

# Chapter 229

## Multifunctional herbal medicines in small animals in veterinary medicine

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### ABSTRACT

Rosemary (*Rosmarinus officinalis*) was used to decline the inflammation levels besides the stress and anxiety that compromise dogs and cats due to the pain and discomfort caused by joint injuries and neurological damage; 3 groups of patients were selected with the assistance of veterinarians and questionnaires that addressed the tutor and animal's

profile, besides the pain levels and behavior of the patient during the time of 3 weeks that it's been evaluated. Overall, more than 75% of the patients that received the medicines had a significant improvement with the treatment, having changes like reduction in pain, reduction in lameness, better support in pelvic or thoracic limbs, bigger comfort or reduction in the stress and anxiety levels, proving that the Rosemary can be considered as an effective anti-inflammatory against joint injuries on small animals.

**Keywords:** Behavior, Inflammation, Rosemary, Treatment, Pain.

### 1 INTRODUCTION

Phytotherapy: having Greek origin, Phytos (plant) and therapy (treatment) is the science that aims to use plants for the treatment and prevention of various diseases. This science has been studied since the beginning of humanity and in this way, it is always undergoing modifications, being increasingly used today for the treatment of various diseases (BARBOSA, 2011).

However, veterinary medicine lacks research and studies related to treatments with phytotherapy, an area considered by many professionals as practical and effective, in addition to having low cost (BARBOSA, 2011).

Among the therapeutic vegetables that already have some beneficial action for humans, there is rosemary (*Rosmarinus officinalis*), a phytotherapeutic considered multifunctional with anti-inflammatory, antiviral, and antibacterial properties and antioxidants (BAIOTTO et al., 2007).

Its therapeutic properties already described, present in its essential oil, comprise antiseptic, antifungal, insecticide, antioxidant, astringent, antimicrobial, anti-inflammatory, and antitumor activity (BUENO et al., 2016).

Regarding its pharmacological action, this herb has an important component, osmarinic r acid (RA), which has anti-inflammatory and antinociceptive action (decrease in the ability to perceive pain and

discomfort). Studies prove that RA has an anti-inflammatory effect in cases of both chronic and acute inflammation, inhibiting pro-inflammatory components, in addition to presenting an antinociceptive effect in situations of chronic pain without causing alteration in the locomotor activity of animals (SANTOS, 2013).

The oil is found in essential oil form or just as rosemary oil (the latter of which can be prepared at home with some ingredients (TUA SAÚDE, 2020). The main way to use these oils is by inhalation, which allows the molecules to easily reach the brain, beneficially altering the functioning of the body (ALECRIM, 2020).

This plant has also proved effective in several other ways; rosemary water can be used to combat fleas, mites, scabies, and even lice, when it is not an infestation (ANIMAL EXPERT, 2017); still, it can benefit the animal's body in various ways, and can assist in the expulsion of gases and urine, regenerating the liver and being widely used in the therapy of arthrosis and rheumatism (ANIMAL EXPERT, 2017).

Other studies indicate that *Rosmarinus officinalis* is indicated for treatment in animals. For example, the aqueous extract of this herb was used to treat the oxidative stress of diabetic rats (SANTOS, 2013). This was possible because the herb has a considerable antioxidant capacity in vitro and its composition, there are phenolic compounds. Thus, when administered to rats at a concentration of 50 mg/kg, these components were effective in reducing the oxidative stress that was present in the experimental diabetes of these rodents (SILVA et al., 2011).

In addition, it has been shown that rosemary has good antimicrobial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa*, and can be used as an effective and low-cost antimicrobial agent, or can be used as a component of an antibiotic that acts as a controller of microorganisms that are in environments and body surfaces (SOUZA, 2007).

Given the above, the objective of this study was to improve the herbal and aromatherapeutic effect of rosemary in small animals such as dogs and cats that present diseases such as arthritis, arthrosis, patellar dislocation, cranial cruciate ligament rupture, disc herniation, coxofemoral dysplasia, stress, and anxiety. It also aims to compare the different presentations and applications of rosemary (aromatherapy with essential oil, topical ointment, and ingestion of capsules with dehydrated rosemary) in the herbal and aromatherapeutic effects that were previously mentioned. In addition, the project proposes a non-invasive treatment protocol, which values the welfare of the animal. The herbal medicine chosen has been very effective in the treatment in human years, not having harmful collateral effects, besides having low cost.

## **2 MATERIALS AND METHODS**

For the execution of this project with the alecrim (*Rosmarinus officinalis*), the patients were selected in veterinary clinics with the help of the Veterinarians responsible for the treatment of the animals. For the execution of the project, the institutions were divided into 3 groups according to the following description:

Group 1: patients who received dehydrated rosemary and manipulated in capsules, at a concentration of 5 mg per kilogram of body weight, administered orally, twice a day, for 21 days.

Group 2: patients who underwent topical treatment associated with inhalation. And they received the application of 5% rosemary conveyed in cream (qsp 100g). The tutor was instructed to use approximately 1 gram of this cream, apply it to the place where the patient felt pain, keep it in the region for at least 10 minutes, repeating the procedure up to 3 times a day, for 21 days. By the time the tutor applied the cream to the patient, he also made use of rosemary essential oil at a concentration of 10%, dripping a drop of this oil onto a cotton pad and placing it close to the patient's nostrils, or putting the oil in a diffuser, keeping the inhalation for at least 10 minutes.

Group 3: Patients in the control group who did not receive rosemary or any form of treatment related to the project.

We selected 14 patients for Group 1; 13 patients for Group 2 and 15 patients for Group 3, these being of canine or feline species. All of them had previous diagnoses of coxofemoral dysplasia, aseptic necrosis of the femoral head, mineralization of the intervertebral disc, hemivertebrae, arthrosis, overload in pelvic, thoracic limbs and spine, patellar dislocation, rupture of the cranial cruciate ligament or were victims of being run over and had to undergo surgeries and thus were selected by veterinarians who integrated the treatment with the use of rosemary for reduction of pain, inflammation, stress, and anxiety.

