

2021 Napa Primary Care Conference

Alternative Treatments for Musculoskeletal Pain

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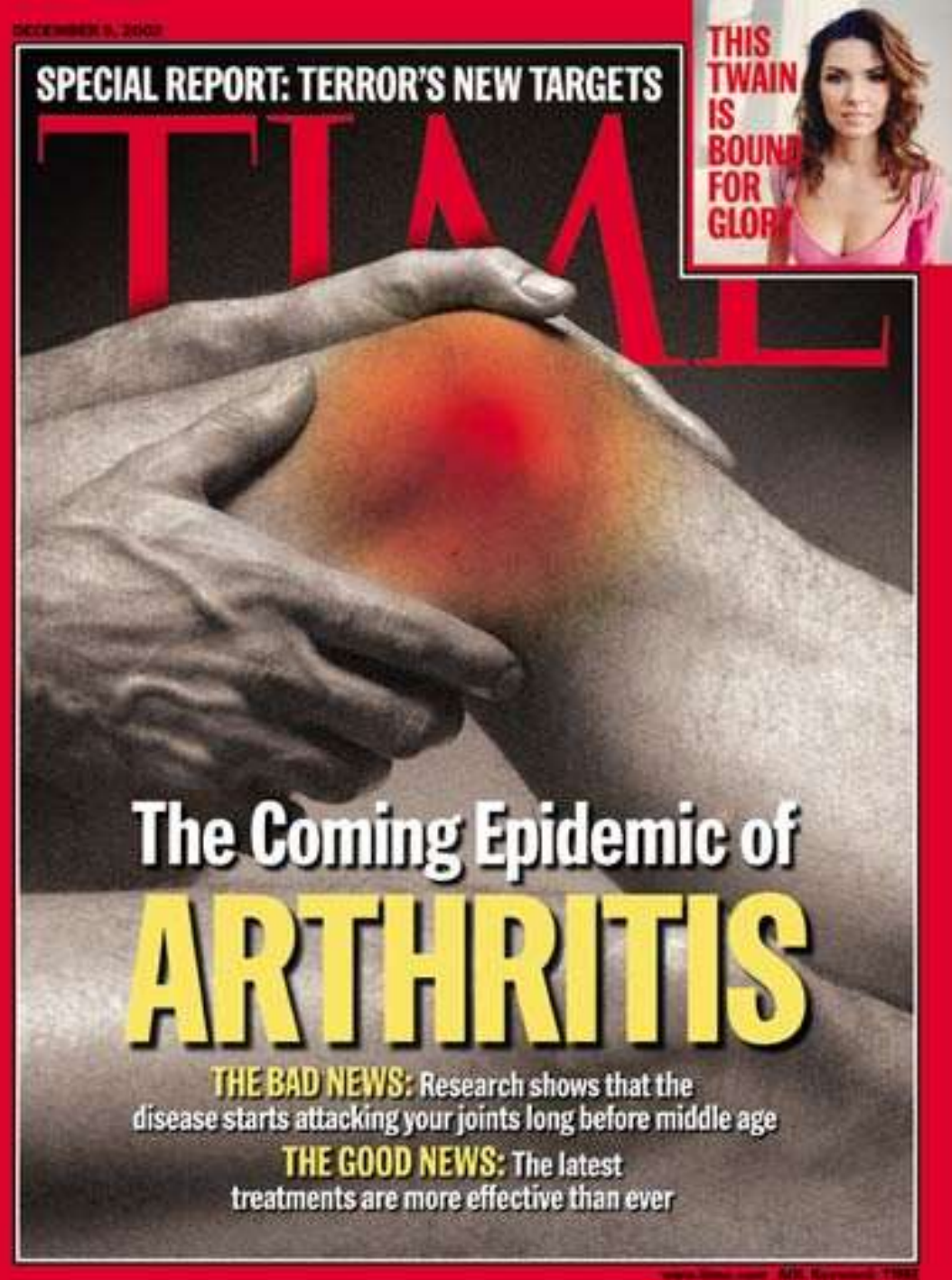
UC Riverside School of Medicine

Musculoskeletal Pain is Ubiquitous

- Everyone gets it at some time in their life – especially those who are active
- There are three main causes:
 - Acute traumatic events
 - Everyday activities that put unusual or repetitive strains on the MSK system (overuse)
 - Musculoskeletal diseases



- Joint problems affect some 43 million Americans
- Most common cause of disability in adults
- More costly than diabetes and cancer
- Numbers are increasing

