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BMJ Open

Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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Keywords:	SPORTS MEDICINE, Stress, Psychological, Neuromuscular disease < NEUROLOGY

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Title

Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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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.

Methods and analysis

A robust search using the Arksey and O'Malley framework will be conducted utilizing the following databases: Medline (Ovid), SportDiscus (Ebscohost), APA PsycInfo (Ebscohost), Embase (Elsevier), Web of Science Core Collection (Clarivate), Sports Medicine & Education Index (ProQuest), and Dissertations and Theses Global (ProQuest). Three persons will participate in screening titles and abstracts using criteria for dystonia/yips in athletes in overhand sports. Full text articles will then be independently reviewed. Brief descriptive analysis of eligible studies will include context on prevalence, etiology, and treatment.

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.

Registration

This protocol is registered with the Open Science Framework.

Strengths and Limitations

- The review will meet the need for a comprehensive mapping of the limited amount of evidence for the yips in athletes of overhand sports.
- This review of the current knowledge on the topic will drive future research endeavors to assist athletes and support staff to better understand and address the yips.
- The review is limited by the lack of definitive diagnostic criteria for the yips, potentially leading to a selection bias in existing literature on the topic.
- A reporting bias in the literature may also be present given a prevailing stigma against addressing it among athletes.

INTRODUCTION

Sports-related focal dystonia, or the yips, are a condition seen in athletes where a repetitive 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 and 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 psycho-neuromuscular disorder, with the prevailing theory among athletes being that it is a form of performance anxiety (1-6). However, many smaller studies performed on the condition in golfers show a fine motor neuromuscular dystonia as the most likely cause (2, 7). 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 is by far the most commonly studied context of the condition (7-13). These studies have shown a correlation of the following with the yips: perfectionistic tendencies, social anxiety, performance anxiety (4), male gender, prior smoking, more experience playing golf (14), more frequent musculoskeletal problems, and a family history of the yips. Evaluations of the yips in other sports have shown that those with an over-commitment to baseball (15), previous psychological trauma, anxiety, experiencing a negative stigma from other players and coaches, increased pressure from coaches, and female gender (1) make an athlete more likely to experience the yips.

One particular study by Sato (1) 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 had a small number of athletes in overhand sports. The primary remaining studies on the yips were in baseball players, largely conducted in Japan (15-17), and mostly evaluated psychological causes.

Mine et al. conducted a systematic review on the effectiveness of management on “the yips in sport” in 2018 (9). Their review primarily included articles about the yips in golf, and 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 (18). 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, etiology, and treatment of upper extremity focal dystonias (yips) in athletes participating in overhand sports?

METHODS AND ANALYSIS

We will conduct our scoping review with guidance from the latest version of the *JBIM Manual for Evidence Synthesis* (19). Utilizing 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, summarizing, and reporting the results (20). For transparency and reproducibility, we will adhere to the PRISMA reporting guidelines for scoping reviews and searches (21, 22).

We organized our research question to JBI's mnemonic, PCC (19):

Participants: Athletes that participate in overhand sports

Concept: Upper extremity focal dystonias or yips

Context: Any worldwide clinical or sports setting

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, pickle ball, squash, racquetball, dodgeball, axe throwing, and jai alai.

Concept: Upper extremity focal dystonias or yips, including 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, bocci, bowling, cornhole, ladder ball, shot put, hammer throw, discus, Frisbee, or juggling.

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 February 29, 2024. No reviews or protocols directly addressed our 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. Library colleagues will peer review the strategy

according to PRESS guidelines (23). 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.

Other sources:

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

Grey literature: Conference proceedings and abstracts for years from 2017 to 2024, as they have publicly available meeting abstracts available for review:

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

Study Selection (eligibility criteria)

Two reviewers from a pool of three will independently screen each title and abstract, then independently review full text in duo for inclusion. When no consensus can be reached between the two reviewers, a third reviewer will be the deciding vote. We will use Covidence (Veritas Health Innovation), an online systematic reviewing platform, to screen and select studies.

Quality assessment

In compliance with scoping review methodology, no quality assessment of included studies will be conducted, as our goal is to rapidly map the literature.

Data extraction:

Two reviewers will pilot our data charting form using sentinel articles prior to finalization of protocol. Three reviewers will then independently extract and chart the data from included studies using Covidence.

We will chart the following data:

- Title
- Year of publication
- Context:
 - o Origin/country of origin (where the source was published or conducted)
 - o Clinical or sports setting
- Aims/purpose
- Participants: Population and sample size within the source of evidence (if applicable)
- Methodology / methods
 - o Study Type
- Concept:
 - o Diagnostic criteria
 - o Intervention type, comparator and details of these (e.g. duration of the intervention) (if applicable). Duration of the intervention (if applicable)
 - o Outcomes and details of these (e.g. how measured) (if applicable)

- Key findings that relate to the scoping review question/s.

Analysis of evidence:

Analysis will include frequency counts of populations, characteristics, and demographics. Brief descriptive analysis will include context on prevalence, etiology, and treatment.

Presentation of results:

Results will be presented in both tabular and narrative form.

Limitations

This review is limited by the lack of definitive diagnostic criteria for the yips, potentially leading to a selection bias in existing literature on the topic. A reporting bias in the literature may also be present given a prevailing stigma against addressing it among athletes.

ETHICS AND DISSEMINATION

As this is a review protocol, no ethical approval is necessary. Results will be submitted to a peer-reviewed journal for publication and submitted to both local and national conferences.

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

Publication plan for protocol: This protocol is registered with the Open Science Framework (osf.io).

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Authors' contributions

All authors contributed to the formation of this protocol and manuscript.

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Competing interests statement

None declared.

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Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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Primary Subject Heading:	Sports and exercise medicine
Secondary Subject Heading:	Neurology, Mental health
Keywords:	SPORTS MEDICINE, Stress, Psychological, Neuromuscular disease < NEUROLOGY

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Title
Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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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 *JBIManual for Evidence Synthesis*. We organized 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 June 26-27, 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 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.

Registration

This protocol is registered with the Open Science Framework (1).

For peer review only

Strengths and Limitations

- The review will meet the need for a comprehensive mapping of the limited amount of evidence for the yips in athletes of overhand sports.
- This review of the current knowledge on the topic will drive future research endeavors to assist athletes and support staff to better understand and address the yips.
- A reporting bias in the literature may be present given a prevailing stigma against addressing it among athletes.

INTRODUCTION

Sports-related focal dystonia, or the yips, are a condition seen in athletes where a repetitive 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 and 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 psycho-neuromuscular disorder, with the prevailing theory among athletes being that it is a form of performance anxiety [2-7]. However, many smaller studies performed on the condition in golfers show a fine motor neuromuscular dystonia as the most likely cause [3-8]. 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 is by far the most commonly studied context of the condition [8-14]. These studies have shown a correlation of the following with the yips: perfectionistic tendencies, social anxiety, performance anxiety [5], male gender, prior smoking, more experience playing golf [15], more frequent musculoskeletal problems, and a family history of the yips. Evaluations of the yips in other sports have shown that those with an over-commitment to baseball [16], previous psychological trauma, anxiety, experiencing a negative stigma from other players and coaches, increased pressure from coaches, and female gender [2] make an athlete more likely to experience the yips.

One particular study by Sato [2] 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 had a small number of athletes in overhand sports. The primary remaining studies on the yips were in baseball players, largely conducted in Japan [16-18], and mostly evaluated psychological causes.

Mine et al. conducted a systematic review on the effectiveness of management on “the yips in sport” in 2018 [10]. Their review primarily included articles about the yips in golf, and 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 [19]. 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.

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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, etiology, and treatment of upper extremity focal dystonias (yips) in athletes participating in overhand sports? We organized our research question to JBI's mnemonic, PCC [20]:

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* [20]. Utilizing 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, summarizing, and reporting the results [21]. For transparency and reproducibility, we will adhere to the PRISMA reporting guidelines for scoping reviews and searches [22,23]. (see 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 February 29, 2024. No reviews or protocols directly addressed our 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 (e.g. article title, abstract, keywords). For example, Medline's Medical Subject Headings (MeSH) are completely different from Embase's Emtree subject headings. Library colleagues will peer review the strategy.

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according to PRESS guidelines [24]. 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.

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, and review for designated overhand sports or athletes:

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

Study Selection (eligibility criteria)

Two reviewers from a pool of three (JK, KS, 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, a third reviewer (KBJ) 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 organized to JBI's mnemonic, PCC [20].

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, pickle ball, 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, bocci, 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 [25,26].

Data extraction:

We piloted our data charting form with two reviewers (JK, KBJ) using sentinel articles prior to finalization of protocol.

Two reviewers from a pool of three (JK, KS, 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 (KBJ) will make the final decision on data charted.

We will chart the following data reported in the included studies:

- Title
- Year of publication
- Context:
 - o Origin/country of origin (where the source was published or conducted)
 - o Clinical or sports setting
- Aims/purpose
- Participants: Athletes that play overhand sports
 - o Population characteristics, demographics, and sample size
 - o Sport type
- Methodology / methods
 - o Study Type
- Concept: Dystonias
 - o Diagnostic criteria
 - o Reported prevalence
 - o Etiology
 - o Intervention, intervention type, intervention modality, intervention duration
 - o Comparator, comparator type, comparator modality, comparator duration
 - o 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, specifically reported prevalence, etiology, and treatment. We will organize our extraction to the PCC.

