

Effects of Early Sports Specialization on Mental Health and Physical Injuries

A Synthesis Project

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Effects of Early Sports Specialization on Mental Health and Physical Injuries

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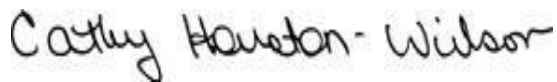


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### **Abstract**

In the landscape of athletics, the topic of sports specialization has recently become more prevalent. From a young age, athletes and their parents see playing sports as an avenue to earn college scholarships, as well as other monies via competition professionally and/or endorsements. With these goals in mind, some athletes see the benefits of choosing to specialize, and to only play one sport year-round. However, specializing in a single sport may also have negative consequences that may not be expected. The purpose of this synthesis is to investigate the effects of early sports specialization on mental health and physical injuries. It was reported that mental health issues from sports specialization are often associated with burnout athletes may no longer enjoy the sport, and they may end up having shortened careers. In addition, physical injuries are often due to overuse of specific body parts for particular sports. This literature review concludes that the benefits of specializing in one sport are more often outweighed by the negatives consequences.

**Key Words:** Youth Athletes, Sport Specialization, Burnout, Injuries

## Chapter 1 – Introduction

In previous generations, it was not uncommon for high school athletes to participate in two or more sports. Seasonal sports would generally remain in their season. There may be offseason activity, but it was much more generalized. Athletes currently competing professionally are more commonly to have played multiple sports than those currently in youth/high school sports (Buckley et al., 2017). There were also less opportunities to play on year-round teams and do sport specific training all the time.

Today, many youth athletes focus on one sport to gain a competitive advantage (Rugg et al., 2021). Parents consider specializing in a single sport as an ideal way to develop sport skills and make a college team (Post et al., 2019). In this way, sports specialization is meant to have a positive effect on athletes. However, there are questions as to whether sports specialization can have negative effects as well. For example, specialization has the potential to increase the rate at which injuries can occur, where athletes can be injured from overusing the same extremities (Hall et al., 2015). Furthermore, effects on mental health can arise from specializing in a single sport, such as burnout and raised stress levels.

With the increasing amount of money and scholarships to be gained from athletics, it makes sense that young athletes and their parents want them to succeed. There is much more money available today at the higher levels of athletics, including scholarships; name, image, and likeness deals (NIL); or professional contracts. With multiple sports consuming limited time, many young athletes choose to play just a singular sport from a young age, and are often encouraged to do so by parents and coaches (Padaki et al., 2017). As a result, there has been a large increase in the amount of year-round sport programs available for youth athletes (Rugg et al., 2021). This results in the loss of the traditional unstructured play that children often enjoy.

And while there may be some performance successes from intensive year-round training, a singular, year-round focus may also lead to burnout, mental health issues, and physical injuries.

### **Statement of the Problem**

This synthesis will include articles that investigate sports specialization. Some will offer the perspective of medical doctors who describe physical injuries, while some articles examine the perspective of psychologists on mental health effects. It is commonly accepted that a wide range of physical activity and athletics can be beneficial to skill development. However, it is becoming more common for athletes to focus their attention on a singular sport as they pursue success. But, whether the benefits of sports specialization outweigh its negative effects is uncertain. Young athletes are specializing in one sport at an early age, which may be resulting in burnout, other mental health issues, as well as physical injuries.

### **Purpose of the Synthesis**

The purpose of this synthesis is to investigate the effects of early sports specialization on mental health and physical injuries.

### **Operational Definitions**

1. Sports Specialization: year-round training (greater than 8 months per year), choosing a single main sport, and/or quitting all other sports to focus on 1 sport.
2. Burnout: Athletes losing interest in a sport due to too much time spent playing.
3. Mental Health: A state of mental well-being that allows people to learn/work well and cope with the stresses of life.
4. Physical Injuries: Damage to the body from an external source.

## **Research Questions**

The following research questions in this study are as follows:

1. What are the negative effects of early sports specialization?
2. Can early sports specialization be beneficial?
3. Are injuries and mental health issues more prevalent in young athletes that specialize early?

## **Delimitations**

1. Articles reviewed for this synthesis have been published within the last 10 years.
2. Any sport can be included in this synthesis.