The tutors of the patients who participated in the project asked for a questionnaire (ANNEX 1), addressing the profile of those responsible, time of availability for application of the drug, type of residence (if it has steps and the type of floor where the animal stays, for example). In addition, the questionnaire addressed the patient's profile, with questions about their personality, the environment in which they are in the residence, whether they have a history of comorbidities that could harm the results of the project or the animals themselves in some way, in addition to which form of administration is the most appropriate. This questionnaire was an important tool in the distribution of patients in the different groups. In addition, the tutors signed the free consent form and were granted (ANNEX 2).

To facilitate the follow-up of the patient's evolution, a questionnaire for pain assessment was used (ANNEX 3), which is composed of the numerical pain assessment scale, with numerical values from 1 to 10 to be analyzed and able to use 4 or 5 descriptions of pain intensity, being them "no pain", "mild pain", "moderate pain," "severe pain," and "pain at the worst possible level." There was also the use of questionnaires, and the Glasgow Questionnaire was selected, which has questions about the behavior of the animal when it was under observation, when there is an approach of the owner, and when touch or pressure occurred in a specific region to observe whether or not there was a reduction in inflammation during the time in which the animal was under evaluation.

From this, the patients received the treatment, being: rosemary capsules intended for those selected for oral use; cream, and essential oil for those undergoing treatment by therapeutic use and inhalation. Patients received daily doses of the medication, as described earlier, and were evaluated weekly by the

veterinarian in charge or by the owner, who filled out the questionnaire of the evaluation of the animal's pain and made a brief report of how the patient went through using the drug.

### 3 FINDINGS

Of the 27 patients who received some form of treatment with rosemary, 14 were undergoing physiotherapy at the Veterinary Ethics clinic, while 10 were indicated by the veterinary doctor. Physiotherapist 3 were taken to the Veterinary Hospital Center of the Moura Lacerda University Center in Ribeirão Preto (SP), where they were evaluated by resident veterinarians, who recommended treatment.

It was noted that, after the 3 weeks, of the 27 patients selected, 21 presented the following alterations: reduction of pain and inflammation, reduction or suspension in claudication, reduction of stress and anxiety, support in the hind legs, and better disposition during the day. The other six patients (22.3%) remained stable in the same period.

Regarding Group 1, which received the cushion orally, of the 14 patients who participated in the project, 11 (78.6%) presented a decrease in the quantification of pain, reducing or ceasing the claudication, presenting greater disposition and comfort, in addition to the reduction in pain, stress, and anxiety, while the other 3 (21.4%) patients did not present quantitative change of pain, but one of them showed improvement in the clinical evaluation by the veterinarian in charge. The other two patients had their pain quantified in grade 1, that is, a pain considered mild and, perhaps for this reason, the improvement could not have been perceived. Table 1 details this evolution for each of the patients.

Table 1: Data from patients belonging to group 1, treated orally with capsules containing dehydrated rosemary (5 mg/kg/IDB, for 21 days). Patients 1 to 9 underwent physical therapy while receiving rosemary. The clinical evaluation was based on the questionnaire applied, quantifying pain between 0 and 10. Behavior was assessed using the Glasgow questionnaire.

Nome	Diagnóstico	dor 1 dia	dor 1 semana	dor 2 semanas	dor 3 semanas	Sí/ claudica	conforto	Redução estresse/an	maior dispos	melhor ap	faz fisioterap
1c	displasia coxofemoral bilateral	1	1	1	1	X	X	X	X	X	X
2c	displasia coxofemoral leve, osteoart em cotovelo	1	1	1	1						X
3c	1 espaço intervertebral em cervical e sobrecarga	5	5	3	2						X
4c	osteoart bil em cot, disp coxof e disp cot direito	7	5	3	1	X	X			X	X
5c	mineralização do disco intervertebral	5	3	1	1			X	X		X
6c	suspeita de artrose em ombro e displasia coxofe	7	5	2	2		X		X	X	X
7c	subluxação femoral bilateral	1	1	1	1						X
8c	displasia coxofemoral bilateral	4	2	2	2	X	X		X	X	X
9f	displasia coxofemoral e artrose	2	2	1	1	X	X	X	X	X	X
10f	doença art degen secundaria a displasia coxofe	7	5	3	2	X	X		X	X	
11c	hemivert e torao, artrose em joelho, sublux bilat	5	3	1	1	X	X		X	X	
12c	disp coxofem, rplcc, redução espaço IV cervical	6	6	4	1	X	X			X	
13c	displasia coxofemoral, espondilose e susp C.E	4	3	2	2	X	X			X	
14c	disp coxofemoral e espondilose em toda coluna	7	5	3	1	X	X			X	

Note 1: c (canine patients)

Note 2: f (feline patients)

In Group 2, composed of 13 patients who received rosemary cream for topical use as treatment in association with rosemary essential oil for inhalation, eight (61.5%) presented a decrease in pain quantification, while five (38.5%) remained with the same pain intensity at the end of treatment. However, among them, two patients showed worsening in the quantification of pain in the first week or the second week, which was followed by a subsequent improvement. In addition, the five showed some improvement during the clinical evaluation by the veterinarians in charge. Among the improvements verified is a reduction in pain and discomfort, reduction or interruption of claudication, improvement in pelvic limb support, as well as a reduction of stress and anxiety. Thus, it can be stated that the 13 patients in the group, at the end of the treatment, had improved the initial clinical picture. All the results related to this group can be seen in Table 2.

Table 2: Performance of Group 2 (rosemary cream at 5% concentration associated with rosemary essential oil at 10% concentration).

