Research and Observations on the Interferential Currents Stimulation for the Treatment of Musculoskeletal Pain in Dog

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Abstract. Interferential therapy in fighting acute and chronic pain of the locomotors apparatus is a well-known and explored domain in human medicine, which is why we try putting it in practice and in veterinary medicine. Interferential stimulation (IFS), also known as interferential therapy (IFT), is a type of electrical stimulation that uses paired electrodes of two independent circuits carrying medium-frequency alternating currents, which interfere and produce a low-frequency current, known as the “beat frequency”.

Observations were made on a number of 5 dogs with different locomotor diseases (spondylitis, arthritis, osteoarthritis, bruise). Treatment was performed with the electrotherapy device Med-Mode System Interferenz 3, mark BOSCH, with circular suction electrodes.

After setting the diagnosis and the seat of pain by clinical and paraclinical methods, has been established a therapeutic program for each individual, which has further been modulating depending on the response of each individual part.

Patients haven’t expressed any discomfort conditions during treatment application, and to the skin were not observed any injury due to currents shift. Recovery was good, being a temporary remission of symptoms (after applying the treatment for 1-3 hours) during the first week, for towards the end of the third week to be permanent.

Key words: interferential therapy, pain control, dog.

INTRODUCTION

Stimulation of the body’s natural physiological healing processes with physical methods of treatment is an old therapeutic principle. Interferential stimulation (IFS), also known as interferential therapy (IFT), is a type of electrical stimulation where two slightly different, medium frequency alternating currents are simultaneously applied to the affected area through electrodes. Superposition or interference between the two currents causes the combined electrical current to rise and fall at a slower frequency, often referred to as the "beat" frequency (Low et al., 2000). This method combines the favorable effects and removes the unfavorable ones of those 2 types of currents, low frequency and medium frequency: crosses the skin with greater ease and with less irritation, reaches greater depths and over a larger volume of tissue than other forms of electrotherapy. So, IFT uses the beneficial effects of low frequency currents to a greater depth (G C Goats, 1990).

Physiological and therapeutic effects of interferential currents are expressed by:

- control of pain (“pain gate” theory);
- motor stimulation (muscle contractions production);
- edema and inflammation reduction (by improving the local blood and lymphatic circulation);
- muscular spasms reduction an relief

Therefore, the therapeutic indications of interferential currents are states such as:
- posttraumatic states, bruises injuries (fractures, sprains, luxations, bruises without bone lesions, hematoma);
- joints sufferings (arthritis, periarthritis, arthrosis);
- painful affections of the spine (spondylosis, spondylitis, neuromuscular pain, bruises);
- neuralgia and neuritis;
- paresis sequels of limbs, in remission.

The aim of the study was to work for implementation of the physiotherapy procedures in the treatment of painful diseases of the locomotors apparatus in dog and highlighting the benefits of interferential current therapy in acute and chronic pain release.

MATERIALS AND METHODS

The study was conducted in the Surgery Clinic of the Faculty of Veterinary Medicine from Cluj-Napoca, during 2008-2009, on a number of 5 animals of canina species, which were submitted in consultation with various painful disorders of the locomotors apparatus (Tab. 1).

<table>
<thead>
<tr>
<th>Casuistry taken in the study</th>
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<tr>
<td><strong>Breed</strong></td>
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<td>Labrador</td>
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<td>Metis</td>
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<td>Metis</td>
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<td>German shepherd</td>
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<td>Boxer</td>
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To induce the interferential currents stimulation we used the electrotherapy device Med-Mode System Interferenz 3, mark BOSCH, with circular suction electrodes (Fig. 1). A vacuum suction unit provides the vacuum. The use of suction electrodes adds another form of sensory stimulation to complement that produced by the interferential treatments. The (rhythmically varying) negative pressure produces a “massage-like” effect that gives a state of physical comfort (G C Goats, 1990). The aspiration deep massage reduces the electrical resistance of the tissue, increasing the tissue conductibility of the interferential currents through better liquidity allocation under the electrodes (Radulescu, A., 1991).

For the group of dogs taken in observation, depending on the severity and the nature of injury, we established a protocol of therapy that includes: the site of electrodes application, method establishment, with two or one pair of electrodes, the currents parameters (intensity, frequency, duration) and the number sessions.
Fig. 1. Med-Module System Interferenz 3 electrotherapy device, BOSCH brand.

