UCSF Benioff Children's Hospitals
Oakland | San Francisco

SPORTS MEDICINE CENTER
FOR YOUNG ATHLETES

Youth Sports Specialization

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I have no conflicts of interest to disclose

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Objectives

- Understand the data in regards to long terms implications of sport specialization
- Analyze the effects of sports specialization on professional sports

We have established that sport specialization = increased injury risk

Sports-Specialized Intensive Training and the Risk of Injury in Young Athletes: A Clinical Case-Control Study

Neeru A. Jayanthi, MD*, Cynthia R. LaBella, MD, Daniel Fischer, more... Show all authors

First Published February 2, 2015 | Research Article | Check for updates
https://doi-org.ucsf.idm.oclc.org/10.1177/0363546514567298

Association of Competition Volume, Club Sports, and Sport Specialization With Sex and Lower Extremity Injury History in High School Athletes

Eric G. Post, MS, ATC*, David R. Bell, PhD, ATC, Stephanie M. Trigsted, MS, ATC, Show all authors

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Specialization patterns across various youth sports and relationship to injury risk

Jacqueline Pasulka, Neeru Jayanthi, Ashley McCann, Lara R. Dugas & Cynthia LaBella

Pages 344-352 | Received 01 Jan 2017, Accepted 27 Mar 2017, Accepted author version posted online: 29 Mar 2017, Published online: 10 Apr 2017

1. Is it necessary to achieve elite athletic performance?

2. What are the long term adult health implications?

3. Is it worth the risk?

How Does Sport Specialization Impact Short-Term Athletic Performance?


BIG
DATA
ANALYTICS
COMPLEX
SOCIAL
INTERNET
SETS
MANAGEMENT
PETABYTES
SYSTEMS
STORAGE
TECHNOLOGIES
INFORMATION
SOFTWARE
SIZE
PARALLEL
DATABASES
SEARCH
DISCOVERY
SHAPED
TIME
LARGE

SHORT TERM ATHLETIC POTENTIAL

"*Diversified sport training in early and middle adolescence may better foster elite athletic potential* than specialization due to a more positive transfer of skills"
(Abernathy et al)

SHORT TERM MOTOR SKILLS

Fransen et al. analyzed 735 boys aged 10-12 years and found that those who *spent many hours in various sports* performed better on a standing broad jump and gross motor coordination than those who specialized in a single sport

SHORT TERM SPORT DROPOUT

Gullich et al. examined athletic performance in Germany and found that the *younger the age of recruitment of the athlete into specialized training programs, the earlier they left* sports

SHORT TERM INJURY RISK WITH ACCESS TO CLUB SPORTS

Holt et al. examined athletic performance in Germany and found that the *children of higher socioeconomic status were more likely to have overuse injuries due to less free play*

SHORT TERM SPORTS PERFORMANCE

At the collegiate level, DiFiori et al. examined a cohort of Division I athletes at their institution and *found that 88% had participated in 2 -3 sports as children*, with the vast majority (70%) not specializing until the age of 12.

In addition, the average age of specialization between collegiate athletes (15.4 years) and non-collegiate athletes (14.2 years) varied significantly.

An Analysis of Sports Specialization in NCAA Division I Collegiate Athletics

Hasani W. Swindell,* MD, Melanie L. Marcille,* BA, David P. Trofa,* MD, Franklin E. Paulino,† MD, Natasha N. Desai,* MD, Thomas Sean Lynch,* MD, Christopher S. Ahmad,* MD, and Charles A. Popkin,*‡ MD

Investigation performed at Center for Shoulder, Elbow and Sports Medicine, Columbia University, New York, New York, USA

- Mean age specialization 14.9 years

- Early sports specialization is uncommon among NCAA Division I athletes for most team sports

- Misconception that early sports specialization is necessary or common among most team-focused collegiate-level athletes

Early Single-Sport Specialization

A Survey of 3090 High School, Collegiate, and Professional Athletes

Patrick S. Buckley,* MD, Meghan Bishop,* MD, Patrick Kane,* MD, Michael C. Ciccotti,* MD, Stephen Selverian,* BS, Dominique Exume,* BS, William Emper,* MD, Kevin B. Freedman,* MD, Sommer Hammoud,* MD, Steven B. Cohen,* MD, and Michael G. Ciccotti,*† MD

Investigation performed at the Rothman Institute at Thomas Jefferson University Hospital, Philadelphia, Pennsylvania, USA

- 3090 athletes
- Age of sport specialization differed between level of sport played
  - High school 12.7 +/- 2.4 years
  - College 14.8 +/- 2.5 years
  - Professional 14.1 +/- 2.8 years

Pediatric Sports Specialization in Elite Ice Hockey Players

Sarah Black, MD,*† Kevin Black, MD,† Aman Dhawan, MD,†
Cayce Onks, MD,† Peter Seidenberg, MD,† and Matthew Silvis, MD†

Conclusion: Early pediatric sports specialization is not common in elite-level (professional and collegiate) ice hockey players.

