MATERIAL

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ZOOM

COMPRESSIVE CRYOTHERAPY

A PRIME CHOICE FOR STIFLE JOINT SURGERY IN DOGS ?

After stifle joint surgery, cryo-compressive splints can help with early functional recovery. These devices combine two simultaneous actions which are particularly indicated in the postoperative period: cold and compression. There are already widely used in humans to improve analgesia and postoperative recovery, and they are now available and adapted for the canine stifle joint.

Clinical benefits of compressive cryotherapy

The therapeutic effects of cold have long been known and widely accepted in the management of musculoskeletal injuries, whether traumatic or post-surgery. Indeed, in the aphorisms of Hippocrates (460-370 BC), the use of ice or snow was already recommended to reduce swelling and pain (1).

Cryotherapy has analgesic, anti-inflammatory, anti-edematous and muscle relaxant effects. When cold is applied locally, a decrease in skin temperature (but no decrease in core temperature), intramuscular and intra-articular temperature is observed. This local hypothermia leads to a decrease in the metabolic activity of the surrounding tissues, associated with venous and arterial vasoconstriction. This results in a lower inflammatory reaction, linked to the reduction of enzyme activity, production of chemical mediators and cellular metabolism. This anti-inflammatory effect promotes cell survival, reduces secondary hypoxic lesions and decreases vascular permeability. This decrease in vascular permeability and the cold-induced vasoconstriction limit the formation of post-traumatic edemas. Finally, the analgesic effect of cryotherapy, partly related to the reduction of edemas, is also due to the reduced excitability of nociceptors and to nerve conduction velocity. This analgesia seems to appear when the skin temperature reaches approximately 10 to 15°C and stays so 15 to 30 minutes after application (2-5).

During local compression, a decrease in blood flow and edema is also observed. These effects work synergistically with cryotherapy. Indeed, the combined actions of compression and cold accelerate, accentuate and favor the penetration of the local temperature decrease while encouraging lymphatic drainage. Compression also improves the conformation of the splint around the anatomical area of interest, thus ensuring a better distribution of cold and a better maintenance of the splint (3,5).

The place of compressive cryotherapy

Indications for compressive cryotherapy are mainly acute post-traumatic injuries: sprain, muscle straining, dislocation, fracture, hematoma, ecchymosis, edema, as well as immediate post-operative care. In humans, the use of compressive cryotherapy still remains rather empirical. However, many studies show that its use following musculoskeletal trauma or in postoperative care significantly improves functional recovery and seems more effective than the simple application of an ice bladder. These effects are particularly significant after knee surgery, such as cranial cruciate ligament repair or total knee prosthesis.
A decrease in postoperative pain, in the use of analgesics and an improved range of motion are widely noted. In some studies, these benefits were observed up to one month postoperatively (2,3,5-7).

The optimal parameters for the use of compressive therapy are still controversial. However, it is clearly accepted that immediate application, i.e. as close as possible to the trauma, is preferable and that it should be limited to the inflammatory phase, i.e. the first 3 to 5 days.

The contraindications of cryotherapy are rare and scarcely reported in veterinary medicine. In humans, we are aware of the following: skin sensitivity disorders, allergies to the cold, Raynaud syndrome, cryoglobulinemia, diabetes and metabolic diseases (risk of skin lesions on fragile skin).

Practical use of compressive cryotherapy in veterinary medicine

While compressive cryotherapy is interesting for the management of all musculoskeletal traumas, it is particularly indicated in the immediate post-operative period. The splint which is currently available in veterinary medicine is perfectly adapted to the conformation of the canine stifle joint and is therefore ideally used in the post-operative stabilization of a ruptured cranial cruciate ligament. It consists of a cryopack and can be inflated using a pressure bulb (Figure 1). The splint is currently available in three sizes, either left-sided or right-sided. It is therefore possible to treat all patients between 15 and 50kg. Other sizes are to come, to complete the existing range. They are available for sale at Novetech Surgery® via Alcyon.

Figure 1: Cryo-compressive splint specific to the canine stifle joint. It consists of a cryopack and can be inflated using a pressure bulb.

To be as effective as possible, the splint should be applied immediately after the procedure is completed, before the animal wakes up (Figure 2). It should be used during the first 4 to 5 days postoperatively, at a rate of 3 to 4 daily sessions of about 20 minutes each. The tolerance and effectiveness of the device seem to be satisfactory (Figure 3). The main risk of cryotherapy is the appearance of skin lesions from overly prolonged or unprotected application. Direct skin-to-cryogen contact should therefore be avoided and application should be limited to approximately 20 minutes, while monitoring the area.

Figure 2: Placement of a cryo-compressive splint in the immediate post-operative period of stifle joint surgery

Compressive cryotherapy is very interesting in postoperative pain management. The development of a specific canine splint should make it easier to use and thus improve the post-operative management of our animals.

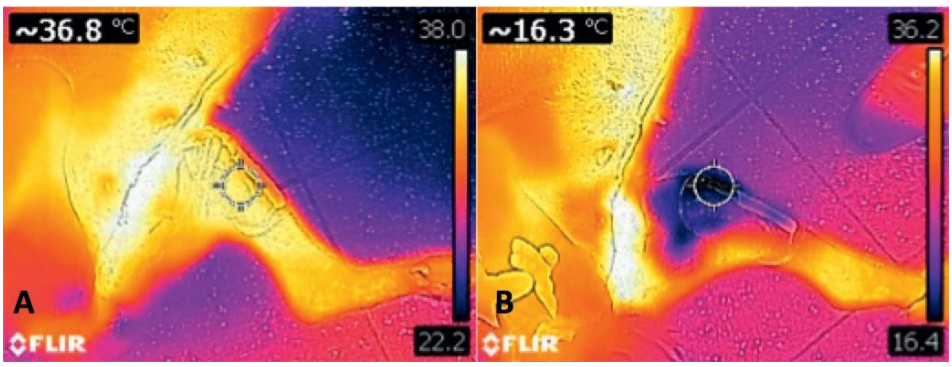

Figure 3: Thermal imaging of a canine stifle joint before (A) and after ten minutes (B) of cryo-compressive splint application. Local skin temperature dropped from 36.8°C to 16.3°C.

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CRYOTHERAPY BRACE WITH COMPRESSION SYSTEM

ITEMS	WEIGHT RANGE	DESCRIPTION	CODE
Small size - Right	15 – 25 kg	Height: 26 cm Circumference: 29 cm	AC-GDS01
Small size - Left			AC-GGS01
Medium size - Right	25 – 35 kg	Height: 28 cm Circumference: 31 cm	AC-GDM01
Medium size - Left			AC-GGM01
Large size - Right	35-50 kg	Height: 30 cm Circumference: 35 cm	AC-GDL01
Large size - Left			AC-GGL01