

Steffen Held/Anne Hecksteden/Tim Meyer/Lars Donath

ERHÖHTE KRAFT UND VERBESSERTE ERHOLUNG NACH GESCHWINDIGKEITSBASIERTEM KRAFTTRAINING IM RUDERN

Eine randomisiert kontrollierte Studie

Literatur

- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Lawrence Erlbaum Associates.
- Dickhuth, H., Huonker, M., Münzel, T., Drexler, H. & Berg, A. (1991). Individual Anaerobic Threshold for Evaluation of Competitive Athletes and Patients with Left Ventricular Dysfunction. In N. Bachl, T. Graham, & H. Löllgen (Eds.), *Advances in Ergometry* (pp. 173-179). Springer.
- Doma, K., Deakin, G. B., Schumann, M. & Bentley, D. J. (2019). Training considerations for optimising endurance development: An alternate concurrent training perspective. *Sports Medicine*, 49 (5), 669-682.
- Foster, C., Florhaug, J., Franklin, J., Gottschall, L., Hrovatin, L., Parker, S., Doleshal, P. & Dodge, C. (2001). A new approach to monitoring exercise training. *Journal of Strength and Conditional Research*, 1, 109-115.
- García-Pallarés, J. & Izquierdo, M. (2011). Strategies to optimize concurrent training of strength and aerobic fitness for rowing and canoeing. *Sports Medicine (Auckland, N.Z.)*, 41 (4), 329-343.
- García-Ramos, A., Barboza-González, P., Ulloa-Díaz, D., Rodríguez-Perea, A., Martínez-García, D., Guede-Rojas, F., Hinojosa-Riveros, H., Chiroso-Ríos, L. J., Cuevas-Aburto, J., Janicijevic, D. & Weakley, J. (2019). Reliability and validity of different methods of estimating the one-repetition maximum during the free-weight prone bench pull exercise. *Journal of Sports Sciences*, 37 (19), 2205-2212.
- González-Badillo, J. J. & Sánchez-Medina, L. (2010). Movement velocity as a measure of loading intensity in resistance training. *International Journal of Sports Medicine*, 31 (5), 347-352.
- Harriss, D. & Atkinson, G. (2015). Ethical standards in sport and exercise science research: 2016 update. *International Journal of Sports Medicine*, 36 (14), 1121-1124.
- Held, S., Behringer, M. & Donath, L. (2019). Low intensity rowing with blood flow restriction over 5 weeks increases VO2max in elite rowers: A randomized controlled trial. *Journal of Science and Medicine in Sport* (<https://doi.org/10.1016/j.jsams.2019.10.002>).
- Held, S., Behringer, M., & Donath, L. (2020). Blutflussrestriktion erhöhte die VO2max bei gut trainierten Ruderern: Eine randomisiert-kontrollierte Studie beim Rudern mit geringer Intensität. *Leistungssport*, 50 (2), 22-26.
- Ingham, S., Whyte, G., Jones, K. & Nevill, A. (2002). Determinants of 2,000 m rowing ergometer performance in elite rowers. *European Journal of Applied Physiology*, 88 (3), 243-246.
- Izquierdo-Gabarrén, M., González de Txabarri Expósito, R., García-Pallarés, J., Sánchez-Medina, L., Sáez de Villarreal E, S. & Izquierdo, M. (2009). Concurrent endurance and strength training not to failure optimizes performance gains. *Medicine & Science in Sports & Exercise*, 42 (6), 1.
- Lawton, T. W., Cronin, J. B. & McGuigan, M. R. (2011). Strength testing and training of rowers. *Sports Medicine*, 41 (5), 413-432.
- Lombardi, V. (1989). *Beginning Weight Training*. Duquesne.
- Macfarlane, D. J. & Wong, P. (2012). Validity, reliability and stability of the portable Cortex Metamax 3B gas analysis system. *European Journal of Applied Physiology*, 112 (7), 2539-2547.
- Martínez-Cava, A., Hernández-Belmonte, A., Courel-Ibáñez, J., Morán-Navarro, R., González-Badillo, J. J. & Pallarés, J. G. (2020). Reliability of technologies to measure the barbell velocity: Implications for monitoring resistance training. *PloS One*, 15 (6), e0232465. (<https://doi.org/10.1371/journal.pone.0232465>).