## **Chapter 2 – Methods**

The purpose of this chapter is to discuss the methods utilized to review the literature on the effect of early sports specialization on young athletes. Articles reviewed for this synthesis were obtained using The College at Brockport's Drake Library. The EBSCO database specifically was used. SPORTDiscus was the database within the EBSCO database that specifically yielded results.

To be included in this synthesis, articles had to be published within the past 10 years (2012-present) and had to be peer-reviewed articles. Within these specific databases, key words were used to search for appropriate articles. Searching "sports specialization" yielded 3,174 results. Searching "sports specialization in young athletes" yielded 343 results. Adding "sports specialization burnout" yielded 100 results, and finally searching "sports specialization in young athletes injuries" yielded 177 results. When the date range and the peer reviewed filters were



applied, titles and abstracts were read. Appropriate articles were those that applied to the research questions asked. Once 10 applicable articles were found, the research concluded.

To compile data on the topic of the effects of sports specialization on young athletes, a final critical mass of 10 articles were used. These articles came from the following journals: two from the *Orthopaedic Journal of Sports Medicine*, four from the *Journal of Athletic Training*, one from *Sports Health*, two from *The American Journal of Sports Medicine*, and one from the *Journal of Sport Rehabilitation*.

The data from these 10 critical mass articles discussed the topics from research questions in this study regarding sports specialization. Some focused on physical injury; some focused on mental health, and some focused on the overall experiences of athletes that specialized at a young age. Data from the studies was collected using questionnaires, surveys, narratives, and physical tests, and was then analyzed using multiple statistical methods.

### **Chapter 3 - Review of Literature**

The purpose of this chapter is to review literature on the effects of sports specialization on young athletes. In particular, the following topics will be investigated: Sports specialization trends/potential benefits, physical health effects of sports specialization, and mental health effects of sports specialization. This review will consider all three and reach a conclusion about the overall topic.

#### **Sports Specialization Trends**

Sports specialization is not necessarily a new idea, but as higher levels of sports get more competitive it is something that is trickling down. Buckley et al. (2017) investigated sport specialization between 3090 athletes at the professional (1731), college (856), and high school

(503) levels. Using a survey, athletes were asked whether they had specialized in a single sport. It was reported that college athletes had the highest percentage of early sports specialization compared to professional and high school (67.7% vs 46.0% and 45.2%, respectively). The authors of this study concluded that trends pointed to current high school athletes specializing in one sport 2 years earlier than current college and professional athletes, suggesting that specializing early isn't a prerequisite to being an elite level athlete.

Bell et al. (2019) investigated trends of sports specialization at a public health scale. Prevalence of sport specialization, economic burden of sport specialization, and physical literacy of athletes were all investigated. Surveys and estimates were conducted that involved medical clinicians, youth sport organizations, parents, and coaches. The authors concluded that the prices and negative effects of specializing early diminished the positive effects of sport specialization. Instead of the money being spent on one specific sport all the time, investing in school-based physical education will produce more well-rounded athletes.

Biese et al. (2022) compared specialization trends between athletes that went Division 1 (D1) and those that played club sports. Using survey data, 261 D1 athletes and 180 club level athletes participated in a survey that outlined how specialized they were in their sport, when they began their organized sport, and several influential factors for participation in their sport. The authors concluded that athletes did not necessarily need to be highly specialized to earn a college scholarship, and they advocated for healthy, long-term development, as opposed to early specialization.

## **Physical Health Effects of Sports Specialization**

There is a great deal of literature that addresses overuse injuries and their relation to early sports specialization. McGuine et al (2017) investigated lower extremity injury rates and how they associated with early sport specialization, using questionnaires with 1,544 participants, with a combined 2843 athletic seasons. Questionnaires addressed their sport participation, lower extremity injury rates, and level of sport specialization. Data was analyzed using group proportions and sorting athletes into low, moderate, and high specialization groups. Athletes with moderate specialization had a 50% higher rate of lower extremity injuries, while those with high specialization had an 85% higher rate. The authors of this study concluded that specialization significantly increases injury rates.

Hall et al. (2015) offered a similar perspective. The authors investigated whether sport specialization is associated with an increased risk of anterior knee pain compared with those who participate in multiple sports. In this study, 546 adolescent female athletes completed the Anterior Knee Pain Scale (AKPS) and answered questions about sport specialization and injury history. It was reported that the group of sport specialized athletes had an increased risk for cumulative anterior knee pain diagnoses. However, they also on average were taller and heavier. In any case, the study indicated that sports specialization carried a higher risk for injury.

