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LONG-TERM USE OF COLLAGEN HYDROLYSATE AS A NUTRITIONAL SUPPLEMENT IN ATHLETES WITH ACTIVITY-RELATED JOINT PAIN

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Purpose: Collagen hydrolysate is a nutritional supplement which has been shown to exert an anabolic effect on cartilage tissue. Its administration appears indicated in patients with osteoarthritis. The purpose of the present study was to investigate the effect of collagen hydrolysate on individuals who are healthy and physically active.

Methods: A prospective, randomized, placebo-controlled, double-blind study was carried out at Penn State University in University Park (Pennsylvania). Parameters like joint pain, mobility and inflammation were evaluated with the use of a visual-analogue-scale during a 24-week-study-phase.

Between September 2005 and June 2006, 147 subjects who competed either on a varsity or a club sport were recruited. Data of 97 of those 147 subjects could be statistically evaluated.

Seventy-three subjects were randomly assigned to receive 10 grams of collagen hydrolysate per day in the form of a vial containing 25 ml of a liquid formulation and 74 subjects to receive a placebo, i.e. a 25 ml of a liquid formulation containing xanthan.

The primary efficacy parameter was the change of the visual analogue scales during the study phase in relation to the parameters referring to pain, mobility and inflammation.

Results: When the data of all the subjects (n = 97) that were evaluated during the study were taken into consideration, 6 parameters showed statistically significant changes of collagen hydrolysate (CH) versus placebo, namely the parameter "pain at rest" as assessed by the physician (CH versus placebo (-1.37 ± 1.78 versus -0.90 ± 1.74 (p = 0.025))) and the following 5 parameters as assessed by the study participants, "joint pain when walking" (-1.11 ± 1.98 versus -0.46 ± 1.63 (p = 0.007)), "joint pain when standing" (-0.97 ± 1.92 versus -0.43 ± 1.74 (p = 0.011)), "joint pain at rest" (-0.81 ± 1.77 versus -0.39 ± 1.56 (p = 0.039)), "joint pain when carrying objects" (-1.45 ± 2.11 versus -0.83 ± 1.71 (p = 0.014)) and "joint pain when lifting" (-1.79 ± 2.11 versus -1.26 ± 2.09 (p = 0.018)).

When a sub-group analysis which merely focused on subjects with knee arthralgia (n = 63) was carried out, the difference between the effect of collagen hydrolysate versus placebo even became more pronounced. It was the parameter "joint pain at rest" which was assessed by the physician with a p = 0.001 (-1.67 ± 1.89 versus -0.86 ± 1.77), plus the remaining five parameters which were based on the participants' assessments like "joint pain when walking" with a p = 0.003 (-1.38 ± 2.12 versus -0.54 ± 1.65), "joint pain when standing" with a p = 0.015 (-1.17 ± 2.06 versus -0.50 ± 1.68), "joint pain at rest" with a p = 0.021 (-1.01 ± 1.92 versus -0.47 ± 1.63), "joint pain when running a straight line" with a p = 0.027 (-1.50 ± 1.97 versus -0.80 ± 1.66) and "joint pain when changing direction" with a p = 0.026 (-1.87 ± 2.18 versus -1.20 ± 2.10).

Conclusions: This is the first clinical trial to show improvement of joint-functioning in healthy subjects who were treated with the nutritional supplement collagen hydrolysate. The results of this study bear implications on the use of collagen hydrolysate as a primary-prevention-effort for individuals who are at risk of suffering from degenerative joint disease. Furthermore, the results also suggest that athletes consuming collagen hydrolysate can potentially improve their physical performance.

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A CLINICAL EVALUATION OF MATRIX-INDUCED AUTOLOGOUS CHONDROCYTE IMPLANTATION: FUNCTIONAL AND STRUCTURAL RESTORATION, AND PATIENT SATISFACTION

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Purpose: In comparison to conventional surgical treatment and periosteal autologous chondrocyte implantation (ACI), matrix-induced ACI (MACI) shows improved clinical outcome and technical simplicity. However, recent research suggests that the lack of measurement standardization across these studies, makes reliable large scale multi-centre cohort analysis extremely difficult. Hence, we have conducted both a prospective single-surgeon cohort study and a retrospective multi-centre satisfaction survey of over 200 MACI patients.

Methods: Prospective Study:

A consecutive series of 31 implantations were performed in 28 patients (18 male; 10 female) at a minimum of 24 months (mean age 36.5 years, mean BMI 25.9). Clinical assessment by the Six-Minute Walk Distance Test, and the self-administered Knee Injury and Osteoarthritis Outcome Score (KOOS) was conducted preoperatively, and at 3, 6, 12, and 24 postoperatively. MRI scans were conducted at 3, 12 and 24 months postoperatively. The relationship between MRI and functional outcome was also calculated. Graft failure was assessed postoperatively, both clinically and radiographically.

Retrospective Study:

Two hundred and two patients, 12 months or greater post-MACI, were surveyed. Patients with significant reoperation (realignment osteotomy etc) or cognitive impairment were excluded. The questionnaire was comprised of ten questions, based mainly on pain and symptom relief, functional restoration, quality of life, and patient satisfaction. Raw answers to the questionnaire were converted to a point scale to gain an overall satisfaction score (based on the Lysholm and Cincinnati scores). Clinical outcome was statistically compared to various cohort variables.

Results: Prospective Study:

Patients demonstrated a significant (P<0.001) improvement in six minute walk distance and all five KOOS subscales from 3 to 24 months after MACI surgery, with the most substantial gains noted in the first 12 months. Similarly, patients also demonstrated significantly (P<0.001) improved MRI scoring from 3 to 24 months, with post-hoc analysis again demonstrating improvement predominantly in the first 12 months, then plateauing thereafter. A moderate to strong relationship was observed between functional KOOS outcome and structural MRI outcome. A 10% incidence of hypertrophic growth following MACI was also observed.

Retrospective Study:

A mean age of the surveyed cohort was 36.9±10.7 (range 14-77) years, male:female sex ratio 114:88, and mean time from MACI to survey of 22.7±8.61 (range 12-49). Of note, 85% of patients rated their pain relief following MACI as good/excellent. 94% of patients stated they had the ability to participate in sport following MACI, 64% of patients reported no swelling after MACI, 81% of patients reported no occurrence of catching/locking, and 82% of patients rated the overall satisfaction of their MACI outcome as good or excellent. Statistical comparison between defined cohort variables and overall satisfaction score found significance between: postoperative months (12-24 months vs. over 24 months, P=0.03), rehabilitation participation (with rehab vs. without rehab, P=0.007), patient age (under 30 years-old vs. 30-50 years-old, P=0.001), and defect location (trochlea vs. patella, P=0.007; medial femoral condyle vs. patella, P=0.03).