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## **Databases for Researching Athletic Training Literature**

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### **ABSTRACT**

Searching the athletic training literature can be confusing and overwhelming with many possible databases for locating relevant peer-reviewed scholarship. Finding evidence-based literature from respected publications is helpful in clinical decision-making for athletic training practitioners. This column details recommended databases and search tips to help students, staff, clinicians, and faculty in the field of athletic training find the literature they need to help make evidence-based decisions and to stay current with the published literature. Databases discussed include Cochrane, PubMed, SPORTDiscus, CINAHL, PEDro, Sports Medicine, and Education Index (formerly Physical Education Index), and Google Scholar.

### **KEYWORDS**

Athletic training, database search tips, literature searching, online databases, review, sports medicine

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### **Introduction**

Several databases exist for researching athletic training literature. Searching the literature is an iterative process that does not have a standard formula. However, as easy as Google and Google

Scholar seem to make searching the literature, several subject-specific databases exist to facilitate targeted searching to help athletic training students and faculty locate relevant scholarly literature.

Our recommendations for searching the athletic training literature include the following databases: Cochrane, PubMed, SPORTDiscus, CINAHL, PEDro, Sports Medicine, and Education Index (formerly Physical Education Index). Even though it is not perhaps a traditional library database, we also recommend Google Scholar as a popular starting point for finding relevant citations on the Internet, especially since not all clinicians and students will have access to the subscription databases.

### **Comparison of databases**

We will present a brief overview of each of the recommended databases, listed along with simple search tips to help athletic training students, researchers, or clinicians in searching the literature.

#### ***Cochrane Database of Systematic Reviews***

Cochrane Database of Systematic Reviews (CDSR, available at <https://www.cochranelibrary.com/>) archives systematic reviews with coverage from 1995 to the present.<sup>1</sup> The systematic review topics in CDSR cover all areas of health care. CDSR can also be found within other database platforms, such as PubMed, Scopus, and Web of Science. It is important to note that not all systematic reviews in Cochrane are freely available full-text.

Systematic reviews take a long time to research and publish. On average, a true systematic review can take ~18 months to conduct before submitting for publication, and they are designed to answer common clinical questions.<sup>2,3</sup> If a systematic review is available on your research topic of interest, it may be a time saver. Cochrane authors conduct an exhaustive literature review, analyze the results, and offer plain language conclusions. Systematic reviews are a good place to start to read available research and look at how studies have been evaluated regarding impact and effectiveness in the clinical setting.

Extensive search strategies are presented in the back of most systematic reviews. For example, in Rome, Handoll, and Ashford's systematic review, "Interventions for preventing and treating stress fractures and stress reactions of bone of the lower limbs in young adults," a 47-step search strategy incorporating subject headings, text words, adjacency, and truncation (wildcard or stemming) is included.<sup>4</sup> Rather than reinventing the wheel in building a search strategy from scratch, locating a gold standard search strategy can help to save time, learn terms to search for, and find relevant citations.

#### ***Search tip in CDSR***

Check Cochrane first to see if a review on your topic exists. If a Cochrane review exists, it will save you time. A review can be used for detailed search strategies, a list of databases searched, and a bibliography of relevant citations that were selected for the systematic review. Use Cochrane reviews as a model for your own research strategies and analysis.

### *PubMed*

PubMed (available at <https://pubmed.ncbi.nlm.nih.gov/>) is a free, government-maintained bibliographic database. PubMed is the interface to the MEDLINE database, the seminal biomedical database maintained and curated by the United States National Library of Medicine. PubMed coverage begins in 1946 and includes millions of citations in medicine, nursing, dentistry, allied health sciences, veterinary medicine, and public health literature from MEDLINE, life science journals, and online books. PubMed indexes articles on athletic training. Citations may include links to open access, full-text content from PubMed Central, and publisher websites.<sup>5</sup> If you have an academic affiliation, check with your library to see if a proxied link is available for additional access to full-text articles.

### *Search tip in PubMed*

PubMed includes medical subject headings (MeSH), a controlled vocabulary with a built-in thesaurus that groups together synonymous terms. It comprises over 25,000 terms that are updated yearly. The benefit of MeSH is that researchers get relevant and comprehensive results and also learn relevant vocabulary to build effective searches. PubMed uses keywords and appropriate MeSH terms to use in searching. Each MeSH term can be exploded to retrieve all references indexed to that term as well as all references indexed to any narrower subject terms. Similarly, other databases, such as CINAHL and SPORTDiscus have unique thesaurus terms built into their databases. As shown in [Figure 1](#), use an example relevant to athletic training researchers, when searching for anterior cruciate ligament, or “ACL” and clicking on advanced search and then under History and Details, a searcher can view how PubMed conducts a search.

