



Mental Health in the Specialized Athlete

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Abstract

Purpose of Review The aim of this review is to interpret the existing evidence regarding the psychological aspects of sport specialization within the context of a developmental framework.

Recent Findings The growing trend toward early sport specialization is associated with increased risk for injury and burnout, both of which have significant implications for mental health. Mental health literacy programs designed to promote awareness, decrease stigma, and encourage help-seeking behaviors can be an effective way to increase resilience and early recognition of those in need.

Summary The trend toward early sport specialization is likely motivated in large part by the expectation that it will increase the likelihood of long-term athletic success. However, recent studies suggest that the majority of elite athletes delay specialization at least until mid to late adolescence. It is essential to consider the developmental psychology of children and adolescents and to avoid imposing expectations that are beyond their neurocognitive capabilities. In addition to depression, anxiety, and burnout, young athletes who are pressured to perform to excessively high standards are likely to internalize athletic failures as feelings of shame. This can lead to maladaptive perfectionistic traits and potentially overtraining, clinical eating disorders, or other harmful behaviors that will result in declines in performance, physical health, and overall well-being. Further work is needed to better inform sport-specific recommendations regarding sport specialization and to optimize the beneficial effects of sport participation while limiting the risks of harm.

Keywords Sport specialization · Sport psychology · Youth sports · Adolescent athletes · Athlete mental health · Mental health literacy

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Introduction

Though a formal definition has not been clearly established, sport specialization generally refers to the year-round participation in a single sport (greater than 8 months per year), often to the exclusion of other sports [1, 2]. This is a practice that has become increasingly common in children and adolescents, with prevalence estimates ranging from 17 to 41% [2–4]. Due in large part to the association of early sport specialization with higher rates of injury and burnout, several guidelines have been put forth to mitigate these risks. It is generally recommended that specializing in a single sport be delayed until after puberty or late adolescence, and that young athletes be monitored for signs of burnout [2, 5]. There is also an emphasis on ensuring adequate rest, with most guidelines suggesting that young athletes have at least 1 to 2 days off from sports per week, and at least 3 months off from their primary sport each year to allow for adequate physical and psychological recovery [6]. Further, it has been

suggested that the hours per week of sport participation be limited to the child's age in years or to no more than 16 h per week, as exceeding these guidelines has been linked to increased risk of injury [5, 7].

Despite the potential consequences, the trend toward early sport specialization has not shown any signs of slowing. As a result, efforts are shifting toward working within the context of early specialization to determine how best to prevent injury and burnout and optimize the physical and psychological development of young athletes. This includes fostering neuromuscular and motor skill development, the lack of which can be a common, albeit unintended, consequence of early specialization. While there are significant concerns regarding the intensity and duration of training exceeding the biomechanical and physical capacity of young athletes, more evidence is needed to better inform the formulation of sport-specific recommendations regarding training and competition load [4].

In terms of psychological consequences of early sport specialization, existing literature suggests that absence of fun or enjoyment in sport participation, intense pressures to perform, and lack of control or decision-making power are a commonly cited reasons for withdrawal from sport in

young athletes [3]. Potential psychological consequences of early sport specialization are outlined in Fig. 1. While there is widespread consensus that athletes should be monitored for signs of burnout, realistic implementation of this concept requires continued efforts to promote awareness and education among athletes, parents, coaches, and providers alike [5, 8••].

Specialization and the Likelihood of Long-Term Athletic Success

Motivation to Specialize

The motivation for specializing in a single sport likely varies among athletes but may include passion for their chosen sport, a desire to foster the confidence born from the development of unique talents or skill sets, and/or a drive to please or impress authority figures such as parents or coaches. Ultimately, most young athletes and their parents likely share the perception that dedication to intensive training in a single sport at an early age will lead to long-term athletic achievement. This, however, may not be the case.