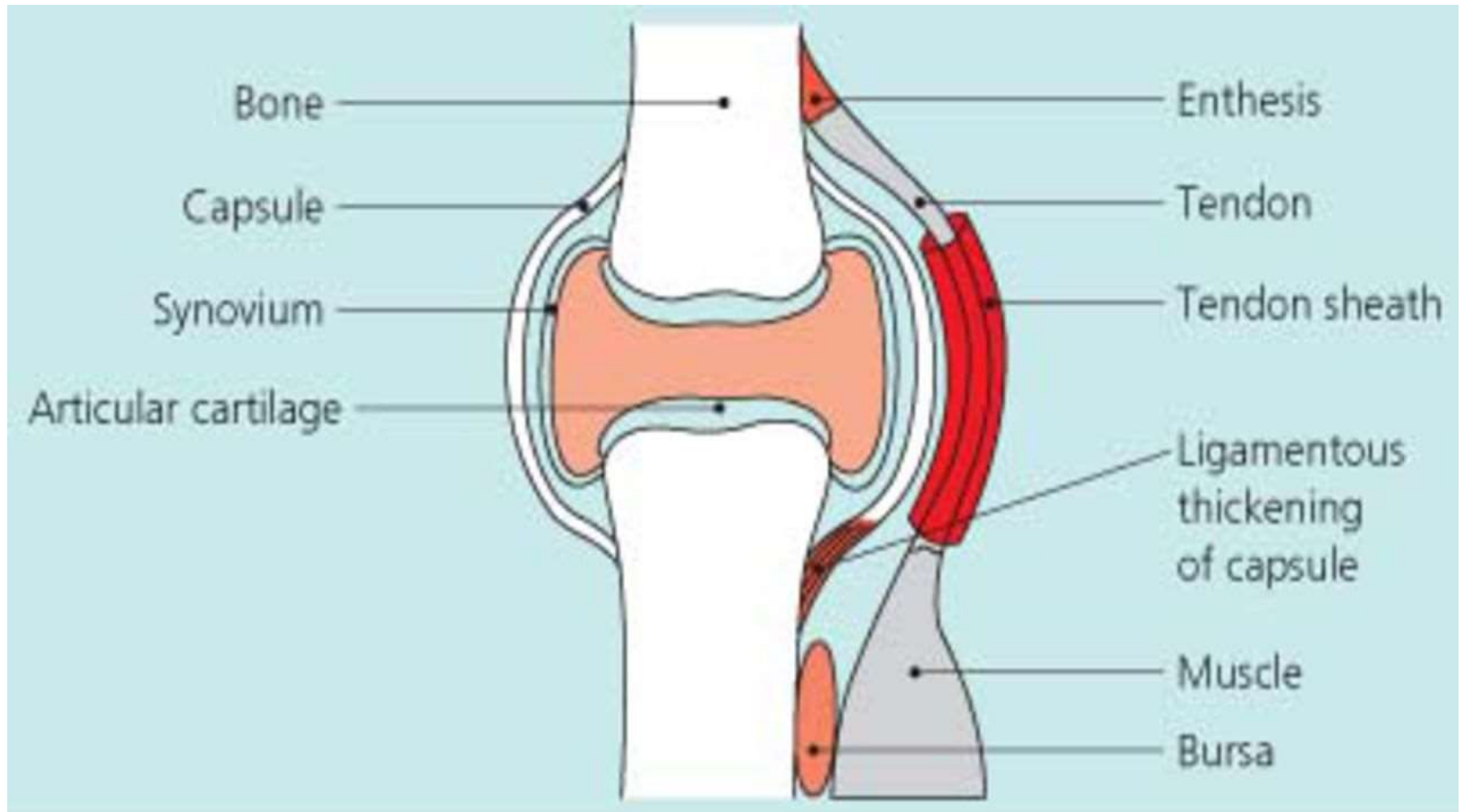


Chronic MSK Pain

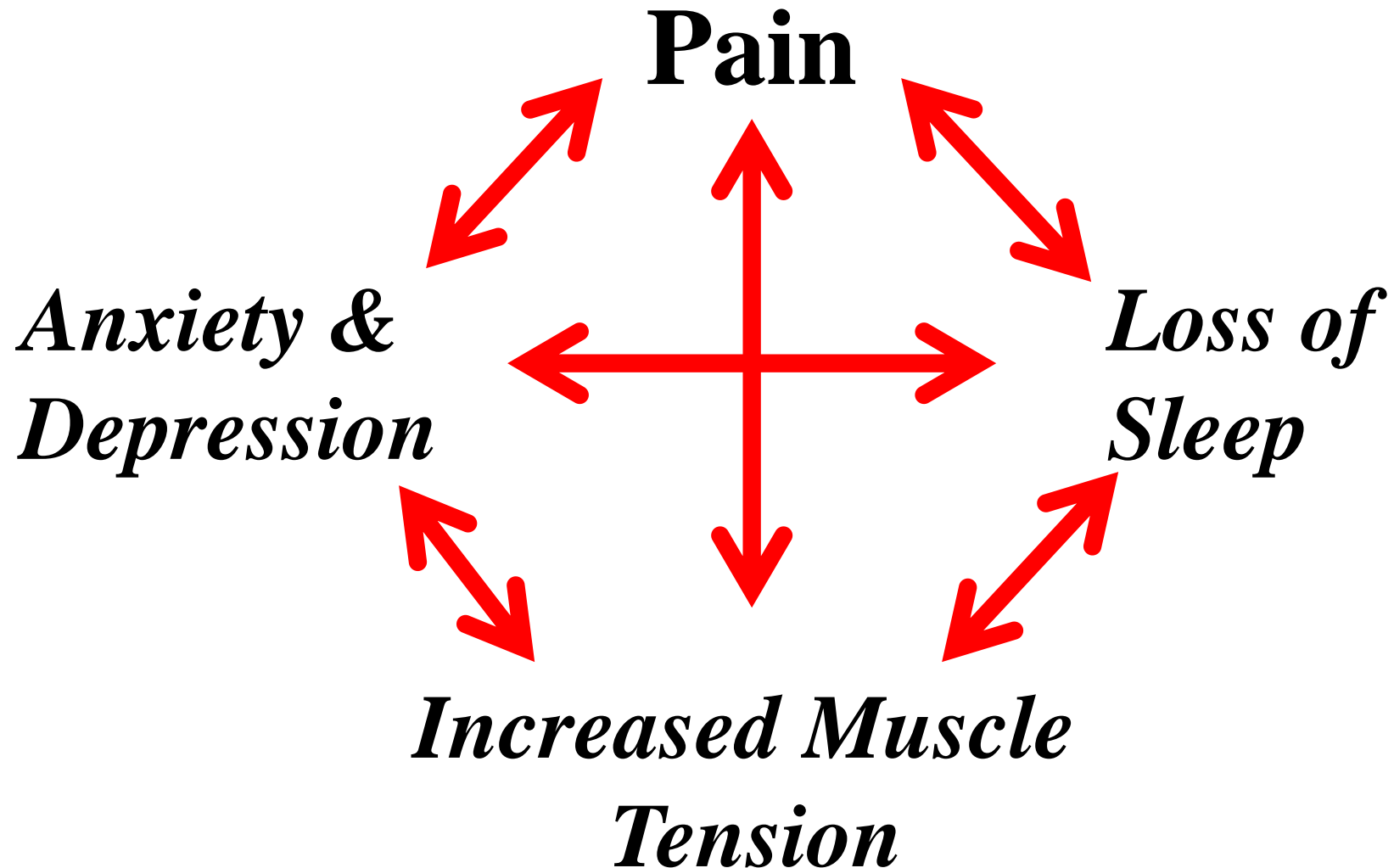
- 3 common sources of pain:
 - Referred pain from proximal site (sciatica or hip pathology causing knee pain)
 - Intra-articular problem (arthritis, disc, meniscus)
 - Periarticular structures
 - Enthesis (lateral epicondylitis)
 - Ligament (MCL strain or partial tear)
 - Tendon or its sheath (rotator cuff)
 - Bursa (greater trochanter, olecranon)
 - Muscle (strain or tear)
 - Bone (stress fracture)



