Nutrition to Fight Inflammation: The Role of Diet in Spondyloarthritis
Core Set of Recommendations for Patients with AS (2013)

- Reduction in Meat Consumption
- Increase in Consumption of Fish and Vegetarian Meals
- Sufficient vitamin D and Calcium intake
Research on Diet and Spondylitis

Relationship between Diet and Spondylitis: A Systematic Review (2017)

• Studies suggest involvement of intestinal bacteria flora may be affected by diet.

• Diet could influence the intestinal flora and might have a positive effect on disease activity.
Research on Microbiome and Spondylitis

A Possible Role of Intestinal Microbiota in AS (2016)

• 70% of patients with AS have subclinical gut inflammation.

• AS is associated with Irritable Bowel Disease.

• Gut Permeability (leaky gut) is found to be greater in AS patients and this leads to more inflammation.

• Probiotic use in treatment of AS inconclusive.
A number of studies have demonstrated that Klebsiella pneumoniae play a role in the disease.

Study suggests possible alternative treatment could be aimed at eliminating Klebsiella (to improve or stop inflammatory damage).
A Possible Role of Intestinal Microbiota in AS (2016)

• Low starch diet proposed as a means of reducing Klebsiella bacteria in the gut.

• 36 patients with AS benefited from a low-starch diet.
  - Significant drop in sed rate, anti-inflammatory medicines, and patients reported decrease in pain/symptoms.
Relationship between Diet and Spondylitis: A Systematic Review (2017)

Conclusion of Systematic Review

Evidence of a possible relationship between AS and diet is extremely limited and inconclusive due to the weakness of the studies conducted.
Inflammatory Foods

- Sugar
- Refined Starch
- Processed Foods
- Red & Processed Meat
- Some Oils

Possibly
- Dairy
- Gluten
- Nightshades?
Inflammatory Foods

Sugar

- Nurses' Health Study found a “Westernized” diet (high in sweets, desserts, French fries & refined grains) resulted in higher inflammatory markers.
Inflammatory Foods

Refined Starch/Processed Foods

- Chips
- Cookies
- Cereals
- Pretzels
- Poptarts
- Donuts
Inflammatory Foods

Red & Processed Meat

- Red meat and processed meats associated with higher inflammatory markers in studies.
- May increase oxidative stress and inflammation.
Inflammatory Foods

Some Oils

- Increase in the ratio of n-6 : n-3 fatty acids, could increase inflammatory processes and consequently predispose or exacerbate many inflammatory diseases.
- This is characteristic of the Standard American Diet.
## Inflammatory Foods

<table>
<thead>
<tr>
<th>Oil</th>
<th>Omega-6 Content</th>
<th>Omega-3 Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safflower</td>
<td>75%</td>
<td>0%</td>
</tr>
<tr>
<td>Sunflower</td>
<td>65%</td>
<td>0%</td>
</tr>
<tr>
<td>Corn</td>
<td>54%</td>
<td>0%</td>
</tr>
<tr>
<td>Cottonseed</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Sesame</td>
<td>42%</td>
<td>0%</td>
</tr>
<tr>
<td>Peanut</td>
<td>32%</td>
<td>0%</td>
</tr>
<tr>
<td>Soybean</td>
<td>51%</td>
<td>7%</td>
</tr>
<tr>
<td>Canola</td>
<td>20%</td>
<td>9%</td>
</tr>
<tr>
<td>Walnut</td>
<td>52%</td>
<td>10%</td>
</tr>
<tr>
<td>Flaxseed</td>
<td>14%</td>
<td>57%</td>
</tr>
<tr>
<td>Fish*</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Inflammatory Foods

Dairy?

- Diets high in meat and dairy are high in arachidonic acid, which are precursors to the pro-inflammatory prostaglandins.
- Diets low in arachidonic acid have shown to improve clinical signs of inflammation in patients with rheumatoid arthritis.
Inflammatory Foods

Dairy

- Saturated fats – which are plentiful in cheese and full-fat dairy products – can increase inflammation.
- Study published in *The Journal of Nutrition* in 2015 found that eating dairy foods increased low-grade inflammation in a small sample of adults.
Inflammatory Foods

**WHAT IS GLUTEN?**

It is a protein that is primarily found in grains:

- **WHEAT**
- **RYE**
- **BARLEY**
- **OATS**
Inflammatory Foods

Gluten?
- a hard to digest protein for all people and may increase inflammation in those with gluten sensitivity.
Inflammatory Foods

- Celiac disease is more common in people who have autoimmune disease.
- Screen for celiac disease before starting a gluten-free diet.
- Proposed people with immune-related disease may be gluten sensitive.
- Screen for celiac disease before starting a gluten-free diet.
Inflammatory Foods

Gluten and Dairy

- May increase intestinal permeability leading to bacterial translocation that leads to immune complex development – these lodge in capillaries and cause inflammation and damage.
Nightshades?

