



BEYOND PERFORMANCE

Our mission is to provide athletes at all levels a comprehensive approach to achieving their athletic potential and enhancing sports performance by utilizing evidence-based training methodologies.

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Jumper's Knee Guide

What is Jumper's Knee?

Jumper's Knee, also known as patellar tendinopathy, is an inflammation of the patellar tendon due to overuse. As the name insinuates, repetitive jumping and cutting has chronically stressed the patellar tendon beyond its structural capacity. As the knee translates further over toe as it naturally does in sport, greater forces are placed on the patellar tendon. Over time the tendon can begin to become inflamed as it becomes weakened by the repetitive stress. Typically, rest will improve symptoms but generally come back after you return to activity that stresses the knee such as jumping.

How to Fix Jumper's Knee

The goal of the rehabilitation process is to increase the durability and tensile strength of the tendon and increase the strength of the surrounding musculature. To treat jumper's knee you want to initially undergo a period of reduced stress on the patellar tendon so the pain and inflammation can decrease. Next comes the general strengthening phase where we utilize isometric strengthening at specific joint angles. Tendons respond really well to heavy isometric holds. This allows the quad muscles to produce a lot of force without yanking on the tendon with a fast contraction of the connected musculature. Remember, as the knee translates further over the toe there is an increase in stress placed on the patellar tendon. Therefore, we want to strengthen the knee in this position as well. Once there is a solid strength base, we can progressively introduce plyometric exercise to rebuild the tendon's durability and tolerance to progressively greater stress.

Nutrition to Support Recovery

A 2016 study by Shaw et al. found that vitamin C and gelatin supplementation increased collagen synthesis. Tendons are a connective tissue made up of collagen fibers, therefore, an increase in collagen synthesis means improved tendon repair. The vitamin C increases the absorbability of the gelatin (cooked form of collagen). The findings from the study indicate that 15g of gelatin (or collagen) with 50mg vitamin C (one orange) one hour before stressing the tendon through exercise can improve tissue repair in the tendon.

[Collagen + by Upper Echelon Nutrition](#) (contains 15g collagen + 100 mg vitamin C)

[Collagen Peptides by Vital Proteins](#) (contains 20g collagen + 90 mg vitamin C)

[Collagen Peptides by Orgain](#) (contains 20g collagen)

Pro Tip:

An isometric hold (joint angle doesn't change) has an anesthetic effective on the local tissues. That means if you have knee pain, at the beginning of your training session perform an isometric hold at the knee joint (Spanish Squat ISO) for temporary pain relief.

Jumper's Knee Rehabilitation Program

Perform the following program 3x per week. Begin with level-one and progress to level-two after about two-weeks. Progress to level-three when the symptoms are manageable, and you are ready to reintroduce plyometric exercises. Don't push past a 3/10 pain level in the injured tendon. Perform all unilateral exercises on both sides.

LEVEL 1.

General Strengthening Exercises

Spanish Squat ISO Hold (<i>shoulders over hips</i>)	3x:45 sec
Spanish Squat (<i>shoulders over hips</i>)	3x15
Band TKE ISO Hold	3x5 w/ a :05 sec hold
RFESS ISO Hold w/ Heel Elevated	3x:20 sec
Low Intensity Knee Over Toe Hop	3x:20
1/2 Kneeling RFE Quad Rot. + Flex.	1x6e

LEVEL 2.

General Strengthening Exercises

Band TKE Partial Squat	2x15e
FFE Barbell 1/4 Split Squat ISO Hold	2x:15 sec
Slant Board Single-Leg Squat w/ Knee Over Toe	2x10 w/ a :06 sec eccentric
Knee Over Toe Single Leg ISO Hold	2x:20 sec
FFESS Low Intensity Hop w/ Knee Over Toe	2x:20
1/2 Kneeling RFE Quad Rot. + Flex.	1x6e

LEVEL 3.

General Strengthening Exercises

Band TKE Partial Squat	2x15e
FFE Barbell 1/4 Split Squat ISO Hold	3x:20 sec
Slant Board Single-Leg Squat w/ Knee Over Toe	3x8 w/ a :08 sec eccentric
Knee Over Toe Single Leg ISO Hold	3x:30 sec
Jump Rope	5 min (+1 min each week)
1/2 Kneeling RFE Quad Rot. + Flex.	1x6e

Vitamin C-enriched gelatin supplementation before intermittent activity augments collagen synthesis

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Affiliations + expand

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Abstract

Background: Musculoskeletal injuries are the most common complaint in active populations. More than 50% of all injuries in sports can be classified as sprains, strains, ruptures, or breaks of musculoskeletal tissues. Nutritional and/or exercise interventions that increase collagen synthesis and strengthen these tissues could have an important effect on injury rates.

Objective: This study was designed to determine whether gelatin supplementation could increase collagen synthesis.

Design: Eight healthy male subjects completed a randomized, double-blinded, crossover-design study in which they consumed either 5 or 15 g of vitamin C-enriched gelatin or a placebo control. After the initial drink, blood was taken every 30 min to determine amino acid content in the blood. A larger blood sample was taken before and 1 h after consumption of gelatin for treatment of engineered ligaments. One hour after the initial supplement, the subjects completed 6 min of rope-skipping to stimulate collagen synthesis. This pattern of supplementation was repeated 3 times/d with ≥6 h between exercise bouts for 3 d. Blood was drawn before and 4, 24, 48, and 72 h after the first exercise bout for determination of amino-terminal propeptide of collagen I content.

Results: Supplementation with increasing amounts of gelatin increased circulating glycine, proline, hydroxyproline, and hydroxylysine, peaking 1 h after the supplement was given. Engineered ligaments treated for 6 d with serum from samples collected before or 1 h after subjects consumed a placebo or 5 or 15 g gelatin showed increased collagen content and improved mechanics. Subjects who took 15 g gelatin 1 h before exercise showed double the amino-terminal propeptide of collagen I in their blood, indicating increased collagen synthesis.

Conclusion: These data suggest that adding gelatin to an intermittent exercise program improves collagen synthesis and could play a beneficial role in injury prevention and tissue repair. This trial was registered at the Australian New Zealand Clinical Trials Registry as ACTRN12616001092482.

Keywords: bone; exercise; injury prevention; ligament; return to play; tendon.