

PLEASE NOTE: *This trial has been registered retrospectively.*

Trial Description

Title

Effects of strength training with superimposed electrical stimulation to acute metabolic and hormonal reactions and adaptations of strength, endurance and agility to a 6 week training period

Trial Acronym

[---]*

URL of the trial

[---]*

Brief Summary in Lay Language

Study investigates physiological reactions of strength training with superimposed eletromyostimulation (EMS) and effects of a 6-week training period to performance parameter.

Brief Summary in Scientific Language

EMS is a method to improve athletes performance (Filipovic et al. 2011). Results in the literature are mostly based on maximum EMS stimulation in concentric or isometric contraction modes. Stimulation at maximum pain threshold limits movement. A combination of mechanical resistance and submaximal EMS during movement could have advantages from both methods. One comon training method to enhance strength and performance is back squat exercise (Cormie et al. 2010). To investigate a combination of both methods, athletes do a 10 repetiton maximum (RM) back squat exercise program with superimposed EMS (70% of pain threshold) leg and trunk muscle groups. Metabolic (oxygen consumption) and hormone parameter (testosterone, cortisol, human Growth Hormone) are analysed. Delayed onset muscle soreness (DOMS) is requested as perceived physical pain on a visual analogue scale. Performance parameter are maximum voluntary contraction and Peak Power of leg and trunk muscle groups, as well as sprints, jumps, aerobic and anaerobic tests.

Organizational Data

- DRKS-ID: **DRKS00008010**
- Date of Registration in DRKS: **2015/04/16**
- Date of Registration in Partner Registry or other Primary Registry: [---]*
- Investigator Sponsored/Initiated Trial (IST/IIT): **yes**
- Ethics Approval/Approval of the Ethics Committee: **Approved**



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Ethics Approval/Approval of the Ethics Committee: **Approved**

- (leading) Ethics Committee Nr.: **23/2013 , Ethikkommission der Deutschen Sporthochschule Köln**

Secondary IDs

Health condition or Problem studied

- Free text: **healthy partipitants**

Interventions/Observational Groups

- Arm 1: **Back squats 10 repetition maximum (RM) with superimposed electromyostimulation (EMS) to leg and trunk muscle groups; 4 sets; 2 times a week; 6 weeks**
- Arm 2: **Back squats 10 RM; 4 sets; 2 times a week; 6 weeks**

Characteristics

- Study Type: **Interventional**
- Study Type Non-Interventional: [---]*
- Allocation: **Randomized controlled trial**
- Blinding: [---]*
- Who is blinded: [---]*
- Control: **Active control**
- Purpose: **Other**
- Assignment: **Parallel**
- Phase: **N/A**
- Off-label use (Zulassungsüberschreitende Anwendung eines Arzneimittels): **N/A**

Primary Outcome

1st-12th training session: Back squats 10 RM with superimposed EMS on leg and trunk muscle groups; 4 exhaustive sets. Exhaustion is reached when load cannot be moved and is documented by RPE-scale (rate of perceived exertion).

Secondary Outcome

Blood collection for hormone analysis of testosterone, cortisol, hGH, CK (ELISA-Kits), respiratory measurements (ZAN 680) and lactate analysis (Ebio plus) and request of perceived physical pain via visual analogue scale until 48 hours after exercise is conducted at 1st and 12th training session.

Tests for performance parameter 1 week before, 1 week after and 3 weeks after training intervention: Strength diagnostics (mechatronic), Jumps (Optojump), Sprints (Sportronic), aerobic test (SRM, ZAN 680), anaerobic test (SRM).

Countries of recruitment

- DE Germany

Locations of Recruitment

- other Deutsche Sporthochschule Köln, Köln

Recruitment

- Planned/Actual: **Actual**
- (Anticipated or Actual) Date of First Enrollment: **2013/04/08**
- Target Sample Size: **26**
- Monocenter/Multicenter trial: **Monocenter trial**
- National/International: **National**

Inclusion Criteria

- Gender: **Male**
- Minimum Age: **18 Years**
- Maximum Age: **30 Years**

Additional Inclusion Criteria

2 years of strength training experience; active athletes

Exclusion criteria

cardiopulmonal disease, smoker, injuries

Addresses

■ Primary Sponsor

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Sources of Monetary or Material Support

- **Public funding institutions financed by tax money/Government funding body (German Research Foundation (DFG), Federal Ministry of Education and Research (BMBF), etc.)**

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Status

- Recruitment Status: **Recruiting complete, follow-up complete**
- Study Closing (LPLV): **2013/07/31**

Trial Publications, Results and other documents

- Paper [---]*

* This entry means the parameter is not applicable or has not been set.

*** This entry means that data is not displayed due to insufficient data privacy clearing.