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.

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 organizations, 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, etiology, 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 abstract or poster presentations 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(1) (osf.io).

For peer review only

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Contributorship statement

All authors (Jordan Knox, Karishma Shah, Mary McFarland, Tallie Casucci, and Kyle Jones) all

contributed to the conception, design, analysis, and writing of this protocol and manuscript, and will participate in the analysis described herein. Kyle Jones is the guarantor, and thus accepts full responsibility for the work and content of

this study.

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Competing interests statement

None declared.

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Appendix I: Recommended items to address in a scoping review protocol [25,27]

Section and topic	Item No	Checklist item	Page#
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a scoping review	1
Update	1b	If the protocol is for an update of a previous scoping review, identify as such	n/a
Registration	2	If registered, provide the name of the registry (such as JBI) and registration number	1
Authors:			
Contact	3a	Provide name, institutional affiliation, email address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	6
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support:			
Sources	5a	Indicate sources of financial or other support for the review	6
Sponsor	5b	Provide name for the review funder and/or sponsor	n/a
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	n/a
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known (Note: Consider providing a rationale for the choice of conducting a scoping review as compared to other evidence synthesis approaches)	2
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to the inclusion/ exclusion criteria	3
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, timeframe) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	3-4
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other gray literature sources) with planned dates of coverage	4
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	3-4
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	4
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion)	4
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	4-5
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any preplanned data assumptions and simplifications (Note: Scoping reviews may not use PICO and instead may use JBI's Population, Concept, and Context [PCC] or another approach to reporting eligibility criteria)	4
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale (Note: Scoping reviews may not extract outcome data, so this can refer to whichever data items are extracted)	5

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(Continued)			
Section and topic	Item No	Checklist item	Page#
Risk of bias in individual studies	14	If this is to occur, describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis (Note: Scoping reviews typically do not include risk of bias assessment, but this information should be described if it will occur)	5
Data synthesis	15a	Describe criteria under which study data will be presented (Note: Scoping reviews do not typically include quantitative synthesis of study data, but should still describe in advance how extracted data are anticipated to be presented in the resulting review)	5
	15b	Describe the planned approach to how extracted data will be presented (such as figures, tables, evidence gaps maps)	5
	15c	Describe any proposed additional analyses (such as thematic analyses) (Note: The JBI methodological guidance does not recommend undertaking thematic analysis as this synthesis of data should ideally occur following methodological appraisal of the included sources)	n/a
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	4
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies) (Note: Scoping reviews typically do not include assessment of meta-bias(es), but this information should be described if it will occur)	n/a
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	n/a

GRADE, Grading of Recommendations, Assessment, Development and Evaluation; PICO, participants, intervention, comparator, outcomes; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

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Appendix II: Search Strategies

Search Strategies

Database results retrieved on June 26-27, 2024.

Table of search concepts

Participants		Overhand throwing
		Overhand sports
		Athletes
		Athletic injuries
		Sports
	AND	
Concept		Yips
		Dystonia
		Choking

Medline (Ovid)

- 1 (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*)
adj6 dystoni*)).ti,ab,kw,kf. [yips - keyword terms] 2402
- 2 Dystonic Disorders/ or Dystonia/ or dystoni*.ti,ab,kw,kf. [dystonia - subject or keyword
terms] 22451
- 3 choking*.ti,ab,kw,kf. [choking - keyword term] 2684
- 4 or/1-3 [all dystonias] 25142
- 5 (throw or throws or throwing or ((overhand* or overhead*) adj3 (athlet* or game* or
motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss*
or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or
throw*) adj3 (axe or axes or ball or balls or spear or spears or stick or sticks))).ti,ab,kw,kf.
[overhand throwing – keyword terms] 12609
- 6 baseball/ or basketball/ or cricket sport/ or football/ or racquet sports/ or swimming/ or
tennis/ or "track and field"/ or volleyball/ or ("axe throw*" or badminton* or baseball* or "base
ball*" or basketball* or "basket ball*" or (bat adj3 ball) or catch or cricket* or crossminton* or
darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or
"dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or
handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or
netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball*
or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or
"pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or
racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or
raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or
"soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or

squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track adj2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon").ti,ab,kw,kf. [sport names - subject or keyword terms]124074

7 (((ball or bird) adj3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")).ti,ab,kw,kf. [positions or select terminology - keyword terms] 54211

8 or/6-7 [overhand sports] 174317

9 Athletes/ or Para-Athletes/ or (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*").ti,ab,kw,kf. [athletes - subject or keyword terms] 80119

10 Athletic Injuries/ or ((athlet* or sport*) adj2 (injur* or trauma*)).ti,ab,kw,kf. [athletic injuries - subject or keyword terms] 39303

11 Sports/ or sport*.ti,ab,kw,kf. [sports - subject or keyword term] 131198

12 (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or Knoblauch* or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") adj1 (disease* or dystoni* or syndrome* or yips)).ti,ab,kw,kf. [yips specifically named after players - keyword terms] 0

13 (4 and 5) not 12 [dystonias + overhand throwing] 29

14 (4 and 8) not (or/12-13) [dystonias + overhand sports] 92

15 (4 and 9) not (or/12-14) [dystonias + athletes] 57

16 (4 and 10) not (or/12-15) [dystonias + athletic injuries] 6

17 (4 and 11) not (or/12-16) [dystonias + sports] 40

18 or/12-17 [results] 224

19 ("34514382" or "33990687" or "28375396").ui. [exemplars] 3

20 or/18-19 [results include exemplars] 224

21 remove duplicates from 20 [final results] 224

Medline (Ovid) Legend

Field codes: / = Medical Subject Heading (MeSH); ti = article title; ab = abstract; kf = keyword heading word; kw = keyword heading (author keywords); ui = unique identifier

Proximity operator: adj#

Truncation: *

SportDiscus (Ebscohost)

Interface - EBSCOhost Research Databases

Search Screen - Basic Search

Database - SPORTDiscus with Full Text

Search modes – Proximity

#	Query	Results
S18	Limit S17 by Source Types: Academic Journals, Reports, Conference Papers, Dissertations, Electronic Resources	210
S17	S13 OR S14 OR S15 OR S16	337
S16	S4 AND S12 NOT (S13 OR S14 OR S15)	168
S15	S4 AND S8 NOT (S13 OR S14)	128
S14	S4 AND S5 NOT S13	38
S13	TI (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR AB (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR KW (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips))	3
S12	S9 OR S10 OR S11	786,855
S11	SU "SPORTS" OR TI sport* OR AB sport* OR KW sport*	652,239
S10	SU "SPORTS injuries" OR TI ((athlet* or sport*) N2 (injur* or trauma*)) OR AB ((athlet* or sport*) N2 (injur* or trauma*)) OR KW ((athlet* or sport*) N2 (injur* or trauma*))	24,985
S9	SU "ATHLETES" OR SU "OLYMPIC athletes" OR TI (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") OR AB (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") OR KW (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*")	271,045

S8	S6 OR S7	519,169
S7	SU "PITCHERS (Baseball)" OR SU "PITCHERS (Softball)" OR SU "RELIEF pitchers (Baseball)" OR SU "QUARTERBACKING (Football)" OR SU "QUARTERBACKS (Football)" OR SU "PASSING (Football)" OR TI (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR AB (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR KW (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*"))	58,618
S6	SU "BASEBALL" OR SU "BASKETBALL" OR SU "BADMINTON (Game)" OR SU "BASQUE pelota (Game)" OR SU "BATTLEDORE & shuttlecock" OR SU "COURT tennis" OR SU "CRICKET (Sport)" OR SU "FOOTBALL" OR SU "MINTON (Game)"	508,236

OR SU "PADDLE tennis" OR SU "PICKLEBALL (Game)" OR SU "RACKETS (Game)" OR SU "RACQUETBALL" OR SU "RACKET games" OR SU "RUGBY football" OR SU "SOFTBALL" OR SU "SQUASH (Game)" OR SU "SQUASH tennis" OR SU "TABLE tennis" OR SU "TENNIS" OR SU "VOLLEYBALL" OR TI ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") OR AB ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") OR KW ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball*

	or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon")	
S5	SU "THROWING (Sports)" OR SU "KNIFE throwing" OR SU "PITCHING (Baseball)" OR SU "PITCHING (Softball)" OR SU "WEIGHT throwing" OR TI (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) OR AB (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) OR KW (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks)))	19,884
S4	S1 OR S2 OR S3	898
S3	TI choking* OR AB choking* OR KW choking*	450
S2	SU "DYSTONIA" or TI dystoni* OR AB dystoni* OR KW dystoni*	354
S1	SU "FOCAL dystonia" OR TI (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) OR AB (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) OR KW (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*))	212

SportDiscus legend

Field codes: TI = title; AB = abstract; KW = keyword; SU = subject

Proximity operator: N#

Truncation: *

PsycInfo (Ebscohost)

