

Nutrition for Sports Injuries and Healing

“Unleashing the Power of Food”

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Learning Objectives

- Understand the three stages of healing
- Be able to apply a practical nutrition pyramid of prioritization to aid in the management of sports injuries
- Understand the importance of Energy Availability (Adequate caloric intake)
- Understand Macronutrient needs (Carbohydrates, Proteins and fats)
- Understand Micronutrient needs (Vitamins, minerals and phytonutrients)
- Understand the significance of nutrient timing
- Understand how and when to use select supplements for inflammation, healing and repair

Healing after an Injury occurs in three stages

1. **Inflammation** - Occurs immediately and continues up to 5 days post-injury. It is the body's way of signaling the immune system to heal and repair damaged tissue, as well as defend itself against viruses and bacteria.
2. **Proliferation (regeneration)** - From 5 days to 3 weeks post-injury. In this phase, tissue rebuilding and repairing occurs.
3. **Maturation (fibrosis)** - From 3 weeks to 2 years. In this phase, remodeling of tissue structure occurs.

Each stage must occur sequentially in order for optimal healing to occur. By understanding the stages of healing, one can more effectively focus specific nutrition and rehabilitation interventions.

Should you use ice and/or anti-inflammatory medications after an injury?

During the inflammatory stage, numerous chemicals are released, some of which can irritate pain receptors called nociceptors. Many people turn to Non Steroidal Anti-inflammatory Drugs, such as Ibuprofen and Naproxen, to reduce the pain. Unfortunately, while these medications can be effective at blocking pain, they can also disrupt the healing process.

Fortunately, there are a number of alternative physical and nutritional interventions that can help reduce the pain associated with inflammation, while at the same time supporting the healing process.

MEAT vs RICE?

Move, **E**xercise, **A**nalgesics, **T**reatment

Rest, **I**ce, **C**ompression, **E**levation

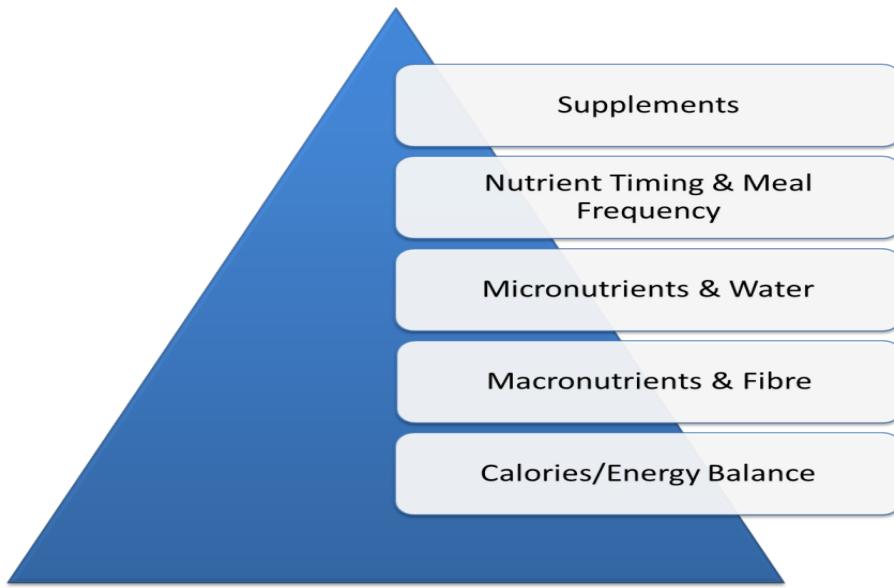
MEAT supports the healing process, whereas certain aspects of RICE may impede it, depending upon the injury.

I generally recommend contrast hydrotherapy as follows: Three minutes of heat alternating with one minute cold, three times, several times throughout the day. This serves to pump nutrition into the injured area and pump waste products out.

Ice is generally reserved for right after surgery or briefly after an injury, depending on the severity of the inflammation.

You should consult your doctor or therapist to determine which approach best suits your injury.

Pyramid of Nutritional Prioritization



(Eric Helms, PhD)

The key points to consider with the pyramid of nutritional prioritization:

- Consume adequate calories to ensure energy balance
- Ensure optimal intake of macronutrients (Carbohydrates, proteins and fats) for energy, repair and reducing inflammation
- Eat enough nutrient dense foods to avoid micronutrient deficiencies (vitamins, minerals and phytonutrients)
- Strategic timing of nutrients for energy and repair
- Select nutrient supplementation for inflammation, muscle, tendon and bone repair

Energy

Adequate calories (energy) are essential for maintaining ideal body weight, fueling activities (e.g. rehabilitation) and promoting healing/recovery. Determining one's energy requirements can be done using online calculators that take into account one's

metabolic rate (BMR) and activity energy expenditure (i.e. rehabilitation, exercise, healing requirements and non exercise activity thermogenesis).