Pain Generators Around a Joint



The Vicious Cycle of Chronic Pain

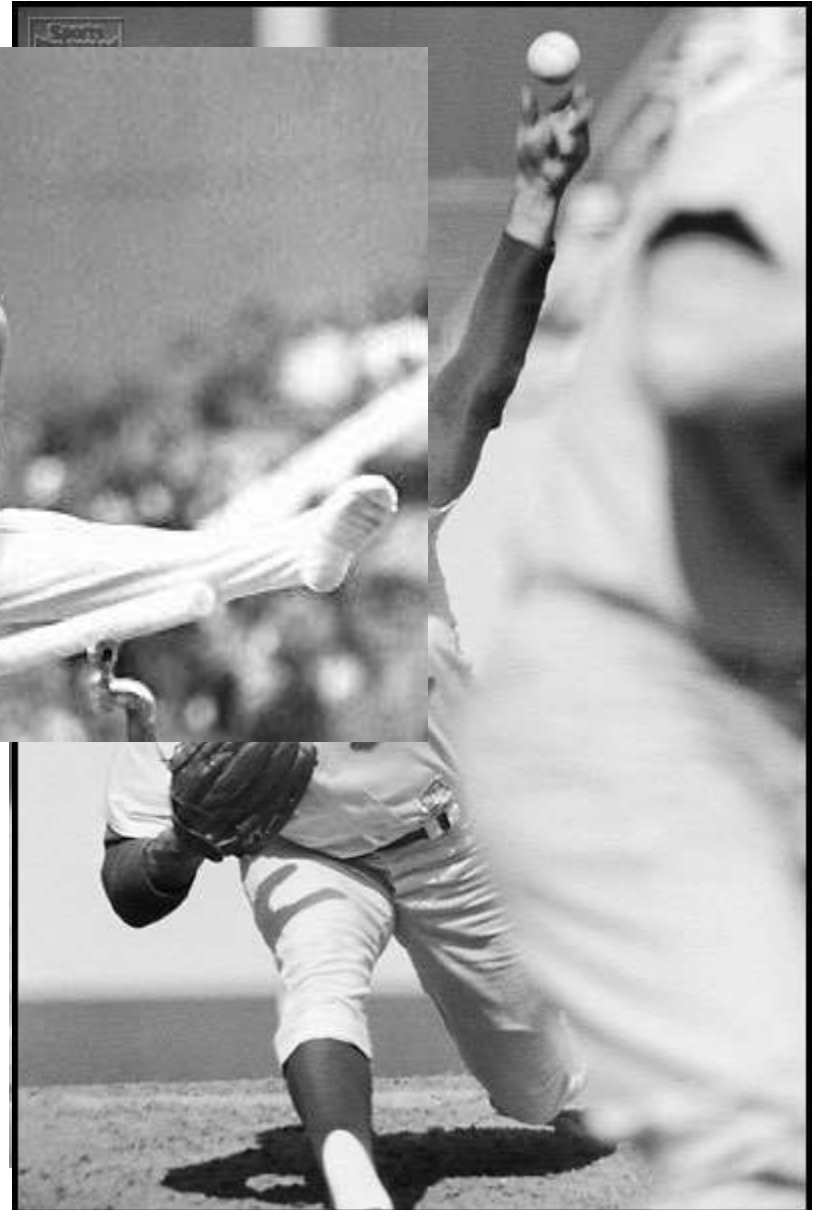
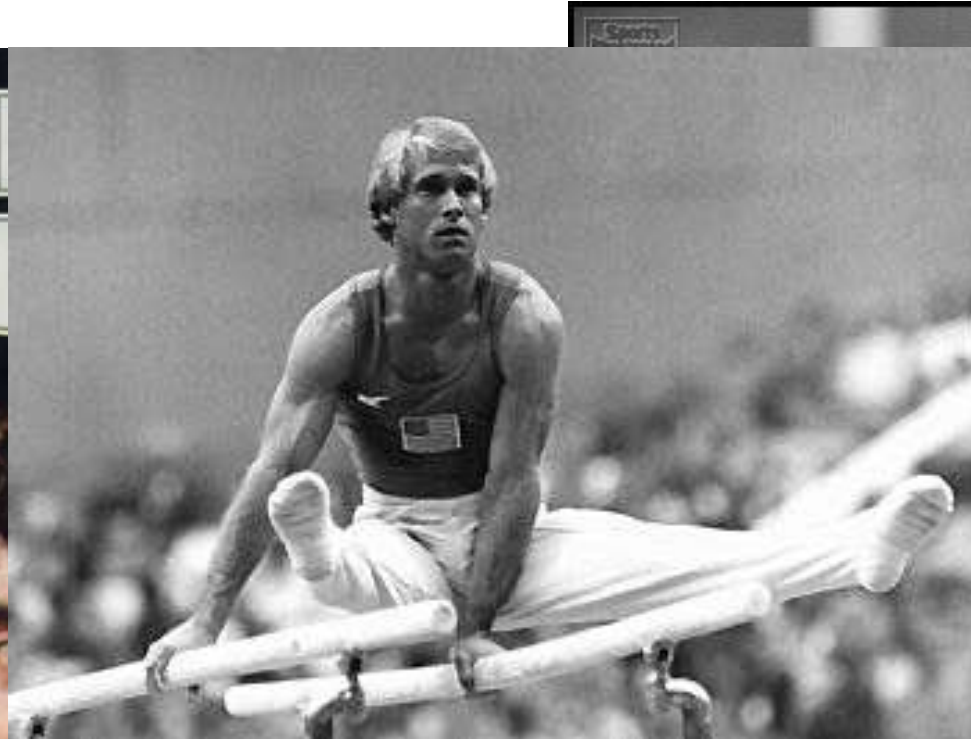
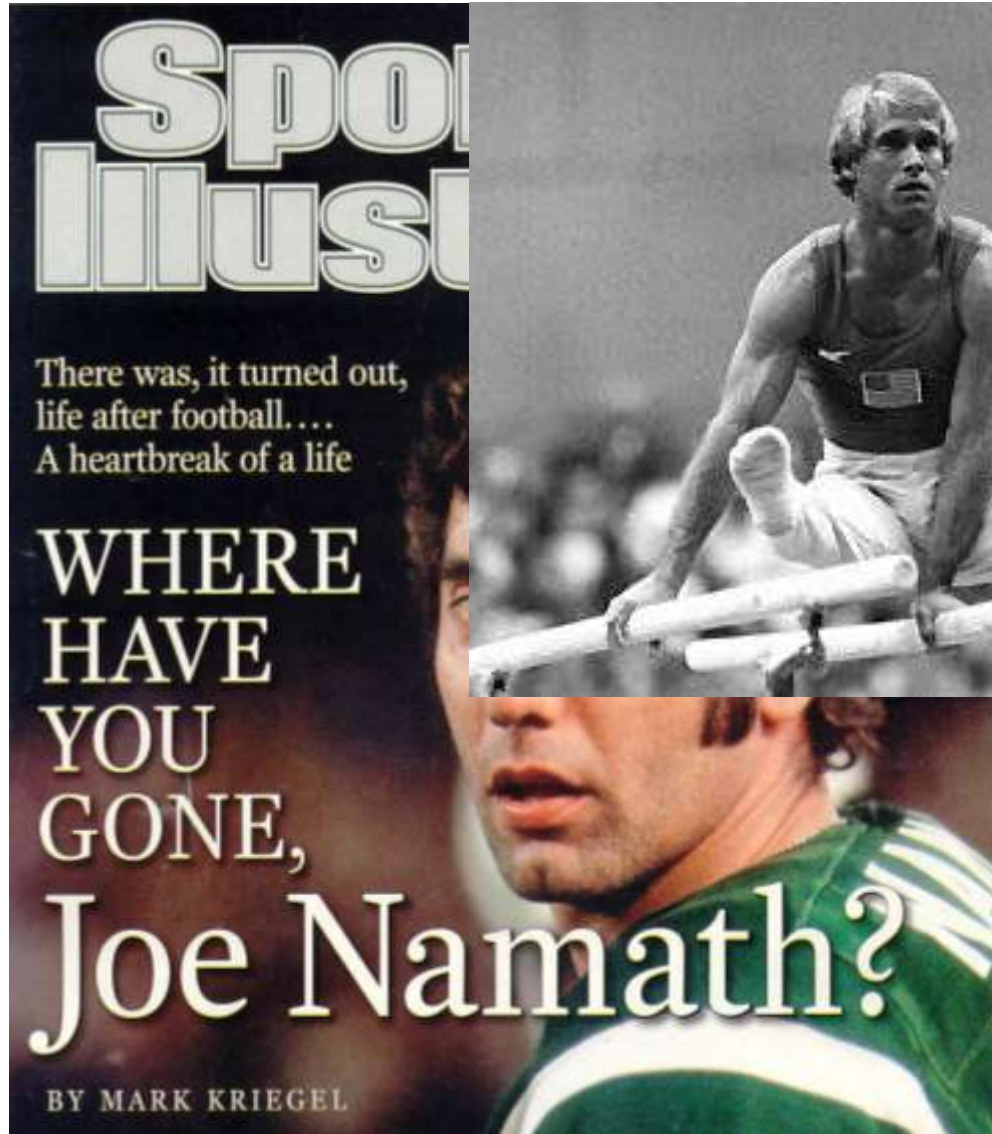


Osteoarthritis

- Most common joint disorder, with predilection for those over 50
- Slowly progressive, with continued breakdown of articular cartilage and changes in subchondral bone
- Common synonyms are **osteoarthrosis** and **degenerative joint disease (DJD)**
 - Osteoarthrosis may be better term since inflammation is often mild
 - Degenerative changes are the predominant factor contributing to disability



Occupational Hazard for Athletes?