Nome	Diagnóstico	via adm	dor 1 dia	dor 1 sem	dor 2 sem	dor 3 sem	claudicação	conforto	red estresse/ansiedade	maior disp	melhor apoio	faz fisioterapia
1 c	lux pat bil, sublux cox esq, A.A.B	tópico	1	1	1	1		x	x		x	x
2 c	disp coxof bil, sublux	tópico	3	2	1	0	x	x		x	x	x
3 c	lux ombto dir, artrose, sobrec em coluna	tópico	2	2	1	1		x	x		x	x
4 c	miner. Disco t11-t12 e L5-L6	tópico	1	1	1	1		x	x			x
5 c	miner. Disco t11-t12 e L5-L6	tópico	1	1	1	1		x	x			x
6 c	RLCC (operada)	tópico	3	3	2	1	x	x			x	
7 c	frat memb tor esq, bronq cron, dis lux pat	tópico	1	1	6	1	x	x			x	
8 c	disp coxof bil, lux bil, contrat em quadric	tópico	5	5	4	3		x		x	x	
9 c	lux pat dir II, sobrec cerv/toracolombar e d	tópico	9	7	5	3				x	x	
10 c	fratura em membro pelvico (operada)	tópico	3	2	2	1	x	x				
11 c	ruptura do ligamento cruzado cranial	tópico	1	1	1	1						
12 c	contusão e edema em membro	tópico	9	5	4	3		x			x	
13 c	displasia coxofemoral	tópico	9	7	6	5		x			x	

Note 1: c (canine patients)

Patients with Grup 3 (control) did not receive rosemary as a treatment, but underwent physical therapy and were followed up and evaluated during the 21 days. In addition to physiotherapy, they had contact with therapies such as laser therapy, magnetotherapy, ozone therapy, kinesiotherapy, and water aerobics. Of the 15 patients, 10 (66.7%) showed a reduction in the quantitative parameters of pain, indicating that physiotherapy and other therapies have a beneficial effect on the changes presented by the patients. Table 3 details the evolution of each of the patients:

Table 3. Patients in the control group did not receive rosemary as a form of treatment. The clinical evaluation was based on the questionnaire applied, quantifying pain between 0 and 10. Behavior was assessed using the Glasgow questionnaire.

nome	diagnóstico	dor 1 dia	dor 1 sem	dor 2 sem	dor 3 sem	claudicação	conforto	red estresse/ansiedade	maior disposição	melhor apoio
1 c	hérnia de disco toracolombar	3	2	2	1			x	x	
2 c	hérnia de disco T11-T12	4	3	2	1				x	x
3 c	luxação patela II, incongruência quadril	1	1	1	1		x		x	x
4 c	RLLC esq, luxação de patela II	3	2	1	0	x	x		x	x
5 c	poliart incong. Articular joelho/quadril	4	4	4	4	*				
6 c	espongiloartrose L4-L5	4	5	4	4			x	x	x
7 c	má formação em coluna lombar	3	3	2	2		x		x	x
8 c	displasia coxofemoral	2	2	2	2					
9 c	hérn. Disco, mielopatia deg, disp coxof.	4	4	4	4					
10 c	artrose em joelho e quadril	9	9	8	7					
11 c	luxação de patela	7	6	5	4				x	x
12 c	artrite e artrose	3	3	2	2	x	x		x	x
13 c	luxação de patela	7	3	3	5	x				
14 c	displasia coxofemoral	7	4	5	4		x		x	
15 c	redução Espaço Intervertebral	2	1	1	1		x		x	

Note 1: c (canine patients)

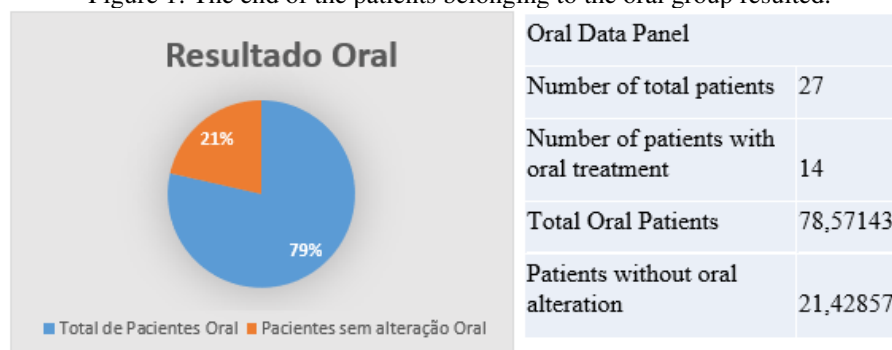
#### 4 DISCUSSION AND FORMAL DECISIONS

Analyzing the results it is possible to conclude that of the patients who received rosemary, 78% had positive changes, with significant improvements both in the group that received the medication orally and topically. However, the airway proved not to be very effective in reducing the stress and anxiety of patients, considering that few animals presented these alterations. D the patients who participated in the project and received the drugs, only 22% remained stable and without changes in the treatment.

The figures below illustrate these observations, making it easier to visualize the performance of the project patients and how effective rosemary drugs were as a natural anti-inflammatory against joint and neurological disorders in dogs and cats.

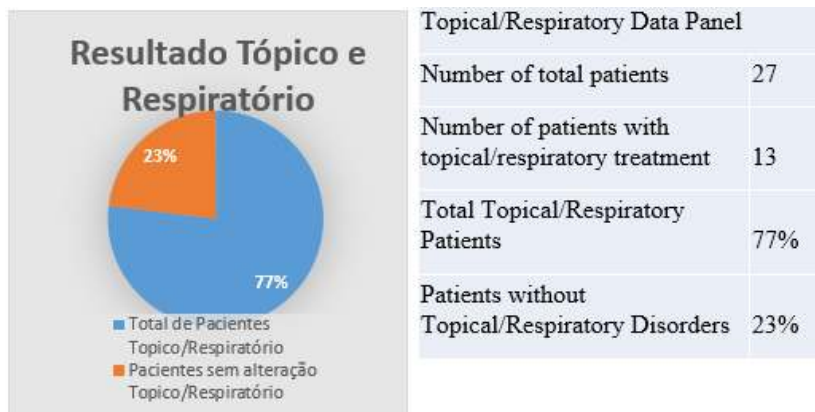
In Figure 1, we observed that of the 14 patients who participated in Group 1, 11 obtained a positive response to the treatment of rosemary, while only 3 patients remained stable with the treatment, corresponding to 79% of the patients who reacted well to the treatment and only 21% of the patients who had no alterations:

Figure 1: The end of the patients belonging to the oral group resulted.



