

Nutrition 102

Supplements and Pain Disorders

Supplements, not Substitutes

- o The goal is for fresh fruits and vegetables to form a major portion of the diet, to be the main course rather than a side dish.

The benefits from fruits and veggies are not derived principally from the vitamins; they can therefore not be obtained from the use of multivitamin pills as a substitute for whole foods.



Fruits and Veggies with Highest Antioxidant Value

- o Cranberries
- o Apples
- o Red grapes
- o Strawberries
- o Red peppers
- o Broccoli
- o Carrots
- o Spinach



Other Recap Issues from Nutrition 101

- o Eat adequate protein – $\frac{1}{2}$ - $\frac{3}{4}$ gram per pound of lean body weight, depending on activity level
- o Avoid simple sugar and eat low glycemic index foods
- o Avoid artificial sweeteners and other additives
- o Avoid food allergens
- o Eat organic to the extent possible
- o Consider reducing or eliminating caffeine



AGE (advanced glycation end-products) and inflammation

“..circulating glycotoxins (sAGE) can be modulated in human diabetes by altering dietary AGE intake. sAGE changes are followed by parallel changes in levels of inflammatory molecules (CRP, TNF α , and VCAM-1), all three of which are established markers of diabetes and vascular disease.

PNAS 99(24):15596-601, 2002



Low AGE diet

- Limit Animal-derived products, such as cheese, sausage and bacon.
- Prepare meals under low heat, for least amount of time necessary, and with as much water as possible. Water delays reactions that lead to AGEs.
 - Boiling, steaming and poaching are preferred to broiling, frying, baking and other high-temperature cooking.
- Eat vegetables, which are low in AGEs.
- Slice meat very thinly and pass it quickly in a frying pan with little oil.
- Enhance flavor with spices rather than relying on cooking methods like frying to improve taste



Trans Fatty Acid Intake

- Increases insulin resistance.
- Associated with elevated risk of new onset diabetes.
- Positively associated with IL-6 and CRP concentrations in women with higher BMI.
-
- Omega-3 fatty acids modify receptivity of PPAR γ increasing insulin sensitivity and glucose transport.



Trans fats

- Major sources: fast foods, bakery products, packaged snacks, and margarines.
- TFA intake positively associated with markers of systemic inflammation in women (sTNF-R1 and sTNF-R2).

Mozaffarian D et al: *Am J Clin Nutr.* 2004;79:606-12



Care and Feeding of the Joints

- o Water – drink at least 2 liters per day
- o Ligaments are made of collagen
 - o Hydrolyzed collagen can provide building blocks
 - o Vitamin C, Bioflavonoids, Grape seed help to Cross-link
- o Cartilage is made of GAGs,
 - o Glucosamine sulfate is a major building block



Spondylosis

- Hydrolyzed collagen – Arthred
- Hydrolyzed collagen provides raw materials for repair of ligaments and tendons
- The dietary equivalent is soup made from bones and gristle and boiled much of the day.
- May also have some benefit for prevention of osteoporosis.



Glucosamine Sulfate:

Over 300 studies – 20 are double-blind, placebo controlled

- o Building block of proteoglycans that make up cartilage
- o Proven to:
 - o Regenerate cartilage
 - o Reduce cartilage-degrading enzymes
 - o Relieve joint pain – better than LT ibuprofen
 - o Increase joint mobility



Healthy
Joint
Space



Glucosamine Sulfate

- o NOT Glucosamine Hydrochloride
- o Dose
 - o Up to 3,000mg for 1st 12 weeks
- o Maintenance dose
 - o 1,500mg daily of sulfate form

o Side effects

- o Minimal effect on glycemic control



Chondroitin Sulfate

In 1998 the journal *Osteoarthritis and Cartilage* published 3 double-blind, placebo controlled studies that documented the effectiveness of chondroitin sulfate for treating arthritis.

