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Short-Term Effects of Ovomet®, Eggshell Membrane, in Joint Pain: A Double-Blind and Placebo Study

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Abstract

Dietary supplements are being extensively used for the treatment of diverse joints disorders. Ovomet®, eggshell membrane, a natural source of glycosaminoglycans such as chondroitin sulfate and hyaluronic acid among other ingredients, has led to the consideration of this product as a potential treatment for joint disorders. On this basis, the aim of the present study was to evaluate the short-term effectiveness of the intake of Ovomet® in volunteers suffering from joint disorders.

The double-blind and placebo study consisted on the daily intake of a capsule containing 300 mg Ovomet® or a capsule containing placebo (microcrystalline cellulose) during 30 days. The Womac questionnaire (Western Ontario and McMasters Universities Osteoarthritis Index) was employed to assess joint pain and dysfunction at days 0, 1, 3, 5, 7 and 30.

Results showed a gradual and significant decrease in pain and dysfunction since day 3 on while the participant's intaking placebo did not show changes. Similarly, there was a significant pain improvement in volunteers intaking Ovomet® compared to the placebo subjects from day 3 onwards.

The daily intake of 300 mg Ovomet® showed short-term effects within the first three days in reducing significantly joint pain and dysfunction. Moreover, a significant improvement in pain was demonstrated in Ovomet® group when comparing with placebo treatment. Ovomet® is a viable, fast, effective and safe alternative for the treatment of joint pain associated with joint disorder.

Keywords: Ovomet®; Eggshell membrane; Joint pain; Womac

Introduction

Osteoarthritis (OA) is one of the most common forms of joint disease and is a top cause of disability in older people. It is a chronic condition in which the material that cushions the joints, the cartilage, breaks down. This causes the bones to rub against each other, causing stiffness, pain and loss of joint movement. About 70% of people over the age of 70 have evidence of osteoarthritis [1]. There is no cure for the disease but some treatments attempt to slow disease progression. Many nutrition supplements have been used for the treatment of OA such as glucosamine, chondroitin sulphate and hyaluronic acid among others.

Ovomet® is an all-natural eggshell membrane manufactured by Eggnovo SL via a patented process (ES 2327087 B2 and ES 2181580 B1) in a sustainable and environmentally friendly manner without the use of chemicals. The eggshell membrane is a natural ingredient obtained from the inner membrane that covers the shell of the egg. Eggshell membranes are composed of fibrous proteins such as collagen type I-V-X [2,3], glucosamine [4], hyaluronic acid (HA) [5], glycosaminoglycans (GAG) like dermatan sulphate and chondroitin sulphate [6] and other components including lysozyme [7], ovotransferrin [8], ovocalixin [9] and desmosine and isodesmosin [10]. Ovomet® contains naturally the above cited components, all of them being important constituents of joints and playing a crucial role in their health, mobility and flexibility. Moreover, Ovomet® can be used as a source of sulfur due to the number of disulphide bonds and sulfur amino acids that have been quantified [11]. It is well known that sulfur plays a very important role in nutrition and in maintaining the cartilage matrix [12]. Previous studies have reported the therapeutic efficacy of eggshell membrane in patients with OA during the first two weeks of treatment [13]. Based on these observations, the goal of the present study was to evaluate the short-term effectiveness of Ovomet®, mainly regarding pain, in volunteers suffering joint disorders.

Materials and Methods

The dietary supplement used in this study was Ovomet®, consisting of eggshell membrane. Compositional analysis of eggshell membranes has identified a high content of protein (collagen types I-V-X, elastin, keratin) [2,3] and moderate quantities of glucosamine and GAGs (chondroitin sulfate, HA) [4]. A randomized double-blind clinic-nutritional study was performed to evaluate the short-term efficacy of the daily intake of an encapsulated food supplement containing 300 mg of Ovomet® (eggshell membrane). Volunteers had to intake one capsule a day of the food supplement with Ovomet® or with placebo (microcrystalline cellulose) during 30 consecutive days.

