


# BMJ Open Prevalence and proposed aetiologies of dystonias or yips in athletes playing overhand sports: a scoping review protocol

Jordan Knox,<sup>1</sup> Karishma Shah,<sup>1</sup> Mary M McFarland,<sup>2</sup> Tallie Casucci,<sup>3</sup> Kyle Bradford Jones <sup>4</sup>

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<sup>1</sup>The University of Utah School of Medicine, Salt Lake City, Utah, USA

<sup>2</sup>The University of Utah Spencer S Eccles Health Sciences Library, Salt Lake City, Utah, USA

<sup>3</sup>The University of Utah J Willard Marriott Library, Salt Lake City, Utah, USA

<sup>4</sup>Department of Family and Preventive Medicine, University of Utah School of Medicine, SALT LAKE CITY, Utah, USA

## Correspondence to

Dr Kyle Bradford Jones; [kyle.jones@hsc.utah.edu](mailto:kyle.jones@hsc.utah.edu)

## ABSTRACT

**Introduction** Sports-related dystonia, also called the yips, are often seen in athletes in multiple sports. In this condition, an athlete abruptly loses the ability to perform a repetitive motion performed thousands of times. Such occurrences are often assumed to be psychological in nature, and thus evaluation for other causes is often lacking. All reviews on the topic have failed to focus on athletes in overhand sports. This scoping review will evaluate the available evidence regarding upper extremity focal dystonias (yips) in athletes participating in overhand sports in any worldwide clinical or sport setting.

**Methods and analysis** We will conduct our scoping review with guidance from the latest version of the Joanna Briggs Institute's (JBI) Manual for Evidence Synthesis, a widely accepted methodology for conducting reviews. We organised our research question and inclusion criteria to the JBI's mnemonic; Participants: athletes that participate in overhand sports; Concept: upper extremity focal dystonias or yips; and Context: any worldwide clinical or sports setting. Search results were retrieved on 26–27 June 2024, in the following databases: MEDLINE (Ovid) 1946–2024, SPORTDiscus (EBSCOhost) 1800–2024, APA PsycINFO (EBSCOhost) 1872–2024, Embase (Elsevier) 1974–2024, Web of Science Core Collection (Clarivate) 1900–2024, Sports Medicine & Education Index (ProQuest) 1970–2024 and Dissertations and Theses Global (ProQuest) 1861–2024. Using Covidence, two reviewers from a team of three will independently screen titles and abstracts, screen full text articles for inclusion, and independently extract data from our included studies. Results will be presented as a narrative descriptive analysis along with tabular data on the prevalence, diagnostic criteria and treatment for yips in athletes of overhand sports.

**Ethics and dissemination** As this describes a scoping protocol, ethical approval is not necessary. Review findings will be submitted to peer-reviewed publications and presentations at local and national conferences.

**Trial registration number** This protocol is registered with the Open Science Framework.

## INTRODUCTION

Sports-related focal dystonia, or the yips, is a condition seen in athletes where a repetitive

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The review provides the first comprehensive analysis of the yips in athletes of overhand sports.
- ⇒ This review of the current knowledge on the topic encompasses a broad search of multiple databases to fully assess the yips in athletes of overhand sports.
- ⇒ A reporting bias in the literature may be present given a prevailing stigma against addressing the yips among athletes.

motion performed thousands of times is abruptly lost. Examples of this occur in many sports, including tennis, archery, running, cricket, volleyball and table tennis, but the most common examples are putting in golf or throwing a baseball. Fine motor control of the movement is sporadic and leads to the inability to accurately perform the previous function. This is thought to be a psychoneuromuscular disorder, with the prevailing theory among athletes being that it is a form of performance anxiety.<sup>1–6</sup> However, many smaller studies performed on the condition in golfers show a fine motor neuromuscular dystonia as the most likely cause.<sup>2–7</sup> The symptoms are frequently more consistent with a fine motor dystonia, where there is an involuntary co-contraction of opposing muscle groups in the affected extremity.

There have not been many studies conducted on the yips. Of the existing literature, the yips in golf are by far the most commonly studied context of the condition.<sup>7–13</sup> These studies have shown a correlation of the following with the yips: perfectionistic tendencies, social anxiety, performance anxiety,<sup>4</sup> male gender, prior smoking, more experience playing golf,<sup>14</sup> more frequent musculoskeletal problems and a family history of the yips. Evaluations

of the yips in other sports have shown that those with an overcommitment to baseball,<sup>15</sup> previous psychological trauma, anxiety, experiencing a negative stigma from other players and coaches, increased pressure from coaches and female gender<sup>1</sup> make an athlete more likely to experience the yips.