In Figure 2, below, we observed that of the 13 patients who participated in the project, 10 obtained a positive response to the use of rosemary drugs, while only 3 patients remained unchanged, equivalent respectively to 77% of patients having positive changes with treatment, with only 23% of patients remaining without noteworthy changes:

Figure 2: final result of patients belonging to the topical group associated with respiratory.



Patients with joint affections had more noticeable results, emphasizing those with diagnoses such as coxofemoral dysplasia, cranial cruciate ligament rupture, or patellar dislocation. However, some patients with the same conditions did not have such noticeable alterations, remaining stable during treatment and thus, it was not possible to reach a conclusion on the effectiveness of the drug in these specific patients.

In addition, patients with neurological disorders did not obtain such noticeable results compared to patients who have joint affections, assuming that the dosage used in the treatment was not sufficient to completely or inhibit the pain of patients who have diagnoses such as hemivertebrae, herniated disc, cauda equina, among other conditions.

And finally, rosemary essential oil was not as efficient in reducing the stress and anxiety of patients, since a very low amount of patients reacted positively to aromatherapy.

Despite several of the patients also undergoing other treatments during the project (physiotherapy, for example), numerous tutors reported improvement in one or more symptoms, specifically after the inclusion of rosemary in the treatment of the animal.

Patients in Group 3, who did not receive treatment with rosemary, also had a good evolution of the symptoms presented; this is not surprising, since they are patients undergoing numerous other treatments.

Numerous studies corroborate our positive results, providing support for the use of rosemary in folk medicine for various types of pain, including rheumatic pain. MELO et al. (2021) make an extensive review of the literature, which addresses numerous situations where rosemary, in different formulations, exerts an anti-inflammatory effect.

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## ANNEX 1: Questionnaire for Tutors – PIC – Rosemary 2021

Nome: Felipe Falcão Haddad\_ / number: (16)99963-1998 / email: felipehaddad09@gmail.com

Name: number:

Email:

This questionnaire evaluates the degree of availability for owners to be able to perform the treatment on their animals to obtain the most reliable results possible.

- 1) The ointment needs to be applied to the animal for at least 10 minutes. How many times in the day will it be possible to make this application?
  - a) 1 time a day
  - b) 2 times a day
  - c) 3 times a day
  
- 2) Are there children in the residence?
  - a) Yes
  - b) No
  - c) A number of children:
  
- 3) What is the type of floor that the animal has contact with?
  - a) Porcelain
  - b) Laminated
  - c) Smooth
  - d) Other
  
- 4) Does the animal have contact with the stairs in the residence?
  - a) Yes
  - b) No
  
- 5) What is the function of the animal in the residence?
  - a) Company
  - b) Guard
  - c) Shepherd/Cattleman
  
- 6) Does the animal have difficulty ingesting medications?
  - a) Yes
  - b) No
  
- 7) Does the animal have any of these diseases?
  - a) Gastroenteritis
  - b) Allergic skin reactions
  - c) Seizures
  
- 8) What is the best way to apply medicines to the animal?
  - a) Oral
  - b) Topical
  - c) Respiratory
  - d) All of the above alternatives
  
- 9) Does the animal have a good relationship with other people?
  - a) Yes
  - b) No
  
- 10) Is the animal usually agitated during the day?
  - a) Yes
  - b) No

## ANNEX 2: Free and Informed Consent Form

TERM OF FREE AND INFORMED CONSENT (TCLE) for the use of animals in research and/or teaching.

1. The ICF must be prepared in 2 (two) copies, signed, one with the owner and the other with the researcher/teacher who must keep it for at least 5 (five) years.
2. This document should provide a complete understanding of the project/class and all its implications for the owner and the animal(s) participating in the research/class.

### MODEL: FREE AND INFORMED CONSENT FORM

Research Title: Multifunctional Herbal Medicines in Veterinary Medicine

Name of the Principal Investigator: Felipe Falcão Haddad

Name of the other participants of the team: Lídia Terêsa Abreu Pires and Naiá Rezende Lago

1. Nature of the research/class: You are being invited to authorize the participation of your animal(s) in this research/class that aims to use rosemary (*Rosmarinus officinalis*) for the treatment of muscle and joint inflammation, in addition to reducing the stress and anxiety of these animals.
2. Identification of the animal(s): identify species, sex, breed, weight, quantity, name, or registration number (if applicable).
3. Involvement in the research/class: by participating in this study Mr. (Mrs.) will allow the researcher to make the treatment with anti-inflammatory ointment (for topical use) for 10 minutes up to 3 times a day, a capsule with an active ingredient that fights inflammation (for oral use) 2 times a day, and rosemary essential oil (for the airways) and the results will be evaluated from the numerical pain assessment scale and questionnaires on the pain of the patient, with questions about the patient's behavior and his reactions when the tutor enters and contact with him or there is pressure from the region affected by the inflammation. You are free to refuse to participate and still refuse to continue participating at any stage of the research without any harm to your animal. Whenever you want, you can ask for more information about the research through the researcher's phone. If necessary, you can contact the Ethics Committee on the Use of Animals (CEUA).
4. About the required data: (if any, specify the data that will be collected).
5. Risks and discomfort: participation in this research does not bring legal complications. The procedures adopted in this research/class obey the ethical principles in the use of animals, elaborated by the National Council for the Control of Animal Experimentation (CONCEA), on the use of animals in educational activities and experiments involving species defined in Law 11.794/2008.
6. Confidentiality: All information collected in this study is strictly confidential. Only the researchers/professors will be aware of the data.
7. Benefits: we hope that this study will bring important information about the benefits of rosemary (*Rosmarinus officinalis*) to combat both inflammation and stress and anxiety in the animal, to improve its quality of life, so that the knowledge that will be built from this research/class can encourage more research in the areas of phytotherapy and aromatherapy in veterinary medicine, the researcher undertakes to disseminate the results obtained.
8. Payment: You will not have any cost for this treatment. It will be entirely free, with the costs covered by the researcher and his advisors.