- McCurdy, K., Langford, G. A., Cline, A. L., Doscher, M. & Hoff, R. (2004). The reliability of 1- and 3RM tests of unilateral strength in trained and untrained men and women. *Journal of Sports Science and Medicine*, 3 (3), 190-196.
- Midgley, A. W., McNaughton, L. R., Polman, R. & Marchant, D. (2007). Criteria for determination of maximal oxygen uptake. *Sports Medicine*, 37 (12), 1019-1028.
- Morán-Navarro, R., Pérez, C. E., Mora-Rodríguez, R., de la Cruz-Sánchez, E., González-Badillo, J. J., Sánchez-Medina, L. & Pallarés, J. G. (2017). Time course of recovery following resistance training leading or not to failure. *European Journal of Applied Physiology*, 117 (12), 2387-2399.
- Nässi, A., Ferrauti, A., Meyer, T., Pfeiffer, M. & Kellmann, M. (2017). Development of two short measures for recovery and stress in sport. *European Journal of Sport Science*, 17 (7), 894-903.
- Padulo, J., Mignogna, P., Mignardi, S., Tonni, F. & D'Ottavio, S. (2012). Effect of different pushing speeds on bench press. *International Journal of Sports Medicine*, 33 (5), 376-380.
- Pareja-Blanco, F., Rodríguez-Rosell, D., Sánchez-Medina, L., Sanchis-Moysi, J., Dorado, C., Mora-Custodio, R., Yáñez-García, J. M., Morales-Alamo, D., Pérez-Suárez, I., Calbet, J. A. L. & González-Badillo, J. J. (2017). Effects of velocity loss during resistance training on athletic performance, strength gains and muscle adaptations. *Scandinavian Journal of Medicine and Science in Sports*, 27 (7), 724-735.
- Pareja-Blanco, F., Alcazar, J. J., Sánchez-Valdepeñas, J., Cornejo-Daza, P. J., Piqueras-Sanchiz, F., Mora-Vela, R., Sánchez-Moreno, M., Bachero-Mena, B., Ortega-Becerra, M. & Alegre, L. M. (2020). Velocity loss as a critical variable determining the adaptations to strength training. *Medicine & Science in Sports & Exercise*, 52 (8), 1752-1762.
- Rodríguez-Rosell, D., Yáñez-García, J. M., Sánchez-Medina, L., Mora-Custodio, R. & González-Badillo, J. J. (2019). Relationship between velocity loss and repetitions in reserve in the bench press and back squat exercises. *Journal of Strength and Conditional Research* (<https://doi.org/10.1519/JSC.0000000000002881>).
- Sánchez-Medina, L. & González-Badillo, J. J. (2011). Velocity loss as an indicator of neuromuscular fatigue during resistance training. *Medicine and Science in Sports and Exercise*, 43 (9), 1725-1734.
- Schwarzrock, M., Treff, G., Viedt, C., Bielig, B., Wick, J., Reyher, D. & Amort, M. (2017). *Trainingsmethodische Grundkonzeption 2017-2020*. Deutscher Ruderverband.
- Scott, N., McPherson, G., Ramsay, C. & Campbell, M. (2002). The method of minimization for allocation to clinical trials: a review. *Controlled Clinical Trials*, 23 (6), 662-674.
- Seiler, S. (2010). What is best practice for training intensity and duration distribution in endurance athletes? *International Journal of Sports Physiology and Performance*, 5 (3), 276-291.
- Treff, G., Winkert, K., Machus, K., & Steinacker, J. M. (2018). Computer-aided stroke-by-stroke visualization of actual and target power allows for continuously increasing ramp tests on wind-braked rowing ergometers. *International Journal of Sports Physiology and Performance*, 13 (6), 729-734.
- Vickers, A. J. & Altman, D. G. (2001). Statistics notes: Analysing controlled trials with baseline and follow up measurements. *British Medical Journal*, 323 (7321), 1123 f.
- Wilson, J. M., Marin, P. J., Rhea, M. R., Wilson, S. M. C., Loenneke, J. P. & Anderson, J. C. (2012). Concurrent training: a meta-analysis examining interference of aerobic and resistance exercises. *Journal of Strength and Conditional Research*, 26 (8), 2293-2307.

Korrespondenzadresse

Steffen Held, Deutsche Sporthochschule Köln, Institut für Trainingswissenschaft und Sportinformatik, Am Sportpark Müngersdorf 6, 50933 Köln
E-Mail: s.held@dshs-koeln.de