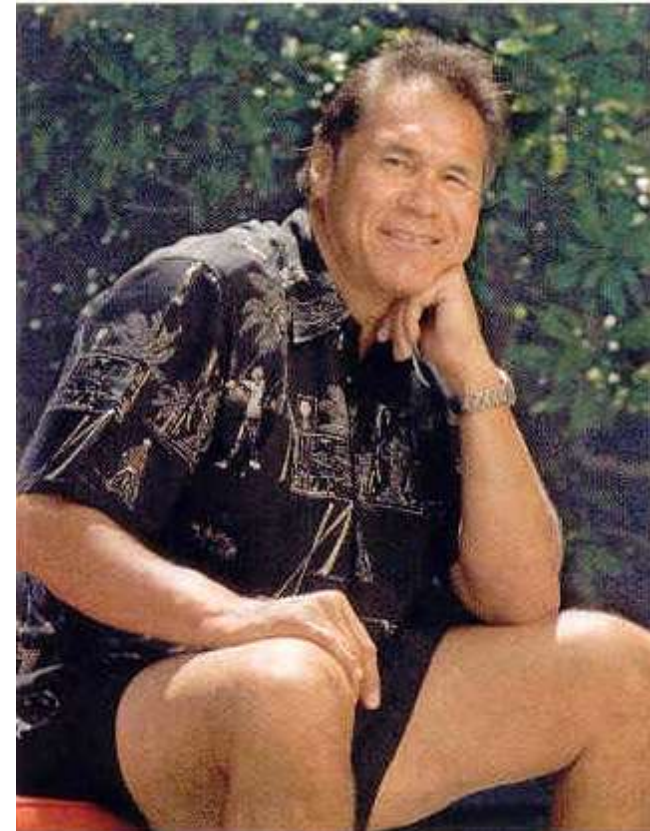
25 YEARS LATER

[JIM PLUNKETT]

Painful Reminders

The Raiders' two-time Super Bowl-winning quarterback is having a fine retirement, but his knees, shoulder, back and neck are living in the past

- “No relief, there’s never any relief. Day in, day out, I feel like crap. Don’t believe anything people say about those golden years of your life. They suck!”



Treatment Goals for MSK Pain

- 4 Main Goals
 - Control discomfort and swelling
 - Minimize disability
 - Improve the quality of life
 - Educate patient about their role in the management
- Subjective complaints and objective findings help guide appropriate therapy
- Eliminating all pain is impossible



Treatment of MSK Pain

- Paradigm shift – **non-pharmacologic measures (not drugs) should be keystone of treatment**
- Previously NSAID's & Narcotics were primary focus
 - Studies showed only modest effectiveness in relieving pain
 - Potential serious adverse effects
- Drugs should be used as adjuncts (not alternatives) to other measures
 - Benefits of non-pharmacologic measures and drugs often additive
 - CDC recently said Nonopioid therapy is preferred when drug therapy used



Prescription Drug *Deaths*

Los Angeles Times | LOCAL

LOCAL U.S. WORLD BUSINESS SPORTS ENTERTAINMENT HEALTH LIVING TRAVEL OPINION

DYING FOR RELIEF | A TIMES INVESTIGATION

Times investigation: Legal drugs, deadly outcomes

Prescription overdoses kill more people than heroin and cocaine combined!

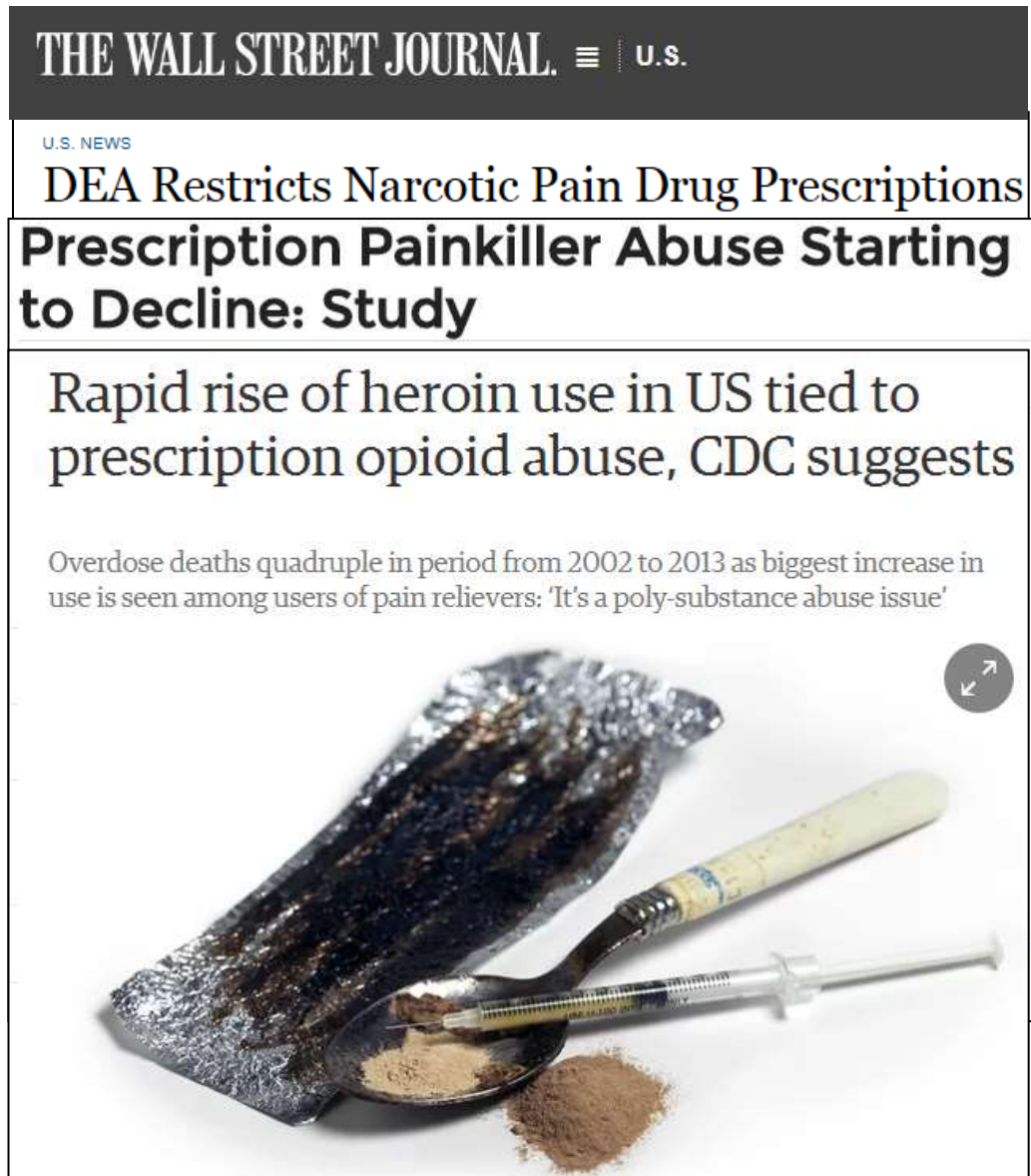
***>28K opioid deaths in 2014 (more than MVA's)
Equivalent of one 747 crashing each week.***

HELPED OR HOOKED?

Lynn Brunt snored loudly as her lungs slowly filled with fluid.