History and Search Details			
Search	Actions	Details	Query
#1	...	▼	<p>Search: <b>acl</b></p> <p>"anterior cruciate ligament"[MeSH Terms] OR ("anterior"[All Fields] AND "cruciate"[All Fields] AND "ligament"[All Fields]) OR "anterior cruciate ligament"[All Fields] OR "acl"[All Fields]</p> <p><b>Translations</b></p> <p><b>acl:</b> "anterior cruciate ligament"[MeSH Terms] OR ("anterior"[All Fields] AND "cruciate"[All Fields] AND "ligament"[All Fields]) OR "anterior cruciate ligament"[All Fields] OR "acl"[All Fields]</p>

**Figure 1.** Detail of ACL search and how PubMed translates the search query.

In this example, a search for “ACL” uses the MeSH term “anterior cruciate ligament” in addition to an all fields search which includes title, abstract, keywords, author names, affiliation, date, journal title, journal language, pagination, and publication type.

The best searches in PubMed combine MeSH and keywords. Gold-standard search strategies for clinical queries developed by Haynes et al., available and pre-loaded in PubMed, include a combination of MeSH and keyword searching (see more at <https://pubmed.ncbi.nlm.nih.gov/help/#clinical-study-category-filters>).<sup>6</sup>

***SPORTDiscus***

SPORTDiscus (available at <https://www.ebsco.com/products/research-databases/sportdiscus>) is a subscription database providing academic content focused on sports and sports medicine, drawn from journals, books, dissertations, and theses. It is a recommended database for athletic training students and researchers. The database is available from EBSCO and the subjects covered include nutrition, physical therapy, occupational health, exercise physiology, and kinesiology. Database coverage runs from 1982 to the present.<sup>7</sup>

***Search tip in SPORTDiscus***

SPORTDiscus includes a unique thesaurus where similar concepts are grouped together to improve comprehensive searching. For example, using the anterior cruciate ligament thesaurus heading will also search for: ACL (Anterior cruciate ligament), anterior cruciate ligament, anterior cruciate ligaments, external crucial ligament, or ligamentum cruciatum anterius.

The thesaurus entry will also suggest possible related terms including broader and related terms. Suggested related terms for ACL in SPORTDiscus include collateral ligament, Lachman test, patellar ligament, and posterior cruciate ligament. Broader search terms include articular ligament, cruciate ligaments, and knee.

***Cumulative Index to Nursing and Allied Health Literature complete***

Cumulative Index to Nursing and Allied Health Literature (CINAHL) is a subscription database available through EBSCO. It includes indexing for ~5,500 journals dating back to 1937 in the nursing and allied health fields.<sup>8</sup> It features journal articles, dissertations, conference proceedings, and book chapters. It also includes research instruments, diseases and conditions, quick lessons, and evidence-based care sheets.

### *Search tips in CINAHL*

An advanced feature of CINAHL that is worth noting is Subject Headings which helps search results be on-topic. Citations in the database have been tagged with relevant subject terms that form an index that can be queried. For example, when searching for the term athletic training, a list of related subjects will be shown, such as “athletic training programs”, “athletic training students” or “athletic training education.” When the box next to the subject “athletic training” is checked, a list of subheadings will appear to help narrow search results.

Searching ‘ACL’ using CINAHL Subject Headings returns “anterior cruciate ligament injuries” (scope note definition “Sprains, strains, tears, or ruptures of the anterior cruciate ligament”) and “anterior cruciate ligament reconstruction” (scope note definition “Reconstructive surgery for a torn anterior cruciate ligament”). In these two CINAHL subject headings hierarchies, “ACL injuries” falls under the larger subject heading of knee injuries and is grouped with other knee injuries including knee dislocation, knee fractures, knee injuries (articular cartilage), medial collateral ligament sprain, meniscal injuries, posterior cruciate ligament injuries, or Sinding-Larsen-Johansson Syndrome. Anterior Cruciate Ligament Injuries fall under the broader subject heading of ligament injuries and are grouped with medial collateral ligament sprain, posterior cruciate ligament injuries, and ulnar collateral ligament injury of the thumb. Just as in PubMed, each CINAHL subject heading can be exploded to retrieve all references indexed to that term as well as all references indexed to any narrower subject terms. Moreover, each CINAHL subject heading can be selected to look for that subject heading as the “major concept” of the article. CINAHL defines “major concept” as the major point of the article. Major concept searches are limited with specific qualifiers (subheadings) to improve the precision of the search and limited to major subject headings that indicate the main concept of an article.

