



2022 NSCA TACTICAL ANNUAL TRAINING [#NSCATactical22](#)

CONFLICT OF INTEREST STATEMENT

I have no actual or potential conflict of interest in relation to this presentation.

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Don't Smoke Your Joints: Nutritional Tactics to Conserve Your Cartilage



Learning Objectives

1. Describe how typical duties of the tactical athlete can be harmful to joint health
2. Identify nutritional compounds that have demonstrated potential to conserve cartilage
3. Employ an effective dietary strategy to preserve joint health

The Problem

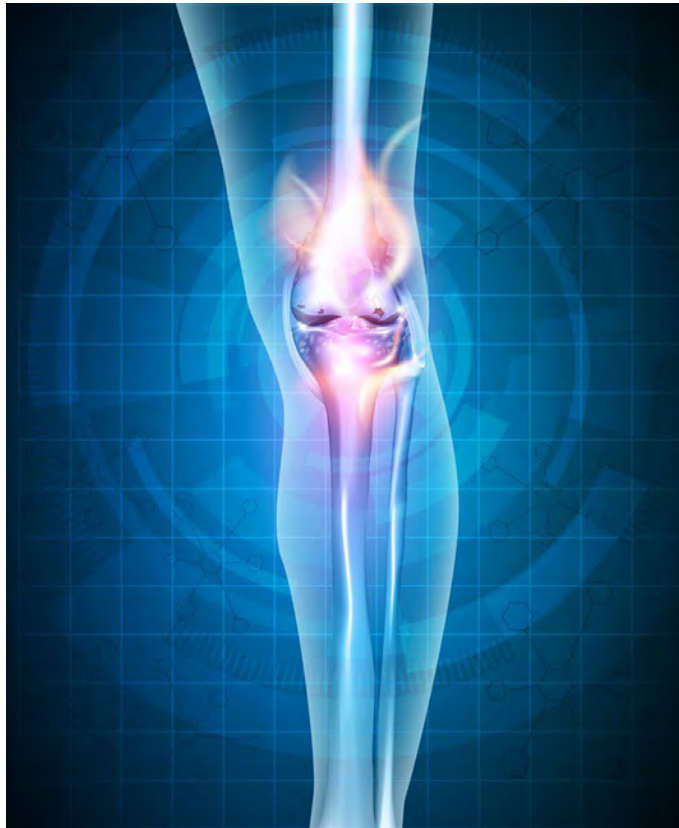


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LTC Nick Barringer, PhD, RD, CSSD, CSCS
Don't Smoke Your Joints: Nutritional Tactics to Conserve Your Cartilage

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“Part” of the solution



Collagen¹



- 8 healthy male subjects completed randomized, double-blinded, crossover-design
- 5 or 15 g or vitamin C- enriched gelatin or a placebo
- 15 g of gelatin with 48 mg of vitamin C consumed 1 h pre 6 min jump rope created double the amino-terminal propeptide of collagen 1 in blood

Collagen²



- 856 articles screened: 15 selected
- Joint pain and recovery, body comp, muscle soreness, and recovery from exercise
- 15 g /day of collagen elevated collagen synthesis rate but did not have a significant impact on MPS

Vitamin D³

- May play a role both directly via VDR in OA cartilage and indirectly via endocrine system
- If 25(OH)D below 50 nmol/L may benefit from increasing while not benefits seen by increasing above this level for OA
- Vitamin D supplementation has not been shown to slow progression of knee OA

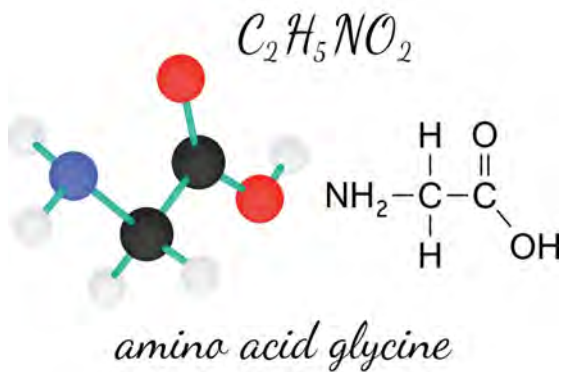


Omega-3 Fatty Acids ⁴



- Inhibits oxidative stress
- Increased ratio of omega-6/omega-3 fatty = increase in plasma MDA levels
- Potential benefit to increasing omega-3 intake for OA