After these clarifications, we ask for your consent freely for the participation of your animal(s) in this research. Please fill in the following items:

Free and Informed Consent

Because of the items presented above, I, in a free and informed way, express my consent to participate in the research/class.

Owner Name: \_\_\_\_\_

CPF/RG: \_\_\_\_\_

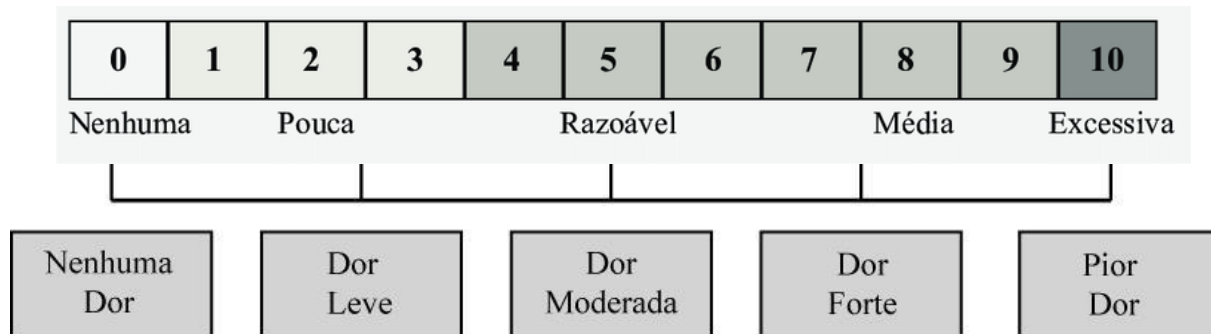
\_\_\_\_\_  
Owner Signature

\_\_\_\_\_  
Signature of the Researcher/Professor

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

PHONES:

Researcher/Teacher: .....



## ANNEX 3: QUESTIONNAIRE FOR PAIN ASSESSMENT IN THE PATIENT

Tutor:

Patient:

Numerical Pain Rating Scale

First day:

First week:

Second week:

Week Three:

Glasgow Composite Scale

Category 1: patient posture.

Rigid: the patient is lying in lateral decubitus, in a fixed position and the legs are partially or completely extended.

Curved: the patient is raised (in season) and his body is curved, acquiring a convex shape with a shrunken abdomen or concave with the shoulders and thoracic limbs lower than the hips.

Tense: the patient may be afraid or afraid to move, with contracted muscles (in this posture the animal can be in any body position).

Category 2: Patient comfort

Inquieto: patient alternates body positions, walking in circles, moving too much, and demonstrating agitation.

Comfortable: the patient is resting relaxed, at ease, without trying to run away or staying in a position considered abnormal.

Category 3: Vocalization.

Crying: patient keeps complaining, with his mouth open, vocalizing loudly.

Moaning: the patient has low crying, or deep grunts, intermittently.

Scream: patient makes loud and continuous sounds, always with his mouth wide open.

Category 4: attention to the wound area.

Biting: using the mouth and teeth in the area that is affected. Licking: patient uses the tongue to rub the area that is affected. Looking: patient turns his head a lot towards the affected area.

Ignoring: patient is not paying attention to the affected area.

Category 5: conduct.

Aggressive: patient may have open mouth or curved lips showing teeth, barking, growling, or threatening to bite.

Depressed: Sad, unresponsive behavior is a little afraid to react.

Disinterested: patient demonstrates an inability to be stimulated to wag his tail or interact with the one who is watching him.

Nervous: the patient has eyes in continuous movement, always with the head and body in motion, looking apprehensive.

Anxious: patient is worried, with eyes wide open and forehead wrinkled.

Frightened: patient shrinks, protecting the body and head.

Quiet: patient is sitting or lying still, without vocalizing any sound. He will look when he speaks to him, but will not answer.

Indifferent: Not responsive to either the environment or its observer.

Content: patient is interested in the environment in which he is, presents positive interaction with the observer, is responsive and alert.

Excited: patient is wagging his tail, jumping, often vocalizing with sounds of contentment.

Category 6: mobility.

Rijo: patient walks rigid, takes time to get up or sit and may be afraid when moving.

Slow to get up or sit: patient takes time to perform these movements, but without the rigidity.

Lame: irregular walking, weight bearing is uneven when walking.

Normal mobility: patient gets up and lies down without abnormal changes and movements.

Category 7: Touch response.

Crying: patient gives a short vocal response. He looks at the affected area and opens his mouth, emitting a short sound.

Dodge: the painful area is quickly removed before or at the time the touch is done.

Bite: patient tries to bite the observer before or at the time of touch.

Guard: patient pulls, removes the painful area away from the stimulus or tenses the muscles of the site to protect from this stimulus.

None: patient accepts the pressure on the wound without the reactions mentioned above.

1) This is the first section of questions and aims to observe the patient's behavior.

Alternative Issues Observe the dog's posture; she looks...

- Rigid
- Bent or tense
- None of these

Apparently, the dog is:

- Restless
- Comfortable

If the dog is vocalizing, he is...