Interface - EBSCOhost Research Databases

Search Screen - Basic Search

Database - APA PsycInfo

Search modes - Proximity

#	Query	Results
S17	S13 OR S14 OR S15 OR S16	287
S16	S4 AND S12 NOT (S13 OR S14 OR S15)	165
S15	S4 AND S8 NOT (S13 OR S14)	85
S14	S4 AND S5 NOT S13	36
S13	TI (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR AB (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR KW (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips))	1
S12	S9 OR S10 OR S11	58,780
S11	SU "SPORTS" or SU "Adaptive Sports" or TI sport* or AB sport* or KW sport*	50,337
S10	SU "Athletic Injuries" or TI ((athlet* or sport*) N2 (injur* or trauma*)) or AB ((athlet* or sport*) N2 (injur* or trauma*)) or KW ((athlet* or sport*) N2 (injur* or trauma*))	2,597
S9	SU "ATHLETES" or TI (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") or AB (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") or KW (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*")	27,838
S8	S6 OR S7	46,728

S7	<p>TI (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR AB (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR KW (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*"))</p>	15,246
S6	<p>SU "Baseball" or SU "Basketball" or SU "Football" or SU "Swimming" OR SU "Tennis" or TI ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or</p>	32,740

"paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or
 poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or
 quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon*
 or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*"
 or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock
 or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or
 speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or
 swim or swims or swimmer* or swimming* or tambass or tamburello or tennis*
 or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or
 volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight
 pentathlon") or AB ("axe throw*" or badminton* or baseball* or "base ball*" or
 basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton*
 or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or
 dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball
 game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten
 ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or
 "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or
 poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or
 quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon*
 or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*"
 or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock
 or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or
 speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or
 swim or swims or swimmer* or swimming* or tambass or tamburello or tennis*
 or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or
 volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight
 pentathlon") or KW ("axe throw*" or badminton* or baseball* or "base ball*" or
 basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton*
 or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or
 dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball
 game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten
 ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or
 "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or
 poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or
 quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon*
 or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*"
 or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock
 or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or
 speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or
 swim or swims or swimmer* or swimming* or tambass or tamburello or tennis*
 or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or
 volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight
 pentathlon")

S5	TI (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) or AB (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) or KW (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks)))	6,416
S4	S1 OR S2 OR S3	7,768
S3	TI choking* OR AB choking* OR KW choking*	785
S2	SU "Muscular Disorders" or TI dystoni* or AB dystoni* or KW dystoni*	6,969
S1	TI (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) or AB (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) or KW (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*))	713

PsycInfo legend

Field codes: TI = title; AB = abstract; KW = keyword; SU = subject

Proximity operator: N#

Truncation: *

Embase (Elsevier, embase.com)

#	Query	Results
#18	#12 OR #13 OR #14 OR #15 OR #16 OR #17	372
#17	#4 AND #11 NOT (#12 OR #13 OR #14 OR #15 OR #16)	83
#16	#4 AND #10 NOT (#12 OR #13 OR #14 OR #15)	11
#15	#4 AND #9 NOT (#12 OR #13 OR #14)	79
#14	#4 AND #8 NOT (#12 OR #13)	158
#13	#4 AND #5 NOT #12	41
#12	(('alexander zverev*' OR 'aryna sabalenka*' OR 'chuck hayes*' OR 'collins obuya*' OR 'daniel bard*' OR 'eric bristow*' OR 'gavin hamilton*' OR 'guillermo coria*' OR 'ian folley*' OR 'jarrod saltalamacchia*' OR 'jon lester*' OR 'keith medlycott*' OR 'knoblauch*' OR 'markelle fultz*' OR 'mackey sasser*' OR 'nick anderson*' OR 'rick ankiel*' OR 'roger harper*' OR 'steve blass*' OR 'steve sax*' OR 'tyler matzek*') NEAR/1 (disease* OR dystoni* OR syndrome* OR yips)):ti,ab,kw	0

#11 'sport'/de OR sport*:ti,ab,kw 168,647

#10 'sport injury'/de OR (((athlet* OR sport*) NEAR/2 (injur* OR trauma*)):ti,ab,kw) 45,560

#9 'athlete'/de OR 'para athlete'/de OR athlete*:ti,ab,kw OR olympi*:ti,ab,kw OR 'para-athlete*:ti,ab,kw OR paralympi*:ti,ab,kw OR 'para olympi*:ti,ab,kw 107,370

#8 #6 OR #7 213,587

#7 'baseball player'/de OR 'basketball player'/de OR 'football player'/de OR 'lacrosse player'/de OR 'softball player'/de OR 'squash player'/de OR (((ball OR bird) NEAR/3 (pass* OR serve* OR serving* OR smash* OR spike* OR spiking* OR throw* OR toss*)):ti,ab,kw) OR baseman*:ti,ab,kw OR basemen*:ti,ab,kw OR baseperson*:ti,ab,kw OR basewoman*:ti,ab,kw OR basewomen*:ti,ab,kw OR batting:ti,ab,kw OR batter:ti,ab,kw OR batters:ti,ab,kw OR blooperball*:ti,ab,kw OR 'blooper ball*:ti,ab,kw OR bowler*:ti,ab,kw OR cabbageball*:ti,ab,kw OR 'cabbage ball*:ti,ab,kw OR catcher*:ti,ab,kw OR 'center field*:ti,ab,kw OR 'chicago ball*:ti,ab,kw OR clincher*:ti,ab,kw OR 'designated hitter*:ti,ab,kw OR dunk*:ti,ab,kw OR 'fastball* pitch*:ti,ab,kw OR fastpitch*:ti,ab,kw OR fielder*:ti,ab,kw OR fielding:ti,ab,kw OR 'first base*:ti,ab,kw OR 'forward pass*:ti,ab,kw OR 'free throw*:ti,ab,kw OR 'foul shot*:ti,ab,kw OR 'hand throw*:ti,ab,kw OR infield*:ti,ab,kw OR inning*:ti,ab,kw OR 'jump shot*:ti,ab,kw OR layup*:ti,ab,kw OR 'lay up*:ti,ab,kw OR 'left field*:ti,ab,kw OR mushball*:ti,ab,kw OR 'mush ball*:ti,ab,kw OR 'pinch hitter*:ti,ab,kw OR 'pinch runner*:ti,ab,kw OR pitcher*:ti,ab,kw OR pitching*:ti,ab,kw OR pitches:ti,ab,kw OR 'point guard*:ti,ab,kw OR puffball*:ti,ab,kw OR outfield*:ti,ab,kw OR quarterback*:ti,ab,kw OR 'right field*:ti,ab,kw OR 'second base*:ti,ab,kw OR 'shooting guard*:ti,ab,kw OR shortstop*:ti,ab,kw OR 'signal caller*:ti,ab,kw OR 'slow* pitch*:ti,ab,kw OR smushball*:ti,ab,kw OR 'smush ball*:ti,ab,kw OR 'super-slow* pitch*:ti,ab,kw OR 'third base*:ti,ab,kw 75,879

#6 'badminton'/de OR 'baseball'/de OR 'basketball'/de OR 'cricket (sport)'/de OR 'football'/de OR 'lacrosse (sport)'/de OR 'racquet sport'/de OR 'racquetball'/de OR 'rugby'/de OR 'softball'/de OR 'squash (sport)'/de OR 'tennis'/de OR 'track and field'/de OR 'volleyball'/de OR 'water polo'/de OR 'axe throw*:ti,ab,kw OR badminton*:ti,ab,kw OR baseball*:ti,ab,kw OR 'base ball*:ti,ab,kw OR basketball*:ti,ab,kw OR 'basket ball*:ti,ab,kw OR ((bat NEAR/3 ball):ti,ab,kw) OR catch:ti,ab,kw OR cricket*:ti,ab,kw OR crossminton*:ti,ab,kw OR darts:ti,ab,kw OR dartchery:ti,ab,kw OR 'dart-throw*:ti,ab,kw OR 'dart* throw*:ti,ab,kw OR 'diamond ball*:ti,ab,kw OR dodgeball*:ti,ab,kw OR 'dodge-ball*:ti,ab,kw OR 'dodge ball*:ti,ab,kw OR downball*:ti,ab,kw OR 'downside ball game*:ti,ab,kw OR football*:ti,ab,kw OR handball*:ti,ab,kw OR gridiron*:ti,ab,kw OR 'jai alai*:ti,ab,kw OR javelin*:ti,ab,kw OR 'kitten ball*:ti,ab,kw OR lacrosse*:ti,ab,kw OR matkot:ti,ab,kw OR netball*:ti,ab,kw OR paddleball*:ti,ab,kw OR 'paddle ball*:ti,ab,kw OR 'paddle sport*:ti,ab,kw OR 'paddle tennis*:ti,ab,kw OR pickleball*:ti,ab,kw OR 'pickle ball*:ti,ab,kw OR polo:ti,ab,kw OR poolball*:ti,ab,kw OR powderpuff*:ti,ab,kw OR punchball*:ti,ab,kw OR 'punch ball*:ti,ab,kw OR 'pumpkin ball*:ti,ab,kw OR quoits:ti,ab,kw OR qianball*:ti,ab,kw OR 'quian ball*:ti,ab,kw OR racketball*:ti,ab,kw OR 'racket ball*:ti,ab,kw OR racketlon*:ti,ab,kw OR 'racket sport*:ti,ab,kw OR rackets:ti,ab,kw OR raquetball*:ti,ab,kw OR 'raquet ball*:ti,ab,kw OR 'raquet sport*:ti,ab,kw OR raquets:ti,ab,kw OR rounders*:ti,ab,kw OR roundnet*:ti,ab,kw OR rugby*:ti,ab,kw OR shurikenjutsu:ti,ab,kw OR shuttlecock:ti,ab,kw OR softball*:ti,ab,kw OR 'soft ball*:ti,ab,kw OR speedball*:ti,ab,kw OR 'speed-ball*:ti,ab,kw OR 'speed ball*:ti,ab,kw OR speedminton*:ti,ab,kw OR sphairee*:ti,ab,kw OR squash*:ti,ab,kw OR sticke:ti,ab,kw OR

