The immediate effects of two muscle energy techniques on quadriceps muscle during vertical jumps: A pilot Study

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BACKGROUND Human locomotion is composed of muscle contraction that is usually typified by a combination of eccentric-lengthening followed immediately by a concentric-shorten contraction thus termed a stretch-shorten cycle (SSC). Connective tissue is also involved due to its elastic recoil properties in SSC. The comparison of squat jump (SJ) to the countermovement jump (CMJ) provides an indication of SSC potentiation of the individual.(1)
In literature there is an indication that Osteopathic Manipulative Technic (OMT) (i.e. structural manipulation) could improve human biomechanics, especially Muscle Energy Techniques (MET). Due to the specific characteristics of MET,it may potentiate myofascial function (2).
The aim of this study is to determine the effect of two different Muscle Energy Techniques (MET) on vertical Jump performance and utilisation of elastic energy.

METHODS Samples were randomly selected from a population of rugby players: They were divided randomly into 3 different groups: an experimental group A (N=10) receiving an isometric MET (IMET) on quadriceps muscle (QM), an experimental group B (N=10) receiving an isotonic concentric MET (CMET) on QM and a placebo group (N=10). The Squat Jump (SJ) and Counter Mouvement Jump (CMJ) were assessed before and after treatment using an Optojump Microgate.
Measurements of height jumped (HJ), Direct Comparison between SJ and CMJ height (DC), Eccentric Utilisation Ratio (EUR) and Percentage of pre-stretch activation (PPSA) were obtained from these jumps.

RESULTS Paired T-Test analysis indicated that IMET had a positive effect performance on SJ (+4.76%, $p < 0.05$) and CMET on CMJ (+6.14%, $p < 0.05$).
IMET has significant negative impact ($p < 0.05$) on DC (-1,5) , EUR (-0,05) and PPSA (-5,85%)
CMET has significant positive impact ($p < 0.05$) on DC (+1,31), EUR (+0,05) and PPSA (+4,53%)
No statistical differences have been found in the placebo group.

CONCLUSIONS The study suggests CMET on QM is the most appropriate technique to potentiate height jump performance and SSC function in CMJ. This enhancement of SSC is probably due to a better storage and utilization of elastic energy stored in the myofascial components during CMJ.
Changes in viscoelasticity and stiffness could lead to increased recoil capacity.
To compliment this study other type of athletes should be investigated as well as the use of other assessment tools such as surface electromyography (e.g. real –time control).
CMET may be applied as on-site treatment. This technique does not appear to alter muscle performance.

REFERENCES

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All authors hereby declare that this experiment have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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