

## [ Primary Care ]

# Sports Specialization, Part II: Alternative Solutions to Early Sport Specialization in Youth Athletes

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**Context:** Many coaches, parents, and children believe that the best way to develop elite athletes is for them to participate in only 1 sport from an early age and to play it year-round. However, emerging evidence to the contrary indicates that efforts to specialize in 1 sport may reduce opportunities for all children to participate in a diverse year-round sports season and can lead to lost development of lifetime sports skills. Early sports specialization may also reduce motor skill development and ongoing participation in games and sports as a lifestyle choice. The purpose of this review is to employ the current literature to provide evidence-based alternative strategies that may help to optimize opportunities for all aspiring young athletes to maximize their health, fitness, and sports performance.

**Evidence Acquisition:** Nonsystematic review with critical appraisal of existing literature.

**Study Design:** Clinical review.

**Level of Evidence:** Level 4.

**Conclusion:** Based on the current evidence, parents and educators should help provide opportunities for free unstructured play to improve motor skill development and youth should be encouraged to participate in a variety of sports during their growing years to influence the development of diverse motor skills. For those children who do choose to specialize in a single sport, periods of intense training and specialized sport activities should be closely monitored for indicators of burnout, overuse injury, or potential decrements in performance due to overtraining. Last, the evidence indicates that all youth should be involved in periodized strength and conditioning (eg, integrative neuromuscular training) to help them prepare for the demands of competitive sport participation, and youth who specialize in a single sport should plan periods of isolated and focused integrative neuromuscular training to enhance diverse motor skill development and reduce injury risk factors.

**Strength of Recommendation Taxonomy (SORT):** B.

**Keywords:** injury prevention; youth sports; athletic performance; neuromuscular training

In the United States, nearly 72% of school-aged youth (69% of girls and 75% of boys aged 8 to 17 years) participate in at least 1 organized sport team or club. This equates to nearly 29 million youth playing organized sports. Similar growth in sports

participation is increasing across the globe in children of all ages,<sup>3,10,37</sup> and it is recognized that sports participation has many benefits, including living a healthy lifestyle, having a positive self-image, and building social relationships. In combination

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Table 1. Seven postulates associated with the Developmental Model of Sport Participation<sup>a</sup>

Postulate 1	Early diversification (sampling) does not hinder elite sport participation in sports where peak performance is reached after maturation
Postulate 2	Early diversification (sampling) is linked to a longer sport career and has positive implications for long-term sport involvement
Postulate 3	Early diversification (sampling) allows participation in a range of contexts that most favorably affects positive youth development
Postulate 4	High amounts of deliberate play during the sampling years build a solid foundation of intrinsic motivation through involvement in activities that are enjoyable and promote intrinsic regulation
Postulate 5	A high amount of deliberate play during the sampling years establishes a range of motor and cognitive experiences that children can ultimately bring to their principal sport of interest
Postulate 6	Around the end of primary school (around age 13 years), children should have the opportunity to either choose to specialize in their favorite sport or to continue in sport at a recreational level
Postulate 7	Late adolescents (around age 16 years) have developed the physical, cognitive, social, emotional, and motor skills needed to invest their effort into highly specialized training in 1 sport

<sup>a</sup>Reproduced with permission from Côté et al.<sup>9</sup>

with increased sport participation, it is now speculated that sports specialization including year-round sport-specific training, participation on multiple teams of the same sport, and focused participation in a single sport may be at an all-time high.<sup>37</sup> In the United States, youth sports specialization with intense year-round training in a single sport may be potentially more common, with a recent report indicating that nearly 30% of young athletes were highly specialized from a sample of nearly 1200 young athletes.<sup>28,60</sup> Factors such as the pursuit of scholarships or professional contracts or the intense desire for talent recognition by parents, coaches, or media appear to fuel interest in specializing in a single sport. Many coaches, parents, and children believe that the best way to develop elite athletes is to participate in only 1 sport from an early age and to play it virtually year-round.