Clinical Relevance: Early pediatric sports specialization before age 12 years is not necessary for athletic success in professional and collegiate ice hockey. This study provides further evidence supporting the recommendations of the American Medical Society for Sports Medicine, American Academy of Pediatrics, and American Orthopaedic Society for Sports Medicine against early sports specialization.

How Does Sport Specialization Impact Mid-Term Athletic Performance?

"I am willing to take the risk if it is the only pathway to professional sports"

Data On Single Sport Specialization = Increased Injury Risk

"Can't become a professional athlete unless you are healthy and on the field"

A CRITICAL LOOK AT PROFESSIONAL SPORTS DATA

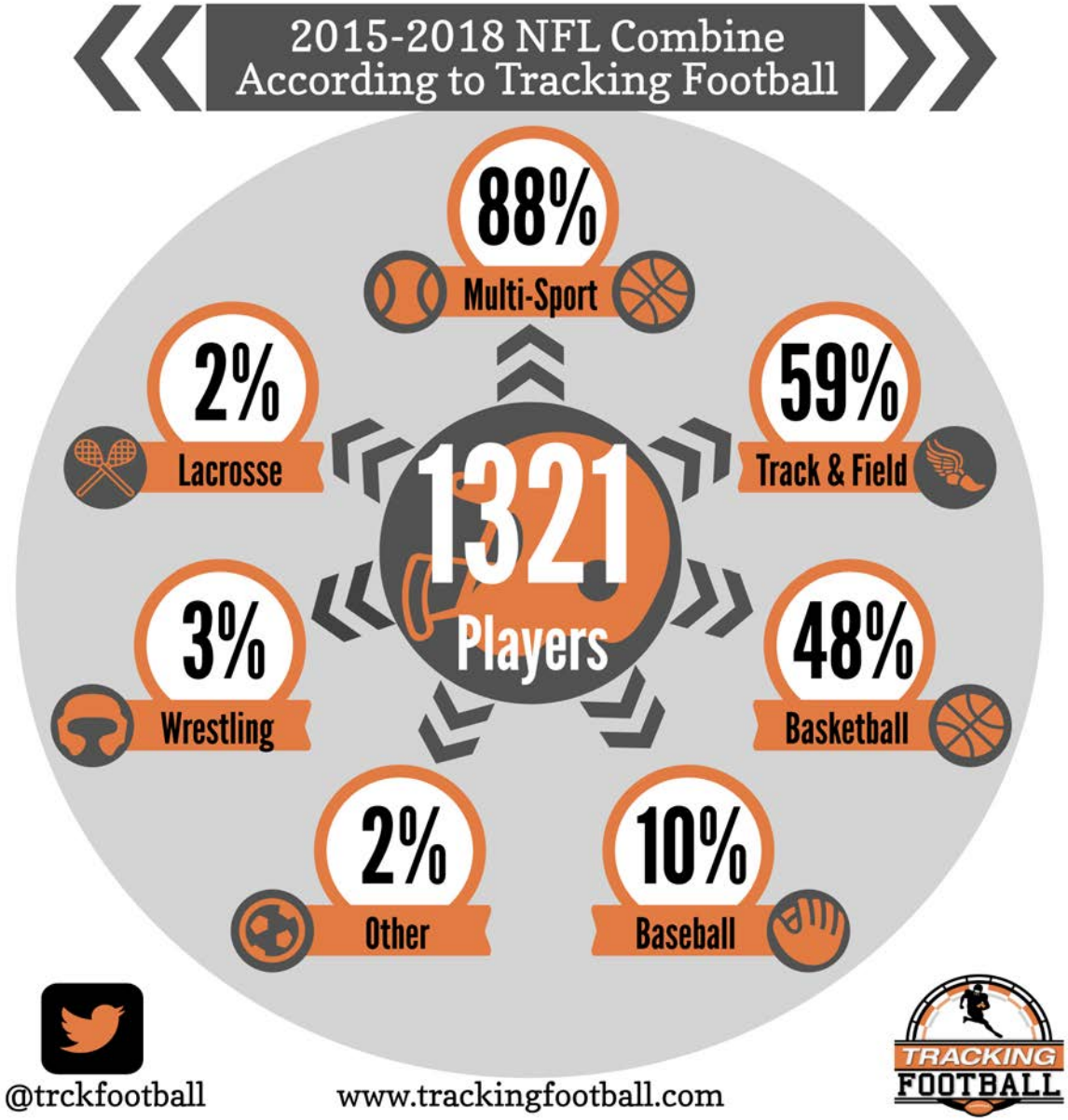
HOW DO SINGLE SPORT ATHLETES DO IN THE NBA??

The Effects of Playing Multiple High School Sports on National Basketball Association Players' Propensity for Injury and Athletic Performance

Caitlin Rugg,* MD, Adarsh Kadoor,† Brian T. Feeley,* MD, and Nirav K. Pandya,*‡ MD
Investigation performed at the University of California, San Francisco, Benioff Children's Hospital, Oakland, California, USA

"Multisport athletes participated in more games, experienced fewer major injuries, and had longer careers than those who participated in a single sport"

HOW DO SINGLE SPORT ATHLETES DO IN THE NFL?



HOW DO SINGLE SPORT ATHLETES DO IN MLB?

