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Original Article

Study the Amelioration Efficacy of a Polyherbal Spray for the Treatment of Osteoarthritic Pain and Inflammation in Dogs and Cats

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Abstract *- The study evaluated the amelioration effectiveness of polyherbal spray (PHS) in treating osteoarthritic pain and inflammation in dogs and cats. The study involved 26 animals aged 1.0-8.0 years who were diagnosed with pain and swelling due to osteoarthritis disorders. The animals were treated with PHS for 7 consecutive days or until complete recovery. The assessment parameters included pain, swelling, edema reduction, activity level, recovery time, and product performance. The results showed significant reductions in pain, swelling, edema, activity level scores, and recovery time. The mean product performance score was 3.92. After 4 consecutive days of twice-a-day treatment, the dogs and cats experienced complete relief from osteoarthritic pain and inflammation. The study recommends PHS as a complementary prophylactic safe therapy alongside standard treatment for these conditions.*

Keywords *- Cats, Dogs, Osteoarthritic pain, Pain, and Polyherbal spray.*

1. Introduction

Pain in animals has many detrimental effects, both physiological and emotional.[1,2] It can delay recovery, negatively impact a patient's well-being, and disturb the bonds between the animal and its owner and the veterinary team.[1,3] Signs of pain may be subtle. They can include withdrawal, decreased mobility, reduced interaction with humans and other animals, poor appetite, and aggression.[4-6] Chronic pain is defined as pain that persists for more than 2–3 weeks. However, it often persists for months or years and may continue beyond the anticipated healing time. Importantly, chronic pain can become maladaptively dissociated from the inciting cause, such that the degree of pain does not necessarily correlate with the pathology and is unrelated to the degree of healing.[6]

Osteoarthritis, or degenerative joint disease, is a chronic inflammatory condition characterized by pain, soreness, stiffness, swelling, and lameness. It is caused by changes in the synovial fluid that diminish the cushioning of joints.[7,8] As the cartilage breaks down, it causes friction between the bones, which leads to inflammation, thickening of soft tissue, and loss of joint mobility.[9] Arthritis is a common chronic illness in humans and domestic animals alike. Dogs are particularly prone to arthritis because of excessive running and exercise, although it can also result from injuries and/or genetic predisposition. Certain breeds, such as labrador retrievers and German shepherds, have a greater genetic vulnerability to joint inflammation.[10]

Studies have looked at the use of nonsteroidal anti-inflammatory drugs (NSAIDs) for acute pain in domestic animals, especially perioperative pain.[11-14] Osteoarthritis is often treated with painkillers and other potent biological agents that target parts of specific immune and inflammatory pathways, such as TNF-α inhibitors and IL-1 receptor antagonists.[15] However, NSAIDs have a high risk of toxicity and adverse side effects, including gastrointestinal bleeding, renal dysfunction, hepatic dysfunction, infusion hypersensitivity reactions, autoimmune responses,[16] and increased risk of severe infection, particularly in the respiratory tract.[17]

As a result, there has been a resurgence of interest in alternative treatments.[18] Herbal medicine is increasing in popularity in veterinary medicine, as it is generally safer, with fewer adverse effects than chemical agents.[9] These remedies can have beneficial effects not only on the symptoms but also

on the course of the disease. The present study aims to evaluate the efficacy of a polyherbal spray (PHS) formulation developed by the Himalaya Wellness Company for use in alleviating osteoarthritic pain and inflammation in dogs and cats.

2. Materials and Methods

2.1. Ethics Statement

The use of animals in this study was approved by the Committee for Control and Supervision of Experiments on Animals (CCSEA) on 07/03/2023, protocol no. AHP/SA_DOGS/12-05/22 & AHP/SA_CATS/12-03/22).

RumInfla, Polyherbal spray (PHS) is a proprietary formulation developed by the Himalaya Wellness Company, Bengaluru, India. It is composed of *Cedrus deodara, Curcuma longa, Mentha arvensis, Cinnamomum camphora*, and *Cinnamomum zeylanicum.*

2.2. Study Subjects

A total of 26 animals, including 20 dogs and six cats of both sexes and various breeds, were included. The animals were aged 1.0–8.0 years. They presented at veterinary clinics in the Bengaluru urban district, Karnataka, India, with complaints of osteoarthritic pain and inflammation.

2.3. Study Design and Procedure

A total of 26 animals (20 dogs and six cats) with major complaints of osteoarthritic pain and inflammation were treated with the PHS for seven consecutive days or until complete recovery.

