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CONDITIONS FOR PREPARING FUTURE PHYSICAL EDUCATION TEACHERS FOR PROFESSIONAL ACTIVITIES ON THE BASIS OF SPORTS COACHING

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Annotation
Assuming physical preparation has been undertaken before this stage of maturation, training design should be increasingly based on a comprehensive needs analysis of the sport and playing position. As with adults, exercise specificity influences young players responses to strength training. Exercise selection therefore should be progressively sport-specific, within the constraints of the skill level and training experience of the young player.

Keywords: sport, training, multi, beyond, programm

Sport-specific exercise selection will vary according to the team sport and playing position. Typically, explosive multi joint lifts (e.g., resistance training exercises and barbell jump squats) that incorporate triple extension of the hips, knees, and ankles will feature in the adolescent players programm, given that this extension is the principle biomechanical action common to many dynamic movements in team sports (15). Likewise, unilateral support exercises should necessarily account for a significant portion of the young athletes training on the basis that most gamerelated movements are executed while supported partly or fully on 1 leg (34). Exercise selection from an injury prevention viewpoint should be based on injury data for the sport and for the playing position if available. Specifically, targeted strength training exercises should be included in adolescent players training to address areas identified as being prone to injury in the sport and playing position. In the case of contact sports, hypertrophy may be an important program goal for adolescent players to varying degrees depending on their playing position. The shoulders should be an area for specific strengthening and hypertrophy because they are the site for impact forces during collisions with other players. Adolescent athletes aremore conducive to a more adult longer-term approach with regard to physical preparation undertaken in a more structured training setting (43). The

starting point for any strength training will depend on the adolescent players training history. If appropriate strength development has occurred before or during puberty, strength training may be progressed to include a more advanced and sportspecific exercise selection. However, if significant deficits are noted, the starting point will be developing strength for fundamental movements and addressing imbalances. In this case, initial exercise selection will be more reflective of general training. If it is appropriate to the sport, speed– endurance work may be introduced into speed and agility work undertaken by players, providing that the adolescent player is technically proficient. Before this stage in development, any speed and agility training undertaken by players would exclusively be categorized as neuromuscular training, with emphasis on movement mechanics and complete recovery between reps. Aerobic endurance remains a training priority for adolescent players. Because this is a stage of increasing specialization in training, the training modes used for individual training should be increasing mode-specific. It follows that cross-training should be largely restricted to off-season training. Furthermore, aerobic endurance development may be predominantly achieved by using interval training with appropriate work bouts and intervals of rest and recovery (44). Optimal combinations of work-to-rest ratios can elicit an almost maximal stimulus for anaerobic and aerobic effects (44). However, these repetition schemes, by definition, will be highly demanding and as such should be progressively introduced during late adolescence. Skill-based conditioning games aimed at aerobic endurance development used in squad training should likewise become more specific to the sport. When coaching prepubescent players, it is important that training should be enjoyable and give the young player an immediate sense of fun and discoverybased learning (43). In practical terms, the choice of training exercises and loads used should be conducive to allow this approach to be safely implemented. For example, body-weight resistance exercises are more appropriate when training more complex whole-body movements. Meta-analyses have identified repetition schemes from 6 to 15 reps and 50% to 100% repetition maximum to be effective for resistance training with young athletes (13). In general, resistance training volumes of 2 or 3 sets and frequency of training of 2 or 3 days per week appear to be most effective. When young players are introduced to strength training, light loads and high repetition schemes (i.e., 12–15 reps) are most appropriate (11). During this early stage of training, progression should be achieved by increasing the number of sets performed and the number of exercises in the workout. The relative loading and number of training days used can then be increased later. Adequate rest and recovery are key components of successful youth

resistance training. Younger players and those in the early stages of their physical preparation will require more recovery time between training days. Training on nonconsecutive days therefore is recommended for prepubescent players to maximize the effectiveness of training and reduce the risk of injury (12). Because many of the benefits of strength training before puberty stem from improved coordination, balance, and proprioception, it follows that exercise modes that favor the development of these aspects should be emphasized when training prepubescent players. Body-weight resistance exercises and free weights offer advantages from this point of view, in comparison to fixed-resistance machines, although these exercises may require closer supervision. Exercise selection should feature a combination of unilateral and bilateral exercises appropriate to the young players capabilities. The inclusion of unilateral exercises in prepubescent players training is important to promote balanced development between limbs (27). These exercises do not allow the young player to compensate with his or her stronger limb, as it is possible with bilateral exercises. Bilateral exercises should also feature in the young players program at this stage of maturation as a means to develop strength from a more stable base of support (Table 1a).

EARLY PUBERTY NEUROMUSCULAR AND MOVEMENT SKILLS TRAINING

Puberty is characterized in boys particularly by a progressive improvement in neuromuscular abilities. This change is known as the neuromuscular spurt (42). However, before attainment of peak height velocity, there may be short-term decrements in some aspects of neuromuscular performance. It follows that neuromuscular training should be progressed during this phase of the young players development in a way that is responsive to their individual rate of neuromuscular development and sensitive to any shortterm changes. Training to reduce the potentially injurious loading that occurs with poor neuromuscular control of lower-limb alignment assumes increased importance given the gains in body mass that occur during puberty, which in turn increase the loading and stresses imposed on joints and connective tissues. In female players, this form of training is advocated as a means to artificially create a neuromuscular spurt, similar to that which occurs naturally in boys during this phase of maturation. As discussed, rates of growth and maturation within a group of players can vary widely. Phases of development are therefore difficult to define within a squad when training young players competing in team sports. For the purposes of this section, guidelines will be divided into prepubescence (i.e., before showing physical signs indicative of the onset of puberty), early puberty (i.e., the phase between the onset of puberty and attaining peak height velocity), and adolescence (i.e., the period

after peak height velocity has been attained and advancing into adulthood). The divisions between stages are necessarily vague. The average age at which peak height velocity is attained (i.e., marking the transition between early puberty and adolescence, as defined earlier) is near 12 years for girls and 14 years for boys (33), but there is considerable variability in this age. Observing changes in physical characteristics, assessing neuromuscular performance, and monitoring seated and standing heights at regular intervals will help in determining the progression between stages. Standing and seated heights are the most helpful objective measure to track with young players when used to plot velocity curves (i.e., gain in height per unit of time) for each player (4). Seated height is helpful because trunk length tends to lag behind leg growth

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