



A Systematic Review: The Relationship Between Early Sports Specialization and Injury in Young Athletes

Zack Winchester, Nate Clem, Donnie MacLeod, Steven G. Lesh
Southwest Baptist University, Bolivar, Missouri



Background

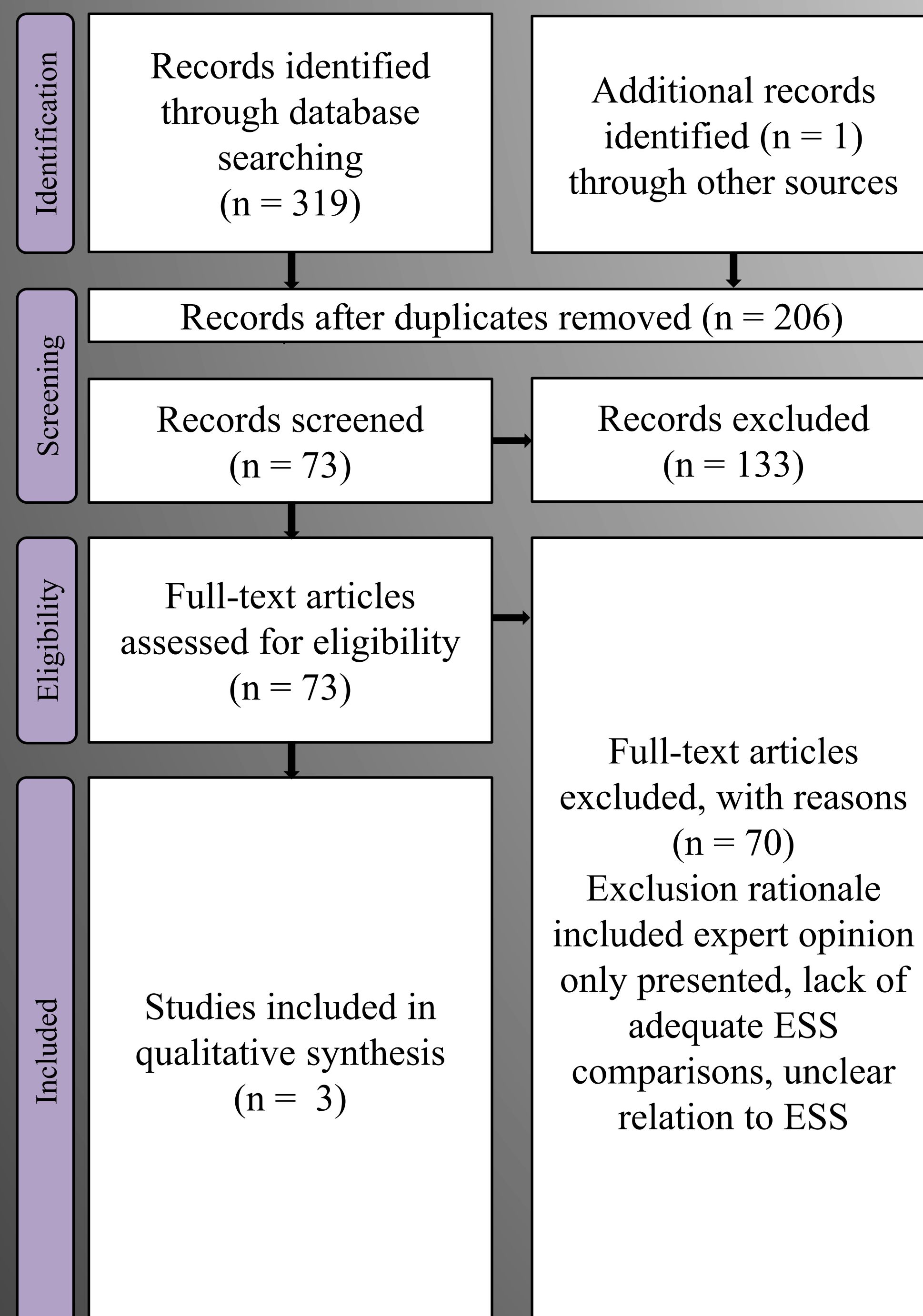
With the popularity of college and professional sports, young athletes are specializing in one sport with the desire to achieve high level success. The mantra of success is forwarded by many elements including coaches, parents, and performance trainers leading the athlete to specialize early. Some sports have developed year-long competitive leagues promoting this training and performance specialization. There has been a recent push in professional literature for adolescents to not partake in early sports specialization (ESS) due to the negative physical and emotional impact.

Purpose

The purpose of this systematic review is to evaluate the relationship between injuries associated with early sports specialization and the young athlete.

Methods

A systematic review of recent literature was completed to identify evidence related to the clinical question. The search was completed by utilizing EBSCOhost. A PRISMA strategy utilizing key words identified 319 articles. After applying screening criteria 3 articles were included for data extraction & analysis. Two reviewers assessed quality of evidence using the checklist developed by Downs & Black. A neutral third reviewer was utilized to resolve disagreements leading to a consensus quality rating of good, fair, and poor.