Early Sport Specialization

Effectiveness and Risk of Injury in Professional Baseball Players

Andrew Wilhelm,* DO, DPT, MS, Changryol Choi,† LAT, ATC, CSCS, and John Deitch,*†‡ MD
Investigation performed at WellSpan Sports Medicine, York, Pennsylvania, USA

- "Statistically significant higher rate of serious injury during a baseball player's professional career in those players who specialized early"
- "*Most current professional baseball players surveyed believed that sport specialization was not required prior to high school to master the skills needed to play at the professional level*"

HOW DO SINGLE SPORT ATHLETES DO IN MLB?

MLB

The Uber of Baseball: The Rise of Young, Versatile Labor Is an Ominous Sign for Older Players

Free Agent Second Basemen Comparison

PLAYER	AGE	WAR	CAREER OPS+	CONTRACT LENGTH	2019 DOLLAR AMOUNT
Brian Dozier (2018)	31	3.4	108	1 year	$9 million
Jed Lowrie (2018)	34	1.6	105	2 years	$20 million
D.J. LeMahieu (2018)	30	2.2	92	2 years	$24 million
Omar Infante (2013)	31	1.4	93	4 years	$32.3 million
Luis Castillo (2007)	31	2.3	94	4	$29.9 million

HOW DO SINGLE SPORT ATHLETES DO IN TRACK AND FIELD?

J Sports Sci. 2018 Nov;36(21):2502-2509. doi: 10.1080/02640414.2018.1465724. Epub 2018 Apr 18.

Excelling at youth level in competitive track and field athletics is not a prerequisite for later success.

23% U13-U17; 13% U13-U20; 43.3% U15-U17; 22.1% U15-U20; 41.8% U17-U20). By U20, less than 30% of athletes who had been ranked in the top 20 at U13 were still listed on the national rankings. Examining a broader sample of athletes revealed weak to moderate correlations between performances at different age grades until at least Under 17-Under 20. These findings reinforce the message that excelling at youth level in competitive athletics is not a prerequisite for senior success.

ORIGINAL INVESTIGATION

Are the World Junior Championship Finalists for Middle- and Long-Distance Events Currently Competing at International Level?

Authors:
Federico Pizzuto *, , Matteo Bonato *, , Gialunca Vernillo *, , Antonio La Torre *, , + Show all authors

In 2015, 61% of the 2002, 54.8% of the 2004, 48.3% of the 2006, 37.5% of the 2008, 26.2% of the 2010, and 29% of the 2012 WJC finalists were not present in the IAAF rankings. Of the 368 athletes considered, 75 (20.4%) were able to achieve the IAAF

HUMAN PERFORMANCE METRICS

Pre-2000 / Post-2000

100 meter 9.79 / 9.58

Mile 3:43.13 / 3.43.13

Marathon 2:05.42 / 2:01.39

Long Jump 29 feet 4 in / 29 feet 4 in

HR 70 / 73

Strikeouts 364 / 367

Take Home Points From Professional Data

SPORTS SPECIALIZATION NOT **REQUIRED** FOR ELITE ATHLETIC PERFORMANCE

PEAK PEFORMANCE IS OCCURING EARLIER

ACTUAL ATHLETIC PERFORMANCE IS NOT IMPROVING

How Does Sport Specialization Impact Long-Term Health?