Fig. 1 Potential psychological risks of sport specialization. *While multiple studies have demonstrated an association between early sport specialization and burnout, the remaining factors shown above have not been explicitly linked to sport specialization. However, examination of the broader body of literature suggests that all of these factors can potentially contribute to burnout in young athletes



Likelihood of Competing at the Collegiate or Professional Level

The National Collegiate Athletic Association (NCAA) recently published statistics for each sport on the likelihood of participating at the college or professional level. They found that among high school athletes, only 3.5 to 12.8% would go on to play college sports, with the one outlier being that 26.2% of high school female ice hockey players would go on to play in college [9]. Among athletes who did make it to the college level, fewer than 10% would participate at the professional level (9.9% for baseball, 1.2% for men's basketball, 0.8% for women's basketball, 1.6% for football, and 7.4% for men's ice hockey) [9]. Closer evaluation of this data suggests that the likelihood of a high school athlete eventually participating at the professional level is exceedingly low—less than one in 100 for baseball, one in 1000 for football, and four in every 10,000 for basketball [9].

Specialization Patterns in Elite Athletes

A 2020 systematic review included 22 studies and found that on average, elite athletes specialized at an older age when compared with semi-elite or non-elite athletes, with most collegiate and professional athletes delaying specialization at least until mid to late adolescence (~ 15 to 16 years), suggesting that early specialization is not a prerequisite for future success in sports [10•]. One of the studies included in this review was a 2017 survey study of NCAA Division I athletes evaluating history of sport participation, which found that more than half of these elite athletes (58%) reported having played at least two sports through their senior year of high school [11]. Among the athletes who specialized in a single sport prior to college, the average age of specialization was 12 years, with gymnasts and figure skaters being the only two groups of athletes for whom specialization began on average prior to 10 years of age [11].

Parental Involvement

In examining the trend toward early specialization, it is important to consider the role of parental involvement and the parent–child dyad. Parents are likely influenced by a multitude of factors, including but not limited to a desire to act in the best interest of the child, their own knowledge of and experience with sports (or lack thereof), rising costs of participation, investment of time and energy, and navigating their role as a sport parent both within the unique culture of each sport and the community at large. One recent study found that a parent's beliefs and perceptions about early sport specialization were associated with the likelihood that their child would specialize, consistent with prior

studies indicating that parents were highly influential in the decision [12, 13]. They also found that the majority of parents (76%) thought that specialization would increase their child's likelihood of athletic success, and only 18% were concerned about increased risk of injury [12].

Developmental Considerations

Childhood

A discussion regarding the psychological impact of early sport specialization requires an understanding of the developmental stages of childhood and adolescence. Described by developmental psychologist Jean Piaget as the preoperational stage, early childhood (ages 2 to 6 years) is a time in which there should be an emphasis on fun and informal or unstructured play [14]. The concrete operational stage (ages 7 to 11 years), in which children are more capable of logical reasoning, is one of great neuroplasticity where there should be an emphasis on skill development rather than competitive outcomes. As defined by another prominent developmental psychologist, Erik Erikson, this is the stage at which children work to negotiate “industry versus inferiority.” During this stage, children become increasingly aware of comparison between themselves and their peers and may become discouraged or embarrassed if they are not able to keep up. It is important to ensure that children are playing with peers who are appropriately matched to their skill level and that coaches and parents maintain an encouraging tone [14].

During the early concrete operational stage (ages 7 to 9 years), children are becoming more adept at skill development and more capable of participating in rule-based structured play, but spontaneous play remains essential for their cognitive and neuromuscular development. Children at this stage are still not particularly forward thinking, and therefore are more likely to be motivated by fun and immediate reward than by future outcomes. Later in the concrete operational stage (ages 10 to 11 years), children are more capable of conceptualizing past, present, and future and of integrating feedback, which is best delivered with praise and recognition for their efforts [14]. Ultimately, the developmental framework suggests that prior to adolescence, sport participation should emphasize enjoyment, skill development, and free or spontaneous play rather than competition or criticism. This is not to say that the concept of winning or losing should be eliminated from competition during childhood, just that it should not be the point of emphasis. Instead, it should be embraced as an opportunity to develop sportsmanship and healthy responses both to victory and defeat.

