

A special advertising section

Photobiomodulation and athletic performance

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Canine sports, which continue to grow in popularity, range from traditional sports, such as obedience and agility, to newer sports, such as barn hunts and triball. Studies have demonstrated that photobiomodulation therapy (PBMT) is an essential component in preventing injuries (Ribeiro et al, 2015), maintaining the highest level of performance possible (Levine et al, 2015) and providing a higher quality of life. It also is a key component in treating injuries and accelerating the healing process of many musculoskeletal injuries.

In addition, PBMT provides a high level of available energy, accelerated gains in conditioning and strength, and a faster recovery after athletic performance. Integrating PBMT into a sports and conditioning program is, therefore, a no-brainer. It can allow a more effective training and strengthening program, as well as a more comfortable and efficient canine athlete. The goal with every dog is to live the best quality of life for the longest time possible. Canine athletes deserve this just as much as any other dog. Optimum performance, prevention of injuries and the acceleration of healing are the goals, which may be combined nicely with PMBT.

PBMT targets the mitochondria or “energy centers” of the individual cells. Skeletal muscle is rich in mitochondria, and when stimulated, there is an increase in metabolic rate. PBMT will, therefore, assist in the athletic performance by facilitating muscle repair, decreasing muscle fatigue and reducing the oxidative stress. All of this assists in injury reduction (Avni et al., 2005). PMBT also has been effective in reducing inflammation on many levels (Bortone et al., 2008). The combination of these facts and more has led researchers to study the effect of laser therapy on both humans and animals after exercise and after activity. Studies have demonstrated conclusive evidence of PBMT reducing the inflammation and accelerating muscle repair with the proper laser parameters (Liu et al., 2009; Levine et al., 2015; Assis et al., 2015). When PBMT is applied during the recovery stage of exercise, it will reduce the inflammation and accelerate healing, which, in turn, will accelerate the training process and maintain optimal performance levels in the canine athlete (de Marchi et al., 2012).

It seems rather simple—the process of applying PBMT will assist the quality of the canine athlete’s performance. In turn, this will assist the dog with living the best quality of life for the longest time possible. Understanding canine sports is the first step in appropriate treatment. Each sport may be broken down into strength, endurance or a combination of events.

Endurance events consist of events longer than 20 minutes; examples include sled dog racing, hunting and field trials. With endurance events, the goal will be to assist in the prevention of fatigue. Recent studies have demonstrated scientific evidence that PBMT is effective in preventing the development of skeletal muscle fatigue, enhancing recovery and maintaining performance (Ferraresi et al. 2012, Ribeiro et al 2015). Many injuries occur secondary to fatigue, especially in the canine athlete. It is often difficult to “tell” a dog to stop when they are having fun running around. And many owners do not fully understand when a dog is becoming fatigued. The addition of PBMT to an endurance athlete’s program allows an increase in the ability of the muscle to function at an efficient level for longer



Photobiomodulation therapy applied to the shoulder extensors and hip flexors to prepare for whippet racing. Sighthounds use their shoulder extensors and hip flexors (and extensors) to propel their bodies forward.

periods.

Strength or intensity events consist of short anaerobic activities. Agility, flyball and short races are examples of strength and intensity events. PBMT applied directly to the specific muscles prior to the activity can enhance performance and decrease the rate of fatigue by increasing the available production of adenosine triphosphate (ATP). This again will take an understanding of the individual sport to determine which muscles will be the most active in strength and intensity events. Very often, the shoulder extensors, hip extensors and elbow extensors will be the most active. However, the hip and shoulder flexors, hip adductors and shoulder adductors also may be very active.

The repair of muscle damage is significant in canine performance. Whether it is a significant gracilis tear or a minor medial shoulder movement, the application of PBMT may accelerate the healing process. The sooner PBMT is applied, the sooner the tissue may move through the six phases of healing, go through physical rehabilitation and return the canine athlete to the prior level of function.

Performance enhancement is always a goal of every athlete, regardless of species. Ferraresi et al (2011) examined 33 male athletes performing a load-bearing strengthening exercise for 12 weeks. The athletes were divided into a control group, a training group and a training group receiving PBMT to the quadriceps immediately following the activity. The group receiving PBMT had a 55 percent increase in muscle performance measured by isokinetic dynamometry. This was the only group that had an increase in muscle mass. While the numbers are low and it was applied to human athletes, we can ponder the potential possibilities in the canine world. Other studies have demonstrated increases in strength with the application of PBMT in the rotator cuff.

The application of PBMT begins with understanding

what muscles are the most active during the canine sport. Also, a contact method is best to take advantage of the effleurage and pressure of the laser’s treatment head. The goal of the PBMT will be to increase blood flow, prepare the body for exercise, increase ATP levels, increase the flow of nutrients to the muscles and decrease any inflammation that may be present. A specific dose of PBMT prior to exercise may vary from 2 to 8 Joules/cm²*. Examining the sport the dog is participating in will assist with the specific muscles and regions to apply the PBMT. For example, in sports such as agility and flyball, a 22-kilogram border collie’s shoulder adductors are approximately 140cm² and the hip adductors are approximately 240cm². An application of 2 to 4 Joules/cm² will be approximately 220 to 480 Joules to the shoulder and 480 to 960 Joules to the hip. This should be applied 20 to 30 minutes prior to the activity and should be sufficient for a day of exercise. Of course, proper warm up, cool down and conditioning is also essential.

There are many examples of how PBMT may be utilized in the canine sports environment. The benefits available are significant and more will be realized in the growing fields of both canine sports medicine as well as PBMT. ●

*Note: The author has had success treating with the dosages recommended in this article. Some musculoskeletal conditions may require higher dosing.

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