Single-sport specialization was first reported in Eastern Europe with athletes involved in individual sports such as gymnastics, swimming, diving, and figure skating.<sup>19,37</sup> International Olympic sports such as these likely contributed to increased sports specialization, with selection processes that eventually reached into the primary school years in an attempt to distinguish future champions and initiate specialized training for enhanced opportunity of success. The development programs for future champions involved intense and high-volume training and rigorous coaching that was often endorsed with parental pressure for achievement. The relative success of these Olympic development programs combined with the lure of professional contracts likely influence young athletes to isolate their focus to a single sport at younger ages across the globe. This is despite the fact that only 0.2% to 0.5% of US high school athletes ever make it to the professional level.<sup>37,53</sup>

This is why, at present, early sports specialization is controversial. Concerns have been raised about the appropriate age to begin as well as the risks and benefits of this type of athletic participation.<sup>27,28,48</sup> The Developmental Model of Sport Participation developed by Côté and colleagues<sup>9</sup> provides a schema of different pathways of involvement in sport, specifically prescribing an early sampling as the foundation for sport participation (both elite and recreational) for the first 2 pathways of the schema (Table 1). While pathway 3 plots a course to elite performance via early sport specialization, a recently published evidence-based review concluded that, for most sports, intense training in a single sport to the exclusion of others should be delayed until middle or late adolescence to optimize success and minimize risk for injury and psychological stress.<sup>27</sup> Sport specialization is associated with overuse injuries, burnout, and social isolation<sup>3,25</sup> and may be associated with quitting sports at a young age. Possibly the worst outcome of early sports specialization is injury and dropout, followed by a sedentary lifestyle and increased risk of being overweight, ultimately compounded with reduced enjoyment of physical activity in youth. This potentially may lead to long-term consequences in adulthood.

Another potential drawback to early sports specialization is that youth are deprived of participation in a diverse year-round sports season, and this can possibly lead to lost development of lifetime sports skills. These lost opportunities for fun, focused physical activity during youth likely contribute to deficits in current and long-term physical activity and health.<sup>37</sup> More specifically, sports specialization in youth may lead to reduced motor skill development. Reduced motor skill proficiency may occur as young athletes focus on the motor skills needed for their sport

but ignore the motor skills developed through a diversified participation portfolio. As young athletes continue to progress in their level of play, their opportunities for participation in various sports continue to decline. The decline of participation in other sports may be from coach or parental pressure, difficulties and conflicts in scheduling, or ultimately, a loss of interest. There may be additional coaching pressures to encourage a young athlete to only participate in a single sport and the promise of greater opportunities in that single sport. If the cycle of sports specialization occurs too early in youth, comprehensive motor skill development will be stifled, which, in turn, increases the risk of future injury and potentially reduces opportunities for the child to achieve optimal sport performance.<sup>23,37</sup> Thus, the purpose of this review is to present the potential pitfalls of early sports specialization as well as alternative strategies to optimize opportunities for all youth athletes seeking to maximize their performance while building lifelong motor skills and maintaining their overall enjoyment for physical activity.

## EARLY SPORT SPECIALIZATION DOES NOT ENSURE SPORTS SUCCESS

An area where elite athletes stand out is in their family history of sport success. Elite athletes are more likely than other students to have a parent or sibling who played sports collegiately or professionally.<sup>11</sup> Although genes do play a role in athleticism, children of athletic parents may additionally get substantial support and encouragement to pursue sports. Regardless, it is important to point out that pushing a child to specialize in a sport early in life in and of itself will not compensate for a lack of athletic genes or guarantee success.<sup>11</sup> The desire for children to succeed in sports is likely driven by several additional factors, including garnering collegiate athletic scholarships, national and Olympic-level team selection, or professional contracts. In many instances, the goals may be less lofty, such as ensuring participation in scholastic sports more generally. For these children (and their parents), the reason they specialize is a fear that if they do not specialize, they will not be able to compete at the next level of competition—the next age group of a club or the middle school or high school team. Whether it is unrealistic goal setting or, more commonly, youth just trying to “keep up” with their competing peers, convincing children (and their parents) that sports diversification is beneficial can be difficult.

