

Using Google and Google Scholar for Evidence-Based Dentistry

Mark P. MacEachern, MLIS¹

Google and Google Scholar are commonly used to find evidence to support clinical decisions. While generally easy to search, the result sets in these resources tend to be large and at times difficult to navigate. This paper describes strategies and techniques that will help clinicians overcome this difficulty and create more precise Google and Google Scholar searches. *Int J Evid Based Pract Dent Hygienist* 2016;2:XXX-XXX. doi: 10.11607/ebh.70

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When I teach students in health sciences about literature searching, Google is the resource that seems to resonate most with my audience. Students find the interface familiar and feel more comfortable searching it than PubMed or the other resources we discuss during those sessions. However, in an evidence-based dentistry context, Google can be polarizing. Many clinicians find it an easy-to-use gateway to the scientific literature while others dismiss it, in part because it can be difficult to separate the good information from the uncertain or questionable information that clinicians are best advised to avoid. While Google does not have the refinement features and indexing depth of PubMed, it does have search-related features and techniques that, if used appropriately, can help clinicians improve search retrieval and enhance their ability to practice evidence-based dentistry. This article highlights seven of these features and techniques that can make Google a more effective resource for clinical work.

¹Health Sciences Informationist, Taubman Health Sciences Library, University of Michigan, Ann Arbor, Michigan, USA.

Correspondence to:

Mark P. MacEachern
Health Sciences Informationist
Taubman Health Sciences Library
University of Michigan
1135 E. Catherine St
Ann Arbor, MI 48109, USA
Email: markmac@umich.edu

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Limit your searches to specific domains

Google is an excellent resource for targeting reports, white papers, consensus statements, clinical guidelines, and other types of clinical information from government agencies and professional organizations. In order to improve the likelihood of finding these sources, I often limit my searches to ".org" and ".gov" websites. You can do this in Google by appending "site:" to your searches, followed by the domain for which you are searching. Figures 1, 2, and 3 all provide examples.

The periodontal disease search in Fig 1 is limited to U.S. government sites, while the same search in Fig 3 is limited to Canadian government sites (note that the domain changes depending on the country). The same search in Fig 2 targets the American Dental Association (ADA) website, which means that the Google results will consist of those pages on the ADA site that mention periodontal disease. While a standard Google search



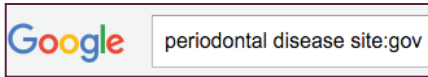


Fig 1 Google search limited to U.S. government websites (.gov).

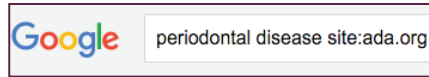


Fig 2 Google search limited to the ADA website (ada.org).

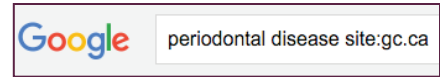


Fig 3 Google search limited to government of Canada websites (gc.ca).

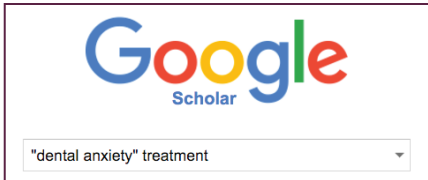


Fig 4 (left) Phrase searching in Google Scholar.

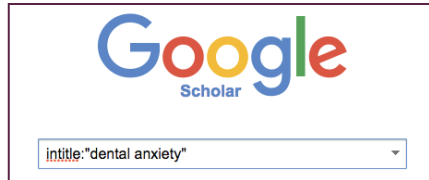


Fig 5 (right) Searching only the title field in Google Scholar.

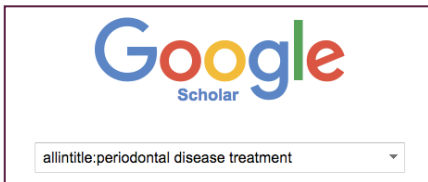


Fig 6 (left) Searching only the title field in Google Scholar.

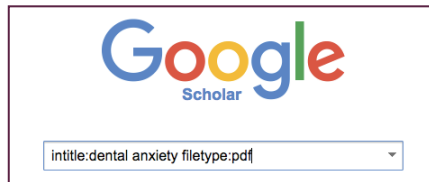


Fig 7 (right) Search for PDF files with filetype:

might work effectively for finding information about periodontal disease, the domain search is more precise and substantially decreases the amount of uncertain information in the results. There are two caveats worth highlighting: the first is that by limiting searches to a specific domain, all good information on other domains will be excluded from the result sets; and second, the quality of information on all domains is variable and it is therefore important to be mindful and critical of all results, regardless of domain.

Use phrase searching

Phrase searching is a common search technique that increases the precision of searches and can drastically reduce the size of search result sets. The search in Fig 4, for example, will retrieve citations that have the words “dental” and “anxiety” in precisely that order, eliminating from the results those citations that have the two concepts in a context where they are not necessarily associated with one another. Keep in mind that the success of a phrase search depends entirely on the use of that phrase, and authors may use slightly different wording to describe the same concept. In other words, authors of a paper on dental anxiety may not necessarily describe the dental anxiety concept with that phrase.

Use Google Scholar to search the published journal literature

Google Scholar (<http://scholar.google.com>) is a very large, interdisciplinary database with citations from many health sciences and other fields. Google Scholar is an excellent complement to PubMed (<http://www.pubmed.gov>) and other citation databases because it is easy to use and has a series of features that can help clinicians find journal citations. Furthermore, the interdisciplinary nature of Google Scholar means that it can be an effective source for finding relevant studies on dental topics published in non-health sciences journals, such as those that focus on engineering, psychology, and education (Fig 4).

Use Google Scholar syntax to search within article titles

Google Scholar result sets are often very large, but it is possible to reduce the number by forcing it to search the title field alone. To do this, simply preface the search with either “intitle:” or “allintitle:” depending on whether you want one term or phrase or all terms to be represented in the citation title field (Figs 5 and 6). By performing title searches, your result sets will be more manageable. However, they might also be less representative of the evidence base because

the strategy will miss citations that do not have those search words or phrases in the title field.

Search Google Scholar for PDFs to find full-text articles

Many full-text articles are hidden behind paywalls and are only accessible through institutional library subscriptions or at your own personal expense. One way to target full-text articles in Google Scholar is to search for PDFs. As illustrated in Fig 7, this forces Google Scholar to return citations that have the phrase “dental anxiety” in the title and have available PDF files. The “filetype:” search also works for other types of documents, including presentations (eg, PPT) and word documents (eg, DOC or DOCX).

Use “cited by” in Google Scholar to find newer citations

Let’s say that you are reading an intriguing study on periodontal disease treatment and are interested in finding similar studies. One approach to this dilemma is to scour the bibliography of that study to see which studies the authors cite and reference. Another approach is to use the “cited by” feature in Google Scholar to find newer studies that have cited the study you are reading; this feature flips the citation hunt around by letting you find newer