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@DrB_Well
THE STATE OF THE PLATE...
A PIE THAT'S HARD TO SWALLOW

U.S. FOOD CONSUMPTION AS A % OF CALORIES

PLANT FOOD:
Vegetables, Fruits, Legumes, Nuts & Seeds, Whole Grains
Fiber is found only in plant foods.

NOTE: Up to half of this category may be processed, for example almonds in candy bars, apples in apple pies or spinach in frozen spinach souffle, and of course these would not be healthy choices. The focus should be on whole unprocessed vegetables, fruits, legumes, nuts and seeds and whole grains.

ANIMAL FOOD:
Meat, Dairy, Eggs, Fish, Seafood
Cholesterol is found only in animal foods. Animal foods are the PRIMARY source of saturated fat.

PROCESSED FOOD:
Added Fats & Oils, Sugars, Refined Grains

63%

12%

25%

GUIDE TO HEALTHY EATING:

Much easier to understand than the USDA Food Pyramid, with no food industry influence.

Eat LESS from the animal and processed food groups and MORE whole foods from the plant food group.

In general, food from the animal and processed food group contribute to disease, while WHOLE foods from the plant group contribute to good health.


New York Coalition for Healthy School Food * www.healthy所学校food.org

Special thanks to Joel Fuhrman, M.D. author of Disease Proof Your Child: Feeding Kids Right * Graphics by MichelleBando.com
Research shows typical American diet can worsen chronic pain
16 December 2015, by Katherine Shonesy

- TWD = Total Western Diet
- exposure to poor diet quality resulted in altered acute nociceptive sensitivity, systemic inflammation, and persistent pain...

Key Concepts

• Total Western Diet =
  – Totally Pain Promoting
  – Totally Depleted (diversity/nutrient)
  – Totally Inflammatory
  – Totally Obesogenic
  – Totally SAD
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**Mindlessly**

**Super Sized:** Hi calorie / Hi glycemic  
Hi liquid calories

**Mindlessly:** Prepared and consumed  
*Eating on the GO! / Fast food*

Hi caffeine / Hi ETOH

Deficiency Prone
Diet

Inflammation

Pain
significant associations between... systemic inflammation (CRP) and LBP

Specifically, those with ↑ CRP levels have nearly twice the odds of reporting LBP

Pain Intensity and Pain Interference in Older Adults: Role of Gender, Obesity and High-Sensitivity C-Reactive Protein

• ↑ hsCRP associated with
  – ↑ levels of pain intensity or
  – ↑ pain interference
Impact of lifestyle and diet on gut bacterial communities across geographically and culturally diverse human populations

Gomez et al./Cell Reports 2016
Westernization is associated with a loss of microbial diversity including organisms able to ferment fiber-rich dietary components.

“westernized diet shifted microbiota structure within 1 day”
Analysis of Gut Microbiome Reveals Significant Differences between Men with Chronic Prostatitis/Chronic Pelvic Pain Syndrome and Controls

• Patients with CPP have significantly less gut microbiome diversity.

Altered gastrointestinal microbiota in irritable bowel syndrome and its modification by diet: probiotics, prebiotics and the low FODMAP diet

Heidi M. Staudacher* and Kevin Whelan
King’s College London, Diabetes and Nutritional Sciences Division, London SE1 9NH, UK

• IBS: dysbiosis … characterised by a reduction in species of Bifidobacteria … associated with worse symptom profile.

Mast Cell-Mediated Mechanisms of Nociception

Diamine Oxidase (DO)

• 25% of population low in DO
• ~87% of HA sufferers

Central nervous system

Neurotransmitter release

Regulation of hematopoiesis?

cGMP ↑

cAMP ↑

Bone marrow

Mast cell secretion

Cardiovascular system

Vasodilatation

Tachycardia, Arrhythmias

Stimulation of nociceptive nerve fibres

Endothelial permeability ↑

Mucus secretion ↑

Gastric acid secretion ↑

Smooth muscle constriction

Gastrointestinalum

HISTAMINE

H1

H1/2

H1

H1

H2

H4

H3

H2

Regulation of body temperature, food intake, locomotion, learning, memory

Central nervous system

Contribution to the regulation of body temperature, food intake, locomotion, learning, memory

Vertigo

Hypotonia, Hypertension

Anaphylaxia

Arrhythmia

Pruritus

Flush

Urticaria

Congestion of the nose, rhinorrhea, sneezing

Bronchoconstriction, dyspnea

Dysmenorrhea

Headache

Nausea, Vomitus

Circadian rhythm, arousal

Leukocytes

Diarrhea

Stomach ache, cramps

Meteorism
• Immune reaction can affect the brain and cause microglial hypersensitivity and central sensitization

• ...this may result from persistent activation of mast cells and neurogenic inflammation

Epigenetics and the Transition from Acute to Chronic Pain

Twin A
- Early Epigenome A
- Environment A
- Late Epigenome A
- Surgery
- No Pain

Folate
Methionine
Betaine
Choline

Twin B
- Early Epigenome B
- Environment B
- Late Epigenome B
- Surgery
- Pain
• **US adults**, 68% consumed < recommended daily allowance (RDA) of magnesium, and 19% consumed < ½ of the RDA.