A perception exists among many parents that to gain an edge toward achieving success, having their child specialize in a single sport at a young age is necessary. This may be best epitomized by the example of Tiger Woods, whose early introduction to golf, the highly structured training to which he was subjected, and his eventual success in becoming perhaps the best golfer of his generation is well known.<sup>12,18</sup> Furthermore, independent youth travel or select club teams are often seen as essential to develop exceptional skills and provide exposure to the recruiting process. These programs may encourage early sport specialization from a training standpoint, often because

the expected time commitment makes participation in other sports or activities logistically difficult.

Early single-sport specialization has been further advanced by the theory of deliberate practice. Deliberate practice is defined as a highly structured activity with the explicit goal to improve performance. This concept states that the “level of performance an individual attains is directly related to the amount of deliberate practice.” The so-called “10 year/10,000 hour rule” was subsequently coined based on studies of small numbers of chess champions and highly selected elite musicians whose success was attributed to very high volumes of training in their disciplines.<sup>5,13</sup> However, studies of athletes indicate that the strategy of early single-sport specialization (performance in these sports occurs at a young age before pubertal maturation is complete) is not a guarantee for success, and in some cases, may be detrimental to long-term achievement and associated with increased injury risk.<sup>23,28</sup>

With the exception of a few sports such as gymnastics and figure skating, the odds of excelling to the elite level in sports do not appear to be increased by early sports specialization. A study of 35,000 highly qualified young athletes selected to train in Russian sports schools found that only 0.14% reached high-level status.<sup>31</sup> Similarly, a 7-year study of German athletes selected to train at young ages found that only 0.3% eventually ranked among the 10 best international senior athletes.<sup>21</sup> Another study of elite and near-elite athletes found that successful elite athletes actually specialized at a later age and trained less in childhood. The elite group, however, pursued intensive training more during late adolescence than their near-elite peers.<sup>36</sup> Vaeyens and colleagues<sup>59</sup> reviewed the training history of 2004 Olympians and found that the mean age of sport initiation was 11.5 years. In addition, the age of onset of training was negatively correlated with the time differential before the athlete achieved competition in an international championship. They concluded that early, high-intensity, sport-specific training and involvement in sports talent programs at a young age is not necessary for international-level success. A study of more than 1500 German national athletes in all Olympic sports reported that those who achieved the international level initiated training in their main sport at an older age. This study also found that, on average, these athletes participated in 2 other sports prior to or in parallel with their main sport. These athletes also continued in other sports to a later age. Importantly, adolescent success did not predict senior-level success.<sup>21</sup> At the collegiate level, a study of National Collegiate Athletic Association (NCAA) Division 1 athletes at 1 university found that 70% did not specialize in their sport until at least age 12 years, and 88% had participated in more than 1 sport. Overall, these university athletes specialized at an older age compared with students at the same university who were not NCAA athletes (mean, 15.4 vs 14.2 years).<sup>55</sup> This study also found that more than 40% had a parent who had competed at the collegiate or professional level, suggesting that genetic and environmental factors play a large role in long-term athletic achievement.<sup>55</sup>

**Table 2. Recommendations for stage of specialization and sport<sup>a</sup>**

Type of Sport	Recommended Stage of Specialization
Gymnastics, diving, figure skating	Early adolescence
Team sports, tennis, golf	Middle adolescence
Endurance sports, track, distance events	Late adolescence

