

Collagen supplements may help improve the health of your tendons and bones, says researcher

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Collagen has become a popular ingredient in the skincare industry, with high-profile advocates such as Jennifer Aniston and the Kardashians

taking it for its purported anti-aging benefits.

But it isn't just our skin that may benefit from [collagen](#). Research shows that collagen supplements may also have many benefits for our [physical health](#) too—which could be important for enhancing athletic performance, reducing the risk of injury and improving quality of life as we get older.

Collagen is the [most abundant protein](#) in the body. It provides structural support to our connective tissues—including our bones, cartilage, tendons, ligaments, muscles and skin.

Collagen is produced by cells called fibroblasts. As we age, our fibroblast function diminishes—and collagen production [slows down](#). This can lead to signs of aging—such as wrinkled and loose skin.

It can also contribute to our bones [becoming weaker](#) and more susceptible to fracture, and our tendons (which are made of [about 70%](#) collagen) [becoming slack](#), which may increase our [risk of injury](#) from falls.

Though collagen loss is inevitable as we age, there are things we can do to slow the process. For example, regular resistance [exercise](#)—such as [weight lifting](#) or body weight training—can combat collagen loss.

Research in young healthy men shows that even a single resistance training session can double the rate of collagen synthesis (how quickly new collagen is formed) in both [muscles](#) and [tendons](#). This effect can last up to three days after a workout.

Two to three months of regular resistance training can increase tendon stiffness in both [young](#) and [older](#) adults. This is important, as stiffer tendons may [decrease the risk of falls](#) or other injuries.

The reason resistance training has these effects is probably due to a cumulative increase in [collagen synthesis](#). This enables new collagen to be produced in the tendon, which in turn strengthens that tissue.

Collagen supplements

While exercise alone is a great way to strengthen our tendons and bones (thanks in part to the way it increases collagen production), research shows the benefits of exercise can be boosted even further by taking a collagen [supplement](#).

For example, [one study](#) in healthy young men found that consuming 15g of collagen before exercising more than doubled the amount of collagen synthesis, compared with when they only took 5g of collagen.

A recent study carried out by my research group found that when fit young men ingested a 30g collagen supplement before a resistance training workout, it led to a 12% increase in [collagen synthesis](#), compared with when only 15g of collagen was ingested. So a greater benefit can be gained from taking 30g of collagen before a resistance training session, compared with 15g.

When it comes to the longer-term effects of combining resistance training with collagen supplementation, research suggests this combination can enhance tendon health and function in both young [female athletes](#) and moderately athletic men—in both the [achilles](#) and [patellar](#) tendons.

Taking a 20g collagen supplement for nine days has also been shown to [improve recovery](#) following strenuous exercise in healthy young men.

In [post-menopausal women](#), ingesting just 5g of collagen daily for a year (with no additional exercise) improved bone mass—making the bones

stronger.

In people with [tendon injuries](#), taking 5g of collagen daily for three months in combination with their rehab exercises led to improved tendon function and less pain.

Overall, research suggests taking a collagen supplement (particularly with a resistance training workout) can have many additional benefits for our connective tissue health. These positive adaptations may help improve physical function, especially when it comes to [explosive-type movements](#) (such as jumping or recovering from a trip).

Limits of collagen

But while research shows collagen supplements can boost the benefits of exercise, there are some factors that may affect how well collagen works.

For instance, [one study found](#) that a collagen supplement taken after resistance exercise had no benefit compared with taking whey protein or water. There are a couple of points that may explain these results.

First, unlike the previously mentioned research, this study didn't have participants consume vitamin C alongside the collagen supplements, and [vitamin C](#) is essential for collagen synthesis.

Second, collagen synthesis was measured in the muscle, not the tendon, and muscle contains only [about 5% collagen](#), compared with [about 70%](#) in tendon. So a beneficial effect of collagen supplementation is more likely to be seen in tendon than muscle.

The amount of collagen taken may also determine whether it has any benefit.

One study examined the effects of ingesting [15g of collagen](#) with resistance exercise for 15 weeks and found it had no beneficial effect on changes in tendon size or stiffness in young men. Our research has now shown that [30g of collagen](#) is necessary to boost collagen synthesis with resistance exercise—and that 15g has no advantage compared with taking no supplement.

It's also not known whether collagen supplements can boost the benefits of exercise in women and older people, so further studies are needed.

Collagen supplements are also unlikely to have any benefit when it comes to building muscle size and strength. This is because collagen contains fewer of the [essential amino acids](#) (protein building blocks) required to stimulate muscle growth compared to other supplements—such as [whey protein](#).

But if your goal is to improve the health of your tendons and bones, collagen supplements may be helpful. Taking [30g of collagen with vitamin C](#), together with your [resistance](#) training workouts, may be the best way to boost the [benefits of exercise according to research](#).

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