stoolball*:ti,ab,kw OR 'stool ball*':ti,ab,kw OR swim:ti,ab,kw OR swims:ti,ab,kw OR swimmer*:ti,ab,kw OR swimming*:ti,ab,kw OR tambass:ti,ab,kw OR tamburello:ti,ab,kw OR tennis*:ti,ab,kw OR 'throws pentathlon':ti,ab,kw OR touchtennis*:ti,ab,kw OR ((track NEAR/2 field):ti,ab,kw) OR 'tut-ball*':ti,ab,kw OR volleyball*:ti,ab,kw OR waterfootball*:ti,ab,kw OR 'water polo*':ti,ab,kw OR 'water rugby*':ti,ab,kw OR 'weight pentathlon':ti,ab,kw145,698 #5 throw:ti,ab,kw OR throws:ti,ab,kw OR throwing:ti,ab,kw OR (((overhand* OR overhead*) NEAR/3 (athlet* OR game* OR motion* OR pass* OR serv* OR shot* OR shoot* OR smash* OR spike* OR spiking* OR sport* OR toss* OR throw*)):ti,ab,kw) OR (((pass* OR serv* OR shot* OR shoot* OR smash* OR spike* OR spiking* OR toss* OR throw*) NEAR/3 (axe OR axes OR ball OR balls OR spear OR spears OR stick OR sticks)):ti,ab,kw) 15,403 #4 #1 OR #2 OR #3 37,831 #3 choking*:ti,ab,kw 4,323 #2 'dystonic disorder'/de OR dystoni*:ti,ab,kw 33,396 #1 'focal dystonia'/de OR dartitis:ti,ab,kw OR myodyson*:ti,ab,kw OR yips*:ti,ab,kw OR (((focal OR 'task-specific' OR 'task specific' OR task*) NEAR/6 dystoni*):ti,ab,kw) 4,155

Embase Legend

Field codes: ti = article title; ab = abstract; kw = keyword; de = index (descriptor) term
Proximity operator: NEAR/#
Truncation: *

Web of Science Core Collection(Clarivate)

- Science Citation Index: 1900 to 2024
- Arts & Humanities Citation Index: 1975 to 2024
- Emerging Source Citation Index 2019 to 2024
- Social Sciences Citation Index: 1900 to 2024

Searches:

1: TS=(dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) NEAR/6 dystoni*)) Results: 3,184

2: TS=(dystoni*)Results: 26145

3: TS=(choking*) Results: 4446

4: #1 OR #2 OR #3 Results: 30613

5: TS=((throw or throws or throwing or ((overhand* or overhead*) NEAR/3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) NEAR/3 (axe or axes or ball or balls or spear or spears or stick or sticks)))) Results: 35,446

6: TS=("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat NEAR/3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart*

throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track NEAR/2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") Results: 312,944

7: TS((((ball or bird) NEAR/3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or "batter's" or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")))) Results: 4317,319

8: #6 OR #7 Results: 4,585,670

9: TS=(athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") Results: 110,409

10: TS((((athlet* or sport*) NEAR/2 (injur* or trauma*))) Results: 17,721

11: TS=(sport*) Results: 203,286

12: TS(("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or Knoblauch* or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") NEAR/1 (disease* or dystoni* or syndrome* or yips)) Results: 0

13: #4 AND #5 NOT #12 Results: 89

14: (#4 AND #8) NOT (#12 OR #13) Results: 1,223

15: #4 AND #9 NOT (#12 OR #13 OR #14) Results: 123

16: #4 AND #10 NOT (#12 OR #13 OR #14 OR #15) Results: 4

17: #4 AND #11 NOT (#12 OR #13 OR #14 OR #15 OR #16) Results: 122

18: #12 OR #13 OR #14 OR #15 OR #16 OR #17 Results: 1,561

Web of Science Legend

Field code: TS = Topic (title, abstract, keyword plus, and author keywords)

Proximity operator: NEAR/#

Truncation: *

Sports Medicine & Education Index (ProQuest)

#	Strategy	Results
S1	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((throw or throws or throwing or ((overhand or overhead) NEAR/3 (athlete or athletes or game or games or motion or motions or pass or passes or passing or serve or serves or serving or shot or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or sport or sports or toss or tosses or tossing or throw or throws or throwing)) or ((pass or passes or passing or serve or serves or serving or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or spike or spikes or spiking or toss or tosses or tossing or throw or throws or throwing) NEAR/3 (axe or axes or ball or balls or bird or spear or spears or stick or sticks))))	16
S2	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft(badminton or baseball or "base ball" or basketball or "basket ball*" or (bat NEAR/3 ball) or catch or cricket or crossminton or darts or dartchery or "dart-throw" or dodgeball or "dodge-ball" or "dodge ball" or football or handball or gridiron or "jai alai" or javelin or lacrosse or matkot or netball or paddleball or "paddle ball" or "paddle sport" or "paddle sports" or "paddle tennis" or pickleball or "pickle ball" or polo or poolball or powderpuff or quoits or qianball or "quian ball" or racketball or "racket ball" or racketlon or "racket sport" or "racket sports" or rackets or raquetball or "raquet ball" or "raquet sport" or "raquet sports" or raquets or rugby or shurikenjutsu or shuttlecock or softball or "soft ball" or speedball or "speed-ball" or "speed ball" or speedminton or sphairee or squash or sticke or stoolball or "stool ball" or swim or swims or swimmer or swimmers or swimming or tambass or tamburello or tennis or touchtennis or (track NEAR/2 field) or volleyball or waterfootball or "weight pentathlon" or baseman or basemen or baseperson or basepersons or basewoman or basewomen or batting or batter or batters or bowler or bowlers or catcher or catchers or "center fielder" or "center fielders" or clincher or "designated hitter" or "designated hitters" or dunk or dunks or dunking or fielder or fielders or fielding or "forward pass" or "forward passes" or "forward passing" or "free throw" or "free throws" or "foul shot" or "foul shots" or infielder or infielders or inning or innings or "jump shot" or "jump shots" or layup or layups or "lay up" or "lay ups" or "left fielder" or "pinch hitter" or "pinch hitters" or "pinch runner" or "pinch runners" or pitch or pitcher or pitchers or pitches or pitching or "point guard" or "point guards" or puffball or outfielder or outfielders or quarterback or quarterbacks or "right fielder" or "right fielders" or "shooting guard" or "shooting guards" or shortstop or shortstops or "signal caller" or "signal callers")	68

S3 noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((athlete or athletes or olympian or olympians or "para-athlete" or "para-athletes" or Paralympian or paraolympians or "para-olympian" or "para-olympians" or sport or sports) or ((athlete or athletes or athletic or athletics or sport or sports or "sports-related") NEAR/2 (injury or injuries or trauma or traumas or traumatic)))
257

S4 [S1] OR [S2] OR [S3] 231

ProQuest Legend

Field codes: NOFT = Anywhere except full text

Proximity operator: NEAR/#

Truncation: *

ProQuest Dissertation and Theses Global (ProQuest)

#	Strategy	Results
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S1	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((throw or throws or throwing or ((overhand or overhead) NEAR/3 (athlete or athletes or game or games or motion or motions or pass or passes or passing or serve or serves or serving or shot or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or sport or sports or toss or tosses or tossing or throw or throws or throwing)) or ((pass or passes or passing or serve or serves or serving or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or spike or spikes or spiking or toss or tosses or tossing or throw or throws or throwing) NEAR/3 (axe or axes or ball or balls or bird or spear or spears or stick or sticks))))	16
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S2	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft(badminton or baseball or "base ball" or basketball or "basket ball*" or (bat NEAR/3 ball) or catch or cricket or crossminton or darts or dartchery or "dart-throw" or dodgeball or "dodge-ball" or "dodge ball" or football or handball or gridiron or "jai alai" or javelin or lacrosse or matkot or netball or paddleball or "paddle ball" or "paddle sport" or "paddle sports" or "paddle tennis" or pickleball or "pickle ball" or polo or poolball or powderpuff or quoits or qianball or "quian ball" or racketball or "racket ball" or racketlon or "racket sport" or "racket sports" or rackets or raquetball or "raquet ball" or "raquet sport" or "raquet sports" or raquets or rugby or shurikenjutsu or shuttlecock or softball or "soft ball" or speedball or "speed-ball" or "speed ball" or speedminton or sphairee or squash or sticke or stoolball or "stool ball" or swim or swims or swimmer or swimmers or swimming or tambass or tamburello or tennis or touchtennis or (track NEAR/2 field) or volleyball or waterfootball or "weight pentathlon" or baseman or basemen or baseperson or basepersons or basewoman or basewomen or batting or batter or batters or bowler or bowlers or catcher or	
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catchers or "center fielder" or "center fielders" or clincher or "designated hitter" or "designated
hitters" or dunk or dunks or dunking or fielder or fielders or fielding or "forward pass" or
"forward passes" or "forward passing" or "free throw" or "free throws" or "foul shot" or "foul
shots" or infielder or infielders or inning or innings or "jump shot" or "jump shots" or layup or
layups or "lay up" or "lay ups" or "left fielder" or "pinch hitter" or "pinch hitters" or "pinch
runner" or "pinch runners" or pitch or pitcher or pitchers or pitches or pitching or "point guard"
or "point guards" or puffball or outfielder or outfielders or quarterback or quarterbacks or
"right fielder" or "right fielders" or "shooting guard" or "shooting guards" or shortstop or
shortstops or "signal caller" or "signal callers") 52

