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A randomized controlled trial on the efficacy and safety of a food ingredient, collagen hydrolysate, for improving joint comfort.

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Abstract

INTRODUCTION: Current options to promote joint comfort are limited to medicines that can reduce pain but can also have adverse effects. Collagen, a major component of joint cartilage, is found in the diet, particularly in meat. Its hydrolysed form, collagen hydrolysate (CH), is well absorbed. CH may stimulate the joint matrix cells to synthesize collagen, so helping to maintain the structure of the joint and potentially to aid joint comfort.

METHODS: In a randomized, double-blind, controlled multicentre trial, 250 subjects with primary osteoarthritis of the knee were given 10 g CH daily for 6 months.

RESULTS: There was a significant improvement in knee joint comfort as assessed by visual analogue scales to assess pain and the Womac pain subscale. Subjects with the greatest joint deterioration, and with least intake of meat protein in their habitual diets, benefited most.

CONCLUSION: CH is safe and effective and warrants further consideration as a food ingredient.

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Collagen hydrolysate for the treatment of osteoarthritis and other joint disorders: a review of the literature.

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Abstract

BACKGROUND: There is a need for an effective treatment for the millions of people in the United States with osteoarthritis (OA), a degenerative joint disease. The demand for treatments, both traditional and non-traditional, will continue to grow as the population ages.

SCOPE: This article reviews the medical literature on the preclinical and clinical research on a unique compound, collagen hydrolysate. Articles were obtained through searches of the PubMed database (www.pubmed.gov) through May 2006 using several pairs of key words (collagen hydrolysate and osteoarthritis; collagen hydrolysate and cartilage; collagen hydrolysate and chondrocytes; collagen hydrolysate and clinical trial) without date limits. In addition, other sources of information, such as abstracts presented at scientific congresses and articles in the German medical literature not available on PubMed, were reviewed and included based on the authors' judgment of their relevance to the topic of the review.

FINDINGS: According to published research, orally administered collagen hydrolysate has been shown to be absorbed intestinally and to accumulate in cartilage. Collagen hydrolysate ingestion stimulates a statistically significant increase in synthesis of extracellular matrix macromolecules by chondrocytes ($p < 0.05$ compared with untreated controls). These findings suggest mechanisms that might help patients affected by joint disorders such as OA. Four open-label and three double-blind studies were identified and reviewed; although many of these studies did not provide key information--such as the statistical significance of the findings--they showed collagen hydrolysate to be safe and to provide improvement in some measures of pain and function in some men and women with OA or other arthritic conditions.

CONCLUSION: A growing body of evidence provides a rationale for the use of collagen hydrolysate for patients with OA. It is hoped that ongoing and future research will clarify how collagen hydrolysate provides its clinical effects and determine which populations are most appropriate for treatment with this supplement.

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Role of collagen hydrolysate in bone and joint disease.

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Abstract

OBJECTIVES: To review the current status of collagen hydrolysate in the treatment of osteoarthritis and osteoporosis.

METHODS: Review of past and current literature relative to collagen hydrolysate metabolism, and assessment of clinical investigations of therapeutic trials in osteoarthritis and osteoporosis.

RESULTS: Hydrolyzed gelatin products have long been used in pharmaceuticals and foods; these products are generally recognized as safe food products by regulatory agencies. Pharmaceutical-grade collagen hydrolysate (PCH) is obtained by hydrolysis of pharmaceutical gelatin. Clinical studies suggest that the ingestion of 10 g PCH daily reduces pain in patients with osteoarthritis of the knee or hip; blood concentration of hydroxyproline is increased. Clinical use is associated with minimal adverse effects, mainly gastrointestinal, characterized by fullness or unpleasant taste. In a multicenter, randomized, doubleblind, placebo-controlled trial performed in clinics in the United States, United Kingdom, and Germany, results showed no statistically significant differences for the total study group (all sites) for differences of mean pain score for pain. There was, however, a significant treatment advantage of PCH over placebo in German sites. In addition, increased efficacy for PCH as compared to placebo was observed in the overall study population amongst patients with more severe symptomatology at study onset. Preferential accumulation of 14C-labeled gelatin hydrolysate in cartilage as compared with administration of 14C-labeled proline has been reported. This preferential uptake by cartilage suggests that PCH may have a salutary effect on cartilage metabolism. Given the important role for collagen in bone structure, the effect of PCH on bone metabolism in osteoporotic persons has been evaluated. Studies of the effects of calcitonin with and without a collagen hydrolysate-rich diet suggested that calcitonin plus PCH had a greater effect in inhibiting bone collagen breakdown than calcitonin alone, as characterized by a fall in levels of urinary pyridinoline cross-links. PCH appeared to have an additive effect relative to use of calcitonin alone.