Epidemiology

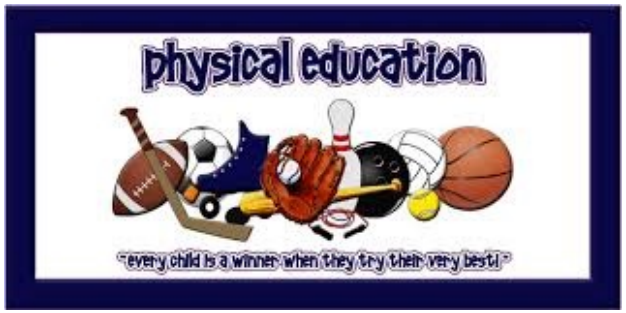
70%

By age 13, 70 percent of kids drop out of youth sports

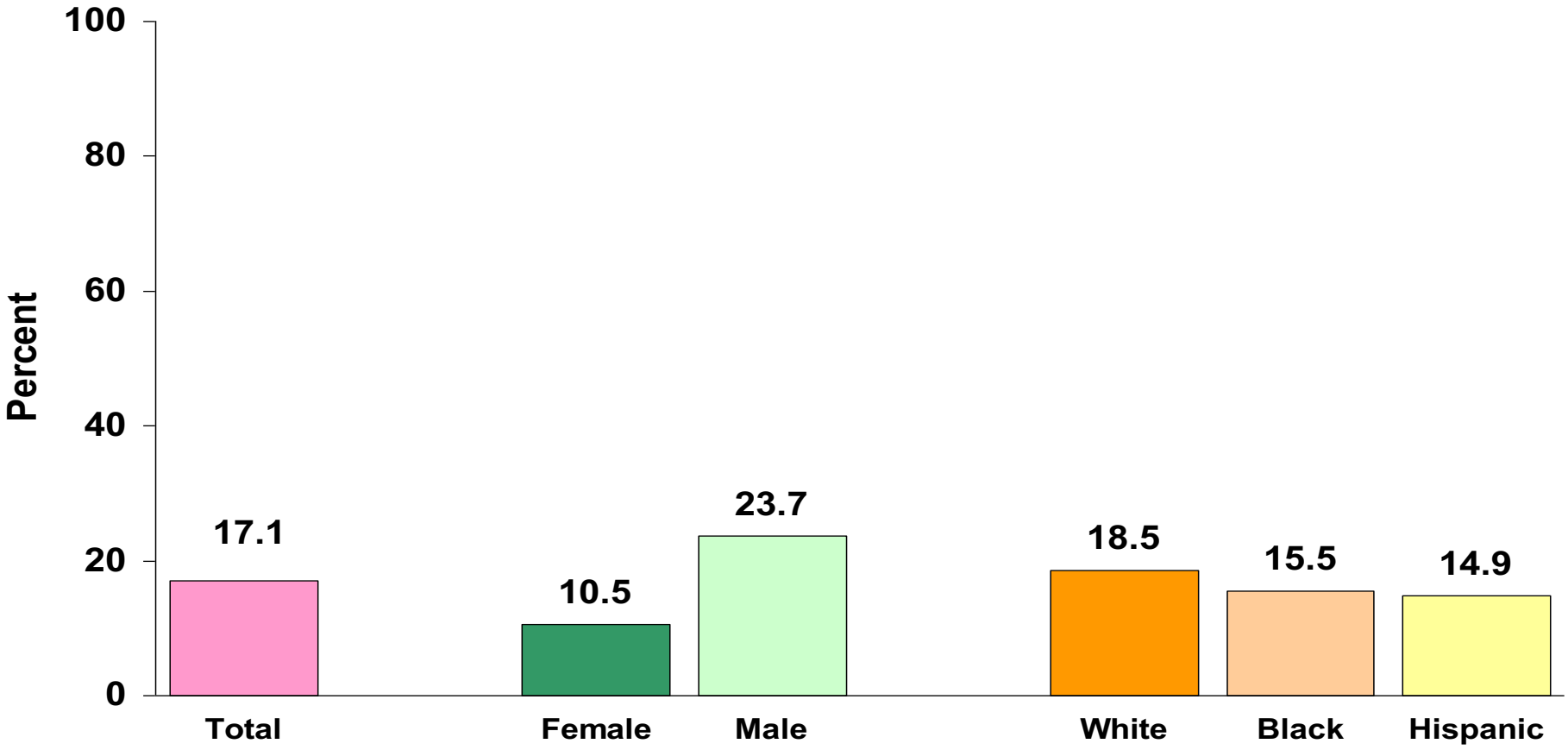
Epidemiology

29%

Percentage of high school students with daily PE



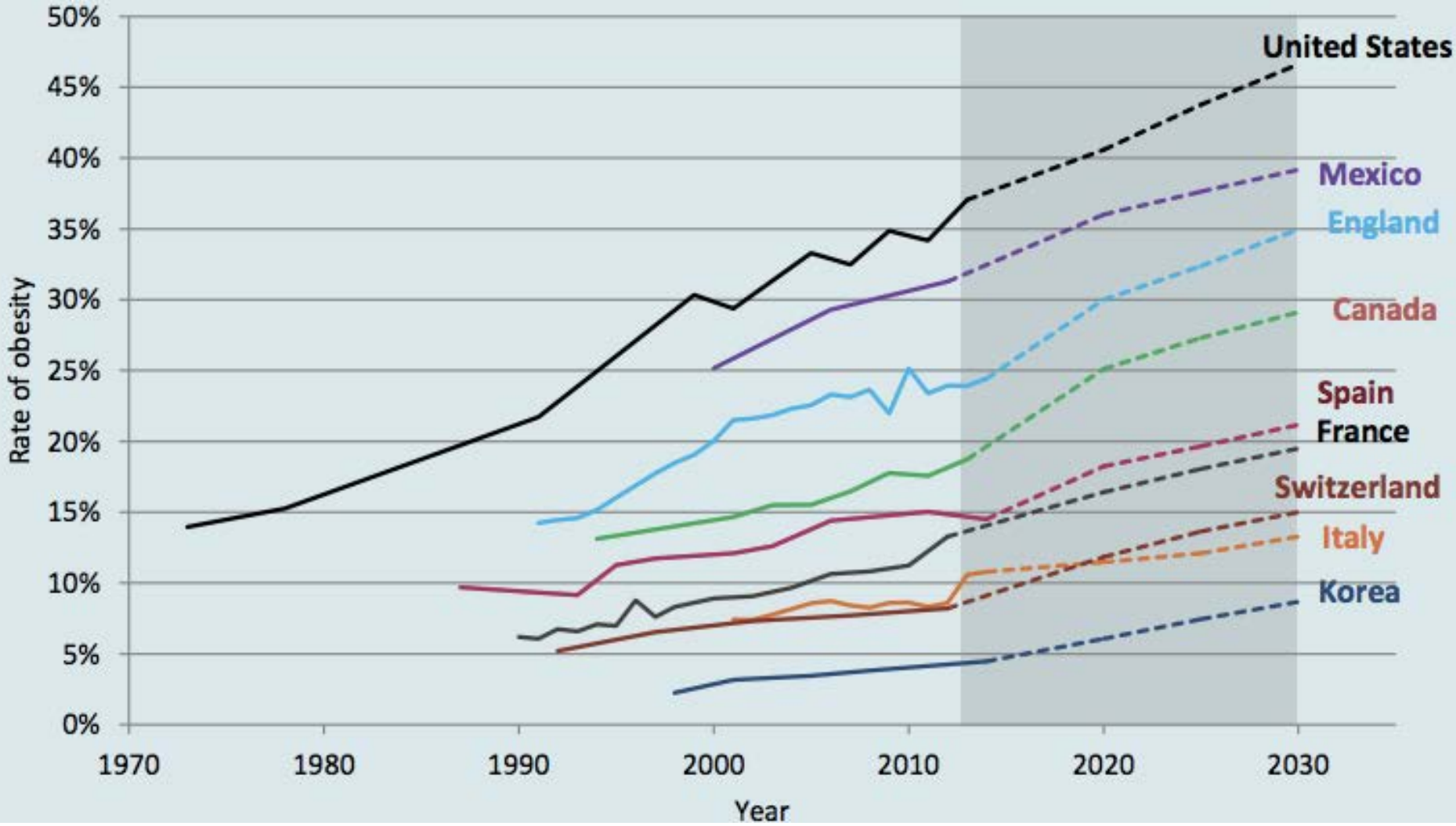
How Physically Active Are High School Students?



