ALLOGENEIC MESENCHYMAL STEM CELL-BASED PRODUCT VERSUS HYALURONIC ACID AS AN INTRA-ARTICULAR TREATMENT FOR CANINE ELBOW OSTEOARTHRITIS

Vicent Ribes Fuster

UAB Universitat Autònoma de Barcelona

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INTRODUCTION

Osteoarthritis (OA) is the **most common joint disease** diagnosed in veterinary medicine, affecting at least **20%** of dogs in the US and up to **80% older than 8 years** old, with an **annual prevalence 6.1 - 6.6%** in primary-care practices in the US and UK.

Current therapies rely on anti-inflammatory and analgesic drugs, although their effectiveness is limited. **Monoclonal antibodies** have recently gained attention for **pain control**, **but** their efficacy remains modest, and **concerns** have arisen regarding their **safety and adverse effects**.

Regenerative therapies, such as **cMSC**, offer a promising alternative by not only **managing pain** and inflammation, but also **halting the progression** of the disease, with **fewer side effects**. **An allogeneic-source** of cMSCs allows for **immediate availability,** ensuring **timely treatment** and **reducing donor morbidity**.

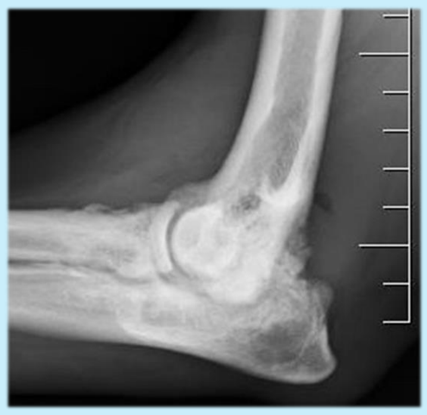

Figure 1. OA in left elbow of one of our patients

MEDIA

MATERIALS & METHODS

1st — Dogs selection

- Inclusion criteria
- 5 dogs
- OA assessment:
  · Physical examination
  · Radiographies (see Figure 1)
- LOAD questionnaire

2nd — cMSC Product

1) Water bath
2) Cells seeding
3) Culture medium renewal
4) Collection and introduction in carrier medium (RL + 0.04% HA)

3rd — Administration

- Under general anaesthesia
- Clipping of the injection site
- 2 dogs with HA (see Figures 2 and 4)
- 3 dogs with cMSC (see Figures 3 and 4)

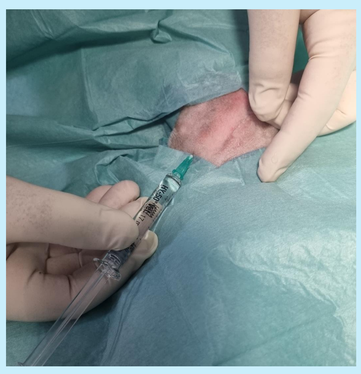

Figure 2. Administering Hyaluronic Acid – HY50 Vet®

Figure 3. Administering allogeneic cMSC-based product

OBJECTIVES

1. Evaluate the **safety and efficacy of** an allogeneic canine mesenchymal stem cell (**cMSC**)-based product administered **intra-articularly** in dogs with elbow OA
2. **Compare** the clinical outcomes **with** a high-density **hyaluronic acid** (HA) formulation, which serves as an **active control**
3. **Identify any adverse effects** associated with the intra-articular administration of cMSCs **and** to **establish a foundation** for future, larger-scale trials

RESULTS

Hyaluronic Acid Active control — **Allogeneic cMSCs-based product**

Figure 4. Representation of the two groups in the study

Within one-month post-treatment, **both animals in the HA group had to be withdrawn from the study due to persistent pain and lameness** that necessitated the initiation of additional analgesic therapies.

Consequently, **only the three dogs** treated with the **cMSCs**-based product **continued** in the trial until the end. **Only two** of these three cMSC-treated dogs could be available for **ROM measured by month four**, although updated **LOAD questionnaires** were obtained **for all three**. LOAD questionnaires **showed improvements** in pain management and absence of lameness. **ROM measurements**, furthermore, resulted in an increased ROM between 12.7% and 21.7%, depending on the limb evaluated (see Figure 5). Overall, the **average improvement** in ROM across all measured limbs **was 15.29%.**

As of April 2025, **five months after** administration, the **cMSCs**-treated dogs remained **free of visible signs** of pain or lameness and demonstrated an improvement in the LOAD questionnaire.

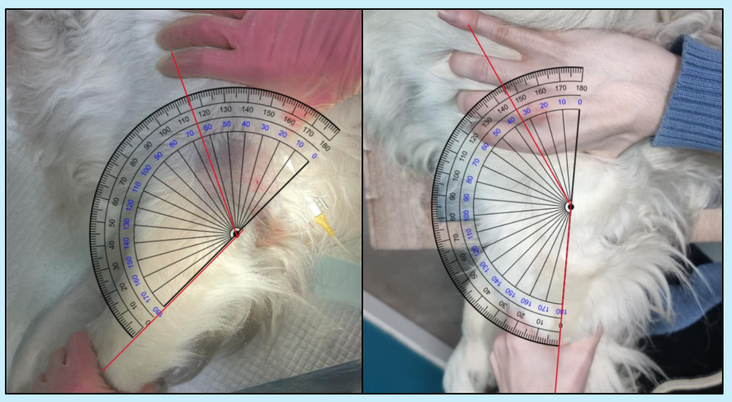

Figure 5. Comparission between joint extension ROM before administration and after 1 month of treatment

DISCUSSION

Only the dogs receiving cMSCs completed the full observation period without requiring rescue analgesia, whereas those receiving hyaluronic acid (HA) deteriorated and were withdrawn early.

Despite these promising results, **the study faced limitations,** mainly related to the owner's **participation**. As the study was double-blinded, owners were unaware of the treatment group, and the requirement to cover clinical and facility use costs, contributed to the limited participation. As a result, **only five dogs** adhered fully to the protocol, **limiting statistical** power and generalizability (n=5).

Additionally, although we intended to analyze **synovial biomarkers,** synovial fluid production was low in dogs with OA, making this aspect of the study **unfeasible**. Furthermore, one of the dogs was housed in a shelter, and **administrative constraints** made follow-up assessments difficult.

To address these limitations, future studies should include a larger sample size.

CONCLUSIONS

This preliminary pilot study shows that intra-articular administration of **cryopreserved allogeneic** mesenchymal stem cell **cMSC offer superior therapeutic outcomes** in pain, lameness, and joint function **compared to high-density hyaluronic acid in dogs with elbow osteoarthritis.** The sustained benefits support their potential as a practical, fast-acting, and low risk alternative to current therapies, while potentially extending the interval between treatments. However, **further investigation** through larger, long-term trials **is essential to confirm these findings** and assess long-term safety and efficacy.