

**UNIVERSITI TEKNOLOGI MARA**

**EFFECTS OF COLD WATER IMMERSION AND  
CONTRAST WATER THERAPY ON MARKERS OF  
EXERCISE INDUCED MUSCLE DAMAGE AMONG  
SOCCER PLAYER**

**YUSRE ZULHAILE BIN ZAINUDDIN**

**2015418162**

Research Project submitted in partial fulfillment  
of the requirements for the degree of  
bachelor of sport Science (Hons.)

**Faculty of Sports Science and Recreation**

JULY 2017

## AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and the result is fully on my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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Name of Student : Yusre Zulhaile bin Zainuddin

Student I.D. No : 2015418162

Programme : Bachelor of Sports Science (Hons.)

Faculty : Sports Science & Recreation

Thesis/Dissertation Title : Effects of Cold water immersion and Contrast Water Therapy on Markers of Exercise Induced Muscle Damage Among Soccer Player.

Signature of Students : .....

Date : July 2017

**ABSTRACT**

The study that compare the effect of cold water immersion (CWI) and contrast water therapy (CWT) on markers of exercise induced muscle damage after repetitive match among soccer players were lack and not clearly discussed in previous literature. The purpose of this study was to compare the effect of cold water immersion and contrast water therapy on markers of exercise induced muscle damage after match among Johor Darul Ta'azim (JDT 3) soccer players. There was 9 participants and they were assigned into both groups CWI (n=9) and CWT (n=9). Participants were under gone in 90 minutes of soccer match to induce the symptoms of muscle damage. For cold water immersion (CWI) groups, the participants immersed their lower body 15 minutes in a cold water (15°C) immersions while the contrast water therapy (CWT) groups alternating 2 min immersions in tanks of cold (15°C) or warm/hot water (40°C), repeated three times (30s transfer time). The participant's ROM, pain scale and creatine kinase were recorded at three times periods which were immediately after match, 24 hours and 48 hours after match. The results were determined by using Repeated Measure ANOVA to show the main effect which the result showed significant effect ( $p = 0.00$ ) on ROM. The difference effect between the therapies were determined by using Mixed Between-Within ANOVA and showed the result show no significant ( $p = 0.580$ ) and suggested that CWT slightly an effective therapy compared to CWI based on the mean score (CWI=113.963) and (CWT=111.333). For the pain scale, the value for main effect was significant ( $p = 0.00$ ) and the difference effect were also significant ( $p = 0.002$ ) and proposed that CWI score were better than CWT based on the mean score (CWI=3.778) and (CWT=5.333). For the creatine kinase, the value for main effect was significant ( $p = 0.00$ ) and the difference effect were also significant ( $p = 0.019$ ) and proved that CWT score was better than CWI based on the mean score (CWT=325.704) and (CWI=425.444). Based on the result it showed that CWT was the best and more effective compare to CWI therapy for recovery among soccer players.

Keyword: *cold water immersion (CWI), contrast water therapy (CWT), exercise induced muscle damage (EIMD), range of motion (ROM), pain scale (PS), creatine kinase (CK).*

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