* Were physically active doing any kind of physical activity that increased their heart rate and made them breathe hard some of the time for a total of at least 60 minutes/day during the 7 days before the survey.

Source: National Youth Risk Behavior Survey, 2007.

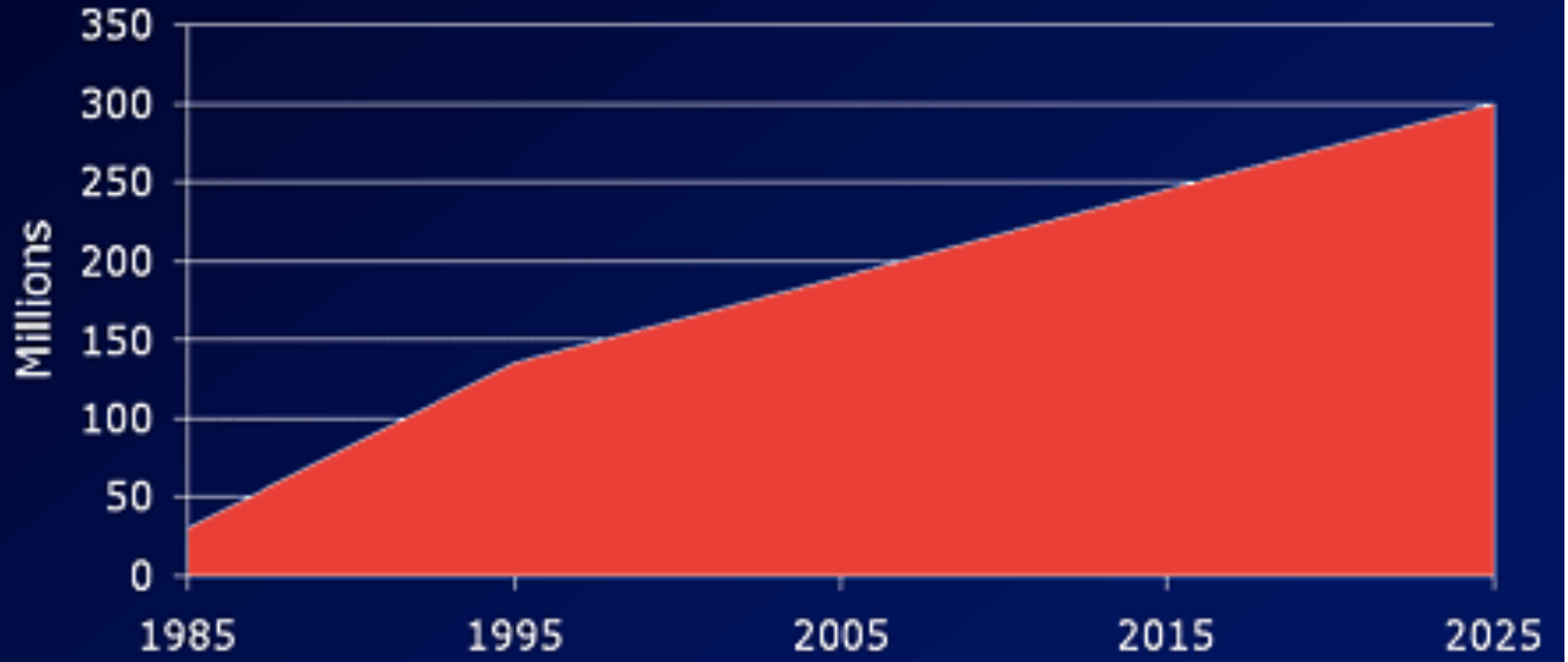
Figure 5: Projected rates of obesity