- Crying or whining
- Screaming
- Moaning
- No vocalization/ none of these

If the dog is paying attention to his wound, he is...

- Chewing
- Licking, staring or rubbing
- Ignores your wound

2) This is the second section of questions and they are asked as the animal approaches, calling it by name and encouraging it to go to whoever will evaluate it.

The dog seems to be...

- Aggressive
- Amoado
- Disinterested
- Nervous/ anxious or afraid

- Quiet or indifferent
- Happy/contented
- Happy/excited

During this procedure, the dog appeared to be...

- Rijo
- Slow or reluctant to stand or sit
- Lamé
- None of these
- Evaluation not performed

3) The third and final section is done to assess the patient's response to touch. For example, if the patient has an affected, inflamed, wounded area, it is necessary to gently apply pressure on it and around it.

When touched, the dog:

- Cries
- Dodge
- Bites
- Growl / protects the wound
- None of these

## ANNEX 4: INFORMAL CONSENT FORM (in order to make it more accessible and didactic for tutors).

### Term of commitment

This is a very simple project that has 3 goals!

- 1) The first and foremost goal is to improve the patient's well-being by using natural medicines to combat inflammation and pain, and the stress and anxiety caused by it!
- 2) The second goal is to provide a more affordable alternative to therapies and treatments of joint diseases, using herbs with anti-inflammatory potential and thus reducing costs with other drugs that may be less priced in.
- 3) And last but not least, the third objective of this project is to encourage other students, researchers of veterinary medicine to explore the areas of phytotherapy, aromatherapy, in order to develop new treatments and research.

Now, about the project: for the treatment of these inflammations, stress and anxiety, wild rosemary (*Rosmarinus officinalis*) can be used: in ointment form, for topical application in the region affected by inflammation; in capsule form orally (because of rapid absorption and practicality); and by respiratory route, through inhalation of the aroma of rosemary essential oil.

The progress of the treatment will be evaluated with questionnaires about the patient's pain! They are simple questions about the patient's behavior, how he reacts when someone in the household comes into contact with him, and when the part of the body that is inflamed is touched or pressed in some way. These questions will allow us to observe whether or not the patient has improved with the treatment, as he gives different answers over the weeks.

The treatment will be temporarily free (costs will be covered by the research) and has minimal risks for the patient. In this way, the tutor will be able to choose the treatment route that best suits his routine and the patient's personality. The capsule and ointment will have the active ingredient dosed according to the weight of the animal, thus avoiding excessive absorption of the drug and any possible side effect.

With this, the project values the well-being of the patient, having the responsible researcher available 24 hours to answer any type of doubt or assist in the best possible way. For this research, the treatment is free and very affordable, being found in pharmacies and markets, leaving an alternative to prepare a home remedy if it is needed in the future. And the results of this research are an incentive for other researchers to explore this area to create new treatments, new drugs and integrative medicine, creating a good relationship with the patient, the tutor and the veterinarian in charge.

### Signatures

Responsible researcher: \_\_\_\_\_

Responsible Guardian: \_\_\_\_\_

Table 1: Patients from group 1 evaluated according to the Glasgow questionnaire.

Animal	Date	Category 1st	Category 1B	Category 1C	Category 1D	Category 2A	Category 2B	Category 3	TOTAL	Percentage
Patient 1c	1 DAY	2	2	1	1	4	1	1	12	2%
Patient 1c	1 WEEK	1	2	1	1	4	1	1	11	2%
Patient 1c	2 WEEK	1	2	1	1	2	1	1	9	1%
Patient 1c	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 2c	1 DAY	1	1	1	1	1	1	1	7	1%
Patient 2c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 2c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 2c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 3c	1 DAY	3	1	4	1	1	1	2	13	2%
Patient 3c	1 WEEK	3	2	4	1	1	1	2	14	2%
Patient 3c	2 WEEK	2	1	4	1	1	1	1	11	2%
Patient 3c	3 WEEK	2	1	4	1	1	1	1	11	2%
Patient 4c	1 DAY	3	2	3	2	4	3	2	19	3%
Patient 4c	1 WEEK	3	2	3	2	4	3	2	19	3%
Patient 4c	2 WEEK	2	2	2	2	2	1	2	13	2%
Patient 4c	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 5c	1 DAY	3	2	1	1	4	4	1	16	3%
Patient 5c	1 WEEK	2	2	1	1	4	4	1	15	2%
Patient 5c	2 WEEK	2	1	1	1	3	3	1	12	2%
Patient 5c	3 WEEK	2	1	1	1	2	2	1	10	2%
Patient 6c	1 DAY	3	2	1	1	3	4	1	15	2%
Patient 6c	1 WEEK	3	2	1	1	3	4	1	15	2%
Patient 6c	2 WEEK	2	1	1	1	2	2	1	10	2%
Patient 6c	3 WEEK	2	1	1	1	2	2	1	10	2%
Patient 7c	1 DAY	1	1	1	1	1	1	1	7	1%
Patient 7c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 7c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 7c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 8c	1 DAY	3	2	2	1	3	4	1	16	3%
Patient 8c	1 WEEK	2	1	1	1	2	1	1	9	1%
Patient 8c	2 WEEK	2	1	1	1	2	1	1	9	1%
Patient 8c	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 9f	1 DAY	3	2	1	1	3	1	1	12	2%
Patient 9f	1 WEEK	3	2	1	1	3	1	1	12	2%
Patient 9f	2 WEEK	1	1	1	1	2	1	1	8	1%
Patient 9f	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 10f	1 DAY	3	2	1	1	4	2	1	14	2%
Patient 10f	1 WEEK	2	2	1	1	4	1	1	12	2%
Patient 10f	2 WEEK	1	1	1	1	3	1	1	9	1%
Patient 10f	3 WEEK	1	1	1	1	3	1	1	9	1%
Patient 11c	1 DAY	3	2	1	1	4	4	1	16	3%
Patient 11c	1 WEEK	2	1	1	1	2	2	1	10	2%
Patient 11c	2 WEEK	1	1	1	1	2	1	1	8	1%

