

UNILATERAL STRENGTH TRAINING WITH MAXIMAL INTENDED MOVEMENT VELOCITY DURING SIX WEEKS IMPROVES LOWER BODY POWER OUTCOME AND MOVEMENT VELOCITY

JOHAN PETERSSON¹, KENNETH RIGGBERGER², SOFIA BRORSSON¹ M. CHARLOTTE OLSSON^{1,2}.

¹HALMSTAD UNIVERSITY, DEPARTMENT OF BUSINESS AND ENGINEERING, HALMSTAD, SWEDEN ²MALMÖ SPORTS ACADEMY, STADIONKONTORET, MALMÖ, SWEDEN

ABSTRACT

In many sports development of power is considered to be one of the most important physiological qualities for success. Despite many studies in the area, research investigating unilateral power training methods for elite athletes is lacking. **PURPOSE:** The purpose of this study was to examine the effects of unilateral explosive strength training on lower body power output and movement velocity after six weeks of training. **METHODS:** 17 elite male handball players (means±SD, 22±4 years), experienced in resistance training, participated in a six week intervention study. The athletes were divided in to one training group (TR) n=11, which performed 15 supervised unilateral explosive strength training sessions during six weeks, and one control group (CTL) n=6, that trained their normal bilateral resistance training for developing power. The training program was performed with heavy loads (>80%1RM) and maximal intended movement velocity. Loaded bilateral vertical squat jump tests were made in a spectrum of loads (20, 40, 60, 80 and 100kg) pre- and post training period. A linear encoder was fixed to the barbell which measured average power in the concentric phase (APc), average power in the eccentric phase (APe), peak velocity (pV) and time to peak velocity (tpV). Non parametric statistics were used to analyze differences within (Wilcoxon test) and between (Mann-Whitney test) the two groups. **RESULTS:** After six weeks training group (TR) showed significant improvements ($p<0,05$) in post-tests compared to pre-tests on all five different loads on; average concentric power (APc) 20kg ($p=0,003$), 40kg ($p=0,004$), 60kg ($p=0,003$) 80kg ($p=0,003$) and 100kg ($p=0,003$). Average eccentric power (APe) 20kg ($p=0,026$), 40kg ($p=0,021$), 60kg ($p=0,004$), 80kg ($p=0,006$) and 100kg ($p=0,041$). Time to peak velocity (tpV) 20kg ($p=0,005$), 40kg ($p=0,005$), 60kg ($p=0,007$), 80 kg ($p=0,005$) and 100kg ($p=0,005$). Significant improvements occurred also for TR in peak velocity (pV) on the higher loads of 60kg ($p=0,007$), 80kg ($p=0,015$) and 100kg ($p=0,006$). No significant improvements were found within the control group (CTL) in any of the measured parameters. Significant differences ($p<0,05$) were seen between TR group and CTL group on every load (20-100kg) between TR and CTL group on APc ($p=0,044, 0,003, 0,004, 0,001$ and $0,001$) and tpV ($p=0,002, 0,015, 0,004, 0,006$ and $0,003$). Significant differences were also seen between TR and CTL group in APe on 40kg ($p=0,021$) 60kg ($p=0,012$) and 80kg ($p=0,009$) and in pV on 80kg ($p=0,018$) and 100kg ($p=0,035$). **CONCLUSION:** The TR group showed improvements after only a short period of structured unilateral maximal velocity training which indicates that unilateral training principles could be effective for improving lower body power output in elite athletes involved in sports where unilateral movements predominate. More and longer studies are needed to evaluate further potential benefits of unilateral strength training.

KEY WORDS

Strength training ; Unilateral ; Power and velocity.