Effects of Cryotherapy on Body Performance

The use of cold therapy to relieve pain and inflammation associated with sports injuries and overuse has been practiced for centuries in different parts of the world. However, in the year 1981, Yamauchi et al. introduced a form of whole body cold-exposure, also referred to as wholebody cryotherapy (WBC) that aims to treat rheumatic diseases. With WBC's noteworthy benefits, it gradually becomes an accepted practice in some parts of the world, not only to facilitate recovery among athletes, but also to improve overall organ function and body performance. In fact, several studies were conducted to determine the benefits of WBC in supporting different organ systems such as the circulatory, respiratory and immune systems (Wasteland, 2009).

Exposure to cold temperature is known to facilitate vasoconstriction. However, prolonged exposure, usually after 30 minutes of cold therapy, may lead to reflex vasodilation (Lippincott Williams & Wilkins, 2009). Moreover, it also stimulates the sympathetic nervous system (SNS), which causes peripheral vasoconstriction and restricts blood to central circulation (Janský & Janský, 2002). Hence, cryotherapy, which utilizes extreme temperatures, can exhibit these effects resulting to better tissue and or ganper fusion that will help meet the oxygen demands of the cells, thereby, facilitating regeneration and healing.

On the other hand, another effect of cryotherapy that shows potential benefit on an individual's well-being is its positive effect on mental health related to hypothalamic-pituitary axis and monoamine regulation, increased β-endorphin levels, hippocampal brain-derived neurotrophic factor normalization, and improved perceptions of self-efficacy (Rymaszewska, Ramsey, & Chładzińska-Kiejna, 2008). This premise was supported by a study published in Psychology, Health and Medicine Journal, which showed that ten sessions of WBC can lead to a significant improvement in mood, in terms of both psychological and somatic aspects. Furthermore, it was also noted that improvement was more pronounced in patients with worse mental state prior to the commencement of WBC, particularly among women and patients with spinal pains and severe depressive symptoms (Szczepańska-Gieracha, Borsuk, Pawik, & Rymaszewska, 2014).

In addition, cryotherapy is widely used in sports medicine and rehabilitation to facilitate recovery and improve performance among athletes. In a study conducted in San Francisco State University that aims to determine the effect of interval cryotherapy in decreasing fatigue during repeated weight lifting, results have shown that exposure to cold temperature in between weight-pulling can significantly increase the number Of total joules and arm pulls. Furthermore, the study also supported the hypothesis that cryotherapy can improve work, velocity and power, as it delays the onset of fatigue (Verducci, 2000).

Aside from those mentioned above, WBC also shows potential benefits on an individual's immune system by altering the antioxidant concentration in the body. In this regard, Dugué et al. embarked on a study that focused on the effects of 12 - week regular exposure to WBC on peroxyl radical trapping antioxidant capacity of plasma (TRAP) among healthy women. Researchers found out that WBC resulted to a mild increase in TRAP (< 5%) which can be associated with improved antioxidant protection (Dugué, et al., 2009). Moreover, according to Stanek et al., a series of ten sessions of 2-min long cryostimulations at -120°C in healthy individuals can increase the level of monocytes (Stanek, et al., 2006). Furthermore, a research paper published in the European Journal of Applied Physiology supported the premise that ten sessions of 3-min-long exposures to cryogenic temperature(-130°C)has the potential to boost the immune system. In fact, the results showed that the level of IL6 and white blood count, specifically lymphocytes and monocytes, significantly increased after cryostimulation (Lubkowska, Szygula, Klimek, & Torii, 2010). These natural killer cells act as the body's primary defense once bacteria and viruses invade the body. Hence, an increase in the level of

Both lymphocytes and monocytes will support an individual's immune system in fighting disease-causing microorganisms (Higuera, 2016).

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