

# Waltham International Symposium: Pet Nutrition Coming of Age

## A Placebo-Controlled Double-Blind Study on the Effect of Nutraceuticals (Chondroitin Sulfate and Mussel Extract) in Dogs with Joint Diseases as Perceived by Their Owners<sup>1</sup>

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### EXPANDED ABSTRACT

KEY WORDS: • *symposium* • *dogs* • *neutraceuticals* • *degenerative joint disease* • *chondroprotective*

In the nutrition consultation practice of our Institute we often get anecdotal reports from pet owners about the positive effect of nutraceuticals on orthopedic problems. In some cases the comprehensive preliminary report reveals that even supplements not containing any substances with potential chondroprotective effect (like mineral and vitamin mixtures) lead to enormous improvements of signs such as lameness as perceived by the owners. These observations initiated the idea to compare dog owners' perceptions of the effects of either chondroitin sulfate (CS) or New Zealand green-lipped mussel extract (*Perna canaliculus*, ME) to a placebo (PL) in a double-blind field study in dogs with a chronic degenerative joint disease.

### MATERIALS AND METHODS

For this study 70 dogs of different breeds, ages (CS  $8.1 \pm 4.3$ ; ME  $7.8 \pm 3.8$ ; PL  $8.2 \pm 3.9$  y) and sexes (CS 10 male/11 female; ME 13 m/5 f; PL 13 m/6 f) were available in several veterinarian practices. They all had in common a degenerative joint disease of the shoulder, elbow, hip joint and/or stifle. One major precondition for the inclusion into the study was that no other medication was necessary for the duration of the feeding trial and the evaluation. Another one was that the owners and attending veterinarians agreed to participate and document their assessment of the progress while using one of the three supplements. The patients also had to be adult, in general good health and the nutrients supply was within reasonable accordance with recommendations.

The 70 patients were randomized into three groups. The first group received 22 mg chondroitin sulfate (Kraeber, Basel, Switzer-

land) per kg body weight per day ( $n = 21$ ), the second group received 11 mg mussel extract (Greenshell mussel powder; Waitaki, New Zealand) per kg body weight per day ( $n = 18$ ) and the third group was fed a placebo ( $n = 19$ ). The placebo was made of 55.5% ground wheat-malt meal, 30% oat flakes, 5% herbarum, 2% honey, 1% soybean oil, 0.5% chicken meat extract and 5.6% processed cellulose in exchange for the active substances. The supplements were mixed into the normal diet of the patients. The feeding regime and diet composition used by the owners of the patients were checked before the start of the study to ensure that no severe case of malnutrition with possible negative effect on the skeletal health was included in the study, that is, the supply of all nutrients fit the requirements of the dogs in acceptable limits.

Changes in clinical symptoms during the 12-wk oral application period were verified separately by dog owners and the attending veterinarians using standardized questionnaires both at the beginning and at the end of the study. In those questionnaires the subjective assessments of the selected variables and their development were systematically verified. Clinical signs were classed by a scale from 1 to 7. In this scaling, 1 = much improved, 4 = unchanged and 7 = much worse.

Data are expressed as means  $\pm$  SD. Means were compared by Tukey's test or by Student's *t*-test to determine significant differences between the groups, with  $P < 0.05$  considered a significant difference.

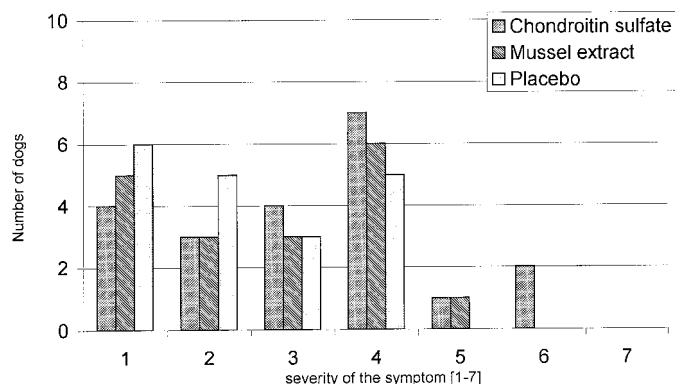
### RESULTS

Fifty-eight dogs (83%) finished the trial. The rest were excluded for different reasons such as a necessity to treat the patients with painkiller and/or other medication or the refusal to eat the test supplements.