Summary of Findings

Year & Lead Author	Sex	Age	Sport	Outcome Measures	Total n	Location of Injury and/or Condition	Location of Sample	Downs & Black
2011 Fleisig	Male	9 – 14 y/o	Baseball	-High volume of pitching -Throwing curve ball at young age -Pitchers that also played position of catcher	481	-Elbow surgery -Shoulder surgery -Retirement secondary to injury	Alabama	26 Good
2015 Hall	Female	Middle school and High school aged	Basketball, Soccer, Volleyball	-Anterior Knee Pain Scale (AKPS) -International Knee Documentation Committee (IKDC) form -Standardized history and physician evaluation	357	-Anterior knee	Kentucky	22 Good
2015 Jayanthi	Both	7 – 18 y/o	Not Reported	-Sport specialization (year round intensive training in a single sport at the exhaustion of other sports) -Sports training (time spent training each sport per week in relation to athletes age) -Injury type (acute, overuse, serious overuse)	1190	-Knee -Foot / Ankle -Shoulder -Head / Neck -Low back	Unspecified	21 Good

Results

Quality was determined to be good in all 3 articles. 2217 total subjects were included in the 3 reports. Participants were separated into two main categories, injured or uninjured as related to ESS. Other metrics include specific injury types, locations, gender and age. It appears there is strong evidence to support that there is a positive relationship between the onset of injury and the avocation of early sports specialization. Injury incidence rates appeared 1.5x to 4.0x higher for athletes in specialized sports. It does not appear that gender impacts the rates as both male and female athletes who choose to specialize suffer injuries at a greater rate than their non early sports specialization counterparts.

Conclusions

Based on the analyzed evidence youth athletes partaking in early sports specialization have a higher incidence of injury when compared to multi-sport athletes. This systematic analysis appears to be in line with contemporary professional opinion and position statements. There is a continued need to develop quality evidence to further support this position.

Clinical Relevance

There is great pressure for young athletes to specialize early in hopes of achieve future success. It does appear that this participation in early sports specialization leads to a greater risk of injury. The physical therapist should utilize this information to properly advise clients and patients to maximize their fullest potential.

Summary of Outcomes

Year & Lead Author	Summary of Outcomes
2011 Fleisig	5% cumulative incidence of injury (25 of 481), 2.2% (11 of 481) were still pitching by 10th year of study. Pitchers who pitched more than 100 innings in at least 1 year were 3.5 times more likely to be injured during the study (p = .049). Pitchers who threw curveballs before age 13 had a slight increase in risk of injury, but it wasn't significant (p = .41). There was a trend for pitchers who also played catcher to have an increased risk of throwing injury, but this trend wasn't significant (p = .09).
2015 Hall	Specialization in a single sport increased the relative risk of patellofemoral pain (PFP) incidence 1.5 times (p = .038). Sinding Larsen Johansson patellar tendinopathy and Osgood Schlatter demonstrated a 4 times greater risk in single sport compared with multiple sport athletes. Single sport athletes were older, taller, and heavier than multiple sport athletes.
2015 Jayanthi	A total of 822 injured athletes accounting for 69.1% of the observed sample. Injured athletes were older than uninjured athletes, spent more hours per week in organized sports and total physical activities, and had higher sports specialization scores. 276 acute injuries, 570 overuse injuries, 134 serious overuse injuries. Most common location for injury was knee, most common diagnosis was patellofemoral pain. There was an independent risk for injury (p < .01) and serious overuse injury (p < .01). Athletes with a serious overuse injury had 1.90 times the odds of being highly specialized as compared with participants with a non-serious overuse injury (p < .01). Injured athletes had 1.45 times the odds of picking a main sport alone when compared with uninjured athletes, after adjusting for sports hours and age (p < .05)

References

- Brenner JS. Overuse injuries, overtraining, and burnout in child and adolescent athletes. *Pediatrics*. 2007;119(6):1242-5.
- Downs, SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomized and non-randomized studies of health care interventions. *Journal of Epidemiology & Community Health*. 1998;52:377-387.
- Fleisig GS, Andrews JR, Cutter GR, et al. Risk of serious injury for young baseball pitchers: A 10-year prospective study. *Am J Sports Med*. 2011;39(2):253-7.
- Hall R, Barber-Foss K, Hewett TE, Myer GD. Sport specialization's association with an increased risk of developing anterior knee pain in adolescent female athletes. *J Sport Rehabil*. 2015;24(1):31-5.
- Jayanthi NA, Labella CR, Fischer D, Pasulka J, Dugas LR. Sports-specialized intensive training and the risk of injury in young athletes: A clinical case-control study. *Am J Sports Med*. 2015;43(4):794-801.
- Jayanthi NA, Pinkham C, Dugas L, Patrick B, LaBella C. Sports specialization in young athletes: Evidence-based recommendations. *Sports Health*. 2013;5(3):251-7.

Contact Information

Steven G. Lesh, PhD, PT, SCS, ATC
Southwest Baptist University 1600 University Ave. Bolivar, MO 65613
slesh@sbuniv.edu