A total of 20 subjects, men and women with known symptomatic osteoarthritis, were enrolled in the study; 10 subjects were randomized to each of the two treatment groups to receive a daily dose of either 300 mg of Ovomet® or 300 mg of the placebo (microcrystalline cellulose). During the performance two participants abandoned voluntarily the study. The final analysis was conducted with 18 volunteers divided in two groups (10 intook Ovomet® and 8 intook placebo).

The assessment was based on Western Ontario and McMasters

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Universities (WOMAC) Osteoarthritis Index [14]. The Womac Index has been extensively validated and has been translated and linguistically validated in over 65 alternate language forms [15]. It consists of five questions addressing the severity of joint pain, two questions addressing joint stiffness and 17 questions addressing limitations in performing physical activities, dysfunction. Subjects were also instructed to record any changes in overall health, as well as any discomfort associated with ingestion of the capsules. Assessments were performed at the beginning (day 0) and at days 1, 3, 5, 7 and 30 of the study.

Data and statistical analysis

The evolution of pain, dysfunction and the total score, based on Womac questionnaire, were recorded in every assessment day for each volunteer. Data are presented as mean ± standard error. Differences between baseline (day 0) and each assessment day (day 1, 3, 5, 7 and 30) were analysed by Student´s-test. Statistical significance was considered when $P<0.05$.

The improvement of pain, dysfunction and total Womac score represented as the percentage are also shown. Data show the percentage of improvement of the mean of every assessment day compared to the baseline (day 0).

To present the improvement in pain of each volunteer, the improvement of each assessment day compared to the baseline was calculated for each participant. This allows calculating the intra-subject pain improvement and the statistical differences of the parameter. Data are presented as mean ± standard error of the intra-subject improvement. Differences between baseline (day 0) and each assessment day (day 1, 3, 5, 7 and 30) were analysed by Student's t-test. Statistical significance was considered when $P<0.05$.

Results and Discussion

The study was carried out between November and December 2017. Eighteen out of twenty subjects completed the full course of treatment and follow-up. None of the dropouts were related to product intake or study procedure in general. There were no discomfort or adverse reactions reported.

The mean age of the volunteers was 50.7 ± 2.32 years old and the mean weight was 72.3 ± 3.3 kg. The 61% of the subjects were women.

The evolution of pain score was recorded. The starting level of pain was about 10.4-10.6 ± 3.0-3.9 in Ovomet® and placebo treatment, respectively. A significant and progressive decline since day 3 was observed in Ovomet® until values of 5 ± 1.8 at day 30 while no significant differences were assessed in the placebo group (9.4 ± 3.9) (Figure 1). Focusing in the percentage of pain improvement in Ovomet® group a progressive improvement was viewed since day 3 until the end of the study (Figure 2). This progress was of 5.8% at day 3 and of 51.9% at day 30, meaning that pain was ameliorated more than 50% in only 30 days.

Regarding dysfunction, a similar pattern was observed, a significant and progressive decrease since day 3 in Ovomet® treatment was viewed, from 40.5 ± 10.6 until reaching values of 21.1 ± 5.2 whereas results were kept more or less stable in the placebo group (27.0 ± 9.5 at day 0 and 22.9 ± 9.7 at day 30) (Figure 3). Likewise, the dysfunction improvement showed a higher recovery in Ovomet® group from 9.1% at day 3 to 47.9% at day 30 (Figure 4).

The total Womac score, which gave the overall view of the evolution, showed the same tendency. The score of the placebo group did not show significant differences (from 46.0 ± 14.4 to 37.0 ± 14.5) while in