<sup>a</sup>Adapted from Jayanthi et al.<sup>27</sup>

Overall, the available data among athlete populations indicate that only a select few who specialize in a sport at a young age achieve elite-level success. It is also important to note that success at young ages does not predict long-term success, and in some cases, early sport specialization may in fact be a limiting factor to elite-level achievement.<sup>11</sup> Furthermore, there are numerous examples of athletes who became champions after relatively short periods of time spent training in their sport or who were part of talent crossover or talent “recycling” programs.<sup>11</sup> The current data lend support to the concept of early sport diversification and recognize that while deliberate practice is certainly necessary for success in sports, it is not sufficient (Table 2). There are a few sports where it may be acceptable to specialize during preadolescent stages because peak performance is typically prior to full maturation. Previous studies have suggested that elite performers in rhythmic gymnastics had specialized prior to the age of 12 years.<sup>30</sup> Middle-entry sports typically represent the far majority of sports where specialization occurs beyond the age of 12 years (or during middle adolescence); these may involve individual sports such as tennis and many team sports.<sup>31</sup> Late-entry sports typically include specialized training toward late adolescence or full maturity, such as endurance or timed event sports. Elite athletes accumulated more training hours only by the age of 21 years when compared with nonelite athletes in sports that are “measured,” and not during adolescence.<sup>36</sup>

While this comprehensive review of single-sport specialization and intensive training generally suggests that in the majority of sports focusing on intense single-sport training generally occurs after the age of 12 years, there are a number of limitations with many of the studies. There are several retrospective survey studies, including some with potential recall of >10 years and some with small sample sizes, as well as varying definitions of specialized training. Some studies include only single sports while others include numerous sports with varying definitions of specialized and intense training. There have been few, if any, long-term prospective surveillance studies comparing the potential benefits and risks of young athletes who are specialized versus those who are diversified. Regardless, there is

little scientific evidence that supports the notion that there is a benefit toward success with earlier single-sport training.

## ALTERNATIVES TO SPORT SPECIALIZATION

Young athletes are being subjected to training for sports at earlier ages and are specializing in 1 sport with the goal of attaining elite status.<sup>34,52</sup> The opportunity for sport sampling is important for injury prevention. Without an opportunity to “sample” different sports during childhood, young athletes are less likely to acquire the foundational physical, psychosocial, and cognitive skills that are important for long-term success in sport.<sup>9</sup>

Additionally, modern day youth are likely not prepared for the demands of sports practice and competition, as the grades for indicators of youth physical activity around the world are low/poor and suggest there is widespread evidence of a physical inactivity crisis.<sup>58</sup> Moreover, 44% of school administrators in the United States report having cut significant time from physical education and recess to increase time for reading and mathematics.<sup>8</sup> Physical education is the only guaranteed opportunity for most children to enhance their physical literacy and experience a variety of sports—from field ball games to resistance training—with appropriate instruction and assessments. Children who are not exposed to meaningful activities and different sports during physical education may be more likely to specialize in 1 sport to exploit a narrow set of motor skills that leverage their personal movement confidence, experience early success, appease parents, and gain the support of their youth coaches. Physical education provides the ideal “alternative” mechanism for a specialized athlete to develop physical literacy as well as broaden their opportunity for sports sampling.

Despite the increasing number of youth sport participants, a contemporary consequence of the sedentary nature of modern day youth is a lower level of motor skill competency and muscular fitness.<sup>7,24,57</sup> The prevalence of competency in fundamental movement skills in a large sample of school-aged children was found to be low, and a clear and consistent relationship existed between low competency in fundamental movement skills and inadequate levels of cardiorespiratory fitness.<sup>24</sup> Other researchers examined secular trends in muscular fitness and found declines in bent-arm hang, sit-up performance, handgrip strength, shuttle run performance, and trunk flexibility in school-aged youth.<sup>7,57</sup> Collectively, these findings highlight the need to improve the preparedness of modern day youth for the demands of sports training and competition to enhance their motor skills performance, improve their physical fitness, and reduce associated injury risks. Without directed movement practice and exposure to a variety of skill-building games and activities early in life, children are less likely to maximize their physical development and capitalize on their athletic abilities later in life.<sup>20,22,36</sup>