The Crackdown on Prescription Drugs

- 2012-13; 39% rise in Heroin related deaths
- 75% Heroin addicts previously addicted to prescription Opioids
- 90% first time users are white; Highest rise in women and wealthy
- Dramatic surge in HIV & Hepatitis C cases as well



Dr. Lisa Tseng

Rowland Heights, CA GP

Doctor convicted of murder for patients' drug overdoses gets 30 years to life in prison



Dr. Hsiu-Ying "Lisa" Tseng was sentenced to 30 years to life in prison for the murders of three of her patients who fatally overdosed, making Tseng the first doctor to be convicted of murder in the United States for overprescribing drugs. (Irfan Khan / Los Angeles Times)



By **Marisa Gerber** - Contact Reporter

Opioids After Joint Replacement

- Study looked at 574 pts undergoing hip or knee replacement
 - ~30% were taking opioids before their surgery
 - 6 mo after surgery; 53% of knee patients and 35% of hip patients were still taking opioids
 - In those not taking prior to surgery; 8% of knee and 4% of hip patients were still taking 6 mo after surgery
- Why are so many patients still taking these drugs after joint replaced?



Opioids Don't Work for Chronic Pain

- Studies show only modest benefit for short term use (<12 weeks)
 - Benefit cannot be extrapolated to chronic use due to tolerance and dependence
 - High percentage of pts self d/c opioids due to lack of efficacy and adverse effects
 - No study shows long-term (>1yr.) benefit of opioids in terms of pain and function
 - Pain beyond 3 mo. exceeds normal tissue healing time and a/w higher risk for long-term use
- Substantial risks; opioid use disorder, overdose, and death
- Excludes palliative and end of life care

Urgent Need for Non Drug Options to Treat Chronic MSK Pain

- Narcotics are not viable option for treating chronic MSK pain
- NSAID's have host of concerns, from ulcers to heart attacks
- Muscle relaxers limited benefit and risk in elderly
- Where can we turn to help patients?





“Primum non nocere”
First, do no harm!
- Hippocrates

Non-Pharmacologic Measures

- Exercise and weight loss
- Thermal modalities
- Education
- Joint protection
- External supports
- Rehabilitation and physical therapy



Exercise and Weight Loss

- Exercise – can improve general health and be therapeutic*
 - OA is a major reason for inactivity in elderly – health benefits of exercise lost
 - “Functional” exercises involving ADL’s best (climbing stairs, getting out of chair)
 - Non weight bearing with bike or water exercise
- Weight loss – helps pain with knee or hip OA**
 - Decreases risk for developing OA
 - Next to age, obesity biggest risk for OA -- 10 lb. loss helpful



*Mior, Clin J Pain. 2001

**Gay, Ann Phys Rehab Med. 2016

Thermal Modalities

- Heat – helps pain and spasm; use prior to stretching*
 - Moist heat may be better than dry
 - Hot paraffin or heat mitten for hands
 - Deep heat with diathermy (using ultrasound, microwave or shortwave)
- Cold – helps relieve muscle aches after exercise**
 - Helps control swelling
 - Apply using ice packs, ice massage or local spray
 - 20 min max time



*French, Cochrane Database Syst Rev. 2006

**Hubbard, J Athl Train. 2004

Pulsed Electromagnetic Field

- PEMF technology has been around for 60 years.
- Theory; uses electromagnetic waves pulsing on different frequencies thought to relieve pain by:
 - Reducing inflammation
 - Increasing circulation
 - Improving mobility
- Use up to 4-6 thirty min sessions per day; No known side effects.



Education and Joint Protection

- Patient education – should give encouragement and reassurance, along with advice on exercise and measures to unload joint (cane, brace or footwear).*
- Joint protection – of arthritic joint from stress decreases pain and preserves cartilage.
 - Walking transmits 3.5x body weight across joint, while squatting transmits 9x. Think about choosing swimming over running over tennis.
 - Instability in knee OA common – helped with a therapy program and controlled exposure to movements that challenge stability
 - Ambulatory assistive devices – such as canes and walkers can support gait

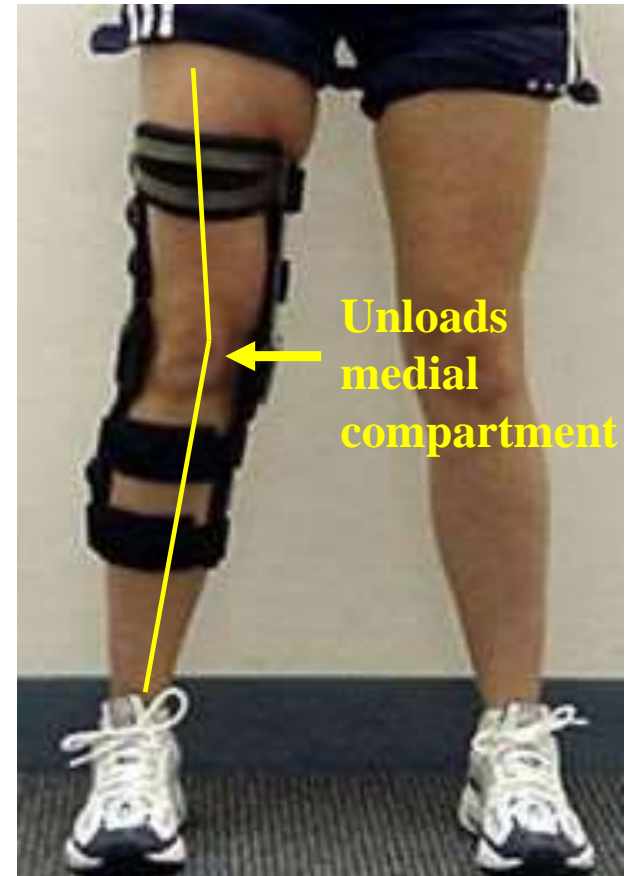
Fitting a Cane

- When placed vertically alongside toes, top of cane should be aligned with *ulnar styloid*
- Force on the cane should be directed downward
- Should be placed in contralateral hand



External Supports

- **Functional knee braces** (unloader brace) – helpful for medial compartment arthritis. *Produce valgus thrust to unload medial compartment**
- **Elastic bandages** – can reduce pain and feeling of giving way; Loose fitting bandages better
- **Patella taping** – can reduce pain and improve function in patellofemoral compartment OA
- **Wedged insoles / orthotics** – may reduce loading on medial or lateral knee compartment
- **Splinting for hand OA** – helps relieve pain for base of thumb OA



How to decide if an Unloader Brace will be effective



External Supports

- **Functional knee braces** (unloader brace) – helpful for medial compartment arthritis. *Produce valgus thrust to unload medial compartment*



Knee OA without bracing
(bone-on-bone contact)



Knee OA with bracing
(space created between bones)

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- **Wedge insoles/orthotics** – may reduce loading on medial or lateral knee compartment*
- Splinting for hand OA – helps relieve pain for base of thumb OA