Adolescence

Piaget referred to adolescence as the formal operational stage (ages 12 to 18 years), reflecting the increased ability to think abstractly, multitask, and engage in more complex problem-solving in real time [14]. Adolescents are more likely to be motivated by performance-related goals and are better able to appreciate the importance of prioritizing physical health and wellness. Athletes at this stage will compare themselves not only with their peers, but also with their own prior performance, allowing recognition of their strengths and weaknesses and enhancing their ability to integrate constructive feedback more effectively [14]. Adolescence also represents a time of identity formation in which there is an emphasis on establishing one's identity as an individual, seeking a sense of belonging, and gaining a sense of control over one's life, all of which have significant implications in the context of sport participation. Developmental considerations for young athletes are outlined in Table 1.

Anxiety

Prevalence

Anxiety disorders represent the most common group of mental disorders in youth, affecting approximately 15 to 20% of children and adolescents, and may present with emotional distress or excessive worrying, difficulty with focus or concentration, avoidant behaviors, and/or somatic symptoms [15]. The stress of athletic competition can result in varying degrees of competitive or performance anxiety, which has been shown to negatively impact performance and enjoyment, and may result in early discontinuation of sport [16]. In keeping with the developmental framework, it is essential to ensure that the level of competition is appropriate for the child's developmental stage and to avoid setting expectations that exceed the cognitive and emotional capacities of

the young athlete, as this could contribute to anxiety in this population.

Physiologic Changes in Adolescents

Adolescence brings to the forefront a plethora of factors that can lead to heightened anxiety, including physiological and hormonal changes, academic pressures, and fear of rejection, to name a few. For the specialized athlete, many of these can be compounded exponentially. Female athletes for example, particularly in sports with an aesthetic component such as gymnastics or dance, might struggle with anxiety regarding their changing body composition, as hormonal changes result in increased body fat percentage during this time. This may render them vulnerable to adopting maladaptive behaviors to mitigate weight gain and potentially lead to clinical eating disorders. Physiological changes certainly affect male athletes as well. Although they tend to develop more lean body mass after puberty, males are certainly not exempt from developing eating disorders, and in fact may go undetected for longer periods of time given that females are disproportionately affected and therefore may be more readily recognized. Beyond changes in body composition, adolescence is a time of rapid growth, often with the trunk and extremities not necessarily growing in perfect proportion. This can have substantial effects on biomechanics, coordination, and performance, with resultant implications for confidence and self-esteem.

Academics

In terms of academic stressors, specialized young athletes often engage in high intensity training for several hours each week, limiting the time and energy available to dedicate to academic pursuits. Pressures to perform academically and athletically can become overwhelming, resulting in increased anxiety, sleep disruption, decreased energy, and little to no time for rest and recovery; all of which will

Table 1 Developmental considerations for young athletes

Piaget's developmental stage	Age (years)	Developmental skills	Points of emphasis	Sport participation
Pre-operational	2 to 6 years	<ul style="list-style-type: none"> • Symbolic thinking • Imagination 	<ul style="list-style-type: none"> • Fun 	<ul style="list-style-type: none"> • Informal or unstructured play
Concrete operational	7 to 9 years (early)	<ul style="list-style-type: none"> • Concrete thinking • Integration of rules 	<ul style="list-style-type: none"> • Fun • Skill development • Immediate reward 	<ul style="list-style-type: none"> • Rule-based structured play • Spontaneous play
	10 to 11 years (late)	<ul style="list-style-type: none"> • Conceptualization of past, present, and future • Integration of feedback 	<ul style="list-style-type: none"> • Fun • Skill development • Praise and recognition • Sportsmanship 	
Formal operational	12 to 18 years	<ul style="list-style-type: none"> • Abstract thinking • Problem solving • Multi-tasking 	<ul style="list-style-type: none"> • Fun • Athletic performance • Constructive criticism 	<ul style="list-style-type: none"> • Formal and informal competition

ultimately negatively impact performance and perpetuate the entire cycle.

Fear of Rejection or Negative Evaluation

As one of the primary objectives of adolescence is to establish one's identity and individuality within a community, some of the heightened anxiety seen during this stage is related to fears of rejection or criticism from peers and/or authority figures. Specialized athletes are subject to close examination not only by peers, teammates, and opponents, but also to coaches, parents, and in many cases spectators. Depending on one's sport and level of competition, the degree of scrutiny may vary, but combined with the uncertainty of outcome inherent to competition, this can result in significant anxiety. Among competitive athletes, adolescents are likely at greater risk for performance anxiety in terms of psychological development, as younger children are less concerned about the potential for negative evaluation by others. Female athletes appear to be at greater risk than males, consistent with trends seen in the general population [17]. Older and more experienced athletes tend to have lower levels of competitive anxiety, possibly due to the development of more adaptive coping responses to the pressures of competition that comes with experience [17].