S3 noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or
myodystonias or myodystonic or yips) AND noft((athlete or athletes or olympian or olympians
or "para-athlete" or "para-athletes" or Paralympian or paraolympians or "para-olympian" or
"para-olympians" or sport or sports) or ((athlete or athletes or athletic or athletics or sport or
sports or "sports-related")) NEAR/2 (injury or injuries or trauma or traumas or traumatic)))
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S4 [S1] OR [S2] OR [S3] 89

ProQuest Legend

Field codes: NOFT = Anywhere except full text

Proximity operator: NEAR/#

Truncation: *

BMJ Open

Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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Secondary Subject Heading:	Neurology, Mental health
Keywords:	SPORTS MEDICINE, Stress, Psychological, Neuromuscular disease < NEUROLOGY

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Title
Prevalence and Proposed Etiologies of Dystonias or Yips in Athletes Playing Overhand Sports: A Scoping Review Protocol

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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 *JBIManual for Evidence Synthesis*. We organized 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 June 26-27, 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.

Registration

This protocol is registered with the Open Science Framework [1].

For peer review only

For peer review only

Strengths and Limitations

- 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.

INTRODUCTION

Sports-related focal dystonia, or the yips, is a condition seen in athletes where a repetitive 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 psycho-neuromuscular disorder, with the prevailing theory among athletes being that it is a form of performance anxiety [2-7]. However, many smaller studies performed on the condition in golfers show a fine motor neuromuscular dystonia as the most likely cause [3-8]. 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 is by far the most commonly studied context of the condition [8-14]. These studies have shown a correlation of the following with the yips: perfectionistic tendencies, social anxiety, performance anxiety [5], male gender, prior smoking, more experience playing golf [15], more frequent musculoskeletal problems, and a family history of the yips. Evaluations of the yips in other sports have shown that those with an over-commitment to baseball [16], previous psychological trauma, anxiety, experiencing a negative stigma from other players and coaches, increased pressure from coaches, and female gender [2] make an athlete more likely to experience the yips.

One particular study by Sato [2] 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 [16-18], and mostly evaluated psychological causes.

Mine et al. conducted a systematic review on the effectiveness of management on “the yips in sport” in 2018 [10]. 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 [19]. 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.

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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, etiology, and treatment of upper extremity focal dystonias (yips) in athletes participating in overhand sports? We organized our research question to JBI's mnemonic, PCC [20]:

Participants: Athletes that participate in overhand sports

Concept: Upper extremity focal dystonias or yips

Context: Any worldwide clinical or sports setting

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METHODS AND ANALYSIS

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We will conduct our scoping review with guidance from the latest version of the *JBI Manual for Evidence Synthesis* [20]. Utilizing 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, summarizing, and reporting the results [21]. For transparency and reproducibility, we will adhere to the PRISMA reporting guidelines for scoping reviews and searches [22,23]. (See Appendix I.)19

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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 February 29, 2024. No reviews or protocols directly addressed the research question.

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Literature searching

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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 (e.g., article title, abstract, keywords). For example, Medline's Medical Subject Headings (MeSH) are completely different from Embase's Emtree subject headings. Library colleagues will peer review the strategy according to PRESS guidelines [24]. Citation management and duplicate detection and removal will be accomplished with EndNote (Clarivate Analytics.)

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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 Appendix II.)

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Other sources:
References of included studies will be checked for additional relevant studies.

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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:

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

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Study Selection (eligibility criteria)

Two reviewers from a pool of three (JK, KS, 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, a third reviewer (KBJ) 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 is organized to JBI's mnemonic, PCC [20].

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, pickle ball, 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, bocci, 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 [25,26].

Data extraction:

We piloted our data charting form with two reviewers (JK, KBJ) using sentinel articles prior to finalization of protocol.

Two reviewers from a pool of three (JK, KS, 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 (KBJ) will make the final decision on data charted.

We will chart the following data reported in the included studies:

- Title
- Year of publication
- Context:
 - o Origin/country of origin (where the source was published or conducted)
 - o Clinical or sports setting
- Aims/purpose
- Participants: Athletes that play overhand sports
 - o Population characteristics, demographics, and sample size
 - o Sport type
- Methodology / methods
 - o Study Type
- Concept: Dystonias
 - o Diagnostic criteria
 - o Reported prevalence

- Etiology
 - Intervention, intervention type, intervention modality, intervention duration
 - Comparator, comparator type, comparator modality, comparator duration
-
- Outcomes, including outcome measurements, and outcome duration

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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, etiology, and treatment. We will organize 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.

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 organizations, 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, etiology, 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 [1] (osf.io).

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48 All authors (Jordan Knox, Karishma Shah, Mary McFarland, Tallie Casucci, and Kyle Jones) all
50 contributed to the conception, design, analysis, and writing of this protocol and manuscript, and will participate in the
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52 this study.

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55 not-for-profit sectors.

56 **Competing interests statement**

57 None declared.

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Appendix I: Recommended items to address in a scoping review protocol [25,27]

Section and topic	Item No	Checklist item	Page#
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a scoping review	1
Update	1b	If the protocol is for an update of a previous scoping review, identify as such	n/a
Registration	2	If registered, provide the name of the registry (such as JBI) and registration number	1
Authors:			
Contact	3a	Provide name, institutional affiliation, email address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	6
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	n/a
Support:			
Sources	5a	Indicate sources of financial or other support for the review	6
Sponsor	5b	Provide name for the review funder and/or sponsor	n/a
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	n/a
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known (Note: Consider providing a rationale for the choice of conducting a scoping review as compared to other evidence synthesis approaches)	2
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to the inclusion/ exclusion criteria	3
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, timeframe) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	3-4
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other gray literature sources) with planned dates of coverage	4
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	3-4
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	4
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion)	4
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	4-5
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any preplanned data assumptions and simplifications (Note: Scoping reviews may not use PICO and instead may use JBI's Population, Concept, and Context [PCC] or another approach to reporting eligibility criteria)	4
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale (Note: Scoping reviews may not extract outcome data, so this can refer to whichever data items are extracted)	5

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(Continued)			
Section and topic	Item No	Checklist item	Page#
Risk of bias in individual studies	14	If this is to occur, describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis (Note: Scoping reviews typically do not include risk of bias assessment, but this information should be described if it will occur)	5
Data synthesis	15a	Describe criteria under which study data will be presented (Note: Scoping reviews do not typically include quantitative synthesis of study data, but should still describe in advance how extracted data are anticipated to be presented in the resulting review)	5
	15b	Describe the planned approach to how extracted data will be presented (such as figures, tables, evidence gaps maps)	5
	15c	Describe any proposed additional analyses (such as thematic analyses) (Note: The JBI methodological guidance does not recommend undertaking thematic analysis as this synthesis of data should ideally occur following methodological appraisal of the included sources)	n/a
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	4
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies) (Note: Scoping reviews typically do not include assessment of meta-bias(es), but this information should be described if it will occur)	n/a
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	n/a

GRADE, Grading of Recommendations, Assessment, Development and Evaluation; PICO, participants, intervention, comparator, outcomes; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

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Appendix II: Search Strategies

Search Strategies

Database results retrieved on June 26-27, 2024.

Table of search concepts

Participants		Overhand throwing
		Overhand sports
		Athletes
		Athletic injuries
		Sports
	AND	
Concept		Yips
		Dystonia
		Choking

Medline (Ovid)

1 (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*)
adj6 dystoni*)).ti,ab,kw,kf. [yips - keyword terms] 2402
2 Dystonic Disorders/ or Dystonia/ or dystoni*.ti,ab,kw,kf. [dystonia - subject or keyword
terms] 22451
3 choking*.ti,ab,kw,kf. [choking - keyword term] 2684
4 or/1-3 [all dystonias] 25142
5 (throw or throws or throwing or ((overhand* or overhead*) adj3 (athlet* or game* or
motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss*
or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or
throw*) adj3 (axe or axes or ball or balls or spear or spears or stick or sticks))).ti,ab,kw,kf.
[overhand throwing – keyword terms] 12609
6 baseball/ or basketball/ or cricket sport/ or football/ or racquet sports/ or swimming/ or
tennis/ or "track and field"/ or volleyball/ or ("axe throw*" or badminton* or baseball* or "base
ball*" or basketball* or "basket ball*" or (bat adj3 ball) or catch or cricket* or crossminton* or
darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or
"dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or
handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or
netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball*
or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or
"pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or
racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or
raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or
"soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or

squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track adj2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon").ti,ab,kw,kf. [sport names - subject or keyword terms]124074

7 (((ball or bird) adj3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")).ti,ab,kw,kf. [positions or select terminology - keyword terms]