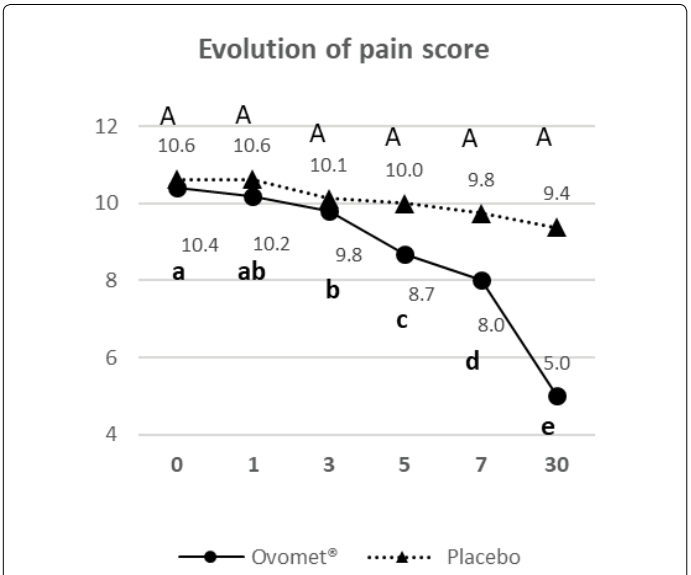

Figure 1: The evolution of pain score during the treatment with Ovomet® or placebo is presented.
Circles represent the treatment with Ovomet® and triangles the placebo treatment. Letters in bold indicate significant differences in Ovomet® group (Student's t-test, $P \leq 0.05$) between each assessment day and the baseline (day 0). Capital letters indicate significant differences in placebo group (Student's t-test, $P \leq 0.05$) between each assessment day and the baseline (day 0). Values are the mean (n=10 for Ovomet®; n=8 for placebo)

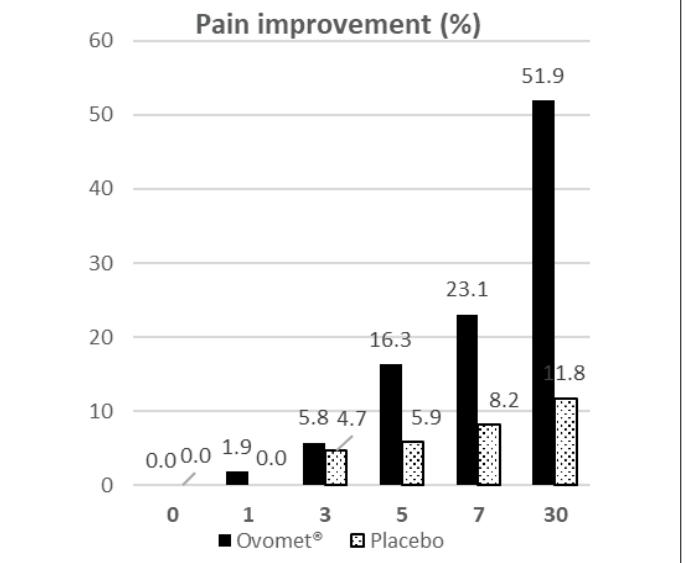

Figure 2: The evolution of pain improvement in percentage during the treatment with Ovomet® or placebo is presented.
Black bars correspond to Ovomet® and dotted bars to the placebo group

the group intaking Ovomet® a significant drop was observed since the day three on (Figure 5). In Ovomet® group values started in 57.5 ± 15.0 and declined until 29.9 ± 7.6 the day 30. Similarly, the total Womac improvement was higher in Ovomet® group going from 8.5% at day 3 to 48% of recovery at day 30 (Figure 6).

Concerning the intra-subject pain improvement, that means the improvement of every assessment day compared to the baseline (day 0) for each volunteer, a significant improvement was observed in Ovomet®