Perfectionism

Defining Perfectionism

Athletes commonly self-identify as perfectionists, and indeed often exhibit perfectionistic tendencies. Perfectionism can be conceptualized as a multidimensional construct, consisting of perfectionistic striving (i.e., a strong desire to meet exceedingly high standards) and perfectionistic concerns (i.e., fear of failure and/or harsh self-criticism) [18]. Though the former is considered to be the more adaptive element of perfectionism and the latter maladaptive, both represent a potential threat to the psychological wellbeing of the athlete, as perfectionism can be associated with depression, anxiety, and eating disorders [18, 19]. To that end, there is an important distinction between perfectionistic striving, which is perhaps best characterized by the drive to perform to unrealistic or unattainable expectations, and healthy goal setting or achievement-oriented motivation.

Risk Factors and the Role of Psychological Development

Perfectionism is often seen in those with a predisposition to neuroticism and is likely inextricably linked to shame [19, 20]. This reinforces the importance of utilizing a developmentally

informed approach both to coaching and to parenting. As reflected by Erikson's description of the latter half of childhood being a stage in which the chief objective is to establish one's sense of "industry versus inferiority," children may internalize criticism as the perception that they are inherently flawed, which is precisely the origin of shame. This reinforces the assertion that children thrive on positive reinforcement and encouragement and do not necessarily benefit from an overemphasis on competitive outcomes, as this will only increase the opportunity for failures or losses to be internalized as shame.

Adolescents are developmentally only in the beginning stages of practicing self-evaluation and learning to integrate feedback, so are similarly vulnerable to harsher forms of criticism. Care should be taken to provide encouragement and constructive criticism, and to allow them the opportunity to share their input as well. For example, it may be helpful to clearly identify a specific skill that can be improved upon while empowering the athlete to implement the necessary changes and steering clear of critiques that are likely to lead to feelings of inadequacy.

Eating Disorders

The importance of devoting care and attention toward avoiding practices that hearken feelings of shame, inadequacy, and/or powerlessness is highlighted by their link to clinical eating disorders—one of the most salient manifestations of maladaptive perfectionistic striving [19]. Multiple studies have found a higher prevalence of eating disorders in athletes compared with non-athletes, particularly in sports that require a lean physique [21, 22]. Disordered eating may go unrecognized in athletes for several reasons, including underreporting, potential maintenance of normal body weight with very low body fat but high muscle mass, use of excessive exercise as a compensatory behavior, and/or failure to link physiological indicators such as amenorrhea or declining performance to nutritional deficiencies [21]. Due to the myriad health consequences, athletes with identified eating disorders require laboratory evaluation to identify abnormalities in electrolytes or other elements of physiological function, and may require further testing such as electrocardiogram or bone density scan [23]. Ultimately, these complex disorders require treatment with a comprehensive multidisciplinary team.

Depression

Prevalence and Risk Factors

Though the prevalence of depression in elite athletes is likely comparable to if not slightly lower than the general population, there are several unique considerations in athletes.

Existing literature suggests that depression is more common in individual compared with team sport athletes, and has a higher prevalence in aesthetic sports [21, 24]. Specific risks for depression include competitive failures, lack of healthy relationships, and injury necessitating time away from sport.

Athletic Identity

Athletic identity, a social and cognitive construct that refers to the extent to which one identifies as an athlete, is an important consideration in this context [25]. One can imagine that for a young athlete specializing in a single sport from an early age, they might understandably construct their sense of self around their role as an athlete. This may increase the likelihood that performance failures will be internalized as feelings of inadequacy and might explain why individual sport athletes are more likely to experience depression than team sport athletes, for whom success and failures are shared among the entire team.

