

# Support for Healthy Tendons and Ligaments

Developed and reviewed by the clinical, chiropractic, and naturopathic members of the Standard Process team

## Tendon and Ligament Function and Importance

Tendons and ligaments are dense, fibrous tissues that connect bones, joints, muscles, and organs. They are comprised predominantly of type I collagen and non-collagen proteins. A key function of tendons and ligaments is to support and transmit loads applied to the musculoskeletal system.

Many factors influence the health of tendons and ligaments including movement patterns, nutrition, aging, health status, and postural habits. Compared with muscle tissue, tendons and ligaments are poorly vascularized and take longer to heal from injury.

Tendon strains and ligament sprains are commonly encountered in a physical medicine clinic. They may occur because of repetitive overuse or acute injury. Repetitive stress can lead to progressive inflammation, which then causes fibers to weaken until they fail under load.

An acute injury can occur because of a single traumatic event. In this scenario, a tendon or ligament may be unable to maintain its integrity when faced with a high-speed movement or high-impact trauma. An acute injury may develop more quickly if the tendon or ligament is already fatigued through repetitive stress.

After a tendon or ligament injury occurs, the body supports tissue repair with type III collagen, which is comprised of smaller fibrils than type I collagen. This initial repair creates a disorganized matrix of fibrils. Over time, as type I collagen replaces type III, the fibrils become more aligned which increases tissue strength.

To support ligament and tendon health, consider in-office modalities, at-home exercises, lifestyle interventions, and dietary support.

## Supportive Lifestyle Practices

- Rehabilitation exercises after a tendon or ligament injury that include the use of resistance bands can be used to strengthen tissues and prevent recurrence more effectively than bodyweight exercises alone.<sup>1</sup>

- To help avoid overuse injuries, encourage patients who exercise regularly to include rest and recovery days in their schedule.<sup>1</sup>
- Encourage patients to perform passive stretching, which has been found to improve vasodilation and increase blood flow to connective tissue.<sup>2</sup>
- Instrument Assisted Soft Tissue Mobilization (IASTM) can increase fibroblasts and support the synthesis and realignment of collagen fibers.<sup>3</sup> Studies have shown significant increases in dorsiflexion range of motion and reductions in ankle joint stiffness after utilizing IASTM on plantar flexors and Achilles' tendon.<sup>4</sup>

## Whole Foods Nutritional Recommendations

- Consumption of amino acids found in high-quality protein is required for tendon and ligament health. Proline, glycine, and hydroxyproline are the building blocks of collagen and are needed for tissue repair.<sup>5</sup> Foods rich in these beneficial amino acids include bone broth, beef, chicken, fish, eggs, legumes, and dairy products.
- Educate patients on the value of foods rich in the trace mineral manganese which is a cofactor in the synthesis of collagen.<sup>6</sup> Manganese can be found in nuts, seeds, beans, and leafy greens.
- Ensure adequate consumption of foods rich in vitamin C such as citrus fruits, bell peppers, strawberries, and broccoli. The antioxidant vitamin C serves as a cofactor for enzymes involved in collagen production and stimulates cellular processes for ligament and tendon repair.<sup>7</sup>
- Encourage the intake of foods rich in vitamin A to fight inflammation and support tissue repair through collagen synthesis, fibroblast activation, and the promotion of angiogenesis.<sup>8</sup> Active vitamin A can be found in animal products such as eggs, organ meats, beef, and dairy. Provitamin A can be found in sweet potatoes, carrots, spinach, and cantaloupe.

# Dietary Supplement Regimen



## Ligaplex® II

Suggested Use: **2 capsules twice per day**

Ligaplex® II is a connective tissue and joint support supplement.\*

- Provides essential nutrients to support the skeletal system and facilitate movement\*
- Nutritional compounds for support of proper formation and maintenance of skeletal tissues\*
- Contains a combination of key ingredients from Cardiotrophin PMG®, Ostrophin PMG®, Manganese B12™, Super-EFF®, and Cataplex® E
- Excellent source of vitamin A, vitamin B<sub>12</sub> and manganese



## Boswellia Complex

Suggested Use: **1 tablet, 2-4 times daily**

Boswellia Complex contains Boswellia, Celery Seed, Ginger and Turmeric. These herbs have been traditionally used in herbal preparations to:

- Maintain and support healthy joints\*
- Support healthy circulation\*
- Provide antioxidant activity\*



## Cataplex® A-C

Suggested Use: **2 tablets per meal**

Cataplex® A-C helps support immune system function, and a healthy hematopoietic (blood cell & plasma creation) system.\*

- Maintains healthy cells and tissues\*
- Helps maintain healthy epithelial and connective tissues\*
- Contains a combination of key ingredients from Cataplex® A and Cataplex® C along with organic Echinacea
- Excellent source of antioxidant vitamin A
- Good source of antioxidant vitamin C



## C Synergy

Suggested Use: **1 tablets per meal**

C Synergy, formerly known as Collagen C™, is a supplement to support collagen production and contains antioxidant vitamin C to support healthy connective tissue.\*

- Provides whole food acerola and rose hips
- Excellent source of antioxidant vitamin C, which is involved in the production of collagen

## Assessment of Tendons and Ligaments

## In Office/Physical Exam

- Perform relevant orthopedic tests and assess active and passive range of motion
- Assess postural and movement patterns
- Visualization and palpation of tissue to identify signs of inflammation, taut and tender fibers
- Gather information on exercise habits and injury history
- Consider imaging in appropriate patients

## REFERENCES

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