



Undenatured type II collagen mitigates inflammation in exercised Labrador Retrievers

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Introduction

Undenatured type II collagen (UC-II®) is a glycoprotein from chicken sternum cartilage that shows promise in the reduction of exercise-associated pain and lameness in canines¹. Exercise can cause microtrauma in the tissue and joints of dogs, resulting in a cycle of inflammation and discomfort even in healthy dogs². The objective of this trial was to evaluate the effect of undenatured type II collagen supplementation on inflammation via gait analysis after exercise in healthy Labrador Retrievers.

Materials and Methods

Animals and Housing

- 40 healthy Labrador retrievers (20m/20f; 5-12yrs) selected from colony of Labrador retrievers at Four Rivers Kennel.
- All dogs housed in temperature controlled individual kennels overnight and aired outside in social groups for appx 6hrs daily.
- All dogs fed the same standard kennel diet.
- Water was provided *ad libitum* via automatic waterers.

Diet and Treatments

- All dogs fed the same standard kennel diet once daily in the morning.
- All dogs sorted into two treatment groups based on age, sex body weight, and genetic lineage.
- Twenty dogs from undenatured type II collagen group received 40mg UC-II® (10mg Collagen Type II/Min. 3% Undenatured Type II Collagen; Lonza Consumer Health, Inc) in capsule form once daily by mouth.
- Twenty dogs from placebo group received 40mg maltodextrin in capsule form once daily by mouth.

Study Design

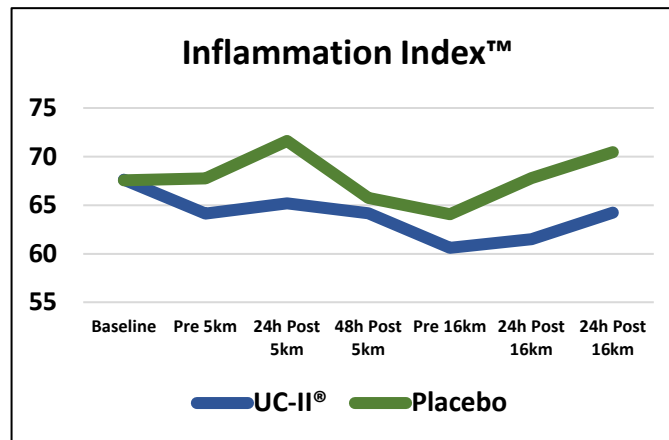
- After a two-week acclimation and loading period, all dogs began a twice weekly running exercise regimen over 11-weeks starting at 5km and increasing incrementally to 8km, with a final 16km run
- The dogs ran freely in groups alongside an all-terrain vehicle in the bush and were free to stop, swim, etc.
- All dogs were gaited at baseline (prior to supplementation), before the first 5km run, 24h and 48h after the first 5km run, before the final 16km run, and 24h and 48h after the final 16km run.
- Dogs were gaited using a Gait4Dogs (CIR Systems, Inc) pressure walkway connected to software.

Gait Analysis Methods

- Each dog is walked on the pressure mat 6-10x to obtain at least three valid “walks” for gait analysis
- Scores for each limb and gait cycle are automatically generated by the software for a variety of temporal, spatial, and pressure measurements
- Four parameters have a known ideal score for each limb:
 - Gait Lameness Score – Combination of weight distribution and reach, calculated by the Gait4Dogs software - Ideal at 100 per limb
 - Total Pressure Index – Weight Distribution of all four limbs - Ideal at 25% per limb
 - Hind Reach – Length of reach of hind limbs - Shows flexion and extension of the hip - Ideal at 50% of the step length
 - Step/Stride Ratio – Ratio of the length of step and length of stride - Shows the torque around the cervical or lumbar spine - Ideal at 50% per limb
- All parameters also have an ideal symmetry ratio of “1” between the left to right forelimbs and left to right hindlimbs, indicating a balanced gait
- For each parameter, the distance away from the ideal score is calculated for each dog and added together to provide an “at a glance” Inflammation Index™ score which allows us to track the dog’s overall gait between timepoints

Results

- At baseline, both undenatured type II collagen and placebo groups had similar Inflammation Index™ scores
- At 24h post first 5km run, the undenatured type II collagen group had a significantly lower Inflammation Index™ score compared to placebo (p=0.032)
- At 24h post 16km run, the undenatured type II collagen group had a significantly lower Inflammation Index™ score compared to placebo (p=0.029)
- At 48h post 16km run, there was a trend with the undenatured type II collagen group having a lower Inflammation Index™ compared to placebo (p=0.073)



Webcam Video Box

Inflammation Index™			
	UC-II®	Placebo	P-value
Baseline	67.62 ± 2.08	67.57 ± 2.35	0.988
Pre 5km	64.14 ± 2.11	67.76 ± 2.04	0.220
24h Post 5km	65.20 ± 2.08	71.62 ± 2.11	0.032
48h Post 5km	64.18 ± 2.09	65.74 ± 1.96	0.587
Pre 16km	60.62 ± 2.12	64.06 ± 1.89	0.228
24h Post 16km	61.49 ± 1.93	67.79 ± 2.11	0.029
48h Post 16km	64.23 ± 2.54	70.45 ± 2.33	0.073

Conclusion

In summary, healthy Labrador Retrievers supplemented with undenatured type II collagen had lower inflammation on gait analysis compared to placebo Labrador Retrievers after exercise.

References

- 1D'Altilio M., Peal A., Alvey M., Simms C., Curtsinger A., Gupta R.C., Canerdy T.D., and Goad J.T. (2007) Therapeutic Efficacy and Safety of Undenatured Type II Collagen Singly or in Combination with Glucosamine and Chondroitin in Arthritic Dogs. *Toxicol Mech Methods*, 17, 189-196.
- 2 Pearson W., Pezzali J.G., Donadelli R.A., Wagner A., and Buff P. (2020) The Time Course of Inflammatory Biomarkers Following a One-Hour Exercise Bout in Canines: A Pilot Study. *Animals*, 10(3), 486.