Injury

Injury also presents a significant risk for depression in athletes, particularly when requiring prolonged time away from sport. For the specialized athlete, sport participation may represent not only an integral part of their identity, but in many cases might be a source of confidence and self-esteem, a mechanism for coping with life stressors or discharging negative emotions, and/or the grounds on which most if not all of one's social relationships are based. Abrupt removal from sport due to injury therefore can have tremendous impact beyond the immediate effects of the injury itself, as demonstrated by a recent systematic review which found that a stronger athletic identity was associated with increased risk for developing depressive symptoms after injury [26].

Social Isolation

Though the detrimental effects of social isolation in the aftermath of an injury may be quite evident, it is also important to recognize the potentially isolative effects of specialization in general. Excessive volume and/or intensity of training may limit the opportunity for age-appropriate social engagement with peers, with implications for social and emotional development and potentially increased risk for depression.

Burnout

Depression in athletes is often discussed in the context of overtraining and burnout. These concepts are best understood as a spectrum on which the early stages are

characterized by overreaching, where functional overreaching refers to a short period of intentionally training beyond one's normal intensity and duration to achieve a so-called supercompensation effect, commonly employed in periodization approaches to training. Non-functional overreaching is when this increased intensity is implemented to a great enough extent that it negatively impacts performance and requires days to weeks to recover. Further along this spectrum is overtraining syndrome, in which excessive training results in persistent declines in performance, depressed mood, fatigue, and other physiological and hormonal changes, requiring at least 2 months to fully recover [27]. Burnout occurs when the extent of the psychological and/or physiological fatigue exhausts the athlete's motivation to continue to participate, potentially leading to withdrawal from sport.

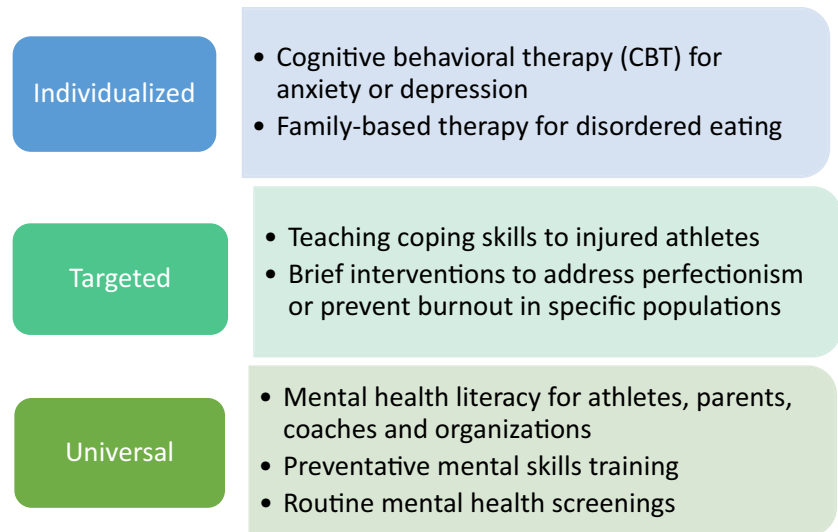
Treatment

Individualized Treatment

Consistent with a preventative health model, mental health support can occur at varying levels, including individualized treatment, interventions targeted to specific populations, and implementation of universal practices or policies [28]. Examples of treatments at each of these levels are highlighted in Fig. 2. At the highest level of need are athletes with clinically diagnosable mental health conditions such as anxiety, depression, or disordered eating. Drawing from the broader literature on youth mental health treatment, current evidence-based guidelines support the use of cognitive behavioral therapy (CBT) as a first-line treatment for both pediatric depression and anxiety [29, 30]. For youth with greater symptom severity or who do not respond to CBT, pharmacological approaches including selective serotonin reuptake inhibitors (SSRIs) can also be used and have substantial empirical support [29, 30]. While family-based therapy has been demonstrated to be the most effective treatment approach for eating disorders in adolescents, CBT may also be useful in this setting, either as an adjunct to family-based therapy or with patients for whom family-based treatment is not an option [31].