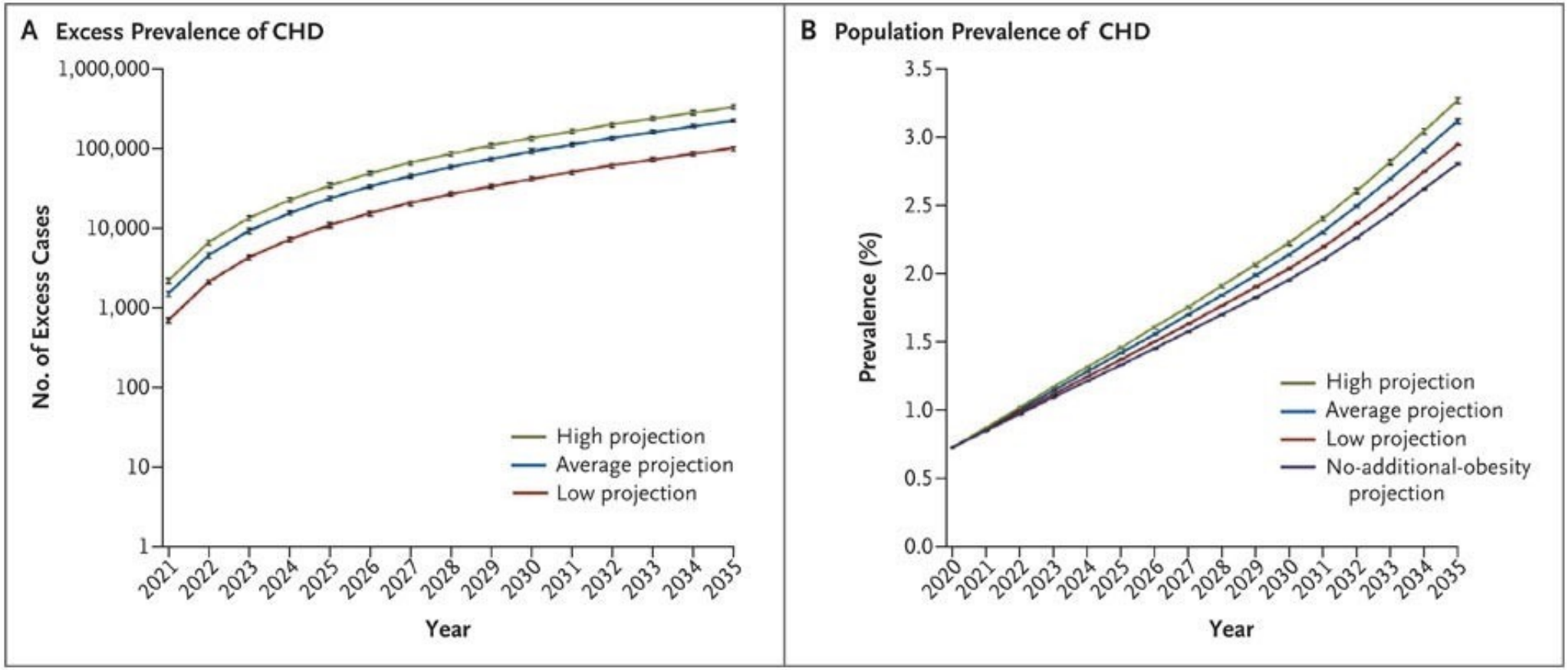
Obesity

Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years. The percentage of children aged 6–11 years in the United States who were obese increased from 7% in 1980 to nearly **18%** in 2012.

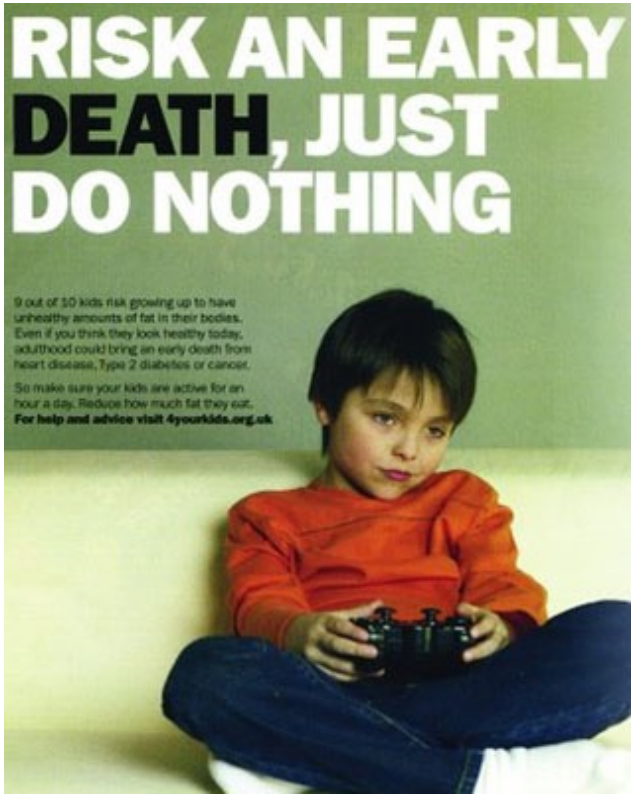
Incidence of Type 2 Diabetes: WHO Projections



King H et al. *Diabetes Care*. 1998;21:1414-1431.