Many individuals reduce their calorie intake during injury recovery out of fear that they will gain weight. While consuming excessive simple carbohydrates could lead to unwanted weight gain, supporting the healing process with adequate calories is essential. In addition, some weight gain may be favorable for optimal healing. Also, during recovery, the use of crutches or other ambulation aids can substantially increase one's energy requirements.

Macronutrients

There are three macronutrients:

1. Carbohydrates
2. Proteins
3. Fats

Each macronutrient plays an important role in the healing process and will be discussed in the context of the three T's: Total, Type and Timing.

Carbohydrates

Carbohydrates include sugars (simple) and starches (complex). Their primary function is to provide energy for moderate-intense activity. They are also important in keeping the body in an anabolic state by helping to mediate cortisol levels, a main catabolic hormone. Carbohydrates also spare protein, which further aids in maintaining an anabolic state.

During injury healing, one should consider meeting carbohydrate requirements for both the healing process as well as

rehabilitation. This could be in the range of 3-5g/kg Body Mass, with the focus on low glycemic carbohydrates (e.g. whole grains, vegetables and fruits) as the primary sources.

Proteins

Proteins are essential for muscle growth and repair as well as keeping the body in an anabolic state. They can be categorized as:

1. **Complete** - Animal sources, such as beef, poultry, pork, lamb, fish, eggs, dairy and plants such as quinoa and soy
2. **Incomplete** - Plants, such as grains, legumes, nuts and vegetables

The general dose for protein to help support healing is 1.5-2.5 g/kg Body Mass. Include some protein with each meal (about 0.4 g/kg Body Mass or about 20-40g). If you are vegetarian, make sure to balance complementary protein sources throughout the day, e.g. Rice and beans, and aim for intakes towards the higher end.

Protein needs can be higher in older adults as well as in disuse atrophy, where there can be anabolic resistance.

Fats

Fats and oils can be categorized according to their saturation. The degree of saturation determines the melting point and stability of a fat. Fats are important as an energy source (low intensity activity), hormone production and in controlling inflammation

Sources of fats include:

Saturated fats- Animal fats and coconut

Monounsaturated- Avocados, olive oil, macadamia nuts

Polyunsaturated:

Omega 6 (Proinflammatory if out of balance)- Seed and vegetable oils, e.g. canola, corn, peanut, sunflower, safflower

Omega 3 (anti-inflammatory)- Dark green leafy vegetables, flax/hemp seeds, walnuts, cold water fish, grass-fed beef, omega-3 eggs

In general, fats should make up anywhere from 15-20% of one's diet, with the emphasis on omega 3 polyunsaturated fatty acids and monounsaturated sources. Diets high in saturated fats and omega 6 polyunsaturated fatty acids can put the body in a more inflammatory state.

Micronutrients

Micronutrients include vitamins, minerals and phytonutrients. They are required in small quantities to ensure normal metabolism, growth and physical well-being. They also help to reduce inflammation and support the healing process.

When it comes to micronutrients, avoiding nutrient deficiencies is the key and this can be done by eating a well balanced, varied, whole foods and unprocessed diet.

Supraphysiologic vitamin and mineral supplementation beyond what a balanced diet can provide, is not recommended and in the case of antioxidants (e.g. Vitamins A,C,E,Beta carotene, Zinc and Selenium) can adversely affect healing by disrupting the beneficial aspects of inflammation.

Nutrient Timing

The strategic timing of your nutrition is important to ensure that sufficient energy and nutrients are available for recovery and repair.

Specific Nutrient Timing Considerations Include:

- Proteins: 20-40g/meal, ideally pulsed every 3-4 hours
- Carbohydrates: Meet the total daily carbohydrate needs to support rehabilitation, with the focus on consuming low glycemic carbohydrates before and after rehabilitation
- Fats: No specific timing. Include healthy sources with meals
- Pre- and post-rehab nutritional interventions: Consume protein and collagen 30-60 minutes prior to rehab exercises
- Consume casein protein (~ 30-40 g) at bedtime

Supplements

Supplements can play a role in helping to enhance repair, but only when the foundation (energy, macros, micros and timing) is covered.

Supplements can be categorized based on how they support (not block) inflammation as well as their role in muscle, tendon and bone repair.

