Volumen XVIII
Número 85
2001
Págs. 554-556

ARCHIVOS DE MEDICINA DEL DEPORTE

METABOLIC CLASSIFICATION AND INDIVIDUAL ANAEROBIC THRESHOLD IN THE FREE CLIMBING, BIG WALL AND HIGH MOUNTAINS-CLIMBERS

Presentation: Jorge Egocheaga (Spain).

Mountaineering has been classified at a metabolic point of view like an aerobic characteristic sport. However, this sport includes some activities (Big Wall, Himalayan climbs) in which we think that the anaerobic metabolism plays a fundamental role in the mechanism to obtain energy. On the other hand, there are several activities that in last years have been incorporated to the Mountaineering, like the Free Climbing in which competition takes part of the habitual development in carrying out the activity, and the athletes control begins to be indispensable. Our work hypothesis is centralised in demonstrate the importance of the anaerobic metabolism on a relevant mechanism in the process to obtain energy in the studied activities .For that, we mainly make use for the application of the technical to obtain the individual anaerobic threshold, establishing comparison parameters between laboratory ergometric tests and fields tests. The confirmation of this hypothesis takes to a necessity of variation in the mountaineering classic metabolic classification. On the other hand, mountaineer athletes are being classified and studied as an homogenous group. We think that the special conditionings that the development of a concrete activity inside this sport takes to, they are going to have influence on establishing own characteristics for each group of athletes. For that a study was realised referring the specific anthropometrics and ergometric analysis, finding differences in some points that demonstrate us the necessity to stabiles comparative rules between these athletes attending to the developed activity, not being valid the mountaineer's analysis at a total point of view.

EXERCISE INDUCED MUSCLE DAMAGE AND RECOVERY ASSESSED BY MEANS OF SEMG ANALYSIS AND ULTRASONOGRAPHY

Presentation: Paola Sbriccoli (Italy).

PURPOSE:

It is generally accepted that eccentric exercise (EC) can elicit temporary damage to skeletal muscle. The aim of this study was to further investigate the surface electromyographic (sEMG) modifications induced by EC, and to provide an enzymatic and ultrasonographic (US) correlate to sEMG changes. The evolution and recovery from EC induced muscle damage was also assessed.

MATERIALS AND METHODS

Five subjects (EC Group) performed two bouts of 35 EC maximum contractions with the biceps brachii of their non dominant arm, five subjects were tested without performing EC (Control Group: CNT). The maximal isometric force (MVC) was measured. Force and sEMG signals were recorded during 80%MVC isometric contractions. In EC and CNT subjects US assessment on non-dominant biceps brachii was performed; creatin kinase (CK) and Lactic Dehydrogenasis (LDH) plasma levels were also assessed. Force, sEMG and CK-LDH measurements were performed before EC and after it periodically for 4 weeks. The sEMG was analysed in time and frequency domains. US was assessed by measuring muscle belly thickness and local muscle blood flow.

RESULTS AND CONCLUSIONS

After EC, the MVC was reduced by 40% on average with respect to the pre-EC values. A significant decrease in the initial frequency content, and in the MDF decay (13-42% less than the pre-EC values, respectively) was also observed. The sEMG amplitude (Root Mean Square, RMS) was unchanged after EC. The US revealed an increase in muscle belly thickness and in local muscle blood flow after EC. A complete recovery of all the considered parameters was achieved in two weeks. In conclusion sEMG analysis was confirmed as an early indicator of muscle damage. Muscle recovery from damage is followed by both sEMG and US and this may have useful clinical implications.

CROSS SECTIONAL OUTCOME ANALYSIS OF ATHLETES WITH CHRONIC PATELLAR TENDINOPATHY TREATED SURGICALLY AND BY EXTRACORPOREAL SHOCK WAVE THERAPY

Presentation: Koen Peers (Belgium).

OBJECTIVE

To compare the outcome of chronic patellar tendinopathy treated surgically and by extra-corporeal shock wave therapy.

PATIENTS AND INTERVENTIONS

A total of 29 patients (30 knees) with chronic patellar tendinopathy, 14 were treated surgically and 15 (16 knees) received extra-corporeal shock wave therapy.

MAIN OUTCOME MEASUREMENTS

Functional outcome questionnaire: VISA (Victorian Institute of Sport Assessment) score, Visual Analogue Scale (VAS) and Roles and Maudsley classification.

RESULTS

Two patients of the ESWT group were excluded because of concomitant therapy, which left 13 patients (14 knees) available for analysis. At an average of 6 months follow-up the mean Visa and VAS score for the ESWT group was 78.8 ? 28.7 and 9 ? 2 which improved up to 83.9 ? 28.6 and 9? 2 at 22.1 months. The surgery group scored 70.7 ? 22.2 points on the VISA score at an average of 26.3 months follow-up ($p = 0.41$ and $p = 0.18$) and 8 ? 3 on VAS score ($p = 0.14$). In the ESWT group 5 (33%) patients rated their pain status at 22.1 months as excellent, 5 (33%) as good, 2 (13%) as fair and 2 (13%) as poor. In the surgery group 4 (33%) evaluated the result as excellent, 3 (25%) as good, 3 (25%) as fair and 2 as poor (17%).

CONCLUSIONS

ESWT shows a comparable functional outcome to surgery in a cross sectional analysis of patients with chronic proximal patellar tendinopathy, resistant to conservative treatment.

EFFECTS OF STRENGTH ENDURANCE TRAINING IN NORMOBARIC HYPOXIA ON MUSCLE CROSS SECTIONAL AREA, STRENGTH ENDURANCE CAPACITY AND MAXIMAL STRENGTH

Presentation: Birgit Friedmann (Germany).

