



Medical nutrition therapy for Rheumatoid Arthritis

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Medical Nutrition Therapy (MNT)

- A comprehensive **nutrition assessment** of individuals with RA is essential, with a review of systems to determine the systemic effects of the disease process.
- Current weight and history of weight change over time are the least expensive, least invasive, and most reliable assessment tools to use.
- **Weight change** is an important measure of RA severity. The characteristic progression of **malnutrition** in RA is attributed to excessive **protein catabolism** evoked by inflammatory **cytokines** and by disuse atrophy resulting from functional impairment.

- The **diet history** should review:
 - ▣ the usual diet
 - ▣ the effect of the handicap
 - ▣ types of food consumed
 - ▣ changes in food tolerance secondary to oral, esophageal, and intestinal disorders.
- The **effect of the disease** on food shopping and preparation, self-feeding ability, appetite, and intake also must be assessed.
- The **use of elimination or other diets** purported to treat or cure arthritis should be identified.

MNT

- Articular and extraarticular manifestations of RA affect the **nutrition status** of individuals in several ways:
- Articular involvement of the small and large **joints** may limit the ability to perform nutrition-related **ADLs**, including **shopping** for, **preparing**, and **eating** food.
- Involvement of the **temporomandibular** joint can affect the ability to chew and swallow and may necessitate changes in **diet consistency**.
- Extraarticular manifestations include increased metabolic rate secondary to the inflammatory process, **SS**, and changes in the **gastrointestinal mucosa**.

1. **Taste alterations** secondary to xerostomia and dryness of the nasal mucosa
2. **dysphagia** secondary to pharyngeal and esophageal dryness
3. **anorexia** secondary to medications, fatigue, and pain
 - may reduce dietary intake.

- The association of foods with disease **flares** should be discussed.
- **Dietary manipulation** by either modifying food **composition** or **reducing body weight** may give some clinical benefit in improving RA symptoms.
- A **vegan, gluten-free** diet causes improvement in some patients, possibly because of the reduction of immunoreactivity to food antigens. Identification of possible food allergies and use of an elimination diet may be useful.

- **Fasting** reduces:
 1. (its role in adaptive cellular responses) **oxidative damage and inflammation.**
 2. **hypertension, asthma,** and symptoms of RA.
- Thus fasting has the potential to delay aging and help prevent and treat diseases while minimizing the side effects caused by medications.
- **Intermittent fasting** during the acute phase of RA may provide some **pain relief.**

- The **antiinflammatory diet** similar Mediterranean-style eating plan includes foods that almost everyone should aim to consume on a daily basis, such as:
 - ▣ moderate amounts of lean meat
 - ▣ unsaturated fats instead of saturated fats
 - ▣ plenty of fruits and vegetables, and fish.
- These diets are also nutritionally adequate and cover all of the food groups.

Energy

- There are 3 unique aspects of energy metabolism in RA:
 1. **elevated REE.** RA causes cachexia, a metabolic response characterized by loss of muscle mass and elevated resting energy expenditure.
 2. **elevated whole-body protein catabolism,** a destructive form of muscle metabolism that translates to muscle wasting.
 3. **low body cell mass,** which leads to increased fat mass.

Energy

- People with RA tend to be **less active** than people without it; the stiffness and swelling caused by inflammation naturally prompt them to pursue less physical, more sedentary lifestyles. Such habits lead in turn to overall **gains in fat mass**. Being overweight puts **an extra burden on weight-bearing joints** when they are already damaged or under strain.

Energy

- **TEE** is significantly lower in RA patients.
- Energy requirements should be adjusted according to the **weight** and **activity level** of the individual.
- People with RA should **consume nutrient-rich diets** and incorporate **physical activity** throughout the day to boost their total energy expenditure (This helps maintain a healthy weight).

Protein

- Protein requirements for individuals who are poorly nourished or who are in the inflammatory phase of the disease are 1.5 to 2.0 g protein/kg body weight. Well-nourished individuals do not have increased requirements.

Fat

- **less than 30%** of the total energy intake
- The **type of fat** included in the diet is important: an increase in the amount of **omega-3** fatty acids primarily from **fish oils** and **alpha-linolenic acid** (found in flaxseed, soybean oils, and green leaves) have been shown to reduce inflammation in RA.
- The antiinflammatory diet with higher omega-3 fatty acids can reduce inflammatory activity and allow for increased physical function, and improved vitality for RA patients.