One particular study by Sato<sup>1</sup> explored the yips in 242 Division I college athletes. The survey was given to athletes in many different sports but showed an incidence of 13.2% of athletes who had experienced the yips. The yips were more common in studied women, as well as with athletes engaging in softball and swimming. While very informative, this study included only a small number of athletes in overhand sports.

The primary remaining studies on the yips were in baseball players, largely conducted in Japan,<sup>15–17</sup> and mostly evaluated psychological causes.

Mine *et al* conducted a systematic review on the effectiveness of management on ‘the yips in sport’ in 2018.<sup>9</sup> Their review primarily included articles about the yips in golf, included only one study on an overhand sport (basketball) and included many fewer studies than did Nijenhuis *et al*’s review of treatments for task-specific dystonias in sports in 2024.<sup>18</sup> Nijenhuis’ paper not only focused exclusively on treatment, but only included four individuals with dystonia who played an overhand sport (baseball and tennis). None of these reviews looked exclusively at sports with overhand motions.

Given that the prevailing amount of scientific literature about the yips has focused on golfers, information about the overhand motion of athletes in various other sports is lacking. The research question leading to this scoping review is: what is the available evidence regarding prevalence, aetiology and treatment of upper extremity focal dystonias (yips) in athletes participating in overhand sports? We organised our research question to the Joanna Briggs Institute’s (JBI) Manual for Evidence Synthesis, a widely accepted methodology for conducting reviews, using their mnemonic, PCC:<sup>19</sup>

- ▶ Participants: athletes that participate in overhand sports.
- ▶ Concept: upper extremity focal dystonias or yips.
- ▶ Context: any worldwide clinical or sports setting.

## METHODS AND ANALYSIS

We will conduct our scoping review with guidance from the latest version of the JBI Manual for Evidence Synthesis.<sup>19</sup> Using the framework as outlined by Arksey and O’Malley, we will conduct our scoping review with Arksey’s five stages: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data and (5) collating, summarising and reporting the results.<sup>20</sup> For transparency and reproducibility, we will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses reporting guidelines for scoping reviews and searches<sup>21 22</sup> (see online supplemental appendix I).

A search for existing evidence reviews or protocols on the topic was conducted in PubMed, PsycINFO, SPORTDiscus, Cochrane Library, Epistemonikos, EPPI Centre Systematic Reviews, International HTA database, JBI Evidence Synthesis, International Journal of Evidence-based Healthcare, Campbell Systematic Reviews, PROSPERO, Open Science Framework, FigShare and Preprint Citation Index (Web of Science) on 29 February 2024. No reviews or protocols directly addressed the research question.

## Literature searching

A librarian will develop the search strategies using a combination of keywords and database subject headings for the primary databases (MEDLINE Ovid) from sentinel studies and team feedback, then translate the strategy to the other selected databases. Database search translation refers to database-specific subject headings and search fields (eg, article title, abstract, keywords). For example, MEDLINE’s Medical Subject Headings are completely different from Embase’s Emtree subject headings. Library colleagues will peer-review the strategy according to the Peer Review of Electronic Search Strategies (PRESS) guidelines, an evidence-based resource on optimal search strategies in reviews.<sup>23</sup> Citation management and duplicate detection and removal will be accomplished with EndNote (Clarivate Analytics).

Databases will include MEDLINE (Ovid) 1946–2024, SPORTDiscus (EBSCOhost) 1800–2024, APA PsycINFO (EBSCOhost) 1872–2024, Embase (Elsevier) 1974–2024, Web of Science Core Collection (Clarivate) 1900–2024, Sports Medicine & Education Index (ProQuest) 1970–2024 and Dissertations and Theses Global (ProQuest) 1861–2024. No date limits, nor methodological filters will be used (see online supplemental appendix II).

## Other sources

References of included studies will be checked for additional relevant studies.

Grey literature: we will search for dystonias or yips in conference proceedings and abstracts which are publicly available for years from 2017 to 2024 as listed below, and review for designated overhand sports or athletes:

- ▶ American Academy of Neurology (<https://www.aan.com/>).
- ▶ Movement Disorder Society (<https://www.movement-disorders.org/>).