Children should participate in a variety of sports with qualified youth coaches who, in turn, have the necessary knowledge and

skills to organize and monitor age-related training and adaptations so that the children are more likely to experience long-term success as competitive athletes. Developmental sport programs need to match the anatomic, physiological, and psychosocial uniqueness of children and adolescents and relate to their long-term physical development to build a strong foundation for future success.<sup>32,38</sup> Some children may develop advanced level or adult-level skills at a young age and may create some coaching philosophies that are adult-driven and possibly more appropriate for an older athlete. This may put them at risk for general and serious overuse injuries<sup>23,28</sup> rather than enhance their physical fitness qualities, improve their movement skill repertoire, and expand their sporting knowledge.

Intense training may result in injury when weekly hours of sports participation exceed a child's age<sup>28</sup> and when the total weekly hours exceed 16.<sup>56</sup> Specialized training itself may have an independent risk for injury as it also limits the amount of recreational and unstructured exercise. Young athletes may be able to participate in similar volumes of physical activity without additional injury risk, but the distribution of physical activity is important. In a study of nearly 1200 young athletes in a variety of sports, the ratio of weekly hours in organized sports to weekly hours in unorganized free play (sports training ratio) approached 2:1.<sup>28</sup> Young athletes who exceed a sports training ratio of 2:1 are more likely to suffer a serious overuse injury.<sup>28</sup> These data seem to indicate that unstructured free play may potentially have a protective effect from serious overuse injury. While this needs to be further investigated, children may be able to self-regulate their own physical activity volumes prior to serious overuse injury versus adult-driven organized practices. Future evaluations of intensity and volume of organized training in young athletes should also include the ratio of organized to unorganized sports and physical activity participation.

In terms of physical conditioning during sports practice, youth sport practice and games may not provide sufficient moderate to vigorous physical activity to meet daily recommendations since a large proportion of time is spent in sedentary or light physical activities. Low levels of habitual physical activity significantly increase injury risk during leisure-time physical activity, physical education, and sports, and the children who are least active appear to have the highest injury risk.<sup>2</sup> A youngster's participation in sport should not start with competition but rather evolve out of preparatory conditioning and instructional practice sessions that address individual deficits. At present, policies and strategies are needed to ensure that youth are prepared for optimal engagement in organized team sports and have the opportunity to enhance their physical fitness while learning and practicing game tactics.

New insights into the design of youth physical development programs may prove to be valuable for youth coaches who need to integrate both health- and skill-related fitness components into a time-efficient training session to alter physical activity trajectories and associated injury risks. Integrative neuromuscular training (INT) includes general (eg, strength-building exercises) and specific (eg, exercise targeted

to motor control deficits) conditioning activities that are designed to enhance both health- and skill-related fitness in a socially supportive environment (Figure 1).<sup>4</sup> INT provides a much needed opportunity for inactive youth to enhance their muscular fitness and improve their motor skill performance, which form the foundation for future participation in context-specific sports and games. This type of age-related training is designed to promote the development of neurocognitive processes and visual-motor abilities under the guidance of a qualified coach who is able to deliver corrective feedback for identified deficits (Figure 2).<sup>49</sup>

Including integrative neuromuscular programming as part of participation in physical education and sports may provide a mechanism to develop dynamic interceptive actions and to increase physical activity levels and sports skills in youth.<sup>2,42</sup> In sports such as football, for example, being able to catch a ball without being distracted by a defender can improve reaction time and potentially decrease injury risk as well as enhance motor skill performance.<sup>6</sup> Of potential relevance, a multisport approach provided with physical education curriculum that introduces a sampling of varied experiences tied to multiple sports in a coordinated fashion can induce more pronounced improvements in aerobic fitness and kinesthetic discrimination ability.<sup>40</sup> When the sports sampling is matched to ability and interest of youth, there are also improvements in task orientation and self-efficacy compared with traditional physical education.<sup>54</sup> INT taught by trained specialists that incorporates intermittent-type activities into a well-designed plan may offer valuable health and fitness benefits to school-aged youth.<sup>14,33,39,40,44</sup> One INT program consisted of body weight exercises with punch balloons that focused on enhancing muscular strength, muscular power, and fundamental movement skills (Table 3). The programming that was added 2 times per week during the first 15 minutes of a grade 2 physical education class provided an effective and time-efficient addition to physical education, as evidenced by improvements in health- and skill-related fitness measures.<sup>14</sup>