Depending on the seat of disease is established the electrodes application spot (Millis et al., 2004). Electrodes application spot is prepared by hair cutting and shaving (Fig. 2) in order to perform the vacuum needed for electrodes fastening on the skin.

Fig. 2. The electrodes application spot establishments on the basis of the disease seat.
In the deeper located conditions, covered with large muscle mass, we used the interferential current application with 4 electrodes (Fig. 3), to have an area of greater coverage and to penetrate deeper. Thus, in the two dogs diagnosed with spondylitis, electrodes were placed in the lumbar area, on the one side and the other of the spine, at a distance of approximately 3 cm between them, in a the right angle.

In more superficial conditions, where the musculature is not very rich and does not allow multiple electrodes application, we used the premodulated interferential current implementation through 2 electrodes (Fig. 4). This method involves mixing the two medium frequency currents inside the machine to produce the low frequency output, the “beat frequency”. Thus, in the dog diagnosed with posterior knee arthritis, the electrodes were placed on the medial and lateral sides of the femorotibiopatellar joint, so the articulation to be in the middle of the currents action.

In the case of the 8 years old German Shepard, diagnosed with osteoarthritis, the electrodes were place so as to include both coxofemoral and femorotibiopatellar joint. In this patient we used a combined treatment, conducting sessions with 4 electrodes, respectively 2 electrodes. The same we have done with the dog with multiple bruises syndrome.

Regardless of the method of electrodes application, they must be placed so that the maximum field of currents action includes in the center the lesions of tissues to be treated.

In our case, the parameters used were the following:
- intensity of 6-8 mA;
- frequency of 80-100 Hz;
- duration: sessions of 10 - 15 minutes, depending on the seriousness and the acute or chronic disease evolution.

A meeting itself of electrotherapy involves performing the following steps:
- positioning the electrodes on the skin;
- conducting the vacuum under electrodes by the aerator switch torsion to right until reaching a value of approx. 0.4 kg/m2;
- duration of session setting;
- frequency setting;
- setting the intensity on 0;
- startup the current application;
- increasing the intensity gradually until we reach the fixed intensity, and before the end of the session, reductions slowly, gradually, till 0.
Treatment was performed during 3 weeks, as follows: in the first week one session per day and the 2 weeks following one session at 2 days.

RESULTS AND DISCUSSION

Patients showed no side discomfort during treatment application, and no lesions occurred on the skin (burns or congestion) due to current application. During treatment patients showed a state of comfort due to physical sensation of massage carried out with vacuum electrodes.

At the local level during treatment application, there are mild rhythmic contractions of the muscles due to waves of electrodes with suction vacuum. One of the effects of these contractions is to improve the local circulation that leads to speeding up the processes and the metabolism of local repair and healing.

In the first week after the treatment application, we noticed a gradual remission of the symptoms and a greater mobility of the affected limbs for a short but upward period of time (in the beginning for about 30 minutes - one hour, for during the therapy progress to increase this period).

Towards the end of the two weeks we have seen an increasing remission of symptoms and an improved mobility throughout the limbs concerned. An almost total remission we observed only towards the end of the third week. Indeed, the remission of symptoms and the recovery of the limbs mobility were not total, but we can say with certainty that the quality of life of these animals was much improved.

Using the combination of intensity of 6 mA, frequency of 80-100Hz and sessions of 10 minutes, we had the best analgesic effect. Regarding the intensity, it is known that the intensity under 8mA is used for sensory stimulation, and the intensity over 8mA for motor stimulation.

CONCLUSIONS

After conducting the first study on the electrotherapy with interferential currents effect in the patients with various painful conditions of the locomotor’s apparatus recovery, we reached several key conclusions:

- electrotherapy is a non-pharmacological and non-invasive treatment of various painful conditions of soft and hard tissues of the locomotive, and not only;
- the electrotherapy variant with interferential currents is advantageous because it can handle very deep areas with very little damage to the skin;
- interferential currents application with vacuum electrodes is preferably at least for 2 reasons: - gives a feeling of physical comfort through the massage performed; - reduces the electrical skin resistance;
- interferential therapy gives good results in treating various painful conditions, but for best results it should be associated with the administration of small doses of anti-inflammatory drugs.

REFERENCES