- o In 2000 JAMA reviewed the outcomes of 37 studies on the effects of glucosamine and chondroitin. Chondroitin had a high positive outcome on OA and glucosamine a moderate outcome. (JAMA. 2000:283:1469-1475)



Chondroitin Sulfate

- o Dose: 400mg. 3x daily
- o Side effects: Rare GI disturbance
- o Cost – only 3% of dose may be absorbed as intact chondroitin
 - o Studies are ongoing to establish whether combination of glucosamine and chondroitin is more effective than glucosamine alone



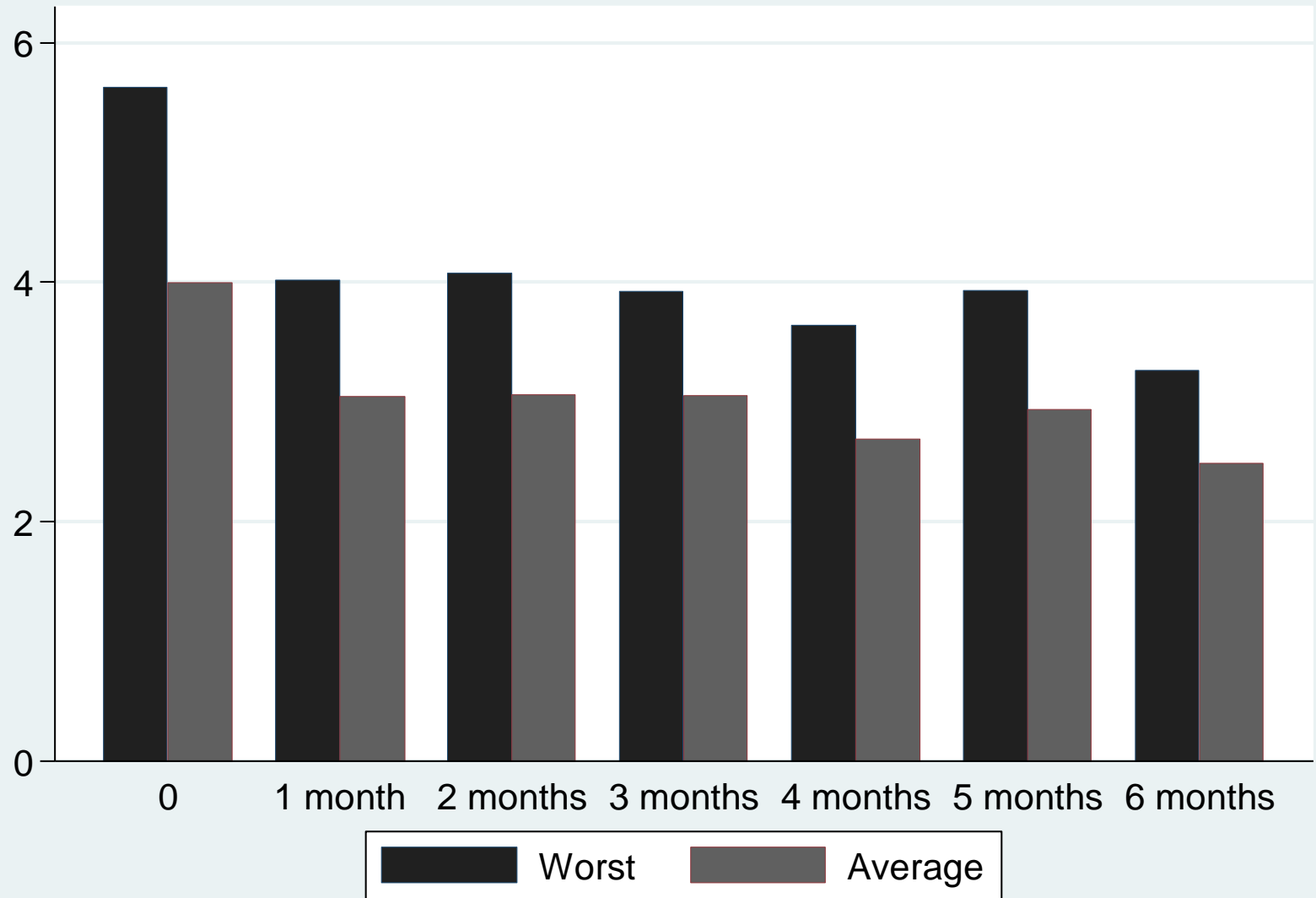
Vitamin D

- 50 Patients with Chronic Low Back Pain
- 5000 IU vitamin D3/day for 6 months

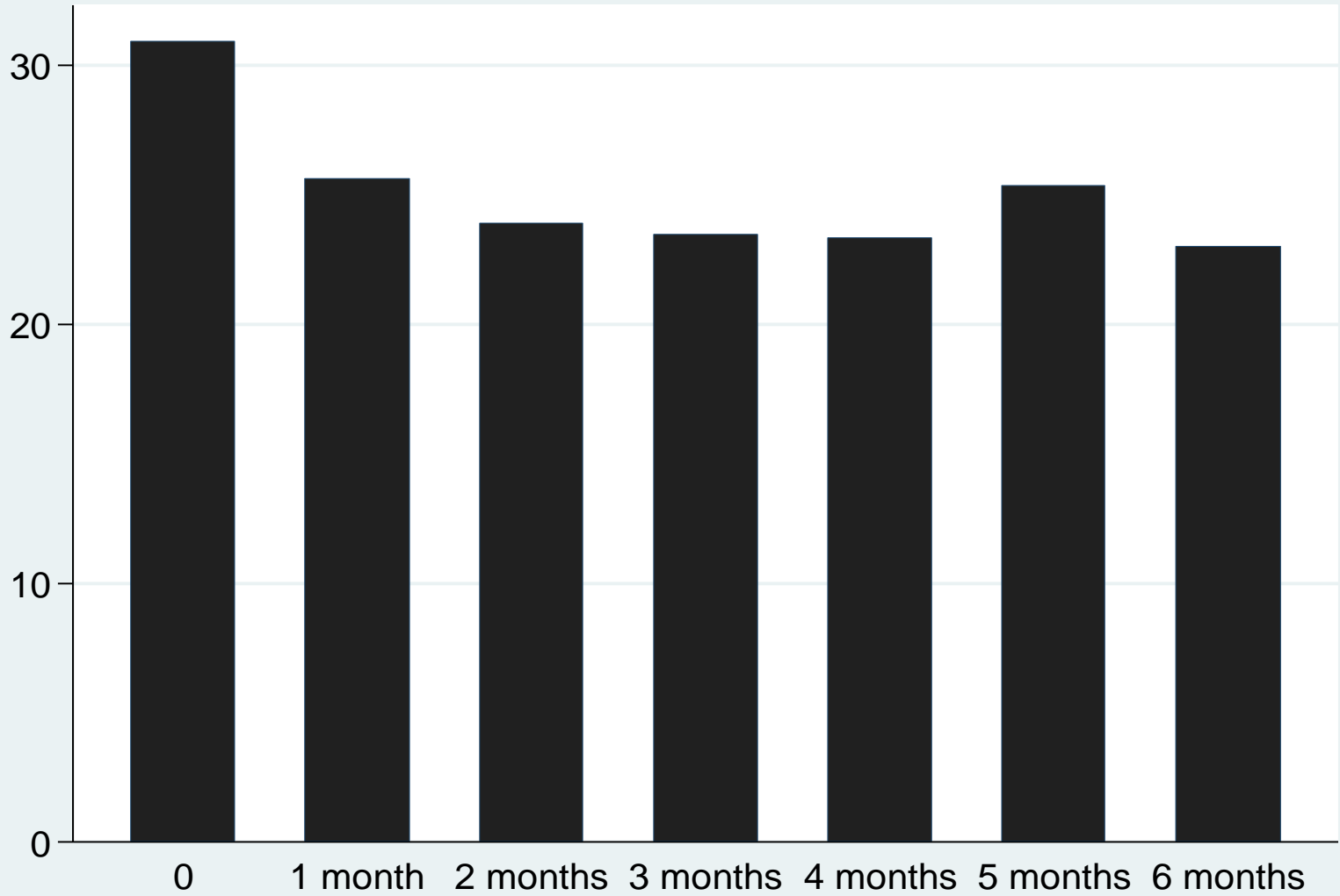
- Unpublished data from Vancouver
Washington



