

INTRODUCTION / INTRODUCTION

Resistance exercise and strong healthy children: safe when done right!

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Abstract: Weight lifting in children and youth is often viewed as a potentially harmful activity that could result in damage to bones, connective tissue, and muscle. Reviews, such as the one appearing in this issue of the journal by Behm et al. (*Appl. Physiol. Metab. Nutr.* **33**: this issue), show that the balance of evidence indicates that weight lifting in pediatric populations is safe. Importantly, weight lifting, when performed in a safe and age-appropriate manner, is very beneficial on a number of health fronts, including strength and balance, self-esteem, and reducing cardiovascular risks. This is an understudied area that is still lacking in key areas of research to establish efficacy, dose–response relationships, and other health benefits.

Résumé : Chez les enfants et les adolescents, les séances de poids et haltères sont souvent perçues comme étant potentiellement dangereuses et pouvant mener à des lésions aux os, aux tissus conjonctifs et aux muscles. Selon les synthèses, telles que celle de Behm et coll. du présent numéro de la revue (*Physiologie appliquée, nutrition et métabolisme* **33** : ce numéro), la majorité des résultats de recherche révèlent que la pratique des poids et haltères chez les jeunes est sécuritaire. Chose plus importante, cette activité, lorsque pratiquée de façon sécuritaire et adaptée à l'âge de la personne, est très salubre sur le plan de la santé, entre autres en améliorant la résistance, l'équilibre et l'estime de soi et en réduisant les risques cardiovasculaires. D'autres recherches dans ce domaine encore négligé doivent être réalisées afin de préciser l'efficacité de cette forme d'entraînement, d'établir des relations dose-effet, et de découvrir d'autres bienfaits pour la santé.

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A number of parents and coaches will have posited the following questions: when is it OK for my child to lift weights? Will it damage his or her bones? Should he or she follow the same program as me? In the following paper, Behm et al. outline the position of the Canadian Society for Exercise Physiology dealing with resistance exercise in children and adolescents. This is an area in which there is as much mythology and advice as there is good science. In short, however, the available evidence indicates that resistance exercise training is a safe, highly beneficial exercise modality in children and adolescents. Not only does resistance training impart increases in strength, coordination, balance, and improved sports performance, it also imbues health benefits from a bone standpoint and elevates self esteem. Other evidence suggests that high-intensity resistance exercise training also decreases adiposity (Benson et al. 2008) and the risk of diabetes (Cali and Caprio 2008). Of note, but perhaps not surprisingly, evidence indicates that children suffering from cystic fibrosis, burn victims, and the obese can also benefit from progressive resistance training (PRT).

The authors surmise that much of the gain in strength in children and adolescents with PRT is due to a neurally mediated change; however, they present evidence to show

that gains in muscle cross-sectional area and muscle mass have been observed using non-invasive methods. Regardless of the mechanisms that bring about gains in strength in children, it is more than likely that they are more similar to, rather than different from, those seen in adult skeletal muscle. Thus, it is not unreasonable to suggest that the beneficial health changes seen in adults as a result of resistance training could also be expected to be observed in children.

Despite similar mechanisms of adaptation in strength with PRT the authors strongly caution against simply imposing training philosophies and (or) methods geared for adults on youth. The authors caution that the design of PRT programs for children and youth cannot be generalized and progression is highly variable, depending on physical maturation, previous experience, and the ability to adapt to a new stressor. Pre-participation examinations are only recommended for children and youth who had a pre-existing condition such as obesity or diabetes. Caution is issued when parents and (or) coaches have inappropriate experience or place pressures on children for unrealistic performance. Moreover, participation in multiple sports is also considered a potential issue when the total training volume exceeded a tolerable upper limit. Proper exercise form is also stressed as impor-

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tant for minimizing injury risk. Nonetheless, the authors conclude that PRT does not lead to injury of epiphyseal growth plates, cartilage, ligaments, or muscle. In fact, if anything, it appears that soreness, often considered a hallmark of tissue damage and a potential negative response, is less in children than adults following an intense bout of plyometric exercise (Marginson et al. 2005).

The following position paper represents a thorough and provocative summary of the beneficial effects of resistance training in youth. It also highlights that with correct instruction and planning, PRT is both safe and beneficial. Undoubtedly, future work will only add to our knowledge in this area and, I suspect, continue to emphasize the important, yet underappreciated, health benefits imparted by resistance exercise.

Summary points

- Programs of PRT in children and youth lead to gains in strength, improvements in balance and coordination, bone health, reductions in adiposity, and increased self esteem;
- PRT is a safe and well tolerated activity that does not

lead to damage of epiphyseal growth plates, stunting of growth, or any other maladaptive response;

- Programs of PRT for children and youth need to be tailored and carefully developed specifically with children in mind vis-à-vis their physical and emotional maturity;
- Any program of PRT for children should emphasize fun and enjoyment.

References

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