Fat



- There is evidence of a fairly consistent, but modest, benefit of **marine omega-3 PUFAs** on joint swelling and pain and duration of morning stiffness.
- **Fish oil** at a high dose (**3.5 g/day**) has been shown to have additional benefits.
- Some other oils of marine origin and a range of vegetable oils (**olive** and **evening primrose** oil) have indirect antiinflammatory actions probably mediated via **PGE1**.
- The beneficial effects are generally delayed for up to 12 weeks after they are started, but last up to 6 weeks after discontinuing therapy.

Minerals, Vitamins, and Antioxidants

- Several vitamins and minerals function as **antioxidants** and therefore affect inflammation.
- **Vitamin E** is just such a vitamin, and along with **omega-3** and **omega-6**, may affect cytokine and eicosanoid production by decreasing **proinflammatory cytokines**.
- **Synovial fluid and plasma trace element concentrations, excluding Zn**, change in inflammatory RA. Altered trace element concentrations may result from changes of the immunoregulatory **cytokines**.

Minerals, Vitamins, and Antioxidants



- RA patients often have nutritional intakes below the **DRIs** for **folic acid**, **Ca**, **vitamin D**, **E**, **B**, **zinc**, and **Se**.
- In addition, the commonly used drug **MTX** is known to decrease serum **folate** levels with the result of elevated homocysteine levels. Low serum level of pyridoxal-5-phosphate correlates with increased markers of inflammation and continuous use of **NSAID (Naproxen)** also impairs **pyridoxine** metabolism by a mechanism related to COX inhibition.
- Thus, in these patients, adequate intakes of **folate** and vitamins **B6** and **B12** should be encouraged.

Minerals, Vitamins, and Antioxidants

- **Calcium** and **vitamin D malabsorption** and bone demineralization are characteristic of advanced stages of the disease, leading to osteoporosis or fractures.
- Prolonged use of **glucocorticoids** also can lead to **osteoporosis**.
- Therefore **supplementation with calcium and vitamin D** should be considered.

Vitamin D

- Vitamin D deficiency:
 - ▣ autoimmune diseases including DM1, MS, Crohn, dementia, CVDs, rheumatic disorders (SLE, RA).
- Vitamin D:
 - ▣ suppressing Th17 and Th1 cells (proinflammatory)
 - ▣ giving way to Th2 and Treg cells, (antiinflammatory)
- As most studies indicate that vitamin D **insufficiency** is associated with **high disease activity of RA**, it would be logical to supplement RA patients with vitamin D.

Vitamin D

- Supplementation of **500 IU calcitriol daily** given to previously DMARD patients with early RA along with triple DMARD therapy resulted in significant higher **pain relief** (50% vs. 30%) at the end of 3 months, compared with patients treated with triple DMARD and calcium.
- Most clinicians agree that with the increasing adverse health outcomes associated with hypovitaminosis D, **supplementation** should be performed routinely in RA patients.

Minerals, Vitamins, and Antioxidants

- Elevated levels of **copper** and **ceruloplasmin** in serum and joint fluid are seen in RA. Plasma copper levels correlate with the degree of **joint inflammation**, decreasing as the inflammation is diminished. Elevated plasma levels of **ceruloplasmin**, the carrier protein for copper, may have a **protective role because of its antioxidant activity**.

ANTIINFLAMMATORY DIET



- The **antiinflammatory diet**, a diet resembling the Mediterranean diet, has been useful for the treatment of inflammatory diseases, including RA.
- The diet aims for the inclusion of:
 - as much fresh food as possible
 - the least amount of processed foods and fast food
 - minimal amounts of sugar, particularly fructose and sucrose
 - an abundance of: fruits (especially berries) and vegetables, lean proteins, from animal sources such as chicken and fish, and vegetarian sources such as legumes and nuts, essential FAs, and dietary fiber.

ANTIINFLAMMATORY DIET



- Although this diet is not intended for weight loss, people often **lose weight** on it.
- Changing the dietary habits to a Mediterranean diet reduces the **inflammatory** status in **healthy persons**, as well as in patients with obesity, cardiovascular disease, and Crohn's disease.
- The antiinflammatory diet works by reducing the expression of genes involved in the inflammatory process such as **IL-1**, **IL-6**, and **TNF- α** .