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8 or/6-7 [overhand sports] 174317

9 Athletes/ or Para-Athletes/ or (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*").ti,ab,kw,kf. [athletes - subject or keyword terms] 80119

10 Athletic Injuries/ or ((athlet* or sport*) adj2 (injur* or trauma*)).ti,ab,kw,kf. [athletic injuries - subject or keyword terms] 39303

11 Sports/ or sport*.ti,ab,kw,kf. [sports - subject or keyword term] 131198

12 (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or Knoblauch* or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") adj1 (disease* or dystoni* or syndrome* or yips)).ti,ab,kw,kf. [yips specifically named after players - keyword terms] 0

13 (4 and 5) not 12 [dystonias + overhand throwing] 29

14 (4 and 8) not (or/12-13) [dystonias + overhand sports] 92

15 (4 and 9) not (or/12-14) [dystonias + athletes] 57

16 (4 and 10) not (or/12-15) [dystonias + athletic injuries] 6

17 (4 and 11) not (or/12-16) [dystonias + sports] 40

18 or/12-17 [results] 224

19 ("34514382" or "33990687" or "28375396").ui. [exemplars] 3

20 or/18-19 [results include exemplars] 224

21 remove duplicates from 20 [final results] 224

Medline (Ovid) Legend

Field codes: / = Medical Subject Heading (MeSH); ti = article title; ab = abstract; kf = keyword heading word; kw = keyword heading (author keywords); ui = unique identifier

Proximity operator: adj#

Truncation: *

SportDiscus (Ebscohost)

Interface - EBSCOhost Research Databases

Search Screen - Basic Search

Database - SPORTDiscus with Full Text

Search modes – Proximity

#	Query	Results
S18	Limit S17 by Source Types: Academic Journals, Reports, Conference Papers, Dissertations, Electronic Resources	210
S17	S13 OR S14 OR S15 OR S16	337
S16	S4 AND S12 NOT (S13 OR S14 OR S15)	168
S15	S4 AND S8 NOT (S13 OR S14)	128
S14	S4 AND S5 NOT S13	38
S13	TI (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR AB (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR KW (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips))	3
S12	S9 OR S10 OR S11	786,855
S11	SU "SPORTS" OR TI sport* OR AB sport* OR KW sport*	652,239
S10	SU "SPORTS injuries" OR TI ((athlet* or sport*) N2 (injur* or trauma*)) OR AB ((athlet* or sport*) N2 (injur* or trauma*)) OR KW ((athlet* or sport*) N2 (injur* or trauma*))	24,985
S9	SU "ATHLETES" OR SU "OLYMPIC athletes" OR TI (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") OR AB (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") OR KW (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*")	271,045

S8	S6 OR S7	519,169
S7	SU "PITCHERS (Baseball)" OR SU "PITCHERS (Softball)" OR SU "RELIEF pitchers (Baseball)" OR SU "QUARTERBACKING (Football)" OR SU "QUARTERBACKS (Football)" OR SU "PASSING (Football)" OR TI (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR AB (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR KW (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*"))	58,618
S6	SU "BASEBALL" OR SU "BASKETBALL" OR SU "BADMINTON (Game)" OR SU "BASQUE pelota (Game)" OR SU "BATTLEDORE & shuttlecock" OR SU "COURT tennis" OR SU "CRICKET (Sport)" OR SU "FOOTBALL" OR SU "MINTON (Game)"	508,236

OR SU "PADDLE tennis" OR SU "PICKLEBALL (Game)" OR SU "RACKETS (Game)" OR SU "RACQUETBALL" OR SU "RACKET games" OR SU "RUGBY football" OR SU "SOFTBALL" OR SU "SQUASH (Game)" OR SU "SQUASH tennis" OR SU "TABLE tennis" OR SU "TENNIS" OR SU "VOLLEYBALL" OR TI ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") OR AB ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") OR KW ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball*

	or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon")	
S5	SU "THROWING (Sports)" OR SU "KNIFE throwing" OR SU "PITCHING (Baseball)" OR SU "PITCHING (Softball)" OR SU "WEIGHT throwing" OR TI (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) OR AB (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) OR KW (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks)))	19,884
S4	S1 OR S2 OR S3	898
S3	TI choking* OR AB choking* OR KW choking*	450
S2	SU "DYSTONIA" or TI dystoni* OR AB dystoni* OR KW dystoni*	354
S1	SU "FOCAL dystonia" OR TI (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) OR AB (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) OR KW (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*))	212

SportDiscus legend

Field codes: TI = title; AB = abstract; KW = keyword; SU = subject

Proximity operator: N#

Truncation: *

PsycInfo (Ebscohost)

Interface - EBSCOhost Research Databases
Search Screen - Basic Search
Database - APA PsycInfo
Search modes - Proximity

#	Query	Results
S17	S13 OR S14 OR S15 OR S16	287
S16	S4 AND S12 NOT (S13 OR S14 OR S15)	165
S15	S4 AND S8 NOT (S13 OR S14)	85
S14	S4 AND S5 NOT S13	36
S13	TI (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR AB (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips)) OR KW (("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or "Knoblauch*" or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") N1 (disease* or dystoni* or syndrome* or yips))	1
S12	S9 OR S10 OR S11	58,780
S11	SU "SPORTS" or SU "Adaptive Sports" or TI sport* or AB sport* or KW sport*	50,337
S10	SU "Athletic Injuries" or TI ((athlet* or sport*) N2 (injur* or trauma*)) or AB ((athlet* or sport*) N2 (injur* or trauma*)) or KW ((athlet* or sport*) N2 (injur* or trauma*))	2,597
S9	SU "ATHLETES" or TI (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") or AB (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") or KW (athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*")	27,838
S8	S6 OR S7	46,728

S7	<p>TI (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR AB (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")) OR KW (((ball or bird) N3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or batter's or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*"))</p>	15,246
S6	<p>SU "Baseball" or SU "Basketball" or SU "Football" or SU "Swimming" OR SU "Tennis" or TI ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or</p>	32,740

"paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") or AB ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") or KW ("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat N3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart* throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track N2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon")

S5	TI (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) or AB (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks))) or KW (throw or throws or throwing or ((overhand* or overhead*) N3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) N3 (axe or axes or ball or balls or spear or spears or stick or sticks)))	6,416
S4	S1 OR S2 OR S3	7,768
S3	TI choking* OR AB choking* OR KW choking*	785
S2	SU "Muscular Disorders" or TI dystoni* or AB dystoni* or KW dystoni*	6,969
S1	TI (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) or AB (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*)) or KW (dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) N6 dystoni*))	713

PsycInfo legend

Field codes: TI = title; AB = abstract; KW = keyword; SU = subject

Proximity operator: N#

Truncation: *

Embase (Elsevier, embase.com)

