

## THE EFFECTIVENESS OF COLD WATER IMMERSION ON RECOVERY FROM FOOTBALL

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There has been a marked increase in the focus on recovery in recent years. This presentation focus on 5 main themes: 1) muscle damage and fatigue in football; 2) the evidence base behind the effectiveness of Cold Water Immersion (CWI); 3) potential mechanisms of CWI; 4) practical applications, and 5) potential contraindications of CWI.

### **Muscle damage and fatigue in football**

In the days following intermittent sprint sport, such as football, there is a marked reduction in muscle function and increase in perception of muscle soreness. Research measuring recovery following a football match has identified the time course recovery responses of a number of physiological markers (1).

For example countermovement jump remained 4% lower than baseline 69 h after a match. This deterioration in muscle function, coupled with the considerable number of competitions per year for competitive players, provides strong rationale to attempt to attenuate the deleterious effects of exercise-induced muscle damage following football matches.

### **Evidence base behind the effectiveness CWI**

There has been significant attention in both applied practice and research to identify optimal recovery strategies from repeated sprint exercise. With the aim to improve the rate of recovery from football matches, CWI techniques have become particularly popular.

A recent meta-analysis (3) of CWI strategies (included 14 studies and  $n=239$ ) indicated that CWI had no effect on recovery of muscle strength (Hedges'  $g=0.134$ ;  $P=0.133$ ), but was effective at reducing delayed-onset muscle soreness (Hedges'  $g=0.525$ ;  $P<0.001$ ).

### **Potential mechanisms of CWI**

The mechanisms of CWI remain elusive; however recent data identifying the dynamics of tissue temperature and blood flow alterations have provided insightful data regarding optimising CWI protocols (Gregson et al, Am J Sports Med 2011; 39: 1316-1323).

The role of the placebo effect is emerging as a key mechanism of CWI, with research from Cook and Beaven (2) suggesting that a combination of prior athlete belief in the effectiveness of CWI and core temperature change being key factors.

**Practical applications of CWI**

Following a review of all available literature, and practical experience in the applied field, the current consensus of optimal protocols is suggested to be 10-15°, for 10-15 minutes, in a standing position, immediately post-exercise.

However it must be stated that use of CWI is only likely to be effective if sleep, rest and nutrition are optimised.

**Potential contraindications of CWI**

Anecdotal observations suggest that many athletes use recovery strategies on a long term basis, for example after every training session throughout a competitive season. The long term utilisation of recovery strategies is poorly understood, especially in relation to the effects on training adaptation.

Recent research has suggested that CWI may blunt long term adaptation to training, however further evidence is required to substantiate these claims in elite athletes.

**References**

1. Andersson H, Raastad T, Nilsson J, Paulsen G, Garthe I, Kadi F. Neuromuscular fatigue and recovery in elite female soccer: effects of active recovery. *Med Sci Sports Exerc* 2008; 40(2): 372-380
2. Cook CJ, Beaven CM. Individual perception of recovery is related to subsequent sprint performance. *Br J Sports Med* 2013; 47(11): 705-709
3. Leeder J, Gissane C, van Someren K, Gregson W, Howatson G. Cold water immersion and recovery from strenuous exercise: a meta-analysis. *Br J Sports Med* 2012; 46(4): 233-340