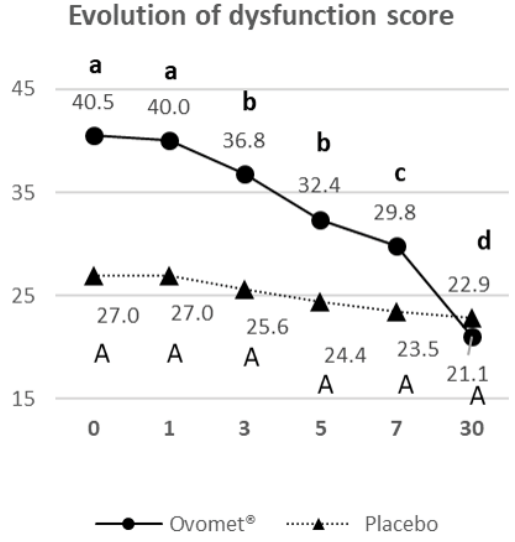

Figure 3: The evolution of dysfunction score during the treatment with Ovomet® or placebo is presented.
Circles represent the treatment with Ovomet® and triangles the placebo treatment. Letters in bold indicate significant differences in Ovomet® group (Student's t-test, P ≤ 0.05) between each assessment day and the baseline (day 0). Capital letters indicate significant differences in placebo group (Student's t-test, P ≤ 0.05) between each assessment day and the baseline (day 0). Values are the mean (n=10 for Ovomet®; n=8 for placebo)

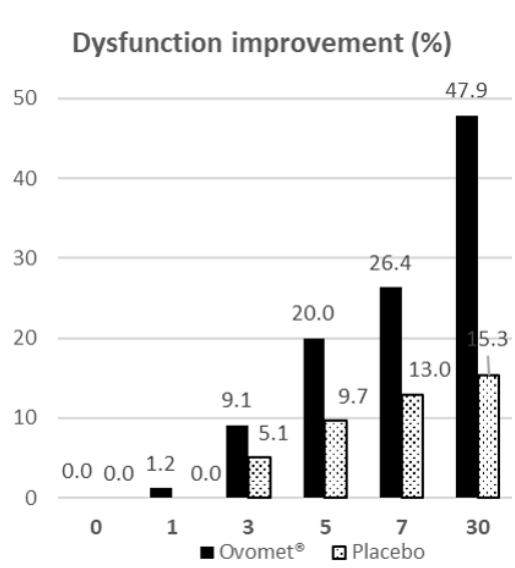

Figure 4: The evolution of dysfunction improvement in percentage during the treatment with Ovomet® or placebo is presented.
Black bars correspond to Ovomet® and dotted bars to the placebo group

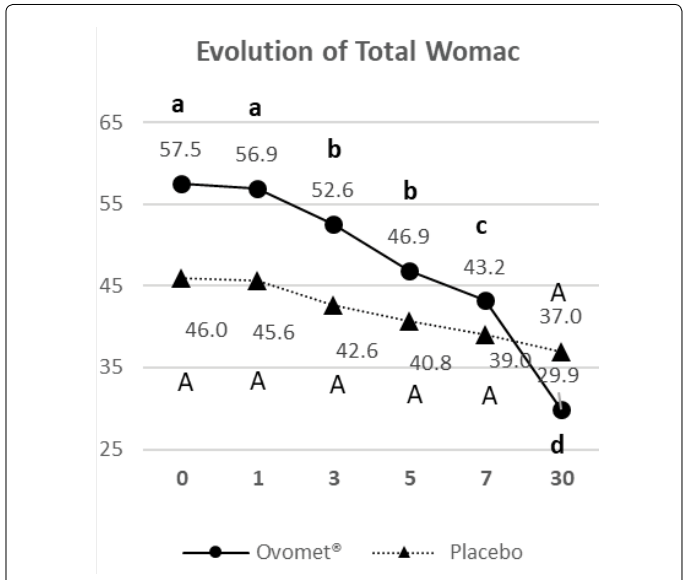

Figure 5: The evolution of total Womac score during the treatment with Ovomet® or placebo is presented.
Circles represent the treatment with Ovomet® and triangles the placebo treatment. Letters in bold indicate significant differences in Ovomet® group (Student's t-test, P ≤ 0.05) between each assessment day and the baseline (day 0). Capital letters indicate significant differences in placebo group (Student's t-test, P ≤ 0.05) between each assessment day and the baseline (day 0). Values are the mean (n=10 for Ovomet®; n=8 for placebo)