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#      Query Results
#18    #12 OR #13 OR #14 OR #15 OR #16 OR #17  372
#17    #4 AND #11 NOT (#12 OR #13 OR #14 OR #15 OR #16)  83
#16    #4 AND #10 NOT (#12 OR #13 OR #14 OR #15)  11
#15    #4 AND #9 NOT (#12 OR #13 OR #14)  79
#14    #4 AND #8 NOT (#12 OR #13) 158
#13    #4 AND #5 NOT #12  41
#12    (('alexander zverev*' OR 'aryna sabalenka*' OR 'chuck hayes*' OR 'collins obuya*' OR
'daniel bard*' OR 'eric bristow*' OR 'gavin hamilton*' OR 'guillermo coria*' OR 'ian folley*' OR
'jarrod saltalamacchia*' OR 'jon lester*' OR 'keith medlycott*' OR knoblauch* OR 'markelle
fultz*' OR 'mackey sasser*' OR 'nick anderson*' OR 'rick ankiel*' OR 'roger harper*' OR 'steve
blass*' OR 'steve sax*' OR 'tyler matzek*') NEAR/1 (disease* OR dystoni* OR syndrome* OR
yips)):ti,ab,kw  0
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1
2
3 #11 'sport'/de OR sport*:ti,ab,kw 168,647
4 #10 'sport injury'/de OR (((athlet* OR sport*) NEAR/2 (injur* OR trauma*)):ti,ab,kw) 45,560
5 #9 'athlete'/de OR 'para athlete'/de OR athlete*:ti,ab,kw OR olympi*:ti,ab,kw OR 'para-
6 athlete*:ti,ab,kw OR paralympi*:ti,ab,kw OR 'para olympi*:ti,ab,kw 107,370
7 #8 #6 OR #7 213,587
8 #7 'baseball player'/de OR 'basketball player'/de OR 'football player'/de OR 'lacrosse
9 player'/de OR 'softball player'/de OR 'squash player'/de OR (((ball OR bird) NEAR/3 (pass* OR
10 serve* OR serving* OR smash* OR spike* OR spiking* OR throw* OR toss*)):ti,ab,kw) OR
11 baseman*:ti,ab,kw OR basemen*:ti,ab,kw OR baseperson*:ti,ab,kw OR basewoman*:ti,ab,kw
12 OR basewomen*:ti,ab,kw OR batting:ti,ab,kw OR batter:ti,ab,kw OR batters:ti,ab,kw OR
13 blooperball*:ti,ab,kw OR 'blooper ball*:ti,ab,kw OR bowler*:ti,ab,kw OR cabbageball*:ti,ab,kw
14 OR 'cabbage ball*:ti,ab,kw OR catcher*:ti,ab,kw OR 'center field*:ti,ab,kw OR 'chicago
15 ball*:ti,ab,kw OR clincher*:ti,ab,kw OR 'designated hitter*:ti,ab,kw OR dunk*:ti,ab,kw OR
16 'fastball* pitch*:ti,ab,kw OR fastpitch*:ti,ab,kw OR fielder*:ti,ab,kw OR fielding:ti,ab,kw OR
17 'first base*:ti,ab,kw OR 'forward pass*:ti,ab,kw OR 'free throw*:ti,ab,kw OR 'foul
18 shot*:ti,ab,kw OR 'hand throw*:ti,ab,kw OR infield*:ti,ab,kw OR inning*:ti,ab,kw OR 'jump
19 shot*:ti,ab,kw OR layup*:ti,ab,kw OR 'lay up*:ti,ab,kw OR 'left field*:ti,ab,kw OR
20 mushball*:ti,ab,kw OR 'mush ball*:ti,ab,kw OR 'pinch hitter*:ti,ab,kw OR 'pinch
21 runner*:ti,ab,kw OR pitcher*:ti,ab,kw OR pitching*:ti,ab,kw OR pitches:ti,ab,kw OR 'point
22 guard*:ti,ab,kw OR puffball*:ti,ab,kw OR outfield*:ti,ab,kw OR quarterback*:ti,ab,kw OR 'right
23 field*:ti,ab,kw OR 'second base*:ti,ab,kw OR 'shooting guard*:ti,ab,kw OR shortstop*:ti,ab,kw
24 OR 'signal caller*:ti,ab,kw OR 'slow* pitch*:ti,ab,kw OR smushball*:ti,ab,kw OR 'smush
25 ball*:ti,ab,kw OR 'super-slow* pitch*:ti,ab,kw OR 'third base*:ti,ab,kw 75,879
26 #6 'badminton'/de OR 'baseball'/de OR 'basketball'/de OR 'cricket (sport)'/de OR
27 'football'/de OR 'lacrosse (sport)'/de OR 'racquet sport'/de OR 'racquetball'/de OR 'rugby'/de
28 OR 'softball'/de OR 'squash (sport)'/de OR 'tennis'/de OR 'track and field'/de OR 'volleyball'/de
29 OR 'water polo'/de OR 'axe throw*:ti,ab,kw OR badminton*:ti,ab,kw OR baseball*:ti,ab,kw OR
30 'base ball*:ti,ab,kw OR basketball*:ti,ab,kw OR 'basket ball*:ti,ab,kw OR ((bat NEAR/3
31 ball):ti,ab,kw) OR catch:ti,ab,kw OR cricket*:ti,ab,kw OR crossminton*:ti,ab,kw OR
32 darts:ti,ab,kw OR dartchery:ti,ab,kw OR 'dart-throw*:ti,ab,kw OR 'dart* throw*:ti,ab,kw OR
33 'diamond ball*:ti,ab,kw OR dodgeball*:ti,ab,kw OR 'dodge-ball*:ti,ab,kw OR 'dodge
34 ball*:ti,ab,kw OR downball*:ti,ab,kw OR 'downside ball game*:ti,ab,kw OR football*:ti,ab,kw
35 OR handball*:ti,ab,kw OR gridiron*:ti,ab,kw OR 'jai alai*:ti,ab,kw OR javelin*:ti,ab,kw OR
36 'kitten ball*:ti,ab,kw OR lacrosse*:ti,ab,kw OR matkot:ti,ab,kw OR netball*:ti,ab,kw OR
37 paddleball*:ti,ab,kw OR 'paddle ball*:ti,ab,kw OR 'paddle sport*:ti,ab,kw OR 'paddle
38 tennis*:ti,ab,kw OR pickleball*:ti,ab,kw OR 'pickle ball*:ti,ab,kw OR polo:ti,ab,kw OR
39 poolball*:ti,ab,kw OR powderpuff*:ti,ab,kw OR punchball*:ti,ab,kw OR 'punch ball*:ti,ab,kw
40 OR 'pumpkin ball*:ti,ab,kw OR quoits:ti,ab,kw OR qianball*:ti,ab,kw OR 'quian ball*:ti,ab,kw
41 OR racketball*:ti,ab,kw OR 'racket ball*:ti,ab,kw OR racketlon*:ti,ab,kw OR 'racket
42 sport*:ti,ab,kw OR rackets:ti,ab,kw OR raquetball*:ti,ab,kw OR 'raquet ball*:ti,ab,kw OR
43 'raquet sport*:ti,ab,kw OR raquets:ti,ab,kw OR rounders*:ti,ab,kw OR roundnet*:ti,ab,kw OR
44 rugby*:ti,ab,kw OR shurikenjutsu:ti,ab,kw OR shuttlecock:ti,ab,kw OR softball*:ti,ab,kw OR 'soft
45 ball*:ti,ab,kw OR speedball*:ti,ab,kw OR 'speed-ball*:ti,ab,kw OR 'speed ball*:ti,ab,kw OR
46 speedminton*:ti,ab,kw OR sphairee*:ti,ab,kw OR squash*:ti,ab,kw OR sticke:ti,ab,kw OR

stoolball*:ti,ab,kw OR 'stool ball*':ti,ab,kw OR swim:ti,ab,kw OR swims:ti,ab,kw OR swimmer*:ti,ab,kw OR swimming*:ti,ab,kw OR tambass:ti,ab,kw OR tamburello:ti,ab,kw OR tennis*:ti,ab,kw OR 'throws pentathlon':ti,ab,kw OR touchtennis*:ti,ab,kw OR ((track NEAR/2 field):ti,ab,kw) OR 'tut-ball*':ti,ab,kw OR volleyball*:ti,ab,kw OR waterfootball*:ti,ab,kw OR 'water polo*':ti,ab,kw OR 'water rugby*':ti,ab,kw OR 'weight pentathlon':ti,ab,kw 145,698
 #5 throw:ti,ab,kw OR throws:ti,ab,kw OR throwing:ti,ab,kw OR (((overhand* OR overhead*) NEAR/3 (athlet* OR game* OR motion* OR pass* OR serv* OR shot* OR shoot* OR smash* OR spike* OR spiking* OR sport* OR toss* OR throw*)):ti,ab,kw) OR (((pass* OR serv* OR shot* OR shoot* OR smash* OR spike* OR spiking* OR toss* OR throw*) NEAR/3 (axe OR axes OR ball OR balls OR spear OR spears OR stick OR sticks)):ti,ab,kw) 15,403
 #4 #1 OR #2 OR #3 37,831
 #3 choking*:ti,ab,kw 4,323
 #2 'dystonic disorder'/de OR dystoni*:ti,ab,kw 33,396
 #1 'focal dystonia'/de OR darditis:ti,ab,kw OR myodyson*:ti,ab,kw OR yips*:ti,ab,kw OR (((focal OR 'task-specific' OR 'task specific' OR task*) NEAR/6 dystoni*):ti,ab,kw) 4,155

Embase Legend

Field codes: ti = article title; ab = abstract; kw = keyword; de = index (descriptor) term

Proximity operator: NEAR/#

Truncation: *

Web of Science Core Collection(Clarivate)

- Science Citation Index: 1900 to 2024
- Arts & Humanities Citation Index: 1975 to 2024
- Emerging Source Citation Index 2019 to 2024
- Social Sciences Citation Index: 1900 to 2024

Searches:

1: TS=(dartitis or myodyson* or yips* or ((focal or "task-specific" or "task specific" or task*) NEAR/6 dystoni*)) Results: 3,184

2: TS=(dystoni*)Results: 26145

3: TS=(choking*) Results: 4446

4: #1 OR #2 OR #3 Results: 30613

5: TS=((throw or throws or throwing or ((overhand* or overhead*) NEAR/3 (athlet* or game* or motion* or pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or sport* or toss* or throw*)) or ((pass* or serv* or shot* or shoot* or smash* or spike* or spiking* or toss* or throw*) NEAR/3 (axe or axes or ball or balls or spear or spears or stick or sticks)))) Results: 35,446

6: TS=("axe throw*" or badminton* or baseball* or "base ball*" or basketball* or "basket ball*" or (bat NEAR/3 ball) or catch or cricket* or crossminton* or darts or dartchery or "dart-throw*" or "dart*

throw*" or "diamond ball*" or dodgeball* or "dodge-ball*" or "dodge ball*" or downball* or "downside ball game*" or football* or handball* or gridiron* or "jai alai*" or javelin* or "kitten ball*" or lacrosse* or matkot or netball* or paddleball* or "paddle ball*" or "paddle sport*" or "paddle tennis*" or pickleball* or "pickle ball*" or polo or poolball* or powderpuff* or punchball* or "punch ball*" or "pumpkin ball*" or quoits or qianball* or "quian ball*" or racketball* or "racket ball*" or racketlon* or "racket sport*" or rackets or raquetball* or "raquet ball*" or "raquet sport*" or raquets or rounders* or roundnet* or rugby* or shurikenjutsu or shuttlecock or softball* or "soft ball*" or speedball* or "speed-ball*" or "speed ball*" or speedminton* or sphairee* or squash* or sticke or stoolball* or "stool ball*" or swim or swims or swimmer* or swimming* or tambass or tamburello or tennis* or "throws pentathlon" or touchtennis* or (track NEAR/2 field) or "tut-ball*" or volleyball* or waterfootball* or "water polo*" or "water rugby*" or "weight pentathlon") Results: 312,944