Results reported by Desplanches et al. (Pflügers Arch., 1993) suggest that strength endurance training performed in normobaric hypoxia with recovery in normoxia leads to a greater increase in muscle cross sectional area (CSA) than equivalent normoxic training. To find out whether severe hypoxia is an additional factor for the development of muscle hypertrophy 19 male untrained subjects were randomly assigned to a 4wk weight resistance training of the quadriceps femoris performed 3x/week as low resistance, high repetition knee extension exercise either in normobaric hypoxia (FiO_2 0.12, HYR, n = 10, 25.1 ± 2.9 yr, 183.5 ± 5.1 cm, 77.0 ± 9.0 kg) or in normoxia (NORM, n = 9, 24.3 ± 2.5 yr, 179.3 ± 8.4 cm, 72.9 ± 9.0 kg) after a 3wk lead-in training in normoxia. Before and after the training period strength endurance capacity and maximal strength were measured with an isokinetic device as work performed in an all-out-test (50 repetitions, 180°·s^{-1}) and as the best result out of 3 maximal repetitions (60°·s^{-1}). Muscle cross sectional area of the quadriceps femoris was determined with magnetic resonance imaging. In both groups there was a significant ($p < 0.05$) increase in strength endurance capacity (HYP from 56.0 ± 11.4 to 60.5 ± 10.6 J/kg, NORM from 59.6 ± 7.3 to 64.7 ± 7.2 J/kg). However, muscle cross sectional area (HYP: 91.2 ± 11.2 vs. 91.4 ± 11.7 cm^2, NORM: 87.4 ± 14.2 vs. 88.4 ± 15.0 cm^2) and maximal strength (HYP: 2.69 ± 0.43 vs. 2.81 ± 0.47 Nm/kg, NORM: 2.85 ± 0.37 vs. 2.90 ± 0.33 Nm/kg) did not change significantly in either group. There were no significant differences between HYP and NORM in the described changes. As strength endurance training in normobaric hypoxia does not lead to a greater increase in muscle cross sectional area, maximal strength and strength endurance capacity it is not superior to equivalent training in normoxia.

VALIFITY OF BIOCHEMICAL OF BIOCHEMICAL PARAMETERS IN THE DAMAGE OF HEART MUSCLE IN INDURANCE RUNNERS

Presentation: Igor Pramuk (Slovakia).

Recently, many cases of exposure to enormous exercise strain like marathon, 100 km run, 24 hours non stop run etc. have occurred. There are also different medical aspects taking into account the impact on the health data after the longest run. More valid scientific information is still needed in this field. 96 runners were examined after the marathon run, 100 km run, and 24 hours run and the changes were evaluated in the serum level CK, CKMB, CKMM, AST, LD and Troponin T. After the longest runs there were observed significantly increased serum levels of these parameters. Because clinical examinations excluded myocardial damage it has been concluded that routinely used markers have low specificity.

A MULTIDISCIPLINARY APPROACH TO SPORTS MEDICINE A FIRST IN THE UNITED KINGDOM

Presentation: Richard Higgins (England).

The Sheffield Centre of Sports Medicine was established by Sheffield University in September 2000. It provides a clinical service for the treatment of sports injuries as well as undertaking teaching and research in the same, for the University's medical school. The concept on which the Centre is based is that clinical work, teaching and research will be conducted under one roof, in one set of facilities. The clinical service will be state-of-the art, comprehensive and multi-disciplinary, bringing together the surgeon, physician and physiotherapist in the overall management process. This will also involve athletes, their coaches and others directly. This activity has already started in temporary accommodation; research is developing and formal teaching is being delivered to medical students, doctors, physiotherapists and others. High quality will be the criterion driving all elements of the Centre's work and for this it will rely on world-class staff and facilities. Surpluses from clinical work will be used to support academic research into Sports Medicine-related topics. Development will be based on a seven to ten year plan. Progress in the next two years will involve the completion of an integrated clinical and academic facility to bring the concept to full fruition. The new clinical facility will include high tech digital operating theatres, a fully equipped rehabilitation gym, with all patients passing through the Centre being given a medical ICD coded diagnosis, by either a Sports Physician or Sports Orthopaedic Surgeon. Also, the Centre will deliver a web-based sports science module of the undergraduate curriculum to the University's MBChB course (from 2003), as well as offering an even wider range of postgraduate medical education both itself and alongside the National Sports Medicine Institute and other collaborators. Collaborators already include universities and advanced sports clinics worldwide, as well as the Centre for Sport and Exercise Science at the Sheffield Hallam University and HealthSouth (UK) Rehabilitation Services Ltd. Links are being established with the local NHS Trusts. A comprehensive research programme will complete the academic profile of the Centre. Specific research interests include tendon and ligament healing, with data being collected directly from the clinical treatment undertaken. Development of research in many other aspects of sports medicine relating to the aetiology and treatment of sports injuries is also in train. This will help further the evidence-based practice of Sports Medicine. The clinical team already includes Sports Orthopaedic Surgeons, Sports Physicians and sports-specialised Physiotherapists, and is expanding rapidly; attracting leaders in their field both clinically and academically from around the world. In summary the aim is to develop a Sports Medicine service of the highest, world class, standard, within a professorial unit, with academic research and clinical services running side by side. The result will be: state-of the art treatment, research and teaching which will raise the practising standards in Sports Medicine using an evidenced based approach; improvements in interdisciplinary communication; heightened patient satisfaction and, most importantly, improved clinical outcome. The delivery of Sports medicine by isolated practitioners with qualifications varying from a chiropractor or physiotherapist to a sports therapist, should become a thing of the past if any country is to keep pace with the changing face and increasing expectations of sport.