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Relation between maximal power output during isokinetic workout on a cycling ergometer and maximal strength

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Introduction: Common cycling literature recommends disclaiming unspecific strength training during season but to prefer on a bike strength endurance training [1]. Literature indicates benefits of strength training for endurance sports [2]. The purpose of this study was to proof correlation between power output at different cadence and maximum strength.

Methods: Power output of junior cyclists (male; n=8; weight: 63.2kg +- 5.7kg) was measured during isokinetic test on a SRM Ergometer with fixed cadence as well as maximum strength on a static measurement system (BAG).

Results: Neither at 60 RPM ($r=0.03$) nor at 140 RPM ($r=0.03$) a relation between maximum strength and power output could be found. But at 80 RPM a correlation could be found ($r=0.65$; $p<0.05$). At 100 and 120 rpm a strong correlation could be found. 100 RPM ($r=0.83$; $p<0.01$) and 120 RPM ($r=0.77$; $p<0.05$) are race specific cadences.

Discussion: The measured data show a strong correlation between maximum power output and maximum strength at race specific cadences. Cadences related to sport specific strength endurance training (60 rpm) show no coherence to maximum strength. This implicates that sport specific strength endurance training is less effective than training of maximum strength. Especially in decisive situations during races the ability of a high power output and fast force development seem to be important. Unspecific maximum strength training aiming an enhancement of neuromuscular strength development can be recommended.

Conclusion: The current result only shows a cross section of young athletes. Further studies with a higher sample should give more information. Strength endurance definitions are varying from sport to sport as well as from discipline to discipline. Further studies shall identify different physiological influences and variables. Vocabulary and training content have to be proven. In addition studies with a treatment "training maximum strength" should be established.

References:

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