Abstract

In contrast to earlier concerns, current position statements of the American Academy of Pediatrics (AAP), the American College of Sport Medicine (ACSM), or the National Strength and Conditioning (NSCA) Association unequivocally state resistance training in children and adolescents to be effective and save. However, national textbooks and training guidelines still contain those outdated opinions that could be found in position paper from the AAP in the late 1980s. That is, we lag behind the international doctrine in this field of research for about 20 to 30 years. Therefore, the primary aim of the present study was to review the currently available data concerning this topic and to outline any desideratum for further research.

The analyses of 69 interventional studies revealed that resistance training is effective over all age groups and that strength gains in children and adolescents were comparable to those from adults. Some authors even found greater improvements for prepubertal children compared to those in later stages of puberty. Mean auxotonic, isokinetic, and isometric strength gains were 31.6% (23 studies), 20.1% (6 studies), and 26.3% (17 studies) respectively. Due to the small number of studies (n= 7) presenting data for female subjects and due to their conflicting results, it is currently impossible to state whether girls muscle strength is less trainable.

Due to the fact that some of the previously published studies failed to detect muscle hypertrophy despite significant improvements in muscle strength, prepubertal strength gains are usually attributed to enhanced neuromuscular activation. However, the majority of those studies used imprecise methods, like anthropometric circumference measurements, to detect structural adaptations. By contrast, the few available studies using more precise methods like ultrasound were able to detect hypertrophy in prepubertal children. Furthermore, there is only little evidence to support the assumption that neuromuscular changes are responsible for the observed strength gains.

Against the early concerns associated with resistance training in children and adolescents, it can be stated that the risk of this exercise type is very low. Besides the fact that the frequently feared damage of the growth plate has never been reported by any prospective resistance training study, only two minor injuries were found to be noted in the 69 analyzed studies. By contrast, there is growing evidence that resistance training during childhood and youth is associated with different kind of health benefits, like enhanced bone mineral density, improved body composition, and psychological health.

Even though it can be stated that resistance training is effective and save during childhood and youth, it must be stated that the underlying mechanisms of strength gains are largely unknown.