CINAHL also provides targeted search functionality. The search term ‘ACL’ can be searched in the title, abstract, word in the subject heading, exact subject heading, word in major subject headings, subject, exact minor subject headings, and all text. Experienced searchers combine the use of CINAHL subject headings with field searching to obtain comprehensive search results.

### *Physiotherapy Evidence Database*

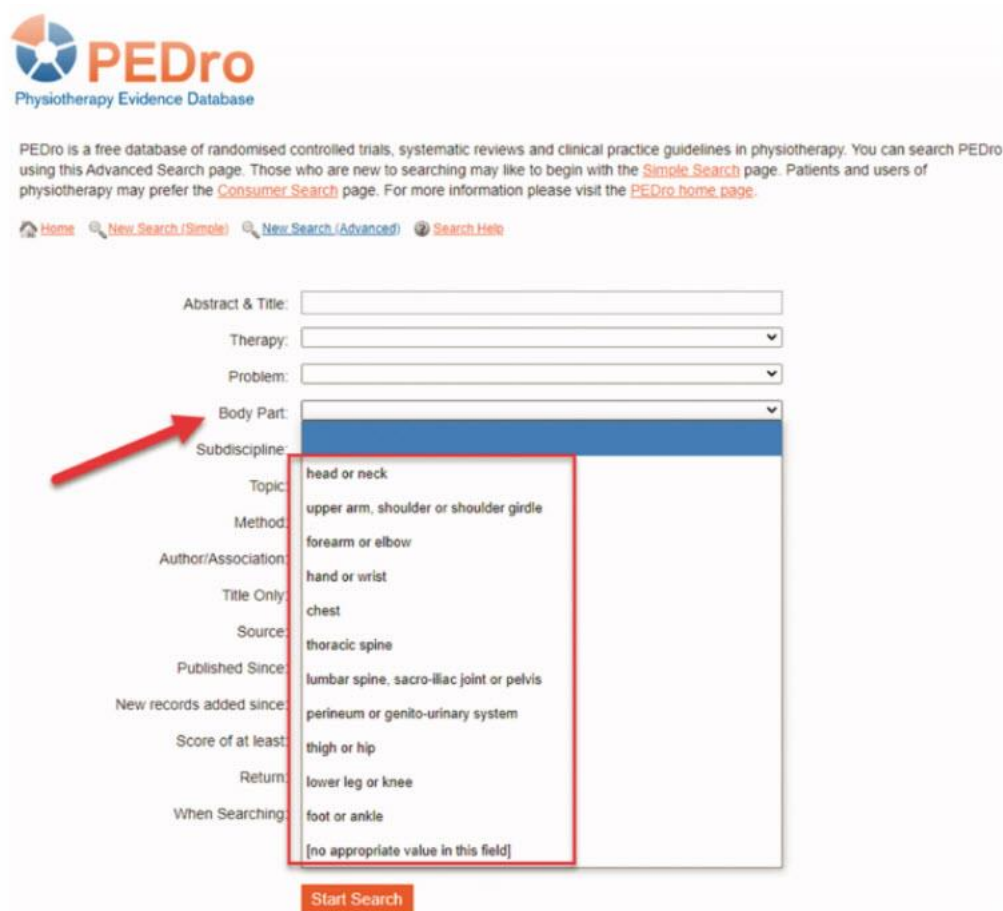
Physiotherapy Evidence Database (PEDro, available at <https://search.pedro.org.au/>) is a free database going back to 1929 that indexes over 45,000 randomized trials, systematic reviews, and clinical practice guidelines in physical therapy produced by Musculoskeletal Health Sydney, School of Public Health at the University of Sydney, Australia and hosted by Neuroscience Research Australia (NeuRA).<sup>2</sup> The database is updated monthly and includes links out to PubMed and publisher websites.

What makes PEDro unique is that all trials are independently assessed for their quality using a scoring scale called the “PEDro scale.” The assessment is based on “believability” (or “internal

validity”) of the trial and whether the trial contains sufficient statistical information to make it interpretable.<sup>10</sup>

### *Search tips in PEDro*

It is recommended that only three search fields be used in advanced search (at <https://search.pedro.org.au/advanced-search>). Using more than three fields will likely result in too few results. In addition, use the ‘Body Part’ pull-down to help focus your search especially when dealing with musculoskeletal injuries, as seen in [Figure 2](#).



**PEDro**  
Physiotherapy Evidence Database

PEDro is a free database of randomised controlled trials, systematic reviews and clinical practice guidelines in physiotherapy. You can search PEDro using this Advanced Search page. Those who are new to searching may like to begin with the [Simple Search](#) page. Patients and users of physiotherapy may prefer the [Consumer Search](#) page. For more information please visit the [PEDro home page](#).

