

Generalized Joint Hypermobility and Sports-Related Injury Risk in Adolescent Athletes

Ethan Chung¹

¹Health Services Mentorship Program, George Mason University; McLean High School

Introduction

Generalized joint hypermobility (GJH) describes unusually large motion across multiple joints. The Beighton score is commonly used to classify GJH, but cutoffs and injury definitions vary. Evidence suggests risk is not uniform: it may depend on the joint, sport, contact exposure, and whether generalized or local hypermobility is measured.^{1–10}

Objectives

- Evaluate whether GJH is associated with sports-related musculoskeletal injury.
- Compare evidence by joint region, especially knee, ankle, and shoulder.
- Assess how sport type, contact exposure, and Beighton-score definitions may explain conflicting results.
- Consider whether hypermobility screening could support broader adolescent injury-risk evaluation.

Methods

Design: structured literature review of supplied peer-reviewed sources. Databases/journals: PubMed, PubMed Central, BMJ Open Sport & Exercise Medicine, JAAOS, Frontiers in Medicine, and Am J Med Genet. Search concepts: “generalized joint hypermobility,” “joint hypermobility syndrome,” “Beighton score,” “sports injury,” “athlete,” “musculoskeletal injury,” “instability,” and “Ehlers-Danlos syndrome.” Included: human studies/reviews connecting hypermobility with injury, pain, instability, biomechanics, assessment, or physical-therapy management. Excluded: Adults, EDS, Ehlers-Danlos Syndrome, Pregnancy, Osteogenesis imperfecta. Extracted variables: population, sample size, hypermobility measure, injury site, athletic setting, and reported association. Synthesis: findings were summarized narratively because studies differed in age, sport, cutoffs, injury definitions, and design. Sources reviewed: a total of 14 sources were reviewed for this research.

Sports-injury studies drove the results; clinical sources were used to interpret assessment and management relevance.

Results

Findings were joint-specific rather than universal: stronger evidence appeared for knee injury during contact activity and shoulder injury, while overall injury risk and ankle injury findings were inconsistent.

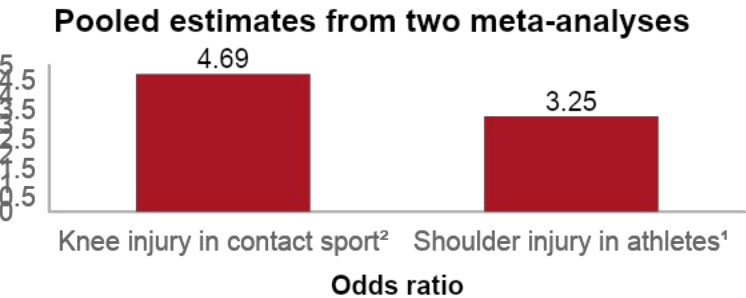


Figure 1. Pooled estimates from two meta-analyses; values summarize different joints and study sets and should not be directly compared.

Evidence synthesis

Study	Design / sample	Key finding
Pacey 2010 ²	Systematic review + meta-analysis; 18 studies	Knee injury risk increased in contact sport (OR 4.69); ankle risk was not increased.
Liaghat 2021 ¹	Meta-analysis; 6 studies, n=2,335	Shoulder injury odds were higher in hypermobile athletes (OR 3.25; low-certainty evidence).
Nathan 2018 ³	Cross-sectional sports sample; n=114	No overall injury association (p=.66), but dislocations occurred only in hypermobile participants.
Van Rijn 2021 ⁴	Prospective pre-professional dancers; n=185	GJH was not a significant independent predictor of injury in this athletic population.
Palmer/Russek/Castori/Engelbert ^{7–10}	Clinical reviews and PT guidance	Hypermobility assessment should consider pain, instability, strength, proprioception, and function—not range of motion alone.

Discussion

The evidence suggests GJH is a context-dependent potential risk factor, not a universal injury predictor. Higher risk was most consistent for specific joints and exposures, especially knee injury in contact sports and shoulder injury in athletes. Conflicting findings likely reflect inconsistent Beighton cutoffs, injury definitions, sport demands, surveillance methods, and population differences. Because GJH is only one part of injury risk, it should be interpreted with history of pain, instability, prior injury, strength, and movement control.

Clinical / Public Health Implications

The Beighton score is quick, inexpensive, and equipment-free, making it feasible for screening in school or sports physicals. However, a high score identifies generalized mobility—not injury risk by itself. Screening is most useful when paired with questions about pain, recurrent sprains/dislocations, prior injury, and functional instability. Athletes flagged through this broader assessment may benefit from targeted strengthening, proprioceptive training, and movement-control exercises.

Limitations & Future Research

Limitations include a small evidence set, mixed ages and sports, and inconsistent thresholds for defining GJH. Some clinical sources focus on symptomatic JHS/hEDS populations rather than healthy adolescent athletes. Future studies should use prospective injury tracking, standardized age-appropriate Beighton cutoffs, and sport-specific exposure data.

References

Conclusion: GJH appears to influence some sports-injury risks, especially joint-specific knee and shoulder outcomes, but it should not be used alone as an injury-prediction test. Refs: 1 Liaghat et al., 2021. 2 Pacey et al., 2010. 3 Nathan et al., 2018. 4 Wolf et al., 2011. 5 van Rijn & Stubbe, 2021. 6 Black et al., 2023. 7 Palmer et al., 2021. 8 Russek et al., 2021. 9 Castori, 2012. 10 Engelbert et al., 2017.