The concept of requiring aspiring young athletes who are deficient in habitual exercise to participate in an age-related preseason conditioning program and sample a variety of sports during the growing years could have significant benefits that are consistent with lifelong health and well-being. If a child does choose to specialize in sport, emergent evidence indicates that integrative neuromuscular training may offer observable benefits over specific year-round sports programming.<sup>32,39,41,50,51</sup> Single-sport-specialized athletes may benefit from enhanced motor competence with INT-focused training to improve physical performance and diversify motor skill competence.<sup>14,15,44-47,50</sup> Implementation of INT training may provide important supportive programming if implemented in the early years as it capitalizes on the corticomotor plasticity in youth during preadolescence.<sup>14,16,29,39-41,49,51</sup> Based on the cumulative evidence, if a child chooses to specialize, early exposure to INT provides an additional benefit that can help enhance motor skills, improve sport performance, and reduce injury risk.<sup>14,15,17,26,43,47</sup>

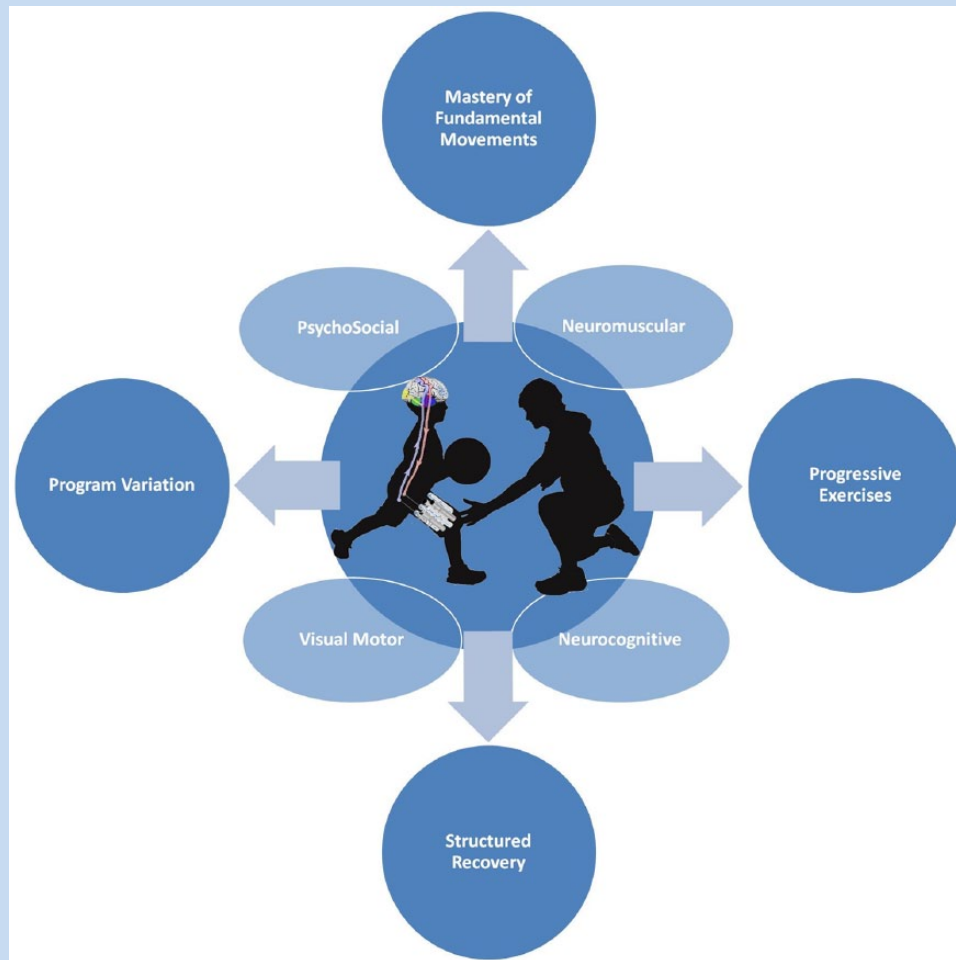


Figure 1. Qualified education and instruction support the complex programming components for effective implementation of integrative neuromuscular training. Reprinted with permission from Myer et al.<sup>49</sup>

Given the known physical and psychosocial benefits of youth sports participation, it is imperative to address contemporary concerns regarding the preparedness of modern-day youth for sport and the importance of multisport exposure for most young athletes. Schools have a unique opportunity to enable less-skilled boys and girls to enhance their skill competency during physical education class while providing an opportunity for others to focus on self-improvement in a dynamic environment. Youth coaches and sport administrators should ensure that young athletes are engaged in meaningful physical activities during sports practice and need to be aware of the limitations of early sports specialization during childhood. Finally, pediatric health care providers have a responsibility to ensure that young athletes develop a range of physical, psychosocial, and cognitive abilities across a variety of sports since the lingering effects of early sports specialization and overuse injuries may deter youth from participating in other forms of physical activity as an ongoing lifestyle choice later in life.

## RECOMMENDATIONS BASED ON THE AVAILABLE EVIDENCE

- Youth should be given opportunities for free, unstructured play to improve motor skill development, and parents and educators should encourage child self-regulation to help limit the risk of overuse injuries.
- Parents and educators should help provide opportunities for free, unstructured play to improve motor skill development during the growing years, which can reduce injury risk during adolescence.
- Youth should be encouraged to participate in a variety of sports during their growing years to influence the development of diverse motor skills and identify a sport, or sports, that the child enjoys.
- Children who do participate in more hours of sport per week than their age, and for more than 16 hours per week in intense training, and who are specialized in sport activities should be closely monitored for indicators of burnout,