[Home](#) [New Search \(Simple\)](#) [New Search \(Advanced\)](#) [Search Help](#)

Abstract & Title:

Therapy:

Problem:

Body Part:

Subdiscipline:

Topic:

Method:

Author/Association:

Title Only:

Source:

Published Since:

New records added since:

Score of at least:

Return:

When Searching:

**Figure 2.** PEDro advanced search, highlighting body part pull-down.  
<https://search.pedro.org.au/advanced-search>.

### *Sports Medicine and Education Index, formerly Physical Education Index*

Sports Medicine and Education Index (SMEI) is a subscription database available from ProQuest at <https://about.proquest.com/en/products-services/pei-set-c>. Sports Medicine and Education Index covers topics ranging from physical and health education to fitness and recreation and the business of sports, as well as kinesiology, physical therapy, motor learning, and sport sociology

and psychology. Records are indexed and classified from peer-reviewed journals, report literature, conference proceedings, trade magazines, patents, and articles from the popular press. SMEI is updated monthly with ~1,000 new records added and covers literature from 1970 to the present.<sup>11</sup>

### ***Search tips in SMEI: “Near” searching***

This database, like all ProQuest databases, allows for “near” searching, which looks for documents that contain two search terms, in any order, within a specified number of words apart. For example: “athletic train\*” n/3 “anterior cruciate ligament” will search for the phrase “athletic train” or “athletic trainer” or “athletic training” or “athletic trains” within three words or less of each other to “anterior cruciate ligament.” The “near” search function is useful when searching for concepts that are not phrases but maybe in the same sentence.

In addition, SMEI includes a built-in thesaurus to help with selecting the appropriate terms for a search. For example, for “athletic training,” the suggested search term is “sports training.” The thesaurus can help with adding related terms, such as “physical fitness” and “cross-training.”

### ***Google Scholar***

Google Scholar (available at [scholar.google.com](http://scholar.google.com)) is a popular free search engine that searches what Google considers to be “scholarly literature.”<sup>12</sup> If you are affiliated with an academic institution, the academic library may provide a proxied link to full-text articles. Not all articles in Google Scholar are freely available to download.

There are several caveats to searching Google Scholar. Google Scholar does not provide a comprehensive list of sources that are indexed. A researcher must trust the results to be “scholarly.” The onus is still on the researcher to assess the quality of the resource(s) found. The majority of results are from government sources along with established publishers and open access sources. Google Scholar offers no unique subject headings and requires keyword searching to find citations. Search strategies are capped at 256 characters long. Therefore, if running a search strategy that includes many synonyms, Google Scholar will only search the first 256 characters. Creating a comprehensive synonym list is helpful when trying to run an expansive search, but Google Scholar may not accommodate such a list.

### ***Search tips in Google Scholar***

The piping (|) symbol is a shortcut for OR in Google Scholar. With a 256 character limit in the search box, using | will preserve three character spaces, compared to four for OR, allowing for more words to be used in a search for synonyms.

Searching for anterior cruciate ligament could look like the following search: ac|“anterior cruciate ligament”|“Anterior Cranial Cruciate Ligament”. To help narrow results, search for



terms in the title of search results: intitle:acl|intitle:"anterior cruciate ligament"|intitle:"Anterior Cranial Cruciate Ligament". And to further narrow results, search by domain: intitle:acl|intitle:"anterior cruciate ligament"|intitle:"Anterior Cranial Cruciate Ligament" site:edu where results from only education domains will be returned.

## Conclusion

Searching the athletic training literature is an iterative process where the overlap of citations will be discovered across databases. For example, many of the citations indexed in PubMed are also discoverable in Google Scholar, so a researcher should consider choosing one to search. The PubMed interface offers more robust search options for limiting search results that are not available in Google Scholar; such as publication type, age group, or gender. Google Scholar provides a simple interface that is attractive for novice searchers who do not need the advanced search functionality of PubMed. Of the databases we describe, the following require a subscription: Cochrane, SPORTSDiscus, CINAHL, and SMEI, while PubMed, PEDro, and Google Scholar are freely available, but this does not mean that 100% of the literature is freely available full-text.

In summary, each of the databases has its strengths and weaknesses when searching the athletic training literature. Cochrane, PubMed, SPORTSDiscus, CINAHL, and SMEI offer powerful facets to limit results, while Google Scholar is free and simple to search. As noted earlier, the onus is still on the researcher to assess the quality of the resources found in all the databases we have outlined. Lastly, when in doubt, seek out a librarian who can help with recommending an appropriate database, crafting a search strategy, and accessing the full-text literature.

## Notes on contributors

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