• Adults who consumed <RDA of magnesium were 1.48 –1.75 times more likely to have elevated CRP.
Serum concentration of magnesium as an independent risk factor in migraine attacks: a matched case–control study and review of the literature

**Odds of migraine↑ 35.3X when magnesium was below normal**

**Low Magnesium migraine↑ CRP**

**Magnesium Deficiency**

**Pain (migraine)**

**Inflammation**

• CoQ10 level of 1550 patients
  • (avg. age=13.3)
• **32.9%** were below the reference range
Other deficiencies Linked to Pain

- Vitamin B1
- Vitamin B2
- Folate
- Calcium
- Amino Acids...
- Omega-3’s
- Zinc...
CDC study: Americans' bellies are expanding fast

BY LINDSEY TANNER - AP MEDICAL WRITER
09/16/2014 10:05 PM | Updated: 09/16/2014 10:05 PM

Obesity-related pain: Time for a new approach that targets systemic inflammation

Obesity and Pain Are Associated in the United States

Arthur A. Stone and Joan E. Broderick

FIGURE 1: Odds ratios for "pain yesterday" for BMI classifications by gender and age group

**FIGURE 2: Obesity-related pain: A proposed framework related to systemic inflammation**

**Inflammatory mediators**
- Cytokines and adipokines (secreted by adipocytes)
  - IL-1, IL-6, IL-8
  - TNF-α
  - Leptin
  - Adiponectin
  - Resistin

**Acute-phase proteins**
- C-reactive protein

**Cardiometabolic mediators**
- Insulin
- Glucose
- Low-density lipoproteins
- Triglycerides
- Plasminogen activator inhibitor-1 (PAI-1)

**Deficiency states**
- Vitamin D
- Testosterone

**Systemic Inflammation**

**Comorbid conditions**
- Depression
- Insomnia
- Sleep apnea
- Fatigue
- Physical deconditioning
- Mechanical overload
- Mal-alignment

**Baseline characteristics**
- Genetic predisposition
- Environmental factors:
  - Trauma
  - Stress
  - Diet
  - Activity
  - Family dynamics/coping

**Obesity**

**Pain**
Diabetes Is an Independent Predictor for Severe Osteoarthritis

Results from a longitudinal cohort study

- N= 900 followed 20 years, BMI controlled
- Poor glycemic control was found to be an independent predictor of severe OA & progression to joint replacement.
- "...creates room for hope that adequate control of glucose metabolism hampers development of OA."

Obesity-Related Adipokines Predict Patient-Reported Shoulder Pain

• These findings suggest a likely pro-inflammatory role within the shoulder joint and points toward a potential target in the treatment of OA pain.

Obesity and Headache: Part II – Potential Mechanism and Treatment Considerations

• back pain correlates with activity in ventral striatum (VS) & medial prefrontal cortex (mPFC)

• VS and mPFC also known to mediate the palatability & hedonic value of food

Mindful Eating & Portion Control

“The More Pain I Have, the More I Want to Eat”: Obesity in the Context of Chronic Pain
E. Amy Janke and Andrea T. Kozak

Decreased food pleasure and disrupted satiety signals in chronic low back pain

• Higher amounts of food, especially high fat & carbs (typically unhealthy) at the detriment of other foods

• How has your diet changed since you started having (when you are in) pain?
Mindful Eating & Rate of Eating
Ready Set… EAT!

• What we know: Faster eating, especially in obese → ↑ calories → ↑ inflammation. (GL)
• Faster eating (<15 min to complete meal) associated with ↑ interleukin-1β IL-6 even after accounting for caloric intake & BMI
• Faster eating ↑ odds ratios for high glucose and low HDL-cholesterol levels in males, even after adjusting for BMI

Eating rate is associated with cardiometabolic risk factors in Korean adults
Lee, K.S. et al. Nutrition, Metabolism and Cardiovascular Diseases, Volume 23, Issue 7, 635 - 641
Depression, daily stressors and inflammatory responses to high-fat meals: when stress overrides healthier food choices.

- Inflammatory markers ↑ following sat. fat meal vs high oleic sunflower oil meal after controlling for age, fat% & physical activity.
- However, if + prior day stressors, these meal-related differences disappeared—because the stressors heightened CRP, SAA, sICAM-1 and sVCAM-1 responses to the sunflower oil meal, making it look more like the responses to the sat. fat meal...

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