COMPLEMENTARY OR INTEGRATIVE THERAPIES

- Because of the **chronic** nature of arthritic diseases, their effects on quality of life, and the fact that most treatments result only in **modest improvement** in symptoms and function, patients commonly try alternative methods of treatment.
- Favorable effects of self-help treatments are often reported **anecdotally**, but usually no **cause-and-effect** relationships are documented.
- with unlimited access to the Internet, patients have greater exposure to remedies and controversial treatments. In a recent survey, rheumatologists (US) showed a favorable opinion toward **CAM** for patients with rheumatic diseases.

COMPLEMENTARY OR INTEGRATIVE THERAPIES

- The terms CAM refer to health-related products and practices that **are not** generally considered part of **conventional** medicine.
- **Complementary** medicine is used together with conventional medicine, and **alternative** medicine is used in place of conventional medicine.
- Therapies vary from aromatherapy to reflexology, herbal, natural products and supplements, physical activities, body work, and many more.



COMPLEMENTARY OR INTEGRATIVE THERAPIES

- Natural products encompass herbs (botanicals), vitamins and minerals, and probiotics.
- They are widely marketed, available to consumers, and often sold as “dietary supplements,” including:
 - fish oil, extra virgin olive oil
 - curcumin, turmeric
 - boswellia, comfrey
 - alfalfa, cat’s claw, thunder god vine, CoQ-10
- **Capsaicin**, the compound responsible for the burning sensation produced by chili peppers, is used as a rubbing topical gel to relieve pain, particularly in joints of OA and RA patients.



Elimination Diets



- Many people have the belief that certain foods may contain harmful substances that can worsen their arthritis symptoms. One theory is that they are having an allergic reaction to the food.
- According to the NIH, the **nightshade elimination diet** for arthritis management is considered CIM.
- It is believed that nightshade plants aggravate the **inflammation** that causes pain, swelling, and stiffness in the joints of some patients with arthritis.

Elimination Diets



- Nightshades are a diverse group of foods, herbs, shrubs, and trees that include more than 2800 species of plants of the *Solanaceae* family, such as **potatoes, tomatoes, sweet and hot peppers, and eggplants.**
- They contain a group of chemicals termed alkaloids, like **solanine** and **chaconine**, which are believed to cause damage to the joints and increase the loss of calcium from the bones.
- The nightshade elimination diet is believed to be safe, but there is always the risk that when eliminating certain foods from their diet, arthritis patients may not get enough of the necessary nutrients (vitamins, minerals, antioxidants).

MICROBIOTA AND ARTHRITIS

- **Increased levels of antibodies** directed against antigens of certain species of gut bacteria point to the relationship between bacteria and arthritis.
- **Mechanisms** through which the microbiota may be involved in the pathogenesis of rheumatic diseases include:
 - ▣ altered epithelial and mucosal permeability
 - ▣ loss of immune tolerance to components of the indigenous microbiota
 - ▣ trafficking of activated immune cells and antigenic material to the joints

MICROBIOTA AND ARTHRITIS

- In 2007, *Prevotella copri* was recovered from human feces. *P. copri* is an obligate anaerobic, nonmotile, gram-negative rod. The importance of this discovery lies in that *P. copri* has been recovered in 75% of patients with new-onset untreated RA (NORA) and only in 21.4% of healthy individuals.

MICROBIOTA AND ARTHRITIS

- Potential future therapeutic **approaches** may include **modification of the microbiota** through the use of **probiotics** or **prebiotics**.

Complementary and Integrative Therapies

- The increasing popularity of the use of **complementary** treatments appears to be particularly evident with people afflicted with RA. **Herbal therapy** is popular; however, concerns of **toxicity** must also be addressed because the Food and Drug Administration (FDA) provides relatively little regulation of herbal therapies.

Complementary and Integrative Therapies

- **Gamma-linolenic acid (GLA)** is an omega-6 fatty acid found in the oils of black currant, borage, and evening primrose that can be converted into the antiinflammatory PGE1.
- This antiinflammatory PGE1 may relieve pain, morning stiffness, and joint tenderness with no serious side effects.



BOX 39-2 The Antiinflammatory Diet

General principles: Aims for variety, with plenty of fresh food, the least amount of processed foods and "fast foods," and abundant fruits and vegetables

Includes plenty of fruits and vegetables, except onions and potatoes, which contain the alkaloid solanine

Low in saturated fat and devoid of trans fats

Low in omega-6 fats, such as vegetable oils and animal fat

High in omega-3 PUFAs such as those found in olive oil, flax, walnuts, pumpkin seeds, and fatty cold-water oily fish such as salmon, sardines, mackerel, and herring. Other healthy oils include grapeseed, walnut, and canola.