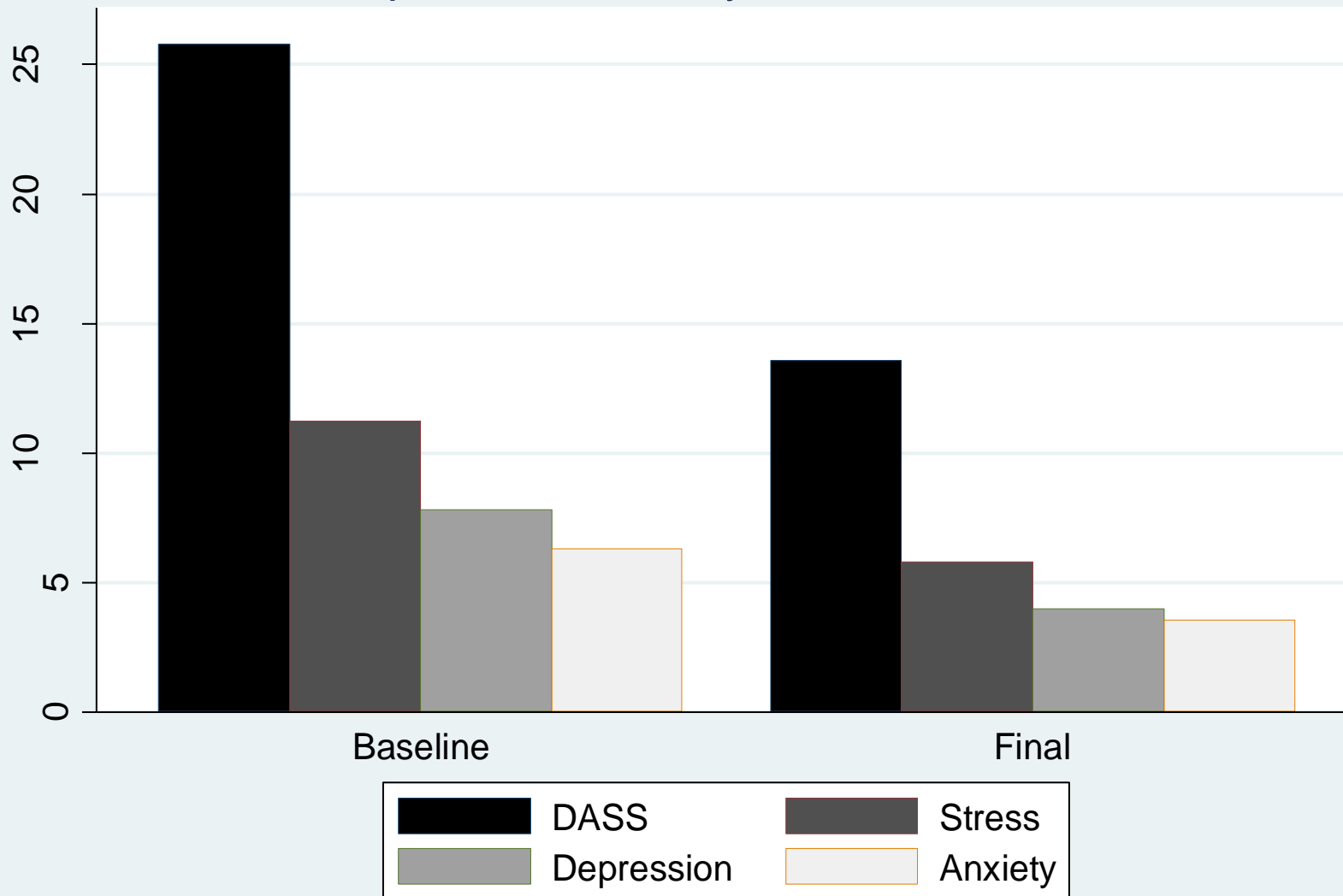
VAS Pain Scores



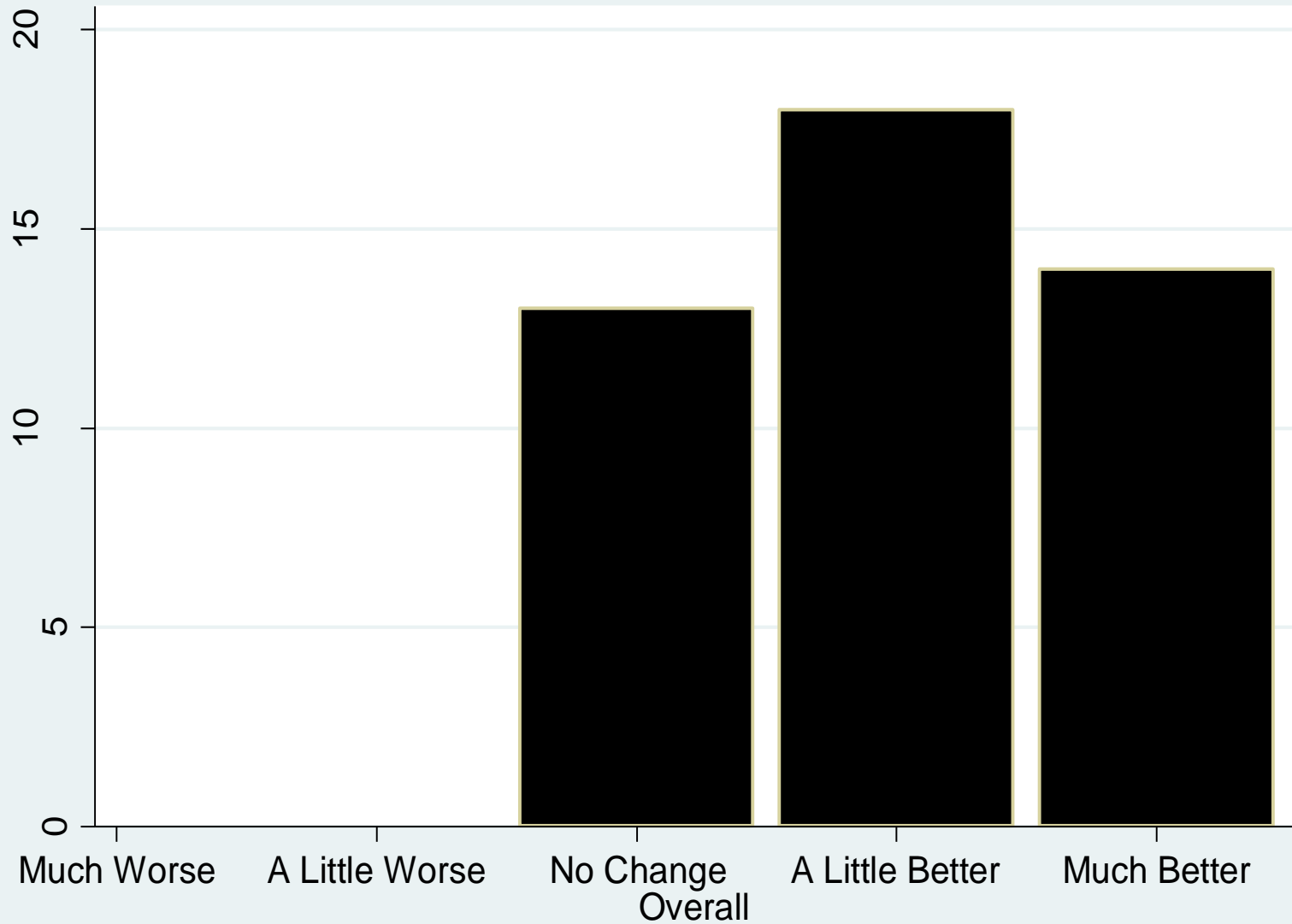
Oswestry Score



Depression Anxiety and Stress Scale



Final Global Assessment



Botanical Therapy - Topical

- Counterirritation
 - Rubefacients
 - Nettles
- Capsaicin
 - Depletion of Substance P
 - Dose: 0.025% - 0.075% applied 4 times per day for 2-4 weeks to determine effect



Capsaicin

- o Zostrix, Capzasin-P – can dilute with other salve or vaseline if needed
- o Homemade: Cayenne in oil
 - o (Add beeswax to make salve)



Botanical Medicine for OA

- o Boswellia: Ayurvedic herb Researched in India to relieve inflammation, joint swelling, and promote joint circulation
 - o boswellic acids in the tree resin counteract the effects of leukotrienes
 - o Increases joint blood supply
- o Dose: 500mg standardized to 70% boswellic acids 3-5x daily on empty stomach



Botanical Medicine for OA

- Curcumin:
 - Natural anti-inflammatory and anti-oxidant
Potentiates cortisol's ability to reduce inflammation.
 - Reduces leukotrienes.
 - Dose: 400mg standardized to 95% curcuminoids 3x daily on empty stomach
 - Side effect: dyspepsia



Botanical Therapy for OA

- Combine both Boswellia and Curcumin with 1,000 mg bromelain for max. absorption; lecithin may also improve absorption
- In one study, Boswellia, Turmeric (Curcumin) were combined with Withania, Zinc and 70% of subjects had a significant decrease in pain and disability



Curcumin in the Diet

- Black pepper improves absorption 2000% !
- Use in curries, scrambled eggs, “Creamy turmeric tea”



Devil's Claw

- Harpagophytum procumbens (Devil's claw)
 - 60 mg harpagoside per day
- Primarily analgesic, not much anti-inflammatory activity; in one study was as effective as vioxx for low back pain
- Try for 4-8 weeks



Antioxidants in Tendonitis

Osgood-Schlatter: selenium 50 mcg tid,
vitamin E 400 IU/d

I have used this with success in plantar
fasciitis as well



Tendonitis - Enzyme Therapy

Certain digestive enzymes, when taken between meals, are absorbed systemically and decrease circulating immune complexes, decrease activated complement, etc.