## Study selection (eligibility criteria)

Two reviewers from a pool of three (JK, KS and KBJ) will independently screen each title and abstract, then independently review full text in duo for inclusion. When no consensus can be reached through discussion between the two reviewers employing the a priori protocol, the third reviewer will be the deciding vote. We will use Covidence (Veritas Health Innovation), an online systematic reviewing platform, to screen and select studies, which gives reviewers the option to view criteria during selection.

Our eligibility criteria are organised to JBI's mnemonic, PCC.<sup>19</sup>

### Inclusion criteria

- ▶ Participants: athletes that play overhand sports, such as: baseball, softball, tennis, football, cricket, basketball, darts, volleyball, football, javelin, badminton, lacrosse, swimming, water polo, pickleball, squash, racquetball, dodgeball, axe throwing and jai alai.
- ▶ Concept: upper extremity focal dystonias or yips, including reported diagnostic criteria, interventions or outcomes.
- ▶ Context: any worldwide clinical or sports setting.
- ▶ Study types: all primary or secondary research studies.

### Exclusion criteria

- ▶ Participants: athletes that play sports with no or rare overhand motion such as golf, soccer, archery, hockey, bocce, bowling, cornhole, ladder ball, shot put, hammer throw, discus, Frisbee or juggling.

### Quality assessment

In compliance with scoping review methodology, which states 'critical appraisal is not mandatory', no quality assessment of included studies will be conducted, as our goal is to rapidly map the literature.<sup>24 25</sup>

### Data extraction

We piloted our data charting form with two reviewers (JK and KBJ) using sentinel articles prior to finalisation of protocol. Two reviewers from a pool of three (JK, KS and KBJ) will independently extract and chart the data from included studies using Covidence. When conflicts arise and consensus cannot be reached through discussion, the third reviewer will make the final decision on data charted. We will chart the following data reported in the included studies:

- ▶ Title
- ▶ Year of publication
- ▶ Context:
  - Origin/country of origin (where the source was published or conducted)
  - Clinical or sports setting
- ▶ Aims/purpose
- ▶ Participants: athletes who play overhand sports
  - Population characteristics, demographics and sample size
  - Sport type
- ▶ Methodology/methods
  - Study type
- ▶ Concept: dystonias
  - Diagnostic criteria
  - Reported prevalence
  - Aetiology
  - Intervention, intervention type, intervention modality, intervention duration
  - Comparator, comparator type, comparator modality, comparator duration

- Outcomes, including outcome measurements and outcome duration

### Analysis of evidence

Analysis will include frequency counts of population characteristics and demographics, represented in tables or graphs. Narrative descriptive analysis will include population, concept and context, along with specifically reported prevalence, aetiology and treatment. We will organise our extraction to the PCC framework.

### Patient and public involvement statement

None.

### Presentation of results

Results will be presented as narrative descriptive analysis along with tabular data on the prevalence, diagnostic criteria and treatment for yips in athletes of overhand sports.<sup>26</sup>

### Limitations

Reporting bias in the literature may be present given a prevailing stigma against addressing the yips among athletes. To mitigate publication and reporting biases, we are searching seven databases and conference proceedings from two professional organisations, in addition to including primary and secondary research studies. Unpublished results will not be included since we will not be contacting researchers, nor searching beyond our designated databases and society conferences. Our goal is to rapidly map the literature on prevalence, aetiology and treatment of upper extremity focal dystonias (yips) in athletes participating in overhand sports.

### ETHICS AND DISSEMINATION

As this is a review protocol of study results, no ethical approval is necessary. Results will be submitted as a manuscript to a peer-reviewed sports medicine journal for publication and submitted as an abstract or poster presentation to local and national athletic training and sports medicine conferences, notably the American Medical Society for Sports Medicine annual meeting.

Any changes from the scoping protocol methodology will be acknowledged and defined in the manuscript.

### Registration plan for protocol

This protocol is registered with the Open Science Framework<sup>27</sup> (osf.io).

X Kyle Bradford Jones @kbjones11

**Contributors** All authors (JK, KS, MMM, TC and KBJ) contributed to the conception, design, analysis and writing of this protocol and manuscript, and will participate in the analysis described in this study. KBJ is the guarantor, and thus accepts full responsibility for the work and content of this study.

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#### ORCID iD

Kyle Bradford Jones <http://orcid.org/0000-0002-5603-7318>

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