How to decide if a Wedged Insole will be effective



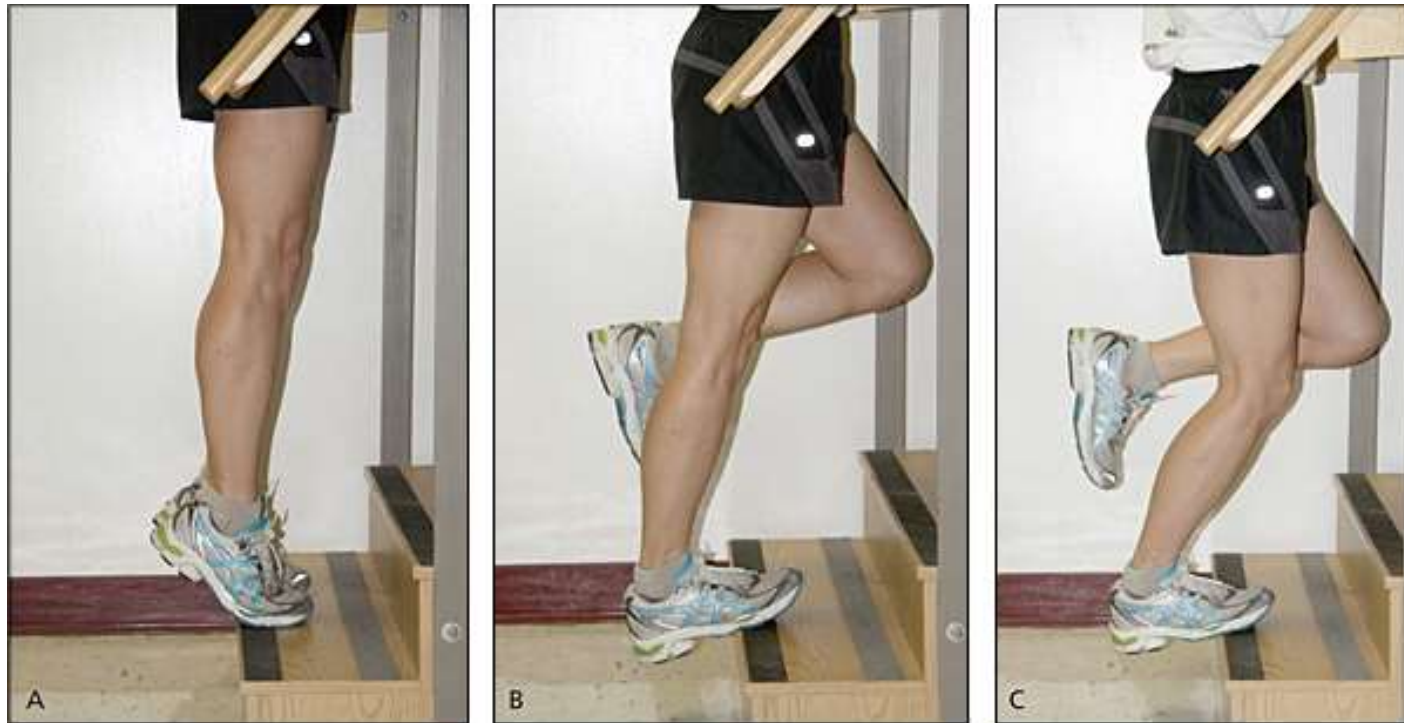
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Eccentric Strengthening Exercises

- Should be used as first line treatment for tendonitis (Achilles or *Patella* tendonitis)
- Typically 3 sets of 10-15 reps twice daily



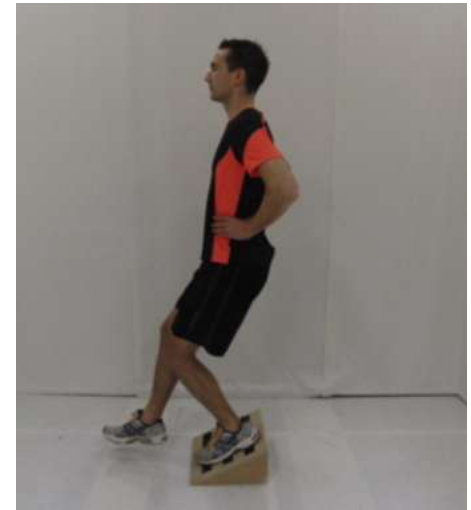
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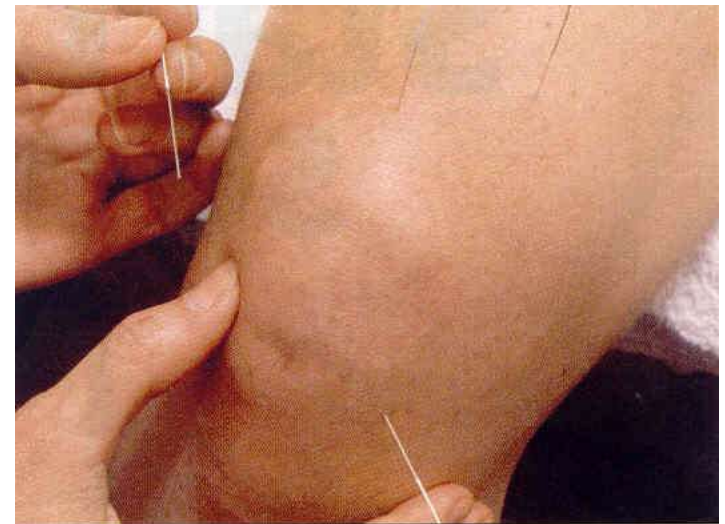
Isometric Contraction for Pain

- Proven to reduce pain in Patella or Achilles tendonitis
- Can use before or after activity – instead of pain medication
- Use about a 70% of max contraction, held for 45 sec 5x per day
- Typically 3 sets of 10-15 reps twice daily
- *Avoid* compressing tendon in dorsi & plantar-flexion



Other Non-Pharmacologic Measures

- Physical Therapy – Strengthen muscles around affected joint and core; Stretch to prevent and reduce contractures in tendons & muscles and to maintain ROM*
- Tai Chi – ancient Chinese form of conditioning exercises shown to reduce pain and falls in elderly**
- Acupuncture – may relieve pain and improve function (data not conclusive)



*Bronford, Spine J. 2004

**Taylor-Piliae, Arch Phys Med Rehabil. 2014

Nitroglycerin Patches

- Good for persistent tendonitis or muscle injury
- Thought to work by vasodilatory effect of Nitric Oxide in local area
 - Nitro-Dur 1 mg/hour patch cut in half applied directly over most tender area. Wear 24 hours per day if possible
 - Need to give 2-3 month trial
- Most common side effect is headache – try using $\frac{1}{4}$ patch or taking off at night