The animals served as the control. Therefore, a control pretreatment period (day 0) was followed by a 7-day treatment period. During the treatment period, no other herbal analgesics or anti-inflammatory formulations were used.

Glucosamine and/or chondroitin formulations were administered 3-4 days, depending on body weight, as standard treatment, followed by PHS alone for maintaining osteoarthritic pain and inflammation.

2. 4. Animal Husbandry

The dogs and cats were managed by their owners as outpatients. They were fed as usual, but the veterinarian, in each case, monitored the food given and the feeding schedule for the duration of the study. Drinking water was made available by the animals' owners *ab libitum.*

2.5. Study Parameters

The assessment parameters were pain, swelling, edema reduction, activity level, recovery time, and product performance. These were assessed pretreatment (day 0) and daily over a treatment period of 7 days (Table 1). The efficacy of PHS was determined based on the overall improvement in the assessment parameters.

Table 1. Assessment parameters grading system for the efficacy of polyherbal spray on pain and swelling in dogs and cats

Parameters	Description	Score
A. Pain score	No pain on palpation of the organ	1
	Pain on palpation of the organ	2
B. Swelling score	No swelling (completely diminished)	1
	Mild reduction	2
	Swelling observed	3
C. Activity level score	Normal-active and alert	3
	Dull and depressed	2
	Sluggishness and lethargy	1
D. Edema reduction score	Complete reduction (100%)	3
	Moderate reduction (50%)	2
	No reduction (0%)	1
E. Product performance score	Highly satisfied	4
	Moderately satisfied	3
	Neither satisfied nor dissatisfied	2
	Not satisfied (no relief)	1

3. Statistical Analysis

Data were expressed as the mean ± standard error of the mean. Comparisons between baseline (day 0) and subsequent days of treatment (day 1 to day 7) were performed using one-way analyses of variance followed by Dunnett's multiple comparison post-hoc tests. *P*-values ≤0.05 were considered statistically significant.

4. Results

Following the application of PHS, pain and swelling were significantly reduced ($p < 0.001$). In the dogs and cats that are presented at veterinary clinics with pain and swelling as the major complaints, these reductions were apparent as early as day 3.

The pain and swelling were completely ameliorated after four consecutive days of PHS treatment. On day 2, activity level scores were significantly improved ($p < 0.05$). Activity levels were completely restored by day 4 (Table 2).

Edema was also significantly reduced ($p < 0.001$) after topical application of PHS to the affected area (Table 3). The mean recovery period was 3.62 (± 0.17) days. The mean product performance score was 3.92 (± 0.05) (Table 4).

Table 2. Effects of a polyherbal spray on pain, swelling, and activity in dogs and cats

Parameters	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Pain score	2.00 ± 0.00	2.00 ± 0.00	2.00 ± 0.00	***1.27 ± 0.09	***1.12 ± 0.06	***1.00 ± 0.00	***1.00 ± 0.00	***1.00 ± 0.00
Swelling score	2.62 ± 0.10	2.62 ± 0.10	***2.15 ± 0.07	***1.65 ± 0.11	***1.38 ± 0.10	***1.00 ± 0.00	***1.00 ± 0.00	***1.00 ± 0.00
Activity level score	1.69 ± 0.14	1.69 ± 0.14	*2.00 ± 0.11	***2.54 ± 0.13	***3.00 ± 0.00	***3.00 ± 0.00	***3.00 ± 0.00	***3.00 ± 0.00

Values are expressed as mean ± standard error of the mean. n = 26

*$p < 0.05$ and ***$p < 0.001$ when compared to day 1 using repeated measure one-way analyses of variance followed by Dunnett's multiple comparisons *post-hoc* tests.

Table 3. Effect of a Polyherbal Spray on Edema Scores in Dogs and Cats with Pain and Swelling

	Edema score
Before treatment	1.00 ± 0.00
After treatment	***2.88 ± 0.06

Values are expressed as mean ± standard error of the mean; n = 26

***$p < 0.001$ on paired t-test

Table 4. Effects of a Polyherbal Spray on the recovery period of dogs and cats with pain and swelling and product performance scores

Parameter	
Recovery period (days)	3.62 ± 0.17
Product performance score	3.92 ± 0.05

Values are expressed as mean ± standard error of the mean. n = 26

5. Discussion

Pain and inflammation in dogs and cats resulting from osteoarthritis disorders were ameliorated completely following topical application of a PHS for 4 consecutive days. This indicates that the PHS possesses analgesic anti-inflammatory properties. Furthermore, edema was significantly reduced after the topical application of the PHS to the affected area.