Jayanthi et al. (2019) investigated sports specialization in an effort to guide athletic trainers and sports medicine providers. The authors looked at information about overuse injury as well as acute injury risk. This was accomplished by analyzing position statements by various societies of medicine and by analyzing survey data about sports specialization. Furthermore, this study attempted to differentiate between different sports. The authors concluded that overuse

injuries were more prevalent in athletes that specialize early, but if they specialized after the age of 12 years, then there were performance benefits to be had.

Dahab et al. (2019) looked at the impact of athletes that specialize and play on a club team, expecting that injury risk would likely be higher for those participating in club sports in addition to their high school seasons. In a cross-sectional study with 97 participants (46 of which participated in club sports), athletes were classified into low, moderate, and high levels of specialization. In addition to physical injuries, quality of life was investigated. After receiving responses to a questionnaire and undergoing preseason physical exams, this study didn't report an association between high school athletes that specialized and participated in club sports being more at risk. The authors did not see that more participation in a single sport had an increased effect on injury risk, although they were cautious in their conclusions.

### **Mental Health Effects of Sports Specialization**

In addition to physical injuries, early sports specialization may also affect the mental health of athletes. Brenner et al. (2019) investigated the psychosocial effect of sports specialization with respect to the areas of mental health, self-esteem, sleep, performance, and overall injury risk. Using a survey, many athletes responded that specializing in one sport increased pressures in their mental state. Sports are often seen as beneficial for mental health and as a way to relieve stress. However, the authors of this study concluded that if specialization occurs then it negates these positive effects.

In another study, Rugg et al. (2021) investigated the trend of injuries, attrition, and burnout for 1699 former NCAA athletes. These athletes completed a survey which asked about demographics, sports played, years of participation, specialization history, and injury history. It

was reported that the number of athletes at the NCAA level that specialized early was low, and burnout occurred often in individual sport athletes and female athletes.

Finally, Christino et al. (2021) investigated the association between sports specialization and athletes' coping skills with 334 sports medicine patients. Surveys included the Athletic Identity Measurement Scale (AIMS), Jayanthi Sport Specialization Scale, and Athletic Coping Skills Inventory (ACSI). The authors discovered that the earlier athletes specialized in a sport, the higher their level of athletic identity was. Coping strategies were better developed in specialized athletes, potentially a result of increased general stress.

An understanding of sport specialization may provide benefits and can aid in protecting youth athletes' minds and bodies. Coaches, parents, and medical professionals are in positions where they can understand these topics and apply them to the athletes they support. With the trend of sports specialization on the rise, it is critical that the positive effects are clearly identified, and that the negative effects aren't ignored in the search for performance successes.

#### **Chapter 4 – Discussion, Conclusion, & Recommendations**

The purpose of this chapter is to showcase the results of the review of literature on the effects of early sports specialization in young athletes. In addition, these results will be applied to the research questions that guided this synthesis project. Finally, recommendations for future research on this topic will be made.

##### **Interpretations**

The first research question posed for this literature review investigated the effects of early sports specialization. The findings of this review found that there was a broad range of effects that are imposed on young athletes that specialize early. Not every effect found was negative, but

most were. For example, lower body injuries in athletes that specialized early were more prevalent, likely due to a higher frequency and intensity of use (Mcguine et al., 2017, Hall et al., 2015). Furthermore, specialized athletes were more likely to experience burnout, lack of sleep, and playing sports for the wrong reasons. Finally, specialization in one sport may impair athletes' proper development in athletics (Brenner et al., 2019). A positive effect reported was improved coping skills in athletes that specialized early. And although this was seen as a positive effect, it was also related to increased stress.

The second research question examined whether early sports specialization is beneficial. The benefit typically expected from early specialization is that athletes will have greater success at the collegiate and professional levels. There was data to support both sides of this argument. Buckley et al. (2017) found that athletes at the highest levels currently did not specialize early, and that specializing early is not necessary to be an elite athlete. Conversely, Jayanthi et al. (2019) reported that after the age of 12 there are some performance benefits to specializing early. Waiting until a more developed age may limit some of the mental and physical risks and may allow athletes to be more successful in the long run. As a concept, it would seem that sport specialization may work. However, it appears more likely that negative effects, such as physical injuries and decreased mental health, outweigh these benefits.