Glycine^{5,6,7}



- Glycine - one of key amino acids that give collagen its strength
- In animal models, 5% glycine in diet improves tendon healing and mechanical strength
- Increasing glycine in the diet may be affecting strategy to treat and prevent OA

Vitamin C⁸



- 286 articles to 10 articles after inc/exc criteria
- Increase type I collagen synthesis and reduce oxidative stress
- No adverse effects

Vitamin K⁹



- Cofactor that plays a key role in negatively regulating calcification
- Sufficient levels of vitamin K associated with lower risk of OA
- 90 $\mu\text{g}/\text{day}$ for women or 120 $\mu\text{g}/\text{day}$ for men

Copper^{10,11}



- Copper cofactor plays key role in formation of cross linkages
- Deficiency compromises matrix
- 900 mcg

Bromelain¹²



- Powerful pain mediator for OA
- Potential work as a replacement agent to NSAIDS
- Dose ranges from 60-1890 mg/day

Bromelain¹³



- Potential to reduce swelling, bruising, and tenderness post injury
- Faster recovery time in ankle injuries
- Improve range of motion

Glucosamine & Chondroitin Sulphate^{14,15,16,17,18,19,20}



- Increase collagen synthesis
- Aids in organization of collagen bundles
- Potentially helpful for pain

Methylsulfonilmethane (MSM)^{21,22,23}



- Anti-inflammatory
- Reduce pain
- Reduce MDA levels

Curcumin^{24,25,26,27,28}



- Antioxidant
- Prevent apoptosis
- Poor bioavailability

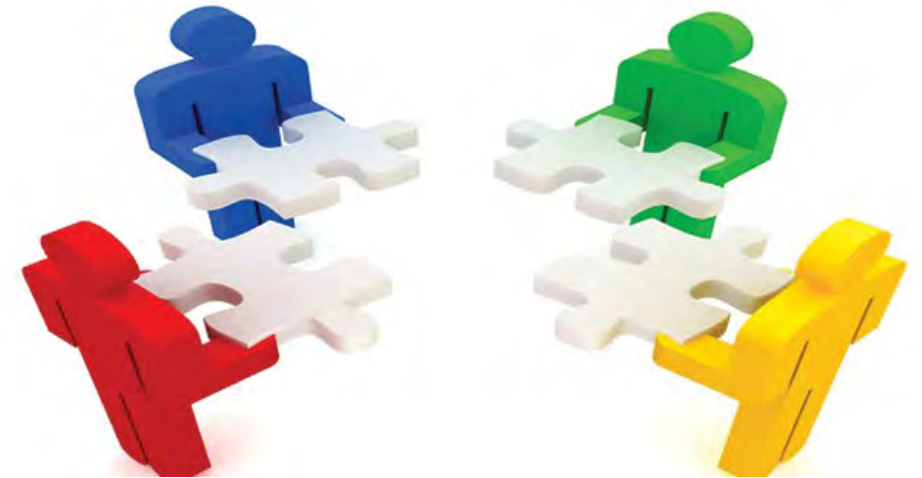
Blueberries^{29, 30}



- Animal model of induced OA
- Fed 5% and 10% blueberry powder
- 10% blueberry powder significantly reduced signs of pain

Putting it all together

- Curcumin: 1500 mg/day (3 x 500mg dose)
- Gelatin: 15 g 1 hour before exercise
- Vitamin C: 48 mg w/ gelatin
- Vitamin D: 1,000 IUs/day
- Blueberries: 1 cup/day
- MSM: 1-3 g (2-6 x 500mg dose)
- Glucosamine Chondroitin Sulfate: 1500 mg/day
- Glycine: Eat high glycine foods (3-5 g)
- Copper: meet RDA
- Vitamin K: meet RDA
- Bromelain: ~1000mg/day
- Omega-3s: 1-2 g/day



Thank you



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Questions



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