Inflammation:

- Bromelain: Generally about 500 mg 3x/day away from food
- Curcumin: 500 mg 3x/day (find product with piperidine)
- Fish oil: 2000 mg 3x/day

Muscle Repair:

- Adequate Protein
- HMB (Beta-hydroxy-beta-methyl butyrate): 3g/day
- Fish Oil: 4000 mg/day
- Creatine Monohydrate: 5000 mg/day for 5 days (in divided doses), followed by 3000 mg/day
- Polyphenols (micronutrients from plant-based foods): Consume a variety of colorful fruits, vegetables, herbs and spices

Tendon Repair:

- Collagen or gelatin: (SEE BAR PROTOCOL)
- Whey Protein: 20-40 g/day (about 3-5 g Leucine)
- Nitrates: From food (e.g. beets and chard)- increases circulation
- Citrulline Malate: 6,000 – 8,000 mg/day- increases circulation

Barr's Gelatin Protocol

- 15 grams of gelatin + 200-500 mg of vitamin C, 30-60 minutes before workout
- Workouts should not exceed ten minutes, and be at least six hours before or after other exercise
- For rehab after an acute injury, start as soon as possible and do up to three mini workouts per day, separated by six hours

Tendon: Use isometric holds- 30 seconds, 3-5 times with 30-second breaks

Bone: Jarring impulses to trigger bone remodeling- Six minutes of jumping rope

Bone Repair:

- Adequate Protein and Carbohydrates

- Calcium: Aim for 1200 mg mostly from food sources
- Vitamin D: Per blood work (optimal levels are 40–60 ng/mL)

Hydration

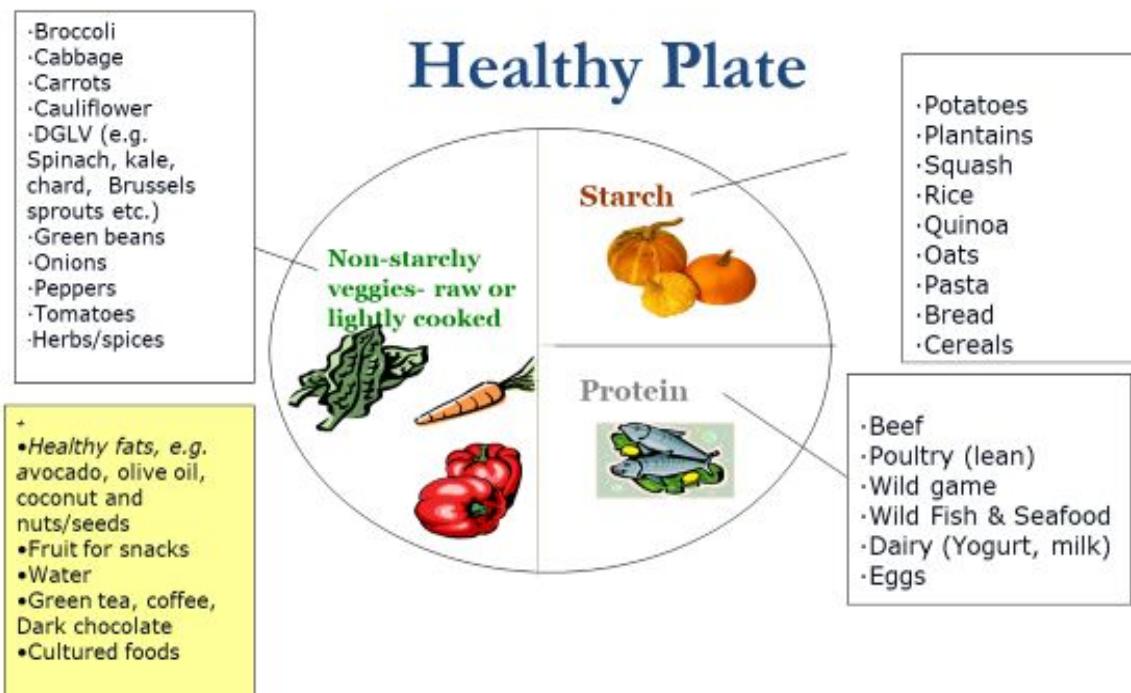
Water is a carrier for nutrients and waste products to and from cells and is a major component of blood. Poor hydration reduces the body's blood volume, thereby reducing oxygen and nutrient delivery, ultimately impairing wound healing.

The Institute of Medicine of the National Academies recommends as a baseline that women consume an average of ~90 oz and men consume 125 oz of water per day. Urine color (dark vs light) is one way to monitor hydration status.

Summary

- Avoid energy restriction as this will slow down wound healing and exacerbate muscle loss
- Eat a well balanced high quality diet to help avoid macro and micro nutrient deficiencies
- Optimise protein intake (20-40 g every 3-4 waking hours)
- Periodize carbohydrates around exercise/rehabilitation
- Consume healthy fats from omega 3 and monounsaturated sources
- Choose supplements to support injury healing and repair, opting for a food first approach when possible

The Healthy Plate can be used as a Guide to Balanced Eating



Choose grass-fed, pasture-raised or wild meats/seafood and local and organic produce whenever possible. The freshness and quality of food, and whether that food has been treated with hormones, antibiotics and/or herbicides, can impact the effect of foods on inflammation and health.

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Precision Nutrition, Nutrition for Injury Recovery Infographic.
<https://www.precisionnutrition.com/>

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