The final research question investigated whether injuries and mental health issues are more prevalent in young athletes that specialize early. As described previously, physical and mental health issues may be more prevalent in athletes that specialize early. Furthermore, Bell et al. (2019) reported that athletes specializing early may be having negative public health consequences, both physical and mental. Athletes are getting injured more often and are struggling with burnout, especially those that participate in individual sports (Rugg et al., 2021).

Specialized athletes often report lacking in sleep, a generally negative mental health effect. And finally, specialized athletes may become too focused on a single skill set, decreasing their overall physical literacy and resulting in skill gaps and overuse injuries.

### **Implications**

The results of this literature review can help athletes, parents, coaches, and administrators understand and recognize the effects that early sports specialization can have. Previous research seems to support the conclusions made in this synthesis. Athletes that specialize early may see some benefits, but the potential negative impact on physical and mental health issues are significant. With parents and coaches more often encouraging their athletes to specialize, there needs to be a risk-to-benefit analysis. Coaches, athletic directors, trainers, and doctors are in a position to guide these athletes in protecting themselves. Considerations should include whether to balance athletics, to wait until older ages to focus on a single sport, or to include preventive physical and mental exercises.

### **Recommendations for Future Research**

The results of this study suggest recommendations for future research.

1. Future research should study athlete and sport characteristics related to the benefits and risks of youth specialization.
2. Future research should develop athletic environments that highlight the benefits of diversifying sports in which athletes participate.

## Summary

The purpose of this literature review was to investigate the effects of early sports specialization on mental health and physical injuries. Ten articles were chosen for review using delimiting variables in a data-based search. Using these articles, the effects of early sports specialization on mental health and physical injuries were investigated.

Results of the studies reported that early sports specialization had negative risks to mental health and physical injuries, and that these risks may outweigh potential performance benefits. Mental health effects included stress, burnout, and lack of sleep. Physical injuries often resulted from excessive frequency and intensity of training. Athletes at young ages are more vulnerable to these risks, which are likely to outweigh potential performance improvements. Through continued research, athletes, their parents, coaches, and administrators should better understand sports specialization and the effects it can have on youth athletes. This will benefit all athletes and help to guide overall optimal participation in athletics.



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Hall, Barber Foss, K., Hewett, T. E., & Myer, G. D. (2015). Sport specialization's association with an increased risk of developing anterior knee pain in adolescent female athletes.

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specialization among former National Collegiate Athletic Association athletes: Trends, scholarship attainment, injury, and attrition. *American Journal of Sports Medicine*, 49(4),

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### Appendix

Author	Title	Source	Purpose	Methods & Procedures	Analysis	Findings	Discussion/ Recommendations Research Notes –  Commonalities/Differences
Biese, Winans, M., Hernandez, M. I., Schaefer, D. A., Post, E. G., Sanfilippo, J. L., & Bell, D. R.	Comparing High School Sport Specialization Trends Between Division I and Club Collegiate Athletes .	Sports Health	The purpose of this study was to examine self-reported trends in high school specialization and influences for sport participation between Division I (D-I) and college-aged club (club) athletes.	261 D1 athletes and 180 club level athletes participated in a survey that outlined how specialized they were in their sport, when they began their organized sport, and several influential factors	Chi-square analyses were used to compare specialization classifications between groups. Nonparametric tests were used to determine significant differences in age-related variables and influential factors between D-I and club athletes.	The study found that club athletes were more likely to have a “low” classification of specialization. Club athletes were more influenced by playing with friends than D-I athletes and D-I athletes were more influenced by pursuing a collegiate scholarship than club athletes	The authors came to the conclusion that athletes did not necessarily need to be highly classified to earn a college scholarship. They advocate for healthy long-term development as opposed to early specialization.