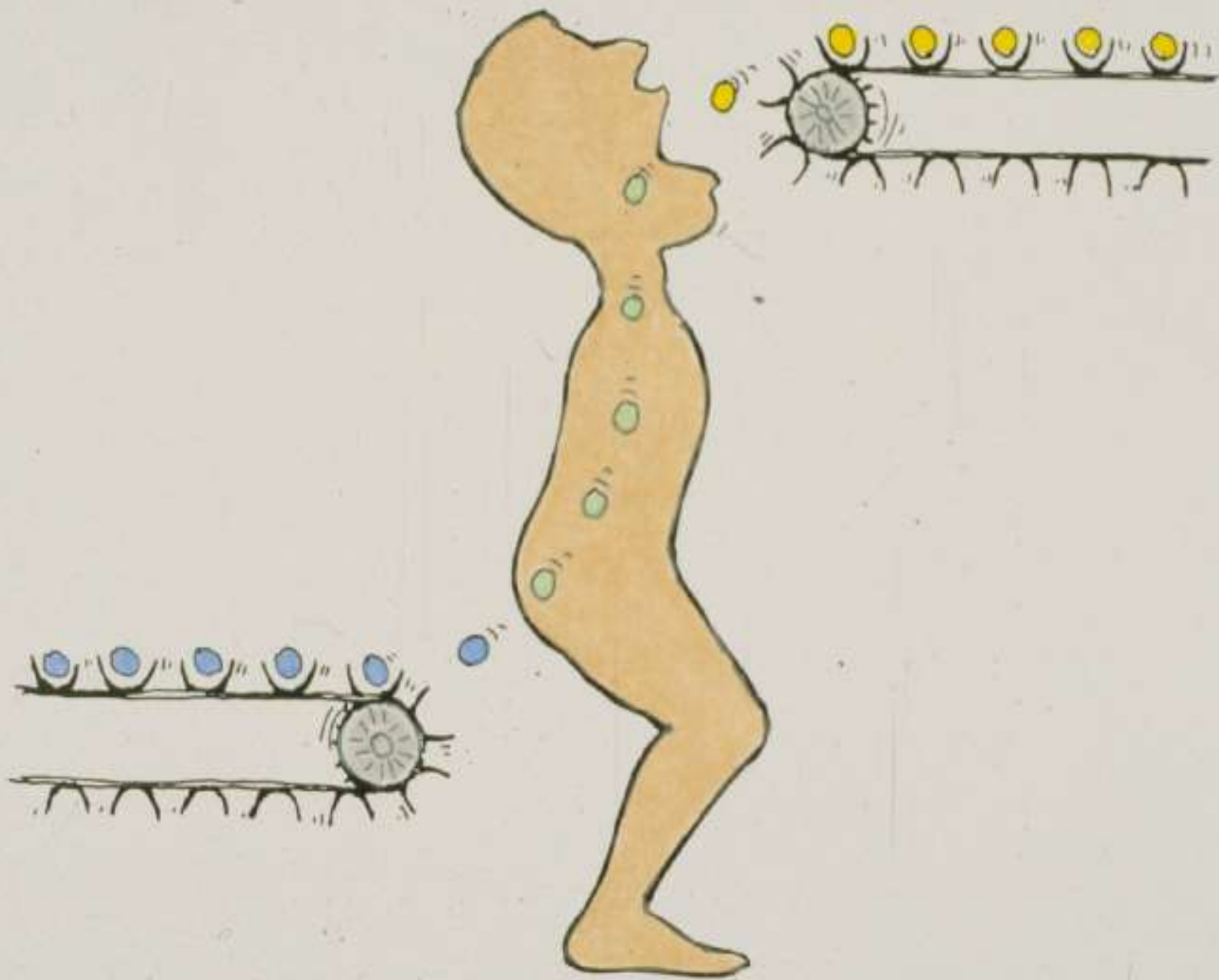


Supplements

- Glucosamine – effective for mod-severe OA in combo with Chondroitin.
- Chondroitin – with Glucosamine
- SAM-e – may be as effective as coxib
- Selenium – no benefits shown
- Folic Acid – may be effective for hand OA (combined with B-12)
- Zinc – more study needed
- Vitamin C – more study needed

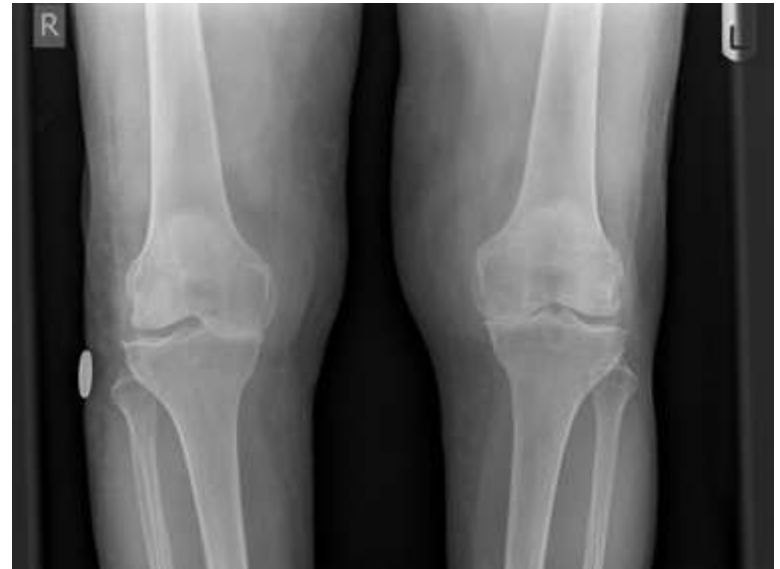


Like most veterinary students, Doreen breezes through chapter 9.



Common Injections for OA

- Glucocorticoids
- Hyaluronic Acid
- Prolotherapy
 - Dextrose
 - Platelet Rich Plasma (PRP)
 - Mesenchymal Stem Cell



Intrarticular Glucocorticoids

- Indications: mod-severe OA not responding to non-pharm treatments and oral meds.
- Adverse Effects: steroid flare, infx rare, no anatomic effect seen after 2 years (Q3mo).
- Evidence: randomized trials and meta-analyses confirm benefit over placebo. Supported by guidelines from multiple organizations.
- Efficacy: reduced pain better than placebo up to 3mo and especially at 2-3 weeks.*

*Bellamy N, *Cochrane Database Syst Rev.* 2006;(2)

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

IMPORTANCE Synovitis is common and is associated with progression of structural characteristics of knee osteoarthritis. Intra-articular corticosteroids could reduce cartilage damage associated with synovitis but might have adverse effects on cartilage and periarthral bone.

OBJECTIVE To determine the effects of intra-articular injection of 40 mg of triamcinolone acetonide every 3 months on progression of cartilage loss and knee pain.

DESIGN, SETTING, AND PARTICIPANTS Two-year, randomized, placebo-controlled, double-blind trial of intra-articular triamcinolone vs saline for symptomatic knee osteoarthritis with ultrasonic features of synovitis in 140 patients. Mixed-effects regression models with a random intercept were used to analyze the longitudinal repeated outcome measures. Patients fulfilling the American College of Rheumatology criteria for symptomatic knee osteoarthritis, Kellgren-Lawrence grades 2 or 3, were enrolled at Tufts Medical Center beginning February 11, 2013; all patients completed the study by January 1, 2015.

INTERVENTIONS Intra-articular triamcinolone (n = 70) or saline (n = 70) every 12 weeks for 2 years.

MAIN RESULTS AND MEASURES Annual knee magnetic resonance imaging for quantitative evaluation of cartilage volume (minimal clinically important difference not yet defined), and Western Ontario and McMaster Universities Osteoarthritis index collected every 3 months (Likert pain subscale range, 0 [no pain] to 20 [extreme pain]; minimal clinically important improvement, 3.94).

RESULTS Among 140 randomized patients (mean age, 58 [SD, 8] years, 75 women [54%]), 119 (85%) completed the study. Intra-articular triamcinolone resulted in significantly greater cartilage volume loss than did saline for a mean change in index compartment cartilage thickness of -0.21 mm vs -0.10 mm (between-group difference, -0.11 mm; 95% CI, -0.20 to -0.03 mm), and no significant difference in pain (-1.2 vs -1.9 ; between-group difference, -0.6 ; 95% CI, -1.6 to 0.3). The saline group had 3 treatment-related adverse events compared with 5 in the triamcinolone group and had a small increase in hemoglobin A_{1c} levels (between-group difference, -0.29% ; 95% CI, -0.5% to -0.007%).

CONCLUSIONS AND RELEVANCE Among patients with symptomatic knee osteoarthritis, 2 years of intra-articular triamcinolone, compared with intra-articular saline, resulted in significantly greater cartilage volume loss and no significant difference in knee pain. These findings do not support this treatment for patients with symptomatic knee osteoarthritis.