- Not research proven to cause inflammation, but nightshades may be problematic for SOME people with immune-related disease due to their lectin and saponin content, which may cause an overactive immune system response.
Anti-Inflammatory Foods

- Vegetables
- Omega-3’s
Anti-Inflammatory Foods

Vegetables are Superfoods!
Anti-Inflammatory Foods

Vegetables contain Vitamins, Minerals and Phytonutrients:

• Strengthen your immune system and mitochondria.
• Improve nervous system
• Promote healthy gut bacteria.
• Help decrease inflammation
Leafy Greens

- Arugula
- Bok Choy
- Chard
- Kale
- Spinach
- Mustard Greens
- Lettuce – dark green and red

High in phytochemicals
Anti-inflammatory properties
Vegetables

Leafy Greens

• Vitamin A
• Vitamin C
  • Immune cell function, skin and gums

High in antioxidants
• natural substances that may prevent or delay some types of cell damage and protect against diseases.
Vegetables

Leafy Greens

- Vitamin K
- B vitamins – folate
  - Important for nervous system
Vegetables

Colored Vegetables

• Asparagus
• Beets
• Peppers – red, orange, yellow, green
• Red cabbage
• Carrots
• Zucchini
• Squash

• Deep color is a sign of antioxidants & phytonutrients.
• Antioxidants help protect against autoimmune disease
Vegetables

Cruciferous Vegetables

- Broccoli
- Brussel Sprouts
- Cabbage
- Cauliflower

High in sulfur-compound–glucosinolate, which may play an important role in disease prevention, by triggering antioxidants and anti-inflammatory responses and contributing to the maintenance of cell balance.
Vegetables

Cruciferous Vegetables

- Folate
- Vitamin C, K
- Potassium
- Selenium
- Calcium
- Phytonutrients
Vegetables

**Sulfur Vegetables**

- Cabbage
- Broccoli
- Cauliflower
- Onions
- Leeks
- Garlic
- Mushrooms
Vegetables

How much Vegetables?

8-9 cups per day
Vegetables

How to eat more veggies?

• Raw with hummus or guacamole
• Roasted
• Steamed
• Salads
• Veggie-Based Meals
• Veggie-Based Smoothies
Starter Smoothie Recipe

2-3 large handfuls leafy greens (start with spinach)
1-2 carrots, sliced
½ banana
1 cup frozen fruit (mango, pineapple, berries)
2 Tbsp flaxseed
Water, almond or coconut milk (fill blender about half full)

Blend for 1-2 minutes
Anti-Inflammatory Foods

Omega-3
- Both omega-3 and omega-6 are essential fatty acids
- The American diet provides an overabundance of omega-6 fatty acids
Anti-Inflammatory Foods

Polyunsaturated Fatty Acids

Omega 6
- Vegetable oils, margarine
- Nuts, seeds, grains
- Conventional meats
  - Linoleic Acid
  - Gamma-linolenic acid
  - Arachadonic acid
  - Produce Omega 6 Eicosanoids
    - PRO-INFLAMMATORY

Omega 3
- Fish like salmon, tuna, sardines, mackerel
- Flaxseed and chia seeds
  - Alpha Linolenic Acid
  - Eicosopentaenoic acid (EPA)
  - Docosahexaenoic acid (DHA)
  - Produce Omega 3 Eicosanoids
    - ANTI-INFLAMMATORY

Compete for the same converting enzymes in the body
Omega-3 Food Sources

Food Sources (lower in mercury) of omega-3

- Salmon
- Anchovies
- Herring
- Pacific Mackerel (not King)
- Sardines
- Trout
- Flax seed
## Table 1 Food Sources of Omega-3 Fatty Acids

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>Omega-3s (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon, Atlantic, farmed, cooked</td>
<td>3 oz</td>
<td>1.83</td>
</tr>
<tr>
<td>Herring, Atlantic, cooked</td>
<td>3 oz</td>
<td>1.71</td>
</tr>
<tr>
<td>Sardines, canned in tomato sauce, drained</td>
<td>3 oz</td>
<td>1.19</td>
</tr>
<tr>
<td>Trout, rainbow, wild, cooked</td>
<td>3 oz</td>
<td>0.84</td>
</tr>
<tr>
<td>Shrimp, cooked</td>
<td>3 oz</td>
<td>0.24</td>
</tr>
</tbody>
</table>

*Source: [https://ods.od.nih.gov/factsheets/omega3fattyacids-healthprofessional](https://ods.od.nih.gov/factsheets/omega3fattyacids-healthprofessional)*
Anti-Inflammatory Foods

Omega-3
- Studies advocate lower intake of omega-6 compared to omega-3 in reducing risk of some chronic diseases that are associated with inflammation
Anti-Inflammatory Foods

- The American Heart Association recommends eating fish (particularly fatty fish) at least two times a week. Each serving is 3.5 ounce cooked or about ¾ cup of flaked fish. Fatty fish like salmon, mackerel, herring, lake trout, sardines and albacore tuna are high in omega-3 fatty acids.

- Ask your doctor or dietitian about dosage for a fish oil supplement. FDA does not recommend exceeding supplements with greater than 2 grams EPA & DHA daily.
Brooke Goldner, MD

- MD with lupus
- Uses a vegan diet and large intake of veggie-based smoothies with flax seed
- Healed of lupus
- Has many followers that are doing her program and seeing reduction in symptoms and labs
- No research
Nutrition to Fight Inflammation

Terry Wahls, MD
- MD with progressive MS
- Uses a paleo-based diet with high intake of vegetables
- Went from wheelchair bound to bike riding and thriving
- States still has MS, but symptoms dramatically improved
- Conducting research
Nutrition to Fight Inflammation

Terry Wahls Research Study

- Effect of Paleo Diet on management of MS.

- Paleo diet
  9 cups of vegetables, some fruits, meat protein including organ meat, and NO gluten dairy, potatoes, or legumes (beans, lentils, peanuts, soy, etc)
Terry Wahls Research Study
- Randomized controlled trial found a Paleo diet may be useful in the management of MS:
  - reduce fatigue
  - increase mental and physical quality of life
  - increase hand and leg function
Terry Wahls Research Results

- Increase in vitamin K may indicate reductions in oxidative cell and mitochondrial damage along with reduced inflammation, perhaps contributing to improved cognitive and motor function, fatigue and quality of life.
QUESTIONS?