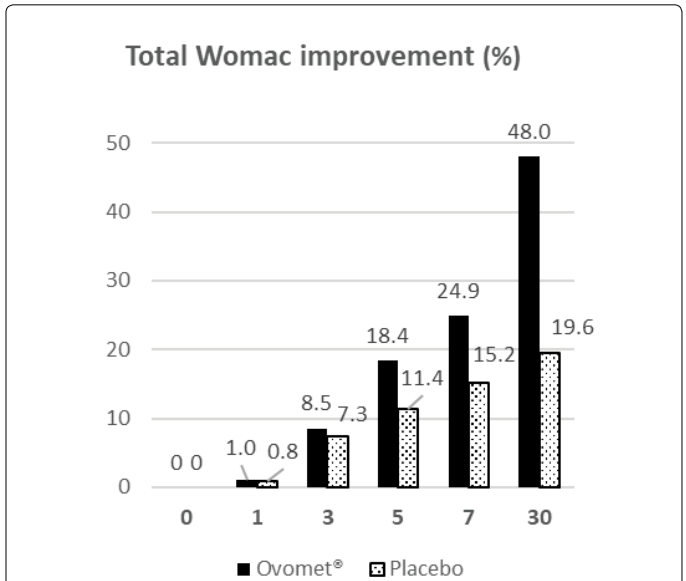

Figure 6: The evolution of total Womac improvement in percentage during the treatment with Ovomet® or placebo is presented.
Black bars correspond to Ovomet® and dotted bars to the placebo group

group while no significant differences were viewed in placebo subjects (Figure 7). The intra-subject pain improvement appears as an important parameter to focus in the pain improvement of each volunteer and that makes possible to statistically compare both treatment groups. The percentage of improvement at day 1 compared to baseline started at 11.1 ± 12.4% for Ovomet® group and -2.3 ± 3.3% for placebo group, no significant differences between groups were viewed (Figure 7). As the treatment continued, the intra-subject pain improvement progressively increased in Ovomet® group, showing significant differences between both groups from day 3 on until reaching values of 40.6 ± 10.2% in Ovomet® and 3.1 ± 12.0% in placebo at the end of the study (Figure 7).

Summarising, the volunteers intaking Ovomet® experienced a gradual and significant decrease in pain, disfunction and total Womac score since day 3 on, while the participants intaking placebo did not show changes. Similarly, the intra-subjects pain improvement showed significant differences between Ovomet® and placebo group from day 3 on.

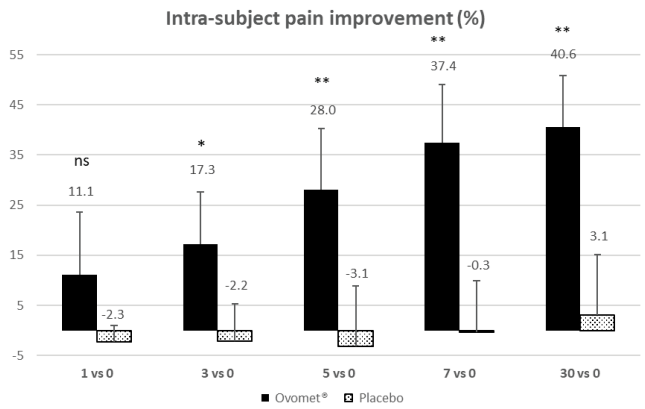

Figure 7: The intra-subject pain improvement in percentage is presented. Black bars represent the treatment with Ovomet® and the dotted bars the placebo treatment. Asterisks indicate significant differences (Student's t-test, P ≤ 0.05 (*) or P ≤ 0.01 (**)) between Ovomet® and placebo group. Values are the average of percentages ± SE (n=10 for Ovomet®; n=8 for placebo)

Conclusion

Participants experienced a rapid response (3 days) for pain, dysfunction and total Womac scores. The intake of Ovomet® showed significant improvement in symptoms since the first 3 days of treatment. As the trial progressed there was a gradual significant improvement in pain and dysfunction. From the current results it can be presumed that the use of Ovomet® does have potential as a treatment for joint pain.

This study concludes that Ovomet® shows short-term effects within the first three days in reducing joint pain. Daily supplementation with 300 mg of Ovomet® significantly reduced pain compared to placebo treatment. Ovomet® is a viable, fast, effective and safe alternative for the treatment of pain associated with osteoarthritis.

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