Abstract

EFFECT OF THE BASIC MEZOCYKLE TO CHANGE THE GAME CONDITION WITH THE PROGRESSIVE LOAD FOR YOUTH FOOTBALL PLAYERS

The aim of this work was to find out whether the use of specific fitness acquisition models (Verheijen, Owen) is more effective as the use of a non-specific model (control group) in elite youth U17 soccer players and whether a player can be equally conditioned in a 4-week period cycle (Owen) compared to a 6-week cycle (Verheijen) or a conventional (non-specific) mesocycle.

Methods: The sample consisted of 3 groups of 16 players (n = 48; Age = 16,02±0,78; Height = 178,6±9,8; Weight = 69±10,6; ECM/BCM = 0,8±0,13; FFM = 61,4±9,8). 39 players have completed the whole research and were divided into groups EXP1, EXP2 and KON. The EXP1 group underwent a Verheijen (2000) training program, where large interval games (LSG) also appeared. The sond EXP2 group underwent an intervention program according to Owen et. al. (2012). The third group underwent a training mesocycle with a classic model that was a combination of general and non-specific fitness training. This model consisted mainly of runs (non-specific preparation) and large forms of games at the end of practice. This third group functioned as a control group.

Laboratory testing always took place in the Human Movement Laboratory (LSM) of the Faculty of Physical Education and Sport of the Charles University (FTVS UK), always in the morning from 8:00 to 12:00. The field testing had a minimum allowed temperature of 10 °C due to objectification of the measured data and always took place in the afternoon hours at 14:00 to 16:00 on artificial grass of the 3rd generation. To determine body composition, we used the TANITA MC-980 bioelectric tetrapolar impedance instrument. The level of postural stability and its parameters were determined using Footscan pressure plate (RsScan International, Belgium). We used KISTLER 8611 force plates (Kistler, Switzerland) to measure the explosive power of the lower limbs, where the sampling frequency is 1000 Hz. We used Cybex Humac Norm (Cybex NORM ®, Humac, CA, USA) to determine muscle strength. The functional stress test was performed on a running ergometer where the Cortex Meta Lyzer 3B (MetaLyzer® 3B, GERMANY) instrument was used in conjunction with the MetaSoft®Studio evaluation software. Test to assess player acceleration speed. Test measured using photocells (Browertiming system). Tests were used in the field: Sprint at 5 and 10 meters, Sprint at 30 meters, 505 agility test, Repeat sprint ability (RSA) and Yo - Yointermitent test (Level 1). Physical activities were analyzed using a Portable Global Positioning System (GPS; (GPSports SPI EliteSystem, Canberra, Australia).

Results: We found a significant improvement in maximum oxygen demand (VO2max) with a high level of the magnitude of phenomenon for EXP1 ($VO2max_{PRE}$: 54,45 ± 2,13 ml,kg^{-1},min^{-1}, $VO2max_{POS}$ = 57,68 ± 2,13 ml,kg^{-1},min^{-1}, p < 0,01, d = - 1,32) and EXP2 ($VO2max_{PRE}$: 55,99 ± 3,97 ml,kg^{-1},min^{-1}, $VO2max_{POS}$ = 59,95 ± 4,25 ml,kg^{-1},min^{-1}, p < 0,01, d = - 0,96). At EXP2, we found a significant improvement in the isokinetic muscle strength of the lower extremities in the three parameters (KEP_{PRE}: 2,85±0,24 N,m,kg^{-1}, KEP_{POS} = 2,97±0,22 N,m,kg^{-1}, p < 0,01, d = - 0,55, KFP_{PRE}: 1,79±0,24N,m,kg^{-1}, KFP_{POS} = 1,91±0,18 N,m,kg^{-1}, p < 0,05, d = - 0,60,KFN_{PRE}: 1,68±0,28 N,m,kg^{-1}, KFN_{POS} = 1,74±0,26 N,m,kg^{-1}, p < 0,01, d = - 0,22). Significant improvement of knee flexor muscle strength on non-dominant limb was found in EXP1 (Verheijen, 2004) (KFP_{PRE}: 1,74± 0,15 N,m,kg^{-1}, KFP_{POS} = 1,82± 0,13 N,m,kg^{-1}, p < 0,01, d = - 0,60). For KON, we observed a significant improvement in the force impulse of all three types of jump and a significant change in jump height in the SJ test (SJ_{PRE} = 35,05±1,71 cm, SJ_{POS} = 35,98±1,66 cm, p < 0,01, d = - 0,55). In the maximum running speed test, we noted a significant improvement in performance for both EXP1 and EXP2 (EXP1: $Sprint20_{PRE}$ = 2,52±0,16 s, $Sprint20_{POS}$ = 2,47±0,17 s, p < 0,01, d = 0,27, EXP2: $Sprint20_{PRE}$ = 2,42±0,06 s, $Sprint20_{POS}$ = 2,36±0,06 s, p < 0,01, d = 1,02). The agility performance of the agility test (A505) showed a significant improvement in the time of EXP1 when changing direction to the preferred side ($A505P_{PRE}$ = 2,57±0,12 s, $A505P_{POS}$ = 2,52±0,12 s, p < 0,01, d = 0,44). When we changed direction to the non-preferred side, we found performance deterioration at EXP2 ($A505N_{PRE}$ = 2,54±0,11 s, $A505N_{POS}$ = 2,59±0,10 s, p < 0,01, d = 0,45). In the RSA test we found a significant improvement in all groups, U EXP1 and EXP2 by 2.5%, while in KON by 1.3% (EXP1: RSA_{PRE} = 4,77±0,18 s, RSA_{POS} = 4,65±0,18 s, p < 0,01, d = 0,62, EXP2: RSA_{PRE} = 4,70±0,23 s, RSA_{POS} = 4,58±0,23 s, p < 0,01, d = 0,52, KON: RSA_{PRE} = 4,82±0,27 s, RSA_{POS} = 4,76±0,28 s, p < 0,05, d = 0,24). In all three factors we observed a significant improvement in performance (covered distance) in the Yo-Yo IRT1 test. The highest intervention effect was observed at EXP1, where the covered distance was increaed by 16.97% (320 m) (EXP1: YoYo $IRT1_{PRE}$ = 1566,15±340,53 m, YoYo $IRT1_{POS}$ = 1886,15±226,77 m, p < 0,01, d = 1,11). At EXP1, the maximum heart rate (SFmax) improved by 1.54 beats / min. The rate of regeneration processes was significantly higher at the end of the intervention program in both experimental groups (EXP1: SFzotpre = 18,29±2,57 %,SFrecpos = 26,95 ± 1,24 %, $p < 0,01$, $d = 4,30$, EXP2: SFzotpre = 16,22±2,46 %,SFrecpos = 20,20±1,01 %, $p < 0,01$, $d = 2,12$).

Conclusion: Based on the results of this study, we can conclude that the application of the model according to Owen et al. (2012) or, according to Verheijen (2000), a significant increase in fitness (especially functional) readiness in comparison with the classic training model was achieved.

Key Words: soccer, physical load, heart rate, sided games