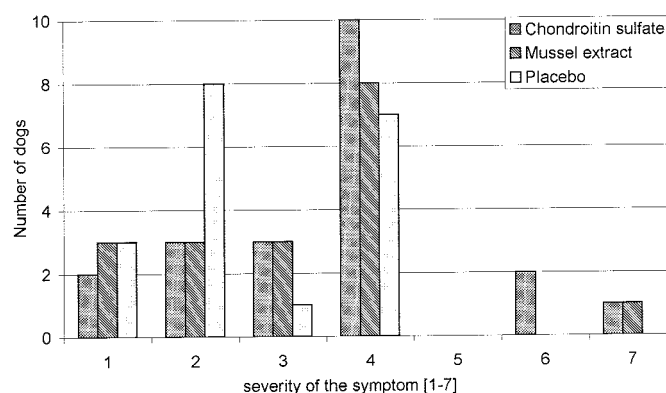
An important result of this study is that none of the tested substances led to a distinct improvement of the recorded symptoms or even to a total recovery in general. The evaluation of the questionnaires of the dog owners shows that the two symptoms improved best in their opinion were "the dog is lame" and "the dog shows pain." The mean value for the symptom "the dog is lame" was  $3.19 \pm 1.5$  in the chondroitin sulfate group,  $2.72 \pm 1.4$  in the mussel extract group and  $2.37 \pm 1.2$  in the placebo group (Fig. 1). The mean for the

<sup>1</sup> Presented as part of the Waltham International Symposium: Pet Nutrition Coming of Age held in Vancouver, Canada, August 6–7, 2001. This symposium and the publication of symposium proceedings were sponsored by the Waltham Centre for Pet Nutrition. Guest editors for this supplement were James G. Morris, University of California, Davis, Ivan H. Burger, consultant to Mars UK Limited, Carl L. Keen, University of California, Davis, and D'Ann Finley, University of California, Davis.

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**FIGURE 1** Distribution of the scaled answers concerning the symptom "the dog is lame" (1 = much improved and 4 = unchanged to 7 = much worse) in the chondroitin sulfate, the mussel extract and the placebo group. (Note: the number of dogs with very good/good response in the placebo group.) There were no significant differences between groups.



**FIGURE 2** Distribution of the scaled answers concerning the symptom "pain" (1 = much improved and 4 = unchanged to 7 = much worse) in the chondroitin sulfate, the mussel extract and the placebo group. (Note: the number of dogs with very good/good response in the placebo group.) There were no significant differences between groups.

symptom "pain" was  $3.62 \pm 1.5$  in the chondroitin sulfate group,  $3.17 \pm 1.5$  in the mussel extract group and  $2.63 \pm 1.2$  in the placebo group (Fig. 2).

The evaluation of the questionnaires of the attending veterinarians revealed a very good correspondence between the judgment of owners and experts. Both groups reported a slight improvement of the symptoms regarding the means of all three treatment groups, including the placebo. Some symptoms even improved more in the latter than in the groups receiving the test substances.

In conclusion, the dog owners as well as the attending veterinarians, who generally agreed with the owners, perceived only a slight improvement in all three groups including the placebo group. However, in all three groups some dog owners observed enormous improvements. Possible reasons for these observations may have been a coincidence of the onset of treatment and a spontaneous transient improvement of the lameness or by an optimistic perception of the effects. The effects of the placebo as well as the good agreement between the scoring of the owners and the veterinarians strongly sug-

gest that case reports and studies that are not carried out double blind may be of limited value in assessing the effectiveness of chondroprotectiva. So far only Bui and Bierer (1) have tested mussel extract in a double-blind study. They reported positive effects. The underlying cause for the different results may be differences in the selection of patients such as a different percentage of patients with inflammation in their affected (degenerative) joints, the diet composition (i.e. interactions between the used substances and other ingredients of the diet) and the formulation of the substances (as freeze-dried powder or lipid extract). The most obvious difference between the studies was the dose of mussel extract. In our own study, 11 mg per kg BW/d was administered; Bui and Bierer (1) added 0.3% mussel extract to a dry diet, which would correspond to an intake of around 45 mg/kg BW, if the dogs are supposed to eat 15 g dry matter/kg BW/d.

## LITERATURE CITED

1. Bui, L. M. & Bierer, T. L. (2001) Influence of green lipped mussels (*Perna canaliculus*) in alleviating signs of arthritis in dogs. *Vet. Ther.* 2: 101-111.