Patient 11c	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 12c	1 DAY	3	2	2	1	4	4	2	18	3%
Patient 12c	1 WEEK	3	2	2	1	4	4	1	17	3%
Patient 12c	2 WEEK	2	2	2	1	3	2	1	13	2%
Patient 12c	3 WEEK	2	1	1	1	2	2	1	10	2%
Patient 13c	1 DAY	3	1	1	1	4	4	3	17	3%
Patient 13c	1 WEEK	2	2	1	1	3	2	3	14	2%
Patient 13c	2 WEEK	2	2	1	1	2	2	1	11	2%
Patient 13c	3 WEEK	2	2	1	1	2	2	1	11	2%
Patient 14c	1 DAY	2	1	2	1	4	3	2	15	2%
Patient 14c	1 WEEK	2	1	2	1	2	1	2	11	2%
Patient 14c	2 WEEK	1	1	2	1	2	1	2	10	2%
Patient 14c	3 WEEK	1	1	1	1	2	1	1	8	1%

Table 2: Group 2 patients evaluated by the Glasgow questionnaire.

Thenimal	Date	Category 1st	Category 1B	Category 1C	Category 1D	Category 2A	Category 2B	Category 3	TOTAL	Percentage
Patient 1c	1 DAY	1	1	1	1	1	1	1	7	1%
Patient 1c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 1c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 1c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 2c	1 DAY	2	1	1	2	5	3	3	17	3%
Patient 2c	1 WEEK	2	1	1	1	2	2	1	10	2%
Patient 2c	2 WEEK	1	1	1	1	2	2	1	9	1%
Patient 2c	3 WEEK	1	1	1	1	2	2	1	9	1%
Patient 3c	1 DAY	3	2	3	2	4	4	3	21	3%
Patient 3c	1 WEEK	3	2	3	2	4	4	3	21	3%
Patient 3c	2 WEEK	2	2	2	1	3	3	2	15	2%
Patient 3c	3 WEEK	2	2	1	1	3	2	1	12	2%
Patient 4c	1 DAY	2	1	1	1	2	1	1	9	1%
Patient 4c	1 WEEK	3	2	3	1	4	4	2	19	3%
Patient 4c	2 WEEK	2	2	2	1	3	2	1	13	2%
Patient 4c	3 WEEK	2	2	1	1	2	2	1	11	2%
Patient 5c	1 DAY	3	2	2	1	4	4	3	19	3%
Patient 5c	1 WEEK	3	2	2	1	4	4	3	19	3%
Patient 5c	2 WEEK	2	2	1	1	3	2	1	12	2%
Patient 5c	3 WEEK	2	2	1	1	3	2	1	12	2%
Patient 6c	1 DAY	3	1	1	2	1	3	1	12	2%
Patient 6c	1 WEEK	3	1	1	2	1	3	1	12	2%
Patient 6c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 6c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 7c	1 DAY	3	1	1	2	1	3	1	12	2%
Patient 7c	1 WEEK	3	1	1	2	1	3	1	12	2%
Patient 7c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 7c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 8c	1 DAY	1	1	1	1	1	1	1	7	1%

Patient 8c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 8c	2 WEEK	3	1	3	2	4	3	2	18	3%
Patient 8c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 9c	1 DAY	2	1	1	1	2	3	3	13	2%
Patient 9c	1 WEEK	2	1	1	1	2	3	3	13	2%
Patient 9c	2 WEEK	1	1	1	1	1	3	3	11	2%
Patient 9c	3 WEEK	2	1	1	1	1	1	1	8	1%
Patient 10c	1 DAY	3	1	1	1	2	4	3	15	2%
Patient 10c	1 WEEK	3	1	1	1	2	4	3	15	2%
Patient 10c	2 WEEK	2	1	1	1	2	2	1	10	2%
Patient 10c	3 WEEK	2	1	1	1	2	2	1	10	2%
Patient 11c	1 DAY	1	1	1	1	1	1	1	7	1%
Patient 11c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 11c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 11c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 12c	1 DAY	3	2	3	2	4	3	3	20	3%
Patient 12c	1 WEEK	3	2	2	1	4	2	3	17	3%
Patient 12c	2 WEEK	3	2	1	1	3	2	2	14	2%
Patient 12c	3 WEEK	2	2	1	1	3	1	1	11	2%
Patient 13c	1 DAY	3	2	2	2	4	4	4	21	3%
Patient 13c	1 WEEK	3	2	2	2	4	4	4	21	3%
Patient 13c	2 WEEK	3	2	2	2	4	3	2	18	3%
Patient 13c	3 WEEK	3	2	2	2	4	3	2	18	3%

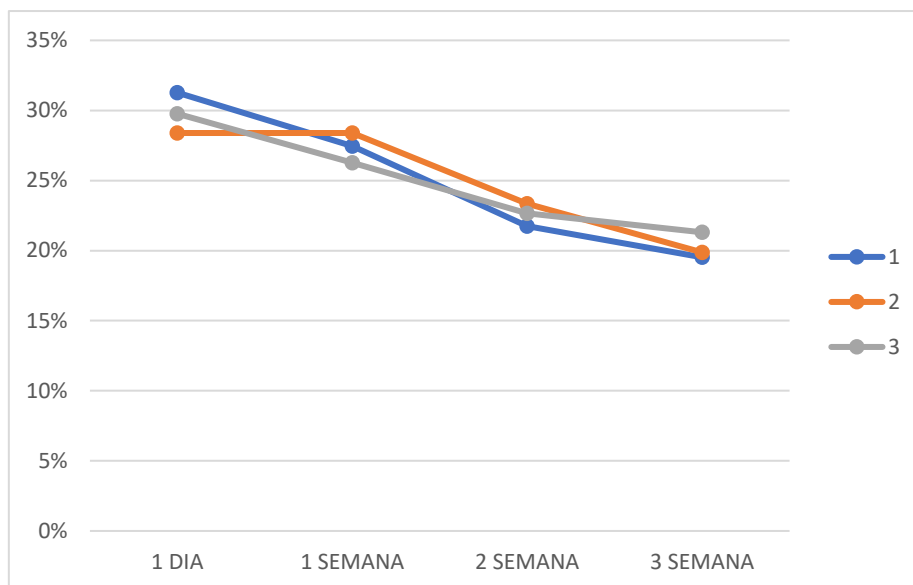
Note 1: c (canines)

Table 3: Group 3 patients evaluated by the Glasgow questionnaire.

