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Whole Body Cryotherapy vs. Cold Water Immersion

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Abstract

In this study, a significant percentage of the population present to clinics with generalized musculoskeletal disorders related to pain. More than one-quarter of Americans (26%) age 20 years and over, or an estimated 58 million adults, suffer from such ailments. This is largely owing to the lack of understanding regarding the mechanisms through which cryotherapy affects recovery from high intensity exercise (Gregson et al. 2011, 2012). This is largely owing to the fact that whole body cryotherapy (WBCt) versus cold water immersion (CFI) has shown that WBCt can provide a form of relief that does not require systemic absorption and breakdown to provide analgesia, we can help to preserve the patient’s liver and kidney function.

Statement of the Problem

An increase in the use and dependency on anti-inflammatory agents and opioid analgesics results in an increase in systemic absorption and breakdown of these medications putting stress on the patient’s liver and kidney function. If we can provide a form of relief that does not require systemic absorption and breakdown to provide analgesia, we can help to preserve the patient’s liver and kidney function.

Research Question

In patients with generalized musculoskeletal disorders related to pain, is there a significant difference in the efficacy of treatment between whole body cryotherapy (WBCt) versus cold water immersion (CFI)?

Literature Review

Current literature shows that the physiological effects of cold therapy include reductions in pain, inflammation, edema, blood flow, and muscle damage. Since whole body cryotherapy (WBCt) and cold water immersion (CFI) both serve to produce these effects, although in a completely different manner, it would seem that one or the other might be a more effective treatment for musculoskeletal disorders related to these symptoms. In order to determine which modality provides the better relief of symptoms an electronic medical database search was conducted through PubMed, Clinical Key, and the Cochrane Library. The focus of this literature review is to examine studies that placed the participants under various forms of musculoskeletal stress that would induce symptoms of pain, inflammation, edema, blood flow, and muscle spasm and then were treated with either CFI or WBCt.

Tissue Response

Despite the many forms of cryotherapy used to this end, WBCt is the most popular in the literature (Blewakley et al. 2012). Several studies have investigated and reviewed the effects of WBCt for reducing soreness and speeding the recovery of force-generating capacity. Additionally, a wide variety of stresses following stressful bouts of exercise. (Bleakley et al. 2012; Leeder et al. 2012). However, evidence regarding the efficacy of CFI, and cryotherapy in general, to speed recovery remains equivocal. Many reviews have concluded that the high cost, time consuming, and exhausting exercise insult, cold protocol and performance outcomes are responsible for the current lack of agreement in the literature. (Bleakley et al. 2012; Leeder et al. 2012)

Discussion

The majority of applied studies using cryotherapy for recovery from exercise cite its effectiveness as a by-product of its ability to blunt inflammation through reducing local metabolism and inducing vasoconstriction. Although metabolic rate and blood flow seem to be reliably affected by cold, studies have yet to investigate a dose-dependence of cold on inflammation. Such a variety of methodological approaches to studying cold presents a challenge to drawing reasonable conclusions from a mechanistic point of view.

Lack of temperature data in addition to the wide variety of exercise stress protocols used to study cryotherapy for recovery has resulted in general disagreement with respect to what types of exercise might benefit from cryotherapy and which method of cryotherapy may be the most appropriate. As different types of exercise induce different stress responses, the recovery necessary to attain a pre-exercise state is different. This must be considered in future studies as cold is not likely to affect recovery from all types of exercise uniformly and thus may not be appropriate for all types of exercise.

Although changes in local metabolism, blood flow and edema and systemic changes in cardiovascular, neurovascular and endocrine function are altered by cryotherapy following stressful exercise, few studies concomitantly study these physiological responses speculated to be mechanistic in the recovery effect of cryotherapy and inflammatory and/or functional outcomes. Thus, although these physiological changes are induced by lowering tissue temperature and may have a role in facilitating recovery from some types of exercise, studies investigating the mechanisms concomitant with functional outcomes need to be undertaken to determine whether cryotherapy has an effect greater than simply a placebo or subjective improvement in recovery.

Applicability to PA Practice

In summary, as WBCt incurs significant costs, further research examining the underlying mechanisms and the effects of the treatment on performance recovery following strenuous exercise is warranted. Practitioners are advised that current treatment protocols are based on anecdotal evidence and there is as yet little evidence supporting its efficacy as a modality of recovery. More studies are needed to quantify whether WBCt is an appropriate treatment option to prescribe an ice bath or cryotherapy, there are some considerations. Ice baths are more uncomfortable than WBCt. You will need to sit in the ice bath longer to achieve the same effect since the water temperature is warmer than WBCt’s sessions. (Blewakley et al. 2014)

In contrast, cryotherapy uses very dry, cold air for a much shorter time so subjects do not report much discomfort at all. After WBCt, subjects do not report the joint stiffness typically seen after an ice bath. (Blewakley et al. 2014) However, ice baths are much less expensive; WBCt sessions can range from $55 – $75 per session. A common thread throughout this research is that cold therapy, either CFI or WBCt, does have a positive effect on the perception of recovery. That would make this a viable alternative to the use and dependency on anti-inflammatory agents and opioid analgesics for the treatment of musculoskeletal disorders related to pain. This research has shown that WBCt can provide a form of relief that does not require systemic absorption and breakdown to provide relief, and that we can help to preserve the patient’s liver and kidney function throughout their lifespan.

References


Whole Body Cryotherapy vs. Cold Water Immersion

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Abstract

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