				for participation in their sport.	All analysis were also conducted with boys and girls separately		
Hall, Barber Foss, K., Hewett, T. E., & Myer, G. D.	Sport specialization's association with an increased risk of developing anterior knee pain in adolescent female athletes.	Journal of Sport Rehabilitation	The purpose of this article study is to see if if sport specialization is associated with an increased risk of development of anterior knee pain in adolescents compared with those who participate in multiple sports	546 female athletes completing the Anterior Knee Pain Scale (AKPS), and answered questions about sport specialization and injury history.	Statistical analyses were conducted in SPSS and statistical significance was established a priori at $P < .05$ . A 1-way ANOVA was used to evaluate potential group differences in height, mass, and age.	The group of sport specialized athletes had an increased risk for cumulative anterior knee pain diagnoses. However, they also on average were taller and heavier which could have an effect	The authors acknowledge that further research is needed, but their study indicated that sports specialization carried a higher risk for injury. They say the next step would be to compare data to other types of injuries
Christino, M. A., Coene, R.	Sport Specialization, Athletic Identity, and	Orthopedic Journal of Sports	The purpose of this study was to examine	334 sports medicine patients	Surveys included demographics, sport participation	Statistical analysis included Fisher's exact tests, t-tests,	The authors found that the earlier athletes specialized and the more specialized they are, the higher

P., O’Neil, M., Daley, M., Williams, K. A., Ackerman, K. E., Kramer, D. E., & Straciolini, A	Coping Strategies in Youth Athletes	Medicine,	associations between sport specialization, levels of athletic identity, and coping skills among adolescent athletes.	completed a survey	ion information, Athletic Identity Measurement Scale (AIMS, 10-item, range 7-70), Jayanthi Sport Specialization Scale (range 0-6), and Athletic Coping Skills Inventory (ACSI, 7 subscales, range 0-84).	Pearson correlations, and linear regression.	their level of athletic identity was. Coping strategies developed better in specialized athletes, potentially due to being at risk for more worry.
Rugg, Caitlin M.; Coughlan, Monica J.; Justine N.; Ham	Early Sport Specialization Among Former National Collegiate Athletic Association Athletes: Trends, Scholars	American Journal of Sports Medicine	The purpose of this study was to determine trends in sport specialization by sex, sport, and decade of participation in	1699 former NCAA athletes completed a survey (17% response rate) which asked about demographics,	Data was analyzed by organizing responses into groups and putting continuous data into means and	The data showed that the amount of athletes at the NCAA level that specialized early wasn’t high. There was also no evidence of injury	The authors conclude that future studies should analyze the trend of individual sport athletes and female athletes suffering from burnout and attrition.

e, Shar on L. ; Feel ey, Bria n T.	hip Attainm ent, Injury, and Attrition		collegiate athletes and to define the effect of specializa tion on scholarshi p attainmen t, collegiate injuries, and causes for attrition during college	sports played, years of particip ation, and speciali zation/i njury history.	standard deviation s, while putting categoric al data into frequenci es and percents.	risks or careers getting shortened. Burnout was prevelenet in these athletes though, specificall y with individual sports and females.	
Buck ley, Bish op, M., Kane , P., Cicc otti, M. C., Selv erian , S., Exu me, D., Emp er, W., Free dma n, K. B.,	Early Single- Sport Speciali zation: A Survey of 3090 High School, Collegia te, and Professi onal Athletes .	Ortho paedic Journ al of Sports Medic ine	The purpose of this study was to compare sport specializa tion between athletes at pro, college, and high school levels.	3090 ath letes comple ted a survey (503 HS, 856 collegi ate, and 1731 profess ional athletes ). Athlete s were asked whethe r they had chosen	Survey results analyzed using 1- way analysis of variance ( $P < .05$ ), and continuo us variables between groups were compare d using Kruskal- Wallis and Mann- Whitney tests.	College athletes had the highest percentage of early sports specializati on compared to pro and high school (67.7% vs 46.0% and 45.2%).	The authors of this study concluded that trends pointed to current high school athletes specializing in one sport 2 years earlier than current college and professional athletes. This points out that specializing early isn't a prerequisite to being an elite level athlete.

