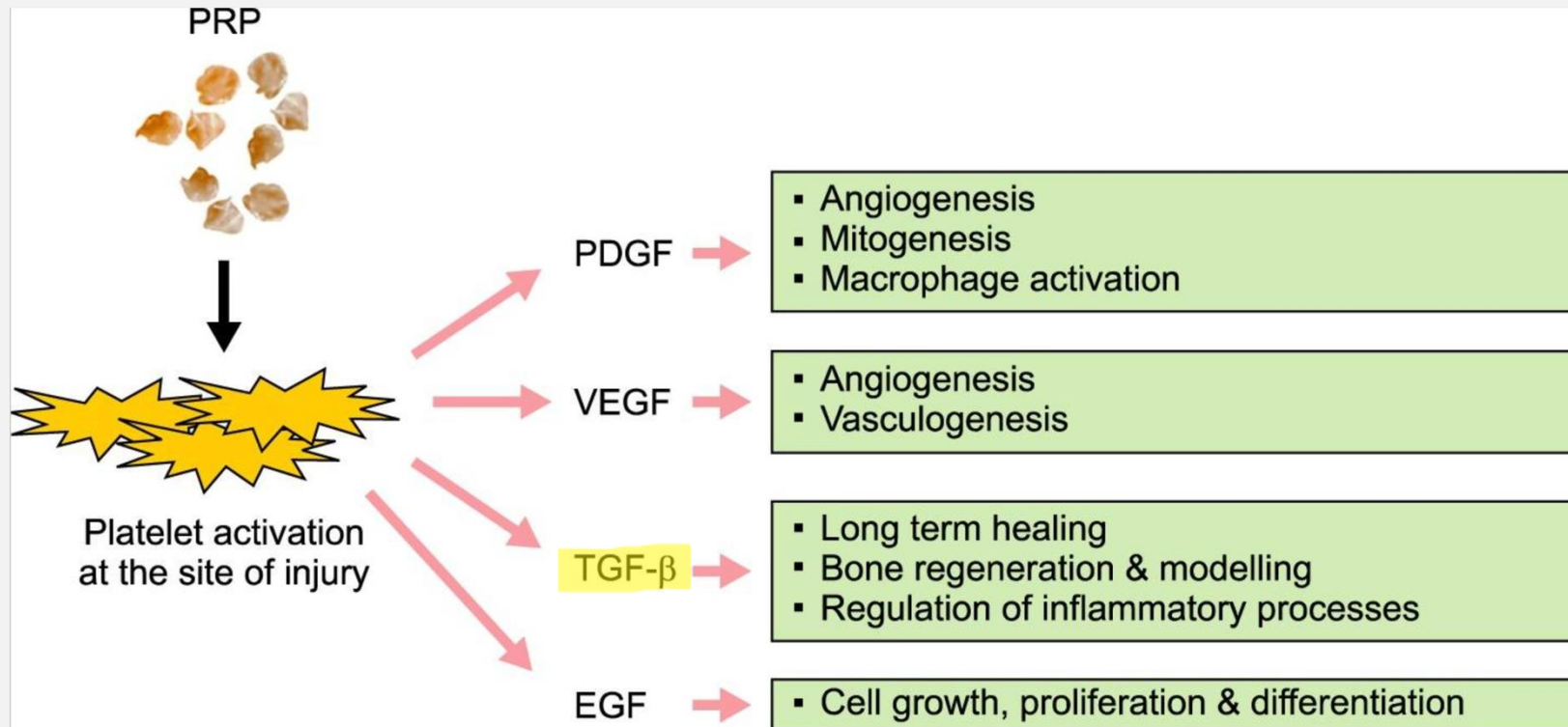


PLATELET-RICH PLASMA (PRP)

- Autologous product that concentrates a large amount of platelets into a small value
 - 5-10x the amount of platelets, and therefore growth factors, as is typically found in blood
- Goal is to **accelerate healing** of injured tendons, ligaments, muscles, and joints



MECHANISM OF PRP



CONSIDERATIONS AND CONTRAINDICATIONS OF PRP

- Cost
- Bleeding
 - Rare cases of coagulopathy due to use of bovine thrombin in preparation
- Contraindications include:
 - Anemia
 - Thrombocytopenia
 - Use of fibrinolytics or anticoagulants
 - Unstable angina

Platelet-rich plasma versus hyaluronic acid in the treatment of knee osteoarthritis

A meta-analysis

Zehan Chen, BS^a, Chang Wang, MD^a, Di You, MD^b, Shishun Zhao, PhD^a, Zhe Zhu, PhD^c, Meng Xu, MD^{d,*}

- Medicine, 2020
- 14 randomized controlled trials including 1350 patients
- Primary outcomes: long-term VAS, IKDC, WOMAC
- **CONCLUSIONS**
- **PRP** was superior to HA in long-term VAS, IKDC, and WOMAC pain, stiffness, and physical function scores as well as WOMAC total scores (short, mid, and long-term) without increased risk of adverse events

FUTURE TREATMENTS

Low-dose radiation therapy offers substantial relief to people with painful knee osteoarthritis

Placebo-controlled clinical trial finds non-invasive radiation treatment offers a conservative alternative to medications, joint surgery

SAN FRANCISCO, September 28, 2025

- Multicenter RCT of 114 patients with mild-to-moderate knee OA comparing treatment with low dose (3 Gy), very low dose (0.3 Gy), or placebo
- Primary outcomes: WOMAC, VAS
- **CONCLUSIONS**
- Meaningful improvements in total WOMAC (pain, stiffness, and physical function) at 4 months in the 3 Gy group (56.8%) compared to placebo (30.6%)
- 12-month follow-up is underway

TAKE HOME POINTS

- Knee osteoarthritis a multifactorial disease seen commonly in the primary care setting
- Exercise, self-management programs, and patient education are integral in symptom management
- Tylenol and NSAIDs (oral and topical) are shown to improve pain and function in patients that do not have contraindications
- Intra-articular injections may provide short-term relief but should be reserved for patients that fail other treatment modalities

QUESTIONS?

REFERENCES

- [illegible]