Animal	Date	Category 1A	Category 1B	Category 1C	Category 1D	Category 2A	Category 2B	Category 3	TOTAL	Percentage
Patient 1c	1 DAY	3	2	4	1	4	4	2	20	2%
Patient 1c	1 WEEK	3	2	4	1	4	3	2	19	2%
Patient 1c	2 WEEK	2	2	3	1	4	3	2	17	2%
Patient 1c	3 WEEK	2	2	1	1	3	3	1	13	1%
Patient 2c	1 DAY	3	2	2	1	3	4	2	17	2%
Patient 2c	1 WEEK	3	2	2	1	3	4	2	17	2%
Patient 2c	2 WEEK	2	1	1	1	2	2	1	10	1%
Patient 2c	3 WEEK	2	1	1	2	3	1	1	11	1%
Patient 3c	1 DAY	1	1	1	1	1	1	1	7	1%
Patient 3c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 3c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 3c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 4c	1 DAY	3	2	2	1	4	2	2	16	2%
Patient 4c	1 WEEK	2	2	1	1	3	2	1	12	1%
Patient 4c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 4c	3 WEEK	1	1	1	1	1	1	1	7	1%
Patient 5c	1 DAY	3	2	3	1	4	4	2	19	2%
Patient 5c	1 WEEK	3	2	3	1	4	4	2	19	2%

Patient 5c	2 WEEK	3	2	3	1	4	4	2	19	2%
Patient 5c	3 WEEK	3	2	3	1	4	4	2	19	2%
Patient 6c	1 DAY	3	2	3	1	4	4	3	20	2%
Patient 6c	1 WEEK	3	2	3	1	4	4	3	20	2%
Patient 6c	2 WEEK	3	2	3	1	4	4	3	20	2%
Patient 6c	3 WEEK	3	2	3	1	4	4	3	20	2%
Patient 7c	1 DAY	3	2	2	1	4	4	2	18	2%
Patient 7c	1 WEEK	3	2	2	1	4	4	2	18	2%
Patient 7c	2 WEEK	2	2	2	1	3	3	2	15	2%
Patient 7c	3 WEEK	2	1	1	1	3	3	1	12	1%
Patient 8c	1 DAY	3	2	2	2	4	3	2	18	2%
Patient 8c	1 WEEK	3	2	2	2	4	3	2	18	2%
Patient 8c	2 WEEK	3	2	2	2	4	3	2	18	2%
Patient 8c	3 WEEK	3	2	2	2	4	3	2	18	2%
Patient 9c	1 DAY	3	2	2	2	3	4	2	18	2%
Patient 9c	1 WEEK	3	2	2	2	3	4	2	18	2%
Patient 9c	2 WEEK	3	2	2	2	3	4	2	18	2%
Patient 9c	3 WEEK	3	2	2	2	3	4	2	18	2%
Patient 10c	1 DAY	3	2	4	2	4	4	3	22	2%
Patient 10c	1 WEEK	3	2	4	2	4	4	3	22	2%
Patient 10c	2 WEEK	3	2	4	2	4	4	3	22	2%
Patient 10c	3 WEEK	2	2	2	1	4	3	2	16	2%
Patient 11c	1 DAY	3	2	2	2	4	3	2	18	2%
Patient 11c	1 WEEK	3	2	2	2	4	3	2	18	2%
Patient 11c	2 WEEK	1	2	2	1	3	1	1	11	1%
Patient 11c	3 WEEK	1	2	2	1	3	1	1	11	1%
Patient 12c	1 DAY	3	2	1	1	4	4	3	18	2%
Patient 12c	1 WEEK	3	2	1	1	4	4	3	18	2%
Patient 12c	2 WEEK	2	1	1	1	3	1	1	10	1%
Patient 12c	3 WEEK	2	1	1	1	3	1	1	10	1%
Patient 13c	1 DAY	3	2	3	2	4	3	2	19	2%
Patient 13c	1 WEEK	1	1	1	1	2	1	1	8	1%
Patient 13c	2 WEEK	1	1	1	1	2	1	1	8	1%
Patient 13c	3 WEEK	1	1	1	1	2	1	1	8	1%
Patient 14c	1 DAY	3	2	2	1	4	3	2	17	2%
Patient 14c	1 WEEK	1	2	2	1	2	3	1	12	1%
Patient 14c	2 WEEK	1	2	2	1	2	3	1	12	1%
Patient 14c	3 WEEK	1	2	2	1	2	3	1	12	1%
Patient 15c	1 DAY	3	2	2	1	3	4	2	17	2%
Patient 15c	1 WEEK	1	1	1	1	1	1	1	7	1%
Patient 15c	2 WEEK	1	1	1	1	1	1	1	7	1%
Patient 15c	3 WEEK	1	1	1	1	1	1	1	7	1%

Line plot with final results of the Glasgow Assessment.



Line Labels	1	2	3	Grand Total
1 DAY	31%	28%	30%	89%
1 WEEK	27%	28%	26%	82%
2 WEEK	22%	23%	23%	68%
3 WEEK	20%	20%	21%	61%
<b>Grand Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>