Ham mou d, S., Cohe n, S. B., & Cicc otti, M. G.				to speciali ze in only 1 sport, and data were then collect ed pertaini ng to this decisio n.	Categori cal variables (all yes/no questions ) were compare d using chi- square analysis ( $P < .05$ ).		
Daha b, Potte r, M. N., Prov ance, A., Albri ght, J., & How ell, D. R.	Sport Speciali zation, Club Sport Participa tion, Quality of Life, and Injury History Among High School Athletes .	Journa l of Athleti c Traini ng	The purpose of this study is to investigat e the quality of life as well as injury history among adolescen t athletes at different sport specializa tion levels.	111 particip ants took place in the study, which consist ed of a questio nnaire given to them during their preseas on physica l exams.	This was a cross sectional study, and all statistical tests were 2 sided and evaluated with a significa nce level of $P$ , .05. All statistical analyses were conducte d using Stata	Results across this study didn't show association between high school athletes that specialized and participate d in club sports being more at risk.	The authors findings were that there wasn't a difference in quality of life or injury risk based on any of the factors that they investigated for. However, they advise to take these results with caution as there is literature out there that shows a higher risk being prevelant.
Bell, DiSt efan o, L., Pand ya,	The Public Health Consequ ences of Sport	Journa l of Athleti c Traini ng,	The purpose of this study is to examine	This study was comple ted by conduc	The followin g topics were analyzed:	The following recommen dations were put forward	The authors lay out a variety of issues surrounding sport specialization and offer recommendations

N. K., & McGuine, T. A. (	Specialization.		the consequences of sports specialization at a public health scale.	ting a narrative review concerning the topic of sports specialization, and the effects it has (positive and negative. After taking information from various backgrounds, the authors identify potential solutions to the health issue.	- Prevalence of sport specialization - The economic burden of sports-related injuries- The financial costs of youth sport specialization -Physical Literacy and sport sampling	following this analysis: - Advocate for policy and rule changes – Participate in injury-prevention programs, follow and disseminate safe sport recommendations - Increase opportunities for low-income and disadvantaged students - Reinvest in school-based physical education	on how to find solutions. It seems that when specialization occurs, the positive aspects of participation are diminished. Continuing to monitor the data and focusing on health as well as overall physical literacy will lead to better long-term health for young athletes. .
McGuine, Post, E. G.,	A Prospective Study on the Effect of	The American Journal of Sports	The purpose of this study is to see if sports	1544 participants completed a questio	Data was summarized by means, standard	Athletes with moderate specialization had a 50%	The authors of this study are confident that their study shows that specialization increases these



Hetz el, S. J., Brooks, M. A., Trigsted, S., & Bell, D. R.	Sport Specialization Lower Extremity Injury Rates in High School Athletes	Medicine	specialization had a connection to an increased risk of lower extremity injury rates in high school athletes.	narrative which connected their sport participation, lower extremity injury rates, as well as their level of sport specialization.	deviations, frequencies, medians, and interquartile ranges. Multivariate analyses were also used to control multiple factors	higher rate of lower extremity injuries, while those with high specialization had an 85% higher rate.	injury rates drastically. They advise athletic programs to keep this in mind for their athletes.
Jayanthi, Post, E. G., Lauray, T. C., & Fabricant, P. D.	Health Consequences of Youth Sport Specialization.	Journal of Athletic Training	The purpose of this article is to look at data on sports specialization to guide athletic trainers and sports medicine providers.	Data was extracted from multiple studies to find commonalities about injuries and specialization	The following topics were analyzed: - Acute injury risks - Sport types and regions of injuries - Sport specificity - Sex differences - Psychological effects	Results were found that indicated that there is some deal of association between physical injuries and early sports specialization. Mental health wise however, there is not enough long-term evidence to support a	The authors conclude that after the age of 12, sport specialization may be appropriate. There are some inherent risks, but they may be worth it to achieve a level of success.

					- Socioeconomic factors	connection	
Brenner, LaBotz, M., Sugimoto, D., & Straciolini, A.	The Psychosocial Implications of Sport Specialization in Pediatric Athletes. Journal of Athletic Training	Journal of Athletic Training	The purpose of this article was to look at topics surrounding sport specialization in young athletes and its association with mental health, sleep, the drive for success in sport, and burnout.	This article looked at available literature surrounding its topic and developed a narrative on multiple different points.	The following topics were analyzed in terms of how they affect sport specialization: - Mental health - Self Esteem - Sleep - Elite Status and performance - Injury risk - Burnout	In the mentioned topics, sport specialization added on pressures and issues to a high percentage of athletes studied. The low likelihood of becoming an elite level athlete is also pointed out to put in perspective whether it is worth it to specialize.	This is another study where the authors conclude that sports overall have positive effects on mental and physical health. The specialization piece takes away a portion of the enjoyability and developmentally appropriate part of athletics. Things like sleep deprivation, burnout, and overuse injuries all increase when sport specialization is occurring.