Low in refined carbohydrates such as pasta, white bread, white rice, and other refined grains, and sucrose (table sugar) and sucrose-containing products such as pastries, cookies, cakes, energy bars, and candy

Favors intake of whole grains such as brown rice, bulgur wheat, and other unrefined grains such as amaranth, quinoa, and spelt.

Includes lean protein sources such as chicken and fish

Low in eggs, red meat, butter, and other full-fat dairy products

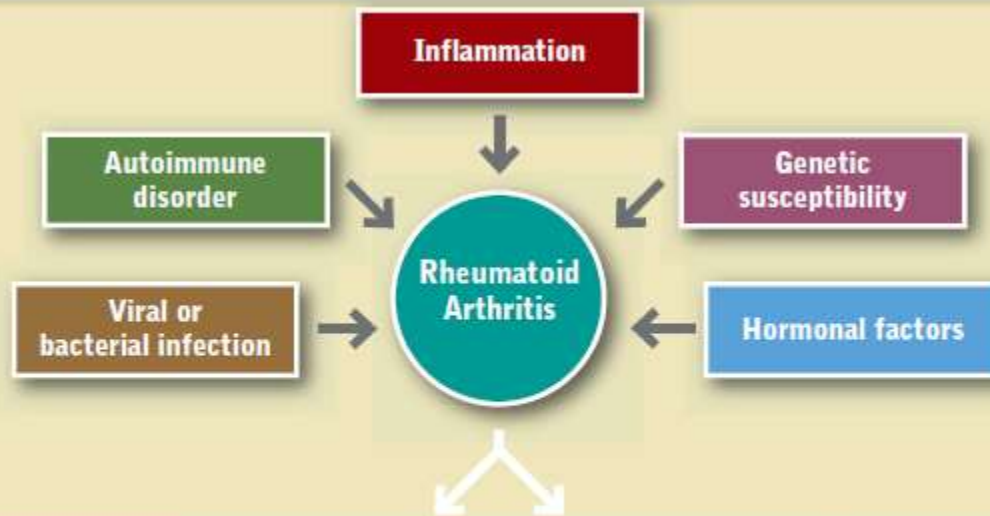
Low in refined and processed foods

Includes spices such as ginger, curry, turmeric, and rosemary, which have antiinflammatory effects

Includes good sources of phytonutrients: fruits and vegetables of all bright and dark colors, especially berries, tomatoes, orange and yellow fruits, and dark leafy greens; cruciferous vegetables (cabbage, broccoli, brussels sprouts, cauliflower); soy foods, tea (especially white, green or oolong), dark plain chocolate in moderation

Additionally, weight should be maintained within healthy parameters, and exercise should be included.

ETIOLOGY



PATHOPHYSIOLOGY

Joint Symptoms

- Warmth
- Redness
- Swelling
- Pain
- Stiffness
- Loss of function

Articular

- Chronic Inflammation In synovial membranes
- Damage to joint cartilage and bone
- Weakening of surrounding muscles, ligaments and tendons

Extra-Articular

- Generalized bone loss
- Rheumatoid cachexia
- Changes In GI mucosa
- Anemia
- Sjögren's syndrome
- Cardiovascular disease

MANAGEMENT

Medical Management

Routine Monitoring and Ongoing Care Doctor visits, blood, urine and lab tests, x-rays
Drug Therapy DMARDs, biological response modifiers, analgesics, NSAIDs, corticosteroids
Health Behavior Changes

- Rest and exercise
- Joint care
- Stress reduction

Surgery Joint replacement, tendon reconstruction, synovectomy

Nutrition Management

- Healthful balanced diet
- Avoidance of possible food allergens
- Adequate B vitamins
- Adequate calcium and vitamin D
- Supplementation with ω -3 PUFA
- Anti-inflammatory diet
- Intermittent fasting during acute phase

A vibrant, sun-drenched forest scene. Tall, slender trees with dense green foliage stand in a clearing. Sunlight beams through the canopy, creating a magical, ethereal atmosphere. The ground is covered in a thick layer of green grass and small white flowers. The overall mood is peaceful and serene.

Thank you