

THE NEUROMUSCULARELECTRICAL NERVE STIMULATION (NMES) EFFECTS ON ATLETE'S PHYSICAL PERFORMANCE OF PENCAK SILAT

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SUMMARY

Background

One of the key to successful of coaching athletes are include development of physical and mental in competition. The development of physical consits of endurance abilities, muscle strength, velocity or speed, explosive muscle, agility, flexibility and also balance. The importance of the function of muscle strength in the sport among athletes are to enhance performance and prevent any risk of injury associated with the competition in a game. In Indonesia, NMES has long been used to supplement voluntary muscle contraction in many rehabilitation setting, for example muscle strengthening, maintanance muscle mass and strength during immobilitation. But there is not know whether NMES can be used to increase muscle strength on competitive athletes in sport.

Purpose

To investigate of a 4-weeks NMES training program between two methods; muscle group method and nerve trunk one on the athlete physical performance of pencak silat.

Method

Quasy experiment with pre and post test without control group design. The applications of NMES sessions were carried out 3 times weekly; each sessions consisted of 10 minutes electrical stimulation. Testing was carried out before and after the NMES training program. Data Analysis by SPSS V 16.00 for windows. Handgrip dinamometer and leg dinamometer was used as instrument.

Results

After 4 weeks, there were improvements on athlete physical performance of pencak silat. The improvement on group muscle method consisted of 1) arm muscle power, 2) tigh muscle power, 3)hand-eye coordination, 4) sutle run velocity. While the improvement on nerve trunk method's group consisted of; 1) arm muscle strength, 2) arm power, 3)hand-eye coordination, 4)foot-eye coordination. NMES can induce motor unit recruitment by non selective so that there is increasing the sum of motor unit recruitment when muscle actively contrax. NMES can activate fast motor units at low force levels. It can improve muscle strength, but final results differ according to the muscle status. For healthy muscle NMES is effective but not more than voluntary training. For impaired muscle, NMES can be more effective than voluntary training. For athetes, NMES is effective for increasing general not necessarily specific strength. The performance of complex movements requiring high levels of neuromuscular coordination can only be obtained if NMES is used in conjunction with voluntary exercise.

Conclusions

NMES has been confirmed to be an important complement to conventioanal strength training programs for enhancement of athletic performance. NMES can also be applied in

conjunction with sport-specific training in annual periodic training programs. There was not differences effect between group muscle method and nerve trunk method.

RINGKASAN

PENERAPAN NEUROMUSKULAR ELECTRICAL STIMULATION (NMES) PADA LATIHAN PENCAK SILAT TERHADAP PENINGKATAN KINERJA PADA ATLET PPLP DAN PPLM PENCAK SILAT JAWA TENGAH

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Latar Belakang

Salah satu kunci sukses dalam pembinaan atlet olahraga adalah pengembangan kemampuan fisik dan mental dalam menghadapi kompetisi. Pengembangan kemampuan fisik termasuk di dalamnya kemampuan daya tahan, kekuatan, daya ledak otot, kecepatan, kelincahan, dan keseimbangan. Hal ini penting dilakukan disamping untuk meningkatkan kinerja atlet namun juga untuk mencegah cedera dalam pertandingan. Di Indonesia, pemanfaatan rangsangan listrik untuk meningkatkan kekuatan otot, memelihara sifat fisiologis otot selama masa immobilisasi sudah sering dilakukan pada pasien di berbagai klinik rehabilitasi. Namun pemanfaatan rangsangan listrik di dunia keolahragaan belum nampak.

Tujuan

Penelitian ini bertujuan untuk mengetahui pengaruh penerapan stimulasi elektrik NMES pada peningkatan kinerja atlet pencak silat.

Metode

Penelitian menggunakan metode *Quasi Experiment*. Pengolahan data pada penelitian ini menggunakan program SPSS Windows versi 16.0 Analisis data dengan uji *Wilcoxon* dan uji *Mann Whitney*. Hasil perlakuan dan kaitan pengaruhnya diketahui dengan menguji perbedaan inter dan antar kelompok.

Hasil

Penemuan utama dari penelitian ini menunjukkan bahwa pemberian neuromuskular electrical stimulation (NMES) selama 4 minggu dengan frekuensi 3 kali per minggu mendampingi latihan rutin atlet pencak silat yang dilakukan dengan metode grup otot mampu meningkatkan kinerja atlet secara signifikan berupa: 1) daya ledak lengan; 2) daya ledak tungkai; 3) koordinasi mata-tangan; 4) kecepatan shuttle run, kecuali pada variabel kekuatan lengan, kekuatan tungkai dan koordinasi mata-kaki. Sedangkan pemberian NMES dengan metode nerve trunk mampu meningkatkan kinerja atlet secara signifikan berupa: 1) kekuatan otot lengan; 2) power lengan; 3) koordinasi mata-tangan; 4) koordinasi mata-kaki, kecuali pada kekuatan tungkai, daya ledak tungkai dan kecepatan shuttle run.

Kesimpulan: Pemberian Neuromuskular electrical stimulasi (NMES) mendampingi latihan rutin pada atlet pencak silat dengan metode grup otot maupun dengan metode nerve trunk terbukti secara bermakna mampu meningkatkan kinerja atlet pencak silat. Tidak terdapat perbedaan yang bermakna diantara dua model pemberian NMES dengan metode grup otot maupun nerve trunk