mon sled training equipment and simple maximal speed data. Notably, the optimal conditions for maximizing peak power represented much greater resistance than that generally used in the literature (Petrakos et al. 2015), and appear to exist within wide ranges. This method has potential value in quantifying individualized training parameters for optimized development of horizontal power, which may reflect greater increases in applied performance measures than those currently used and recommended in practice. REFERENCES Rabita, G., Dorel, S., Slawinski, J., Saez-de-Villarreal, E., Couturier, A., Samozino, P., & Morin, JB. (2015). Scand J Med Sci Sports, 25(5), 583-594 Samozino, P., Rabita, G., Dorel, S., Slawinski, J., Peyrot, N., Saez de Villarreal, E., & Morin, JB. (2015). Scand J Med Sci Sports, in press. Petrakos, G., Morin, JB., & Egan, B. (2015). Sports Med, in press.

MUSCULAR ACTIVITY IN CONVENTIONAL AND DIFFERENTIAL BACK SQUAT EXCERCISE

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Introduction In conventional strength training, deviations from prescribed exercises are corrected and minimized. In comparison, the differential learning (DL) approach bases on movement variations and shows advantages for motor learning in sports and physical therapy (Schöllhorn et al., 2010). In comparison to conventional strength training, differential strength training is characterized by movement variations at lower external load. The application of the DL approach to strength training shows similar training effects as conventional training for the one repetition maximum (1RM) in back squats (Hegen et al., 2015). The aim of this study is to look for the effect of load and movement variations on the activity of selected leg muscles during the back squat exercise. Methods Seven healthy male subjects performed four sets of five back squats in each of three training conditions in a counterbalanced within-subject design. Differential back squat training based on movement variations at 60% 1RM (D60) and conventional back squat training on basis of movement repetitions at 60% 1RM (C60) and 85% 1RM (C85). Muscular activity of the dominant leg was measured using surface electromyography (Biovision, 4000 Hz) at gluteus maximus, vastus medialis, vastus lateralis, biceps femoris, gastrocnemius medialis, gastrocnemius lateralis and tibialis anterior. The raw signal was rectified, smoothed using a 150 ms window root mean square and normalized to the maximum. The mean activity and the coefficient of variation were determined. Differences between the training conditions were analyzed by means of repeated measures ANOVA. Results All muscles show significant differences with large effect sizes between the training conditions in mean activity ($p <= .020$; $\eta^2 >= .479$) and coefficient of variation ($p = .000$; $\eta^2 >= .862$). Increased variation in muscular activity was obtained during back squats in D60 compared to C60 and C85. C85 is characterized by increased mean activity during back squats compared to C60 and D60. Discussion The results emphasize that the movement variations in back squat training lead to lower mean, but more variable activity of the leg muscles. The results indicate different underlying neuromuscular processes and adaptations in differential and conventional strength training. Therefore, performance improvement in the back squat through differential training (Hegen et al., 2015) can be explained by a combination of movement variations, intensity and time under tension. In contrast, effects of conventional strength training can only be explained by intensity. References Schöllhorn WI, Beckmann H, Davids K (2010). Medicina, 46(6), 365-73. Hegen P, Polywka G, Schöllhorn WI (2015). Book of Abstracts - 20th Annual Congress of the ECSS, 590. Contact horst@uni-mainz.de

Oral presentations

OP-PM61 Sports Medicine: Soccer

INJURY PATTERNS AMONG ELITE FOOTBALL PLAYERS: A MEDIA-BASED ANALYSIS OVER SIX SEASONS WITH EMPHASIS ON PLAYING POSITION

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The study objective was to describe types, localizations and severity of injuries among first division Bundesliga football players, and to study the effect of playing positions on injury incidence and severity based on information from public media. Information about exposure and injuries from 1673 players over 6.4 seasons were collected from a media-based register. The knee was the most frequent localization and had the longest recovery time ($p<0.001$). Recovery following ligament injuries was significantly longer than muscle injuries. Significant differences between the playing positions were found in injury incidence and injury burden (lay-off time per incidence-rate), with wing-defenders sustaining significantly lower incidence-rates of groin injuries compared to forwards (rate ratio: 0.46, 95% CI: 0.21-0.99). Wing-midfielders had the highest incidence-rate and injury burden from match injuries while centre-defenders sustained the highest incidence-rate and injury burden from training injuries. There were also significant differences in match availability due to an injury across the playing positions, with midfielders sustaining the highest unavailability rates from a match and training injury. Injury-risk and patterns seem to vary substantially between different playing positions. Identifying positional differences in injury-risk may be of major importance to medical practitioners when considering preventive measures.

EXAMINING THE ASSOCIATION BETWEEN LOWER-LIMB MUSCLE COMPLAINTS AND MUSCLE FUNCTION IN SOCCER PLAYERS.

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Purpose: Lower-limb power, flexibility and hamstring strength are risk factors for time-loss injury; however, Fuller's 2006 consensus statement highlights injury as any physical complaint. This study therefore examined the hypothesis that muscle complaints will negatively correlate with lower limb flexibility, power and hamstring strength. Methods: 19 semi-professional soccer players (Male, 24 ± 3.1 yrs, 75.5 ± 9.5 Kg, 178.7 ± 6.0 cm) were recruited. Lower-limb power was assessed during 3 counter-movement jumps (Kistler portable force platform, CH-8408 Winterthur, Switzerland). Flexibility assessments of the hamstrings, quadriceps, calves and groin were performed using goniometry. Hamstring strength was assessed via maximum isometric (prone, 30° knee flexion) and isokinetic (prone, 0-135° concentric/eccentric knee flexion 60°/S) dominant limb contractions. Muscle complaints were recorded weekly (frequency), allocated a