In addition, the significant increases observed in the activity levels of the cohort indicate that the PHS facilitated the restoration of normal activities in these animals. The animal owners and veterinarians who used the PHS for the treatment of pets suffering from osteoarthritic-associated pain and inflammation were highly satisfied with the efficacy of PHS. These findings are attributable to the herbal ingredients of the PHS, which are *C. deodara, C. longa, M. arvensis, C. camphora*, and *C. zeylanicum*.

Improvements in hard tissue swelling, such as those observed in our study, are generally associated with wound healing. This could be explained by the antibacterial properties of *C. camphora* and *C. zeylanicum*, as infection and prolonged inflammation interfere with the wound healing process. Indeed, cinnamaldehyde, a bioactive constituent found in cinnamon, has been shown to exert considerable antibacterial effects against Gram-positive and Gram-negative bacteria *in vitro* experiments.[20] Cinnamaldehyde has also been shown to inhibit the growth of fungi, including yeast, filamentous molds, and dermatophytes.[21]

A study by Chattopadhyay et al. found that the volatile oil fractions and solvent extracts of *C. longa* possess anti-inflammatory properties.[22] The anti-inflammatory action of curcumin, which is the major phytoactive compound of *C. longa*, has also been evidenced by El Hage and Matthew. These authors recommend the application of *C. longa* in both acute and chronic cases of inflammation. They found the efficacy of curcumin to be on par with that of the well-known anti-inflammatory drug phenylbutazone.[23] Curcumin also plays a regulatory role in cytokine secretion from immune cells, thereby exerting both anti-inflammatory and immunomodulatory effects. An *in vitro* study found that curcumin inhibits the proinflammatory-responsive Th1 cytokine, conferring beneficial effects in the regulation of Th-1-controlled immune disorders.[24] Thus, the beneficial effects of PHS application in the alleviation of osteoarthritic pain and inflammation in cats and dogs can be ascribed, in part, to the anti-inflammatory and immunomodulatory activities of *C. longa*.

Furthermore, the *M. arvensis* in the PHS spray is known to stimulate cold receptors by inhibiting Ca^{++} currents in neuronal membranes, creating cooling sensations. It also has anti-inflammatory properties, which are produced through the inhibition of serotonin and neuropeptides, as well as the release of leukotriene, prostaglandin, and interleukin from monocytes.[25]

The wood of *C. deodara* has long been used in Ayurvedic medicine to treat joint disorders and severe inflammation.[26] Gu et al. have reported that *C. deodara* effectively inhibits the polyarthritic phase of arthritis, as measured by paw swelling in a complete adjuvant-induced arthritis rat model.[27] *C. deodara* wood oil has also been found to exert inhibitory effects on rodent paw edema, both during exudative-proliferative and perpetual periods of irritation.[28] Furthermore, Haghighi et al. found that the volatile oil extract of *C. deodara* wood significantly inhibited carrageenan-induced rat paw edema.[29] Another study found that the active extract of *C. deodara* wood inhibits both the exudative-proliferative and chronic phases of inflammation.[30] In addition, *C. deodara* wood oil has demonstrated significant analgesic effects in acetic acid-induced writhing response and hot plate reaction time mice pain models.[31] Therefore, the alleviation of

osteoarthritic pain and inflammation observed in our study may be partially attributed to the anti-inflammatory, analgesic, and anti-arthritic activities of *C. deodara*.

Topical applications have several advantages over alternative drug formulations. They block pain at the site of inflammation, with maximum active drug concentrations and minimal systemic effects.[32] They generally have better safety profiles and avoid issues associated with oral, intramuscular, or intravenous routes of drug administration, such as gastric disturbances, first-pass hepatic metabolism, and inconstant serum concentrations.[33] Topical applications also have advantages over hypodermic injections, which can be painful, generate dangerous medical wastes, and pose disease transmission risks through needle reuse.[34] In addition, topical applications are generally inexpensive, noninvasive, and can be applied to animals by their owners, obviating the need for the help of a veterinarian.

6. Conclusion

This study demonstrates that the topical application of PHS for 4 consecutive days provides complete relief from osteoarthritic-associated pain and inflammation in dogs and cats. Therefore, PHS could be recommended as a prophylactic therapy alongside standard treatment for the amelioration of osteoarthritic pain and inflammation in dogs and cats.

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