Avhandlingar

1. Lindberg A-S (2014). Firefighters´physical work capacity. Institutionen för kirurgisk och perioperativ vetenskap, Idrottsmedicinska enheten, Umeå Universitet. http://umu.diva-portal.org/smash/record.jsf?pid=diva2%3A719114&dswid=-9204

   Sammanfattning: The overall aim of this thesis was to identify valid, simple, and inexpensive physical tests that can be used for evaluation of firefighters' physical work capacity. Paper I included fulltime- and part-time firefighters (n = 193), aged 20-60 years. Perceived physical demands of firefighting work tasks were ranked, and comparisons between subject groups rating were done with the Mann Whitney U-test and Binominal test. Papers II and III included male firefighters and civilian men and women (n = 38), aged 24-57 years. Laboratory and field tests of aerobic fitness, muscle strength and endurance, balance, and simulated firefighting work tasks were performed. Physical capacity comparisons between subject groups were done and bivariate correlations between physical tests and work capacity in the simulated firefighting work tasks analyzed. Paper IV included the same subjects as in Paper II-III (training-set), and additional 90 subjects (prediction-set), aged 20-50 years. Laboratory and field tests of aerobic fitness, muscle strength and endurance and balance, and simulated firefighting work tasks were included. Data from the training-set was used to build models for prediction of firefighters' physical work capacity, using multivariate statistic. The prediction-set was used to externally validate the selected models. Several work tasks were rated as physically demanding and significant differences ($p < 0.05$) in ratings were found between full-time and part-time firefighters (Paper I). Significant differences were found between subject groups in physical capacity, and work capacity ($p < 0.01$) (Paper II-IV). Both laboratory and field tests were significantly ($p < 0.01$) correlated with work capacity time (Paper II-III). The prediction (R2) and predictive power (Q2) of firefighters' work capacity (Carrying hose baskets upstairs, Hose pulling, Demolition at or after a fire, Victim rescue, and Carrying hose baskets over terrain) was R2 = 0.74 to 0.91, and Q2 = 0.65 to 0.85, and the external validation ranged between R2: 0.38 to 0.80 (Paper IV). In conclusion, rowing 500 m (s), maximal handgrip strength (kg), endurance bench press (n), running 3000 m (s and s scaled to body weight) upright barbell row (n) and standing broad jump (m) together provides valid information about firefighters' physical work capacity.

2. Piedrahita, H (2008). Working in cold conditions indoors effects on musculoskeletal symptoms and upper limb movements. Luleå tekniska Universitet: Arbetsvetenskap/ Industriell Produktionsmiljö. http://epubl.ltu.se/1402-1544/2008/16/index.html

   Sammanfattning: This thesis evaluated the general and local effect of cooling on upper arm movements and muscle function in its relation with musculoskeletal symptoms and complains in working populations. Two experiments were performed in laboratory conditions testing women such a subject. Epidemiology approach was used for evaluate the cold effect on musculoskeletal system in working populations exposed to cold. The results showed that general cooling affected upper arm trajectories due to changes in muscle function parameters. Local leg cooling did not affect upper arm muscle function or trajectories but ability to maintain dynamic balance was reduced.

3. Eriksson A (2006). STRENGTH TRAINING AND ANABOLIC STEROIDS- A comparative study of the vastus lateralis, a thigh muscle and the trapezius, a shoulder muscle, of strength-trained athletes. Umeå University: Department of Integrative Medical Biology, Section for Anatomy. Lulea University of Technology: Department for Health Science, Section for Medical Science. http://umu.diva-portal.org/smash/get/diva2:144813/FULLTEXT01

Sammanfattning: Strength training is widely used to increase performance in sports with high physical demands. The use of drugs such as anabolic steroids among athletes is a wellknown phenomenon, and the effects of these drugs on physical performance documented. The studies presented in this thesis focused on the mechanisms of muscle fiber hypertrophy in the vastus lateralis and the trapezius muscles of strength trained elite athletes. The main hypothesis was that the muscle adaptations to strength training and anabolic steroids are muscle specific. Biopsies were obtained from the trapezius and the vastus lateralis from three groups of elite power lifters. Nine used drugs, ten did not and seven had previously used drugs. Six sedentary males served as controls. The biopsies were frozen and cut in serial cross sections. Histological and immunohistochemical staining techniques were used to analyze muscle fiber morphology and pathology. Fiber type distribution, fiber area, myonuclei number and distribution, satellite cell number and proportion of split fibers were counted and compared for the two muscles within and between the groups. The main findings were that: a) Muscle fiber hypertrophy by strength training is further increased by anabolic steroids. b) The number of nuclei per muscle fiber is higher in power lifters using anabolic steroids compared to non-steroids using lifters. c) Among power lifters who have withdrawn from anabolic steroid usage and training for several years, the number of myonuclei, both subsarcolemmal and internal, remains high. d) In active power lifters, anabolic steroids have no further effect on the number of satellite cells per fiber. e) Power lifters have a high proportion of split fibers. High intensity resistance training increases muscle strength and banned substances such as testosterone and anabolic steroids can enhance the training effects. The studies on muscle cell morphology presented in this thesis reveals that anabolic steroids and testosterone increases muscle fiber size and adds more nuclei to the muscle cell. Based on the morphological appearance of muscle sections from doped and nondoped power lifters, we conclude that testosterone and anabolic steroids enhances the hypertrophic effects of training without adding new features. The addition of myonuclei by training and doping appears to be longer lasting in some muscles than in others. The high proportion of split fibers in power lifter is probably due to high mechanical stress. The findings and conclusions in this thesis raise questions regarding relevant suspension times for athletes caught with banned substances in the body.

WINTERNET

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