SUMMARY

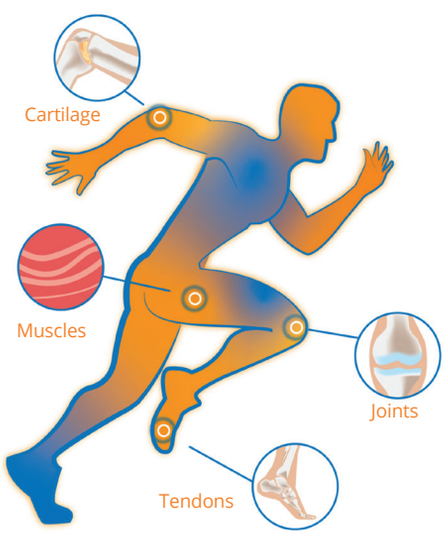
- Collagen hydrolysate is a popular dietary supplement as demand grows for evidence-based food ingredients that support joint health and mobility
- A body of literature confirms bioavailability and supports beneficial effects of collagen hydrolysate on joint health, pain, and function
- The nutraceutical effects were observed with daily supplementation of 8 – 12 g collagen hydrolysate over a period of weeks



# THE USE OF COLLAGEN HYDROLYSATE IN JOINT HEALTH

## Scientific and clinical observations support benefits of daily supplementation

*In recent years, collagen hydrolysate (CH) has become a popular dietary supplement as a growing number of consumers pursues an active, healthy lifestyle and aims to counteract the effects of aging. In particular, CH has been discussed as a nutraceutical that improves joint health and muscle performance, increases agility, and counteracts the effects of aging.*




Collagen is a major structural component of connective tissues and one of the most abundant proteins in the human body (≈ 30%). It sustains tendons, skin and cartilage, thereby supporting integrity, firmness and elasticity of the musculoskeletal system.[1]

Osteoarthritis, inflammatory or degenerative diseases can cause a slow and gradual destruction of cartilage thereby damaging the joint (frequently hip, knee, foot, or hand) and leading to a painful impairment of function and mobility. Joint pathologies generate a great healthcare impact and are particularly prevalent among elderly, being the most common cause of disability in this population group. Long term treatment options are limited and often associated with the risk of side effects. Therapists are therefore looking at the ability of nutraceuticals to delay joint diseases and reduce pain.

KEYWORDS

*Collagen hydrolysate, collagen peptides, nutraceuticals, joint diseases, osteoarthritis, joint pain, joint inflammation, collagen food supplement.*

CH consists of hydrolyzed collagen peptides with a molecular weight distribution of approximately 3 kDa. One of its most important characteristics is the high content of the amino acids glycine and proline, which are essential building blocks for the regeneration and stability of cartilage. During CH-production, collagen fibers are extracted from collagen-rich animal tissues such as bovine hide and subjected to a multi-step process that involves gelatinization and subsequent enzymatic hydrolysis.

This short review provides a brief overview of bioavailability and the effects of CH as nutritional supplement on joint health as has been evaluated in studies and clinical trials.

### BIOAVAILABILITY OF COLLAGEN HYDROLYSATE

Several studies show that collagen peptides have a bioavailability of 82% at six hours[2] and 95% at 12 hours after ingestion.[3] The latter *in vivo* study in mice has traced hydolyzed collagen absorption with radioactive Carbon-14 ($^{14}C$), documenting the uptake of peptides in the gastrointestinal tract, their passage into the blood stream, and stable deposition in muscles, bones and cartilage.[3,4]

In a recent study, Yazaki et al. identified 17 different collagen-derived peptides in blood plasma after CH ingestion, mainly Gly-Pro-Hyp.[5]

### EFFECT OF COLLINSTANT® ON OSTEOARTHRITIS

A recent study conducted by Regal and Herrera investigated the effects of Viscofan's CH COLLinstant® in combination with Vitamin C as daily supplement on osteoarthritis (OA) patients over a period of six months. The randomized, double-blind and placebo-controlled trial included 120 grade 2 and 3 OA patients ≥30 years of age (equal sex ratio) with moderate to severe pain. Patients were randomized 1:1 stratified by age, sex, BMI and OA location to receive

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either 10 g COLLinstant® and Vitamin C, or placebo. The experimental treatment was effective in reducing pain, inflammation, and analgesic consumption, accompanied by an increase in joint function and overall quality of life. Physicians and patients alike rated the treatment efficacy as good (93.4%, unpublished data).[6]

## LITERATURE SUPPORTS CH-BENEFITS FOR JOINTS

A placebo-controlled, 24-week study evalutated the effects of 10 g CH daily supplementation on 147 athletes with joint pain due to physical exercise, without evidence of joint disease. Inflammation parameter, mobility and joint pain were chosen as endpoints. The results showed that the CH-treatment significantly reduced joint discomfort.[7]

Another trial investigated the intake of 1.2 g CH / day versus placebo for six months in patients with joint pain in the upper and lower extremities and pain in the spine. 200 patients of both sexes over 50 years of age were included. In month three, no significant differences were found between the two groups, but after six months, there was an improvement (joint pain reduction) by ≥20 % in the CH-treatment group.[8] According to a review by Moskowitz, the relatively small difference between treatment and placebo group of this study is due to the low CH-dosage. It appears to be necessary to take at least 10 g of hydrolysate to reduce joint pain.[9]

The effects of four different nutritional supplements including CH on OA patients was evaluated by Adam in a randomized, placebo-controlled, double-blind clinical trial. 81 subjects with knee and hip OA consumed 10 g CH or another nutritional supplement daily over a period of 60 days. 81% of patients who received CH observed a reduction in joint pain versus 23% of the other supplement groups. Furthermore, more than 50% of the patients in the CH-group decreased their analgesics consumption compared to only 25% in the other groups.[10]

The effect of 10 g daily CH-supplement was also evaluated in athletes, age 15 – 80 years with pain in their lower or upper extremities due to physical strain. Endpoints of the 12-week study were: pain when walking, climbing stairs, at night, as well as pain when standing (arthralgia of the hip and knee) and pain when carrying objects and performing activities that involve raising the arms above the head (arthralgia shoulders). At the end of the study, 78% of the participants reported an improvement in joint pain and a reduction in painkiller use.[11]

## FINAL REMARKS

As summarized in this mini-review, there is a substantial body of evidence that supports beneficial effects of collagen peptides (collagen hydrolysate) on joint health, pain, and function. The optimal effective dose for daily CH-supplementation appears to range between 8 – 12 g. It has been shown that a daily supplementation of 8 g CH increases the concentration of the cartilage building blocks glycine and proline in the blood, and that the administration of 12 g improves symptoms of osteoporosis and OA, including significant pain reduction.[12]

More research is needed to further investigate dosage and effects of CH as a nutraceutical on reducing joint pain and improving joint function. Viscofan is moving this quest forward with a continuation of clinical investigations on COLLinstant®.

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