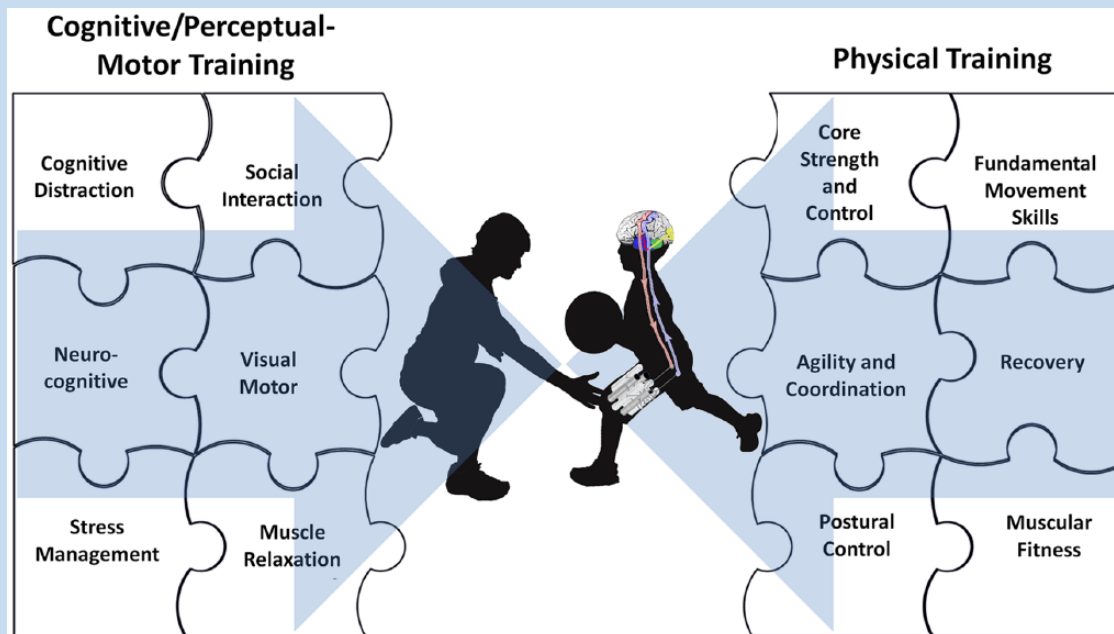


Figure 2. Integrative training model indicating a focus on integration of physical and cognitive training that is consistent with programming for youth. Adapted with permission from Myer et al.<sup>40</sup>

Table 3. Structure of INT program with primary and secondary exercises that were implemented into the first 10 minutes of physical education curriculum<sup>a</sup>

Primary		Secondary	
Weeks 1-8	Weeks 1-2	Weeks 3-5	Weeks 6-8
Front squat	SL balance	SL balance and OH press	SL balance and CP
Squat jump	OH press and catch	SL OH press and catch	Get up and catch <sup>b</sup>
90° jump	Knee tap and catch	ALT knee tap and catch	Knee tap, turn, and catch
Plank	Hip twister	OH chop	Diagonal chop
Balloon drop and catch <sup>c</sup>			

ALT, alternate right and left knee; CP, chest press; INT, integrative neuromuscular training; OH, overhead; SL, single leg.

<sup>a</sup>Reprinted with permission from Faigenbaum et al.<sup>14</sup>

<sup>b</sup>From a sitting position on the floor with a balloon in front of the chest, children tossed the balloon into the air and stood up as quickly as possible to catch the balloon in an athletic stance.

<sup>c</sup>Exercise was performed with eyes open weeks 1 through 4 and eyes closed weeks 5 through 8.

overuse, injury, or potential decrements in performance due to overtraining.

- All youth (including inactive youth) can benefit from periodized strength and conditioning (eg, INT) to help them prepare for the demands of competitive sport participation.
- Youth who specialize in a single sport should plan periods of isolated and focused INT to enhance diverse motor skill development and reduce injury risk factors.

## CONCLUSION

The current evidence-based review supports the contention that children should be encouraged to take part in a variety of sports at levels consistent with their abilities and interests to best attain the physical, psychological, and social benefits of sport.<sup>1,35</sup> Children who specialize early (eg, prior to maturation) in a single sport may execute less age-appropriate sports skills, especially when they do not participate in as much unstructured free play

as their peers. Without opportunities to experience sports diversification, children may not fully develop neuromuscular patterns that may be protective of injury. Alternative solutions to sports specialization, including diverse opportunities for motor skill development during the growing years, combined with

planned integrative neuromuscular training may help optimize the potential for success in young athletes. Further opportunities created in physical education can also help expose youth to diverse sports and potentially greater opportunity to identify sports of greatest potential for success and enjoyment.



## Clinical Recommendations

### SORT: Strength of Recommendation Taxonomy

**A:** consistent, good-quality patient-oriented evidence

**B:** inconsistent or limited-quality patient-oriented evidence

**C:** consensus, disease-oriented evidence, usual practice, expert opinion, or case series

Clinical Recommendation	SORT Evidence Rating
Children who participate in more hours of sport per week than their age, and for more than 16 hours per week in intense training, and who are specialized in sport activities should be closely monitored for indicators of burnout, overuse injury, or potential decrements in performance due to overtraining.	<b>B</b>
All youth (including inactive youth) can benefit from periodized strength and conditioning (eg, integrative neuromuscular training) to help them prepare for the demands of competitive sport participation.	<b>C</b>
Youth who specialize in a single sport should plan periods of isolated and focused integrative neuromuscular training to enhance diverse motor skill development and reduce injury risk factors.	<b>C</b>

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