CONCLUSIONS: Collagen hydrolysate is of interest as a therapeutic agent of potential utility in the treatment of osteoarthritis and osteoporosis. Its high level of safety makes it attractive as an agent for long-term use in these chronic disorders.

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24-Week study on the use of collagen hydrolysate as a dietary supplement in athletes with activity-related joint pain.

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Abstract

BACKGROUND: Collagen hydrolysate is a nutritional supplement that has been shown to exert an anabolic effect on cartilage tissue. Its administration appears beneficial in patients with osteoarthritis.

OBJECTIVE: To investigate the effect of collagen hydrolysate on activity-related joint pain in athletes who are physically active and have no evidence of joint disease.

DESIGN AND SETTING: A prospective, randomized, placebo-controlled, double-blind study was conducted at Penn State University in University Park, Pennsylvania. Parameters including joint pain, mobility, and inflammation were evaluated with the use of a visual analogue scale during a 24-week study phase.

STUDY PARTICIPANTS: Between September 2005 and June 2006, 147 subjects who competed on a varsity team or a club sport were recruited. Data from 97 of 147 subjects could be statistically evaluated.

INTERVENTION: One hundred and forty-seven subjects (72 male, 75 female) were randomly assigned to two groups: a group (n = 73) receiving 25 mL of a liquid formulation that contained 10 g of collagen hydrolysate (CH-Alpha) and a group (n = 74) receiving a placebo, which consisted of 25 mL of liquid that contained xanthan.

MAIN OUTCOME MEASURES: The primary efficacy parameter was the change in the visual analogue scales from baseline during the study phase in relation to the parameters referring to pain, mobility, and inflammation.

RESULTS: When data from all subjects (n = 97) were evaluated, six parameters showed statistically significant changes with the dietary supplement collagen hydrolysate (CH) compared with placebo: joint pain at rest, assessed by the physician (CH vs. placebo (-1.37 +/- 1.78 vs. -0.90 +/- 1.74 (p = 0.025)) and five parameters assessed by study participants: joint pain when walking (-1.11 +/- 1.98 vs. -0.46 +/- 1.63, p = 0.007), joint pain when standing (-0.97 +/- 1.92 vs. -0.43 +/- 1.74, p = 0.011), joint pain at rest (-0.81 +/- 1.77 vs. -0.39 +/- 1.56, p = 0.039), joint pain when carrying objects (-1.45 +/- 2.11 vs. -0.83 +/- 1.71, p = 0.014) and joint pain when lifting (-1.79 +/- 2.11 vs. -1.26 +/- 2.09, p = 0.018). When a subgroup analysis of subjects with knee arthralgia (n = 63) was performed, the difference between the effect of collagen hydrolysate vs. placebo was more pronounced. The parameter joint pain at rest, assessed by the physician, had a statistical significance level of p = 0.001 (-1.67 +/- 1.89 vs. -0.86 +/- 1.77), while the other five parameters based on the participants' assessments were also statistically significant: joint pain when walking (p = 0.003 (-1.38 +/- 2.12 vs. -0.54 +/- 1.65)), joint pain when standing (p = 0.015 (-1.17 +/- 2.06 vs. -0.50 +/- 1.68)), joint pain at rest with (p = 0.021 (-1.01 +/-1.92 vs. -0.47 +/- 1.63)), joint pain when running a straight line (p = 0.027 (-1.50 +/- 1.97 vs. -0.80 +/- 1.66)) and joint pain when changing direction (p = 0.026 (-1.87 +/- 2.18 vs. -1.20 +/- 2.10)).

CONCLUSION: This was the first clinical trial of 24-weeks duration to show improvement of joint pain in athletes who were treated with the dietary supplement collagen hydrolysate. The results of this study have implications for the use of collagen hydrolysate to support joint health and possibly reduce the risk of joint deterioration in a high-risk group. Despite the study's size and limitations, the results suggest that athletes consuming collagen hydrolysate can reduce parameters (such as pain) that have a negative impact on athletic performance. Future studies are needed to support these findings.