TRIAL REGISTRATION ClinicalTrials.gov identifier: NCT0130424

JAMA. 2017;317(9):1167-1175. doi:10.1001/jama.2017.5283

Author Video Interview and JAMA Report Video

Supplemental content

CME Quiz at
jamanetwork.com/learning

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Corresponding Author: Timothy E. McAlindon, DM, MPH, Division of Rheumatology, Tufts Medical Center, 800 Washington St, PO Box 4100, Boston, MA 02111 (mcAlindon@tuftsmedicalcenter.org).

“2 years of intra-articular triamcinolone, compared with saline, resulted in significantly greater cartilage volume loss and no significant difference in knee pain”

McAlindon, JAMA; 2017

Intraarticular Hyaluronic Acid

- Indications: mod-severe OA not responding to standard tx and glucocorticoids injection.
- Adverse Effects: flare, long term evidence on repeated use lacking.
- Evidence: some studies show no benefit over placebo; Similar to steroids but higher cost. Not recommended by various guidelines (AAOS).
- Efficacy: reduce pain better than placebo at 8-12 wks, but not 15-22 wks (not clinically meaningful). Comparable to NSAIDs.

Intraarticular Dextrose Prolotherapy

- Indications: mod-severe OA not responding to standard treatment.
- Adverse Effects: mild-mod pain (similar to saline), but no other adverse events.
- Evidence: only a few randomized controlled studies of low quality; None compared to cortisone or HA.
- Efficacy: 1 RCT showed improved pain, function & stiffness compared to saline and home exercise (WOMAC) up to 1 year.

Intraarticular PRP

- Indications: more often for soft tissue injury, but also mod OA to retard progression.
- Adverse Effects: occasional local and systemic reactions, but not significantly more than placebo.
- Evidence: limited studies (1 RCT vs placebo) and questions regarding optimal prep (PLT concentration, WBC) and dose.
- Efficacy: improved pain and function more than placebo or hyaluronic acid (evidence limited by hi risk of bias).

Intraarticular Stem Cells

- Indications: cartilage damage or early OA and post-meniscectomy.
- Adverse Effects: no difference in minor or serious adverse events beyond standard knee injection.
- Evidence: 6 RCT's and 1 CCT; with only 3 rated as high quality; 4 used bone marrow, 2 adipose and 1 cord blood.
- Efficacy: potential effect on pain and function is inconclusive – evidence rated as weak.

Dry Needling

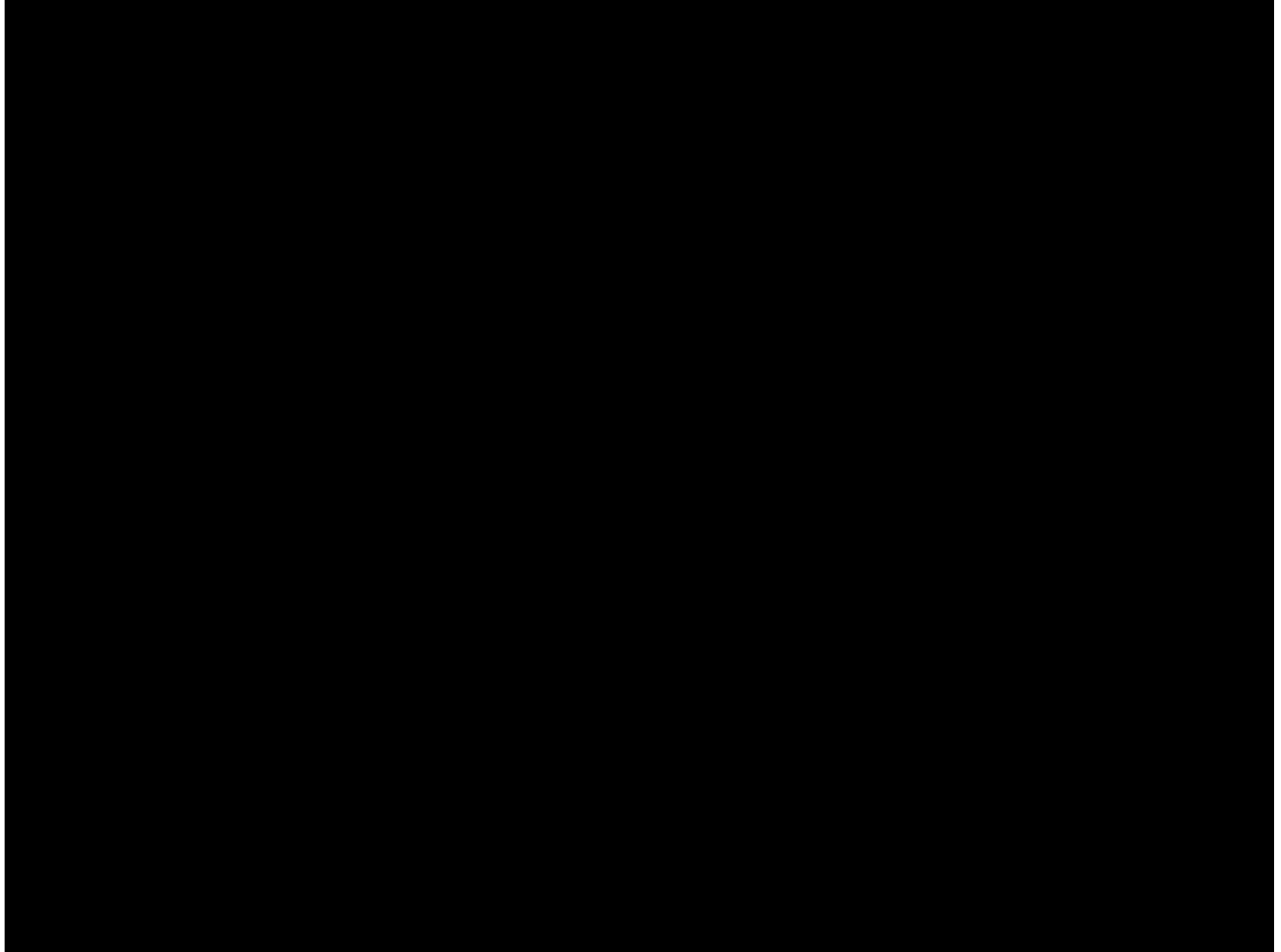
- Quick, easy and low cost
- Use for soft tissue pain – *analogous* to prolotherapy



Dry Needling Hamstring Strain



Dry Needling Hamstring Strain



Dry Needling Hamstring Strain



Dry Needling Hamstring Strain



My Approach to MSK Pain

- Rest until pain free; exercise to tolerance (cross train)
 - Weight loss (10 lbs. goal)
 - Thermal treatments
 - PT, braces, cane etc.
 - Eccentrics & isometrics for Tendonitis
- Dry needling and Nitro patch
- Trial with Oska Device
- Glucosamine 500 mg + Chondroitin 400 TID
- Topical Diclofenac for hand and knee OA



My Approach to MSK Pain

- Tylenol up to 3 gm/d; add low dose NSAID prn (Diclofenac or Naprosyn)
- Cortisone injections for pain relief combined with PT
- Elavil HS (help with sleep)
- Consider Duloxetine or SSRI if sx's of depression
- Tramadol or Tylenol #3 only for severe pain and no more than a few days
- No evidence for oral steroid burst or taper
- Surgical options last resort



Questions?