7: TS((((ball or bird) NEAR/3 (pass* or serve* or serving* or smash* or spike* or spiking* or throw* or toss*)) or (baseman* or basemen* or baseperson* or basewoman* or basewomen* or batting or batter or batters or "batter's" or blooperball* or "blooper ball*" or bowler* or cabbageball* or "cabbage ball*" or catcher* or "center field*" or "chicago ball*" or clincher* or "designated hitter*" or dunk* or "fastball* pitch*" or fastpitch* or fielder* or fielding or "first base*" or "forward pass*" or "free throw*" or "foul shot*" or "hand throw*" or infield* or inning* or "jump shot*" or layup* or "lay up*" or "left field*" or mushball* or "mush ball*" or "pinch hitter*" or "pinch runner*" or pitcher* or pitching* or pitches or "point guard*" or puffball* or outfield* or quarterback* or "right field*" or "second base*" or "shooting guard*" or shortstop* or "signal caller*" or "slow* pitch*" or smushball* or "smush ball*" or "super-slow* pitch*" or "third base*")))) Results: 4317,319

8: #6 OR #7 Results: 4,585,670

9: TS=(athlete* or olympi* or "para-athlete*" or paralympi* or "para olympi*") Results: 110,409

10: TS((((athlet* or sport*) NEAR/2 (injur* or trauma*))) Results: 17,721

11: TS=(sport*) Results: 203,286

12: TS(("Alexander Zverev*" or "Aryna Sabalenka*" or "Chuck Hayes*" or "Collins Obuya*" or "Daniel Bard*" or "Eric Bristow*" or "Gavin Hamilton*" or "Guillermo Coria*" or "Ian Folley*" or "Jarrod Saltalamacchia*" or "Jon Lester*" or "Keith Medlycott*" or Knoblauch* or "Markelle Fultz*" or "Mackey Sasser*" or "Nick Anderson*" or "Rick Ankiel*" or "Roger Harper*" or "Steve Blass*" or "Steve Sax*" or "Tyler Matzek*") NEAR/1 (disease* or dystoni* or syndrome* or yips)) Results: 0

13: #4 AND #5 NOT #12 Results: 89

14: (#4 AND #8) NOT (#12 OR #13) Results: 1,223

15: #4 AND #9 NOT (#12 OR #13 OR #14) Results: 123

16: #4 AND #10 NOT (#12 OR #13 OR #14 OR #15) Results: 4

17: #4 AND #11 NOT (#12 OR #13 OR #14 OR #15 OR #16) Results: 122

18: #12 OR #13 OR #14 OR #15 OR #16 OR #17 Results: 1,561

Web of Science Legend

Field code: TS = Topic (title, abstract, keyword plus, and author keywords)

Proximity operator: NEAR/#

Truncation: *

Sports Medicine & Education Index (ProQuest)

#	Strategy	Results
S1	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((throw or throws or throwing or ((overhand or overhead) NEAR/3 (athlete or athletes or game or games or motion or motions or pass or passes or passing or serve or serves or serving or shot or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or sport or sports or toss or tosses or tossing or throw or throws or throwing)) or ((pass or passes or passing or serve or serves or serving or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or spike or spikes or spiking or toss or tosses or tossing or throw or throws or throwing) NEAR/3 (axe or axes or ball or balls or bird or spear or spears or stick or sticks))))	16
S2	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft(badminton or baseball or "base ball" or basketball or "basket ball*" or (bat NEAR/3 ball) or catch or cricket or crossminton or darts or dartchery or "dart-throw" or dodgeball or "dodge-ball" or "dodge ball" or football or handball or gridiron or "jai alai" or javelin or lacrosse or matkot or netball or paddleball or "paddle ball" or "paddle sport" or "paddle sports" or "paddle tennis" or pickleball or "pickle ball" or polo or poolball or powderpuff or quoits or qianball or "quian ball" or racketball or "racket ball" or racketlon or "racket sport" or "racket sports" or rackets or raquetball or "raquet ball" or "raquet sport" or "raquet sports" or raquets or rugby or shurikenjutsu or shuttlecock or softball or "soft ball" or speedball or "speed-ball" or "speed ball" or speedminton or sphairee or squash or sticke or stoolball or "stool ball" or swim or swims or swimmer or swimmers or swimming or tambass or tamburello or tennis or touchtennis or (track NEAR/2 field) or volleyball or waterfootball or "weight pentathlon" or baseman or basemen or baseperson or basepersons or basewoman or basewomen or batting or batter or batters or bowler or bowlers or catcher or catchers or "center fielder" or "center fielders" or clincher or "designated hitter" or "designated hitters" or dunk or dunks or dunking or fielder or fielders or fielding or "forward pass" or "forward passes" or "forward passing" or "free throw" or "free throws" or "foul shot" or "foul shots" or infielder or infielders or inning or innings or "jump shot" or "jump shots" or layup or layups or "lay up" or "lay ups" or "left fielder" or "pinch hitter" or "pinch hitters" or "pinch runner" or "pinch runners" or pitch or pitcher or pitchers or pitches or pitching or "point guard" or "point guards" or puffball or outfielder or outfielders or quarterback or quarterbacks or "right fielder" or "right fielders" or "shooting guard" or "shooting guards" or shortstop or shortstops or "signal caller" or "signal callers")	68

S3 noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((athlete or athletes or olympian or olympians or "para-athlete" or "para-athletes" or Paralympian or paraolympians or "para-olympian" or "para-olympians" or sport or sports) or ((athlete or athletes or athletic or athletics or sport or sports or "sports-related") NEAR/2 (injury or injuries or trauma or traumas or traumatic)))

257

S4 [S1] OR [S2] OR [S3] 231

ProQuest Legend

Field codes: NOFT = Anywhere except full text

Proximity operator: NEAR/#

Truncation: *

ProQuest Dissertation and Theses Global (ProQuest)

#	Strategy	Results
S1	noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((throw or throws or throwing or ((overhand or overhead) NEAR/3 (athlete or athletes or game or games or motion or motions or pass or passes or passing or serve or serves or serving or shot or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or sport or sports or toss or tosses or tossing or throw or throws or throwing)) or ((pass or passes or passing or serve or serves or serving or shots or shoot or shoots or shooting or smash or smashes or smashing or spike or spikes or spiking or spike or spikes or spiking or toss or tosses or tossing or throw or throws or throwing) NEAR/3 (axe or axes or ball or balls or bird or spear or spears or stick or sticks))))	16

S2 noft(choking or dartitis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft(badminton or baseball or "base ball" or basketball or "basket ball*" or (bat NEAR/3 ball) or catch or cricket or crossminton or darts or dartchery or "dart-throw" or dodgeball or "dodge-ball" or "dodge ball" or football or handball or gridiron or "jai alai" or javelin or lacrosse or matkot or netball or paddleball or "paddle ball" or "paddle sport" or "paddle sports" or "paddle tennis" or pickleball or "pickle ball" or polo or poolball or powderpuff or quoits or qianball or "quian ball" or racketball or "racket ball" or racketlon or "racket sport" or "racket sports" or rackets or raquetball or "raquet ball" or "raquet sport" or "raquet sports" or raquets or rugby or shurikenjutsu or shuttlecock or softball or "soft ball" or speedball or "speed-ball" or "speed ball" or speedminton or sphairee or squash or sticke or stoolball or "stool ball" or swim or swims or swimmer or swimmers or swimming or tambass or tamburello or tennis or touchtennis or (track NEAR/2 field) or volleyball or waterfootball or "weight pentathlon" or baseman or basemen or baseperson or basepersons or basewoman or basewomen or batting or batter or batters or bowler or bowlers or catcher or

catchers or "center fielder" or "center fielders" or clincher or "designated hitter" or "designated hitters" or dunk or dunks or dunking or fielder or fielders or fielding or "forward pass" or "forward passes" or "forward passing" or "free throw" or "free throws" or "foul shot" or "foul shots" or infielder or infielders or inning or innings or "jump shot" or "jump shots" or layup or layups or "lay up" or "lay ups" or "left fielder" or "pinch hitter" or "pinch hitters" or "pinch runner" or "pinch runners" or pitch or pitcher or pitchers or pitches or pitching or "point guard" or "point guards" or puffball or outfielder or outfielders or quarterback or quarterbacks or "right fielder" or "right fielders" or "shooting guard" or "shooting guards" or shortstop or shortstops or "signal caller" or "signal callers") 52

S3 noft(choking or darditis or dystonia or dystonias or dystonic or myodysonia or myodystonias or myodystonic or yips) AND noft((athlete or athletes or olympian or olympians or "para-athlete" or "para-athletes" or Paralympian or paraolympians or "para-olympian" or "para-olympians" or sport or sports) or ((athlete or athletes or athletic or athletics or sport or sports or "sports-related")) NEAR/2 (injury or injuries or trauma or traumas or traumatic))) 55

S4 [S1] OR [S2] OR [S3] 89

ProQuest Legend

Field codes: NOFT = Anywhere except full text

Proximity operator: NEAR/#

Truncation: *