Roles of Providers, Parents, and Coaches

Treatment for mental health disorders of specialized young athletes should be provided by licensed mental health providers with the requisite training and expertise, such as a clinical psychologist, psychiatrist, licensed clinical social worker, psychiatric nurse practitioner, or a licensed mental health counselor [32]. However, anyone

Fig. 2 Treatment and prevention

who interacts regularly with specialized young athletes can play a role in supporting their mental health. A qualitative study exploring the perspectives of adolescent male athletes found that parents and coaches were both considered integral to the support system, and that parents were viewed as the best equipped to recognize early signs of emotional or psychological difficulties [33]. Coaches can also have a tremendous influence on the development of young athletes, and are well-positioned to positively impact their mental health and wellbeing. This can be achieved by openly discussing mental health using non-stigmatizing language, modeling good self-care, recognizing and addressing any concerning behavioral changes, providing information about local treatment options, and, if needed, modifying sport-related demands to better support the needs of the athlete [34•, 35].

Targeted Measures

For athletes at heightened risk for mental health concerns, closer monitoring and formal screening for psychological symptoms may be warranted. One such example is athletes recovering from injury, given the increased risk for depression, anxiety, posttraumatic stress, disordered eating, and substance misuse in this setting [36•]. In light of the prevalence of mental health needs in this population, it may be optimal to integrate psychologists into the care of pediatric sports medicine patients. This would allow the opportunity to proactively administer brief interventions to support coping with injury and time away from sport, and to facilitate treatment referrals for any identified mental health needs such as depression or disordered eating [37••].

Other examples of athletes who may warrant targeted mental health support are those who present with features

of perfectionism or burnout, both of which can have detrimental effects on performance and overall wellbeing. Whether symptoms are identified by concerned coaches or parents or self-reported by athletes, referrals should be made to licensed mental health providers when clinically indicated. Existing evidence supports the use of CBT-based skills and mindfulness techniques as targeted interventions to address symptoms of perfectionism and burnout in athletes [38, 39].

Universal Initiatives

Ideally, a universal approach to the prevention of adverse mental health outcomes and health promotion would be integrated into the preparation and training of young athletes, including mental skills training and educational opportunities for athletes, parents, coaches, and sport organizations [40, 41]. These initiatives have the potential not only to bolster the resilience of young athletes and decrease the likelihood of burnout, but also to potentially prevent the emergence of mental health disorders such as anxiety, depression, or disordered eating.

Mental Health Literacy

Mental health literacy refers to one's knowledge and beliefs about mental health, including the ability to recognize warning signs, identify and utilize available resources, and support others when needed [8••]. One example of how this might be implemented in the athletic population was demonstrated by Vella et al., who established a mental health literacy program utilizing a combination of in-person and Web-based training for adolescent male athletes, their parents, and coaches, with the in-person trainings incorporated into the regular practice schedule.

Using a community-matched design, they found significant benefits for mental health literacy, confidence in identifying resources and seeking help, resilience, and wellbeing [8••]. Another study conducted with collegiate athletes provided three sessions on healthy eating and body image and showed significantly fewer symptoms of disordered eating 18 months after the intervention [42].

Preventative Mental Health Measures and Decreased Risk of Injury

In addition to preventing mental health disorders and optimizing early identification, prevention programs may also reduce injury risk in athletes. One study found that collegiate rowers randomly assigned to a 7-week cognitive behavioral based prevention program had fewer total injury days and fewer health service visits compared to matched controls [43]. In a meta-analysis of studies in the adult literature, preventative psychological interventions were associated with a significant reduction in the likelihood of future sport-related injuries [44].

Conclusions

Promoting the mental health and psychological wellbeing of specialized young athletes requires a multidimensional team-based approach, starting with the recognition that mental health is as important as physical health and that the two are inextricably linked, with significant implications for performance, recovery from injury, and long-term athletic success. The importance of understanding the developmental psychology of children and adolescents cannot be overstated, as this framework can be used to optimize the benefits of sport participation while avoiding potentially detrimental practices. Implementation of mental health literacy programs for athletes, parents, coaches, and youth sport organizations can enhance resilience, foster early identification of those in need, and encourage help-seeking behavior. Further investigations are needed to explore the efficacy of various community-based interventions, to identify appropriate screening measures, and to establish sport-specific recommendations regarding all aspects of specialization.

Declarations

Conflict of Interest Mary M. Daley, Jamie Shoop, and Melissa A. Christino declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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•• Of major importance

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