A Excess Prevalence of CHD
No. of Excess Cases
1,000,000
100,000
10,000
1,000
100
10
1
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Year
High projection
Average projection
Low projection
B Population Prevalence of CHD
Prevalence (%)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Year
High projection
Average projection
Low projection
No-additional-obesity projection

We are creating a generation of children with increased risk of cardiovascular disease due to sport drop out and/or participation barriers!



Physical Activity Guidelines for Children and Adolescents

Be Active and Play, 60 minutes Every Day!

We know that increased number of sports injuries which require surgery will increase the risk of arthritis and dysfunction over time

Clinical Sports Medicine Update

The Long-term Consequence of Anterior Cruciate Ligament and Meniscus Injuries

Osteoarthritis

L. Stefan Lohmander,*† MD, PhD, P. Martin Englund,†‡ MD, Ludvig L. Dahl,† PT, and Ewa M. Roos,† PT, PhD
From the †Department of Orthopaedics, Clinical Sciences Lund, Lund University, Lund, Sweden, and ‡Boston University School of Medicine, Boston, Massachusetts

The objectives of this study are to review the long-term consequences of injuries to the anterior cruciate ligament and menisci, the pathogenic mechanisms, and the causes of the considerable variability in outcome. Injuries of the anterior cruciate ligament and menisci are common in both athletes and the general population. At 10 to 20 years after the diagnosis, on average, 50% of those with a diagnosed anterior cruciate ligament or meniscus tear have osteoarthritis with associated pain and functional impairment: the young patient with an old knee. These individuals make up a substantial proportion of the overall osteoarthritis population. There is a lack of evidence to support a protective role of repair or reconstructive surgery of the anterior cruciate ligament or meniscus against osteoarthritis development. A consistent finding in a review of the literature is the often poor reporting of critical study variables, precluding data pooling or a meta-analysis. Osteoarthritis development in the injured joints is caused by intra-articular pathogenic processes initiated at the time of injury, combined with long-term changes in dynamic joint loading. Variation in outcome is reinforced by additional variables associated with the individual such as age, sex, genetics, obesity, muscle strength, activity, and reinjury. A better understanding of these variables may improve future prevention and treatment strategies. In evaluating medical treatment, we now expect large randomized clinical trials complemented by postmarketing monitoring. We should strive toward a comparable level of quality of evidence in surgical treatment of knee injuries. In instances in which a randomized clinical trial is not feasible, natural history and other observational cohort studies need to be as carefully designed and reported as the classic randomized clinical trial, to yield useful information.

Keywords: anterior cruciate ligament (ACL); meniscus; rupture; outcome; osteoarthritis (OA)

Injuries to the ACL and menisci frequently occur in athletes. Although ACL ruptures occur less commonly in the general population, meniscus lesions are common both in athletes and in the general population.[44,45,47-52,87,102] There is ample evidence that on long-term follow-up, these lesions are associated with the development of knee osteoarthritis (OA), leading to pain and functional impairment in the young or middle-aged adult: the young patient with an old knee. Symptomatic OA in these young patients remains a profound and largely unsolved treatment challenge. There is insufficient evidence to prove that surgical treatment of ACL or meniscus lesions is able to diminish future development of knee OA. A consistent finding in our review of the literature was the often poor reporting of critical study variables, preventing a formal meta-analysis. Against this background, it is pertinent to review our current understanding of the long-term consequences of these injuries and the causes of outcome variability, the mechanisms that may be involved in the development of OA in the injured knee, and how a better understanding of these mechanisms may influence future prevention and treatment strategies.

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No potential conflict of interest declared.