- o Wobenzym-N has been studied in ankle tendonitis, hand flexor tendonitis, supracondylar fractures in children
- o We often use bromelain in this way (500 – 1000 mg three times daily between meals)



Pycnogenol

- French maritime pine bark extract,
- Can get quite pricey at higher doses



Effects of Pycnogenol in studies

(but not all in humans, and not all of good design)

- ↓LDL cholesterol, ↑HDL cholesterol, ↓systolic blood pressure, ↓serum thromboxane
- ↓lymphocyte apoptosis, ↓NF-κB-dependent gene expression
- ↓edema and pain, leg heaviness, leg cramps
- ↓platelet aggregation, ↑diameter of microvessels , activate endothelial nitric oxide synthase
- ↓myocardial remodeling in CHF
- ↓cataracts and retinopathy, delay uptake of glucose from a meal, speed healing of diabetic ulcers



Conditions treated:

- ◇ Asthma
- ◇ Venous insufficiency
- ◇ Osteoarthritis
- ◇ Diabetes
- ◇ Retinopathy
- ◇ Migraine
- ◇ Decrease skin wrinkling
- ◇ Improved cognitive function in elderly
- ◇ Athletic performance
- ◇ Hypertension
- ◇ Menopause
- ◇ Endometriosis
- ◇ ADHD

Adverse effects: gi discomfort, dizziness, HA, nausea,
none severe; 2.4% in patients, 0.9% in healthy



Subjects; Am J Clin Nutr 81(1):243S-255S, 2005 Journal of
ethnopharmacology, 133(2):261-277. 2011

Pycnogenol and arthritis

- WOMAC Pain scores after 3 months on pycnogenol ($p < 0.05$)

Pycnogenol		Placebo	
Inclusion	3 months	Inclusion	3 months
17.3	7.7	17.1	15.2

- Exercise test – distance achieved on treadmill at 8 km/h, inclination 10%

	Pycnogenol	Placebo	Significance level
Inclusion	68 m (0–133)	65 m (12–98)	n.s.
3 months	198 m (55–374)	88 m (25–102)	< 0.05



The use of NSAIDs dropped by 58% during treatment with Pycnogenol, whereas under placebo NSAID use was reduced by only 1%.

Table 2. Analgesics consumption in Pycnogenol/placebo group during the time of the treatment

	Pycnogenol group	Placebo group
Same level	62%	82%
Increased dosage	0%	10%
Decreased dosage	38%	8%



o Percentage Reduction of costs

Costs	Pycnogenol	Placebo	Significance level
Drugs and treatments besides NSAIDs	54%	11%	$p < 0.05$
Hospital admissions	55%	5%	$p < 0.05$
Days hospitalized	60%	11%	$p < 0.05$



Other sources of flavonoids,
catechins, phenolic acids , and
OPC's
(oligomeric proanthocyanidins)

- o Grape seed extract

less expensive alternative to pycnogenol



Grape seed extract in Hypertension

- o Grape seed extract
Study at UC Davis using 150 – 300 mg per day. The average drop in systolic pressure was 12 mm. The average drop in diastolic pressure was 8 mm.

University of California, Davis - Health System. "Study Shows Grape Seed Extract May Be Effective In Reducing Blood Pressure." *ScienceDaily*, 27 Mar. 2006. Web. 27 Aug. 2011



Essential Fatty Acids

- Fish oil – 2-3 tsp per day of liquid cod liver oil with EPA and DHA, or 2-3 Tblsp of flax oil
- GLA – 500 mg per day, only if already using fish oil



Magnesium

- Relaxes muscle, Calms nerves
- Uses:
 - Muscle spasms
 - Migraine
 - Asthma
 - Prevent Hearing Loss
 - Help sleep and anxiety
 - Palpitations



Dosing

- If kidneys normal, dose to bowel tolerance
- If kidneys not normal, needs to be monitored



Sources of Supplements

- Consumerlab.com reviews for quality, purity
- Vitacost.com generally rates well
 - Also generally the cheapest source

