

Nutrition and its effects on inflammation and chronic pain.

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Editorial

We really are what we eat. Our society and medical practices currently undervalue the relationship between nutrition and our daily lives. Whether it is immunomodulation via the enteric system, anti-inflammatory nutrients, or obesity, what we eat is increasingly being found to have correlation to our world and how our patients perceive and experience pain.

Obesity has become an epidemic worldwide; not only does it play a role in metabolic disorders and cardiovascular comorbidities, but it also has a high prevalence in patients with chronic pain. A significant relationship has been demonstrated between pain and A1C levels in mainly the African American population.

Obesity is a risk factor for chronic pain, and obese patients have a higher prevalence of chronic pain. Meleger et al. found that obesity, deficient nutrient intake, and poor eating behavior were highly prevalent in patients with chronic pain on long-term opioid therapy. In 1958, the British Birth Cohort Study used a self-completion questionnaires to find that patients with chronic widespread pain have diet and lifestyle risk factors such as BMI that are in common with patients with cardiovascular disease and cancer. Another study by White et al. showed that a lifestyle intervention of diet and exercise in an at-risk population may prevent development of knee pain.

Inflammation is common to chronic diseases including chronic pain. Diet plays a large role in modulating our immune systems. Activation of the immune system causes release of cytokines, which can be either pro-inflammatory or anti-inflammatory. Patients with chronic pain may have increased pro-inflammatory cytokine levels and/or decreased anti-inflammatory cytokine levels.

In addition, obesity has been shown to have increased pro-inflammatory cytokine levels. C-reactive protein specifically is directly related to amount of adipose tissue, which releases leptin to cause activation of the immune system and pro-inflammatory cytokines. A Western diet is one consisting of high intake of red meat, refined sugars, processed food, and saturated fats. Veronese et al. and Sanchez et al. demonstrated that a better quality of life and decreased pain was achieved with adherence to a Mediterranean diet, which consists of nuts, fish, unrefined carbohydrates, and olive oil. Inflammatory serum markers IL-6 and CRP were reduced after adherence to a Mediterranean diet (Mena et al.).

Plant-food supplements have anti-inflammatory effects. Fruits that are high in anthocyanins have shown to be anti-

inflammatory. Carotenoids, found in red, yellow, and orange vegetables work via reducing pro-inflammatory pathways and causing a reduction in pain. Other vegetables, including broccoli, cauliflower, cabbage, and bok choy have various amount of a component that also reduces inflammatory pathways and reduce pain. Studies done on green tea extract show that a component in it has strong anti-inflammatory properties. Soy causes suppression of pro-inflammatory cytokines also. Both ginger and turmeric also work through multiple anti-inflammatory pathways and decrease pain. The pro-inflammatory effect of caffeine might suggest a negative effect on pain, but clinical studies have shown that using caffeine as an adjuvant in some types of headaches helps to improve this type of pain. A Cochrane review of herbal medicines for low back pain done by Oltean et al. showed that devil's claw, willow bark, and cayenne in plaster form reduced pain more than placebo. Lavender essential oil applied by acupressure appeared to reduce pain compared to conventional treatment.

Various diets involving elimination of particular foods can be helpful in improving chronic pain. About 80% of the immune system lies adjacent to the GI tract and therefore both intake and inflammation of the GI tract may have an effect on pain. Classic vegetarian or vegan diets consisting of fruits, vegetables, and legumes, all of which are anti-inflammatory, have been shown to decrease chronic pain from various causes. The Mediterranean diet mentioned above may also decrease pain and aid in weight loss.

The evidence for dietary modification to improve chronic pain is vast. Diet and nutritional supplements are important factors in inflammation and pain, and modification of diet in patients with chronic pain should be a part of a comprehensive treatment plan.

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