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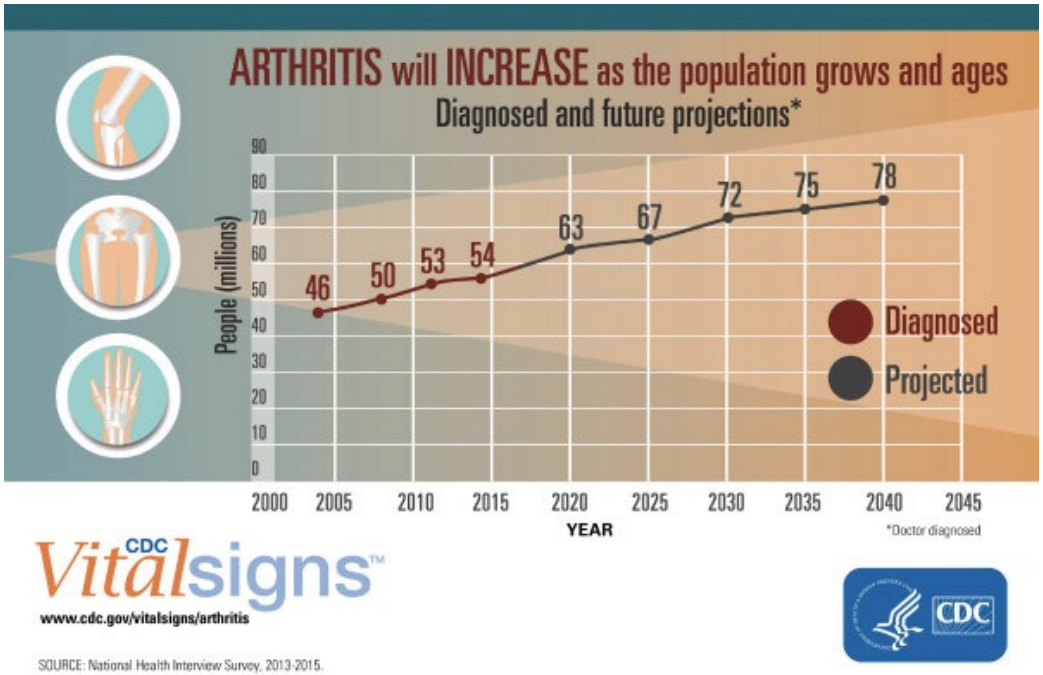
INCIDENCE OF ACL AND MENISCUS INJURIES

The ACL is the most commonly disrupted knee ligament, but isolated ACL tears are uncommon. Rather, associated injuries to the menisci, other ligaments, joint cartilage, and subchondral or cancellous bone are often observed. The pattern of associated injuries may be influenced by the mechanism and force of the trauma causing the ACL rupture. It is likely that these associated injuries significantly contribute to the risk of future OA developing after an ACL injury.



Defining the Problem

The Business of Youth Sports = Problem!!!

$$$$$$

Youth sports have become a 15.3 billion dollar industry!!!

Sixty-three percent of parents will pay between $100 to $499 per month with nearly 20% paying upwards of $12,000 a year

Cost per year is >>>> average scholarship amount

Does not account for expenses from injuries!!!

College athletic scholarships are more likely to be of a higher socio-economic status than the average student, and less likely to be a first generation college student

THE ASPEN INSTITUTE

PROJECT PLAY

REIMAGINING YOUTH SPORTS IN AMERICA

THE ASPEN INSTITUTE
PROJECT PLAY
REIMAGINING YOUTH SPORTS IN AMERICA

Only 34.6% of children between the ages of 6 - 12 in families who make under $25,000 / year participate in team sports whereas those with incomes greater than $100,000 / year had 68.4% participate

Robert Wood Johnson Foundation

Only 25% of middle and high school students from lower income areas participated in youth sports due to fees, transportation, and equipment costs

Financial and medical burdens of youth sports specialization - survey of pediatric sports patients

Sachin Allahabadi [1], Lucia Calthorpe [2], Nirav Pandya [3]

Affiliations + expand

PMID: 33768778 DOI: 10.23736/S0022-4707.21.12304-7

Abstract

Background: The trend towards youth sports specialization has led to increased costs from higher injury rate and from private club fees. The objectives were to characterize the financial and medical burdens of sports specialization with single sport participation or club sports involvement.

Methods: An 18-item survey on sports participation and musculoskeletal injury was administered to parents of patients visiting the clinic of a pediatric sports medicine orthopaedic surgeon over a three-month period. Comparisons were made between groups to identify differences in medical and financial burdens. Logistic regressions were performed to evaluate odds ratios for binary outcomes.

Results: Club athletes were significantly younger than non-club athletes (12.9 ± 3.1 years versus 14.9 ± 2.8 years, p = .0002) with club athletes starting sports at average of 7.2 ± 3.1 years. Club sports participation (adjusted OR 5.88, 95% CI: 1.10, 31.4) and female sex (adjusted OR 3.47, 95% CI: 1.12, 10.74) were significant predictors of spending > $1000 USD on sports annually. Multisport participation (OR 5.72, 95% CI: 1.21, 26.96) and spending > $1000 on sports annually (OR 17.21, 95% CI: 1.49, 199.25) were significant predictors of presenting to clinic for a sports-related injury. Single sport athletes had a higher number of medical appointments for sports injuries (18.6 ± 23.0 versus 9.3 ± 10.0 for multisport, p = .0042).

Conclusions: Youth sports specialization is of substantial financial and medical burden to families. This data can help identify areas of intervention to mitigate injury risk and reduce financial barriers to youth sports participation.

Top 10 List

1. Youth Sports Injuries = Epidemic
2. Single Sport Specialization = Injury Risk
3. Short Term Athletic Performance Improves With Multi-Sport Specialization
4. Mid-Term Athletic Performance Improves With Multi-Sport Specialization
5. Sport Specialization Not Necessary For Elite Performance, Metrics Aren't Changing
6. Sport Specialization Leads To Sports Dropout
7. Minimal Other Avenues For Sports
8. Obesity, Diabetes, and CAD On The Rise
9. Those Who Continue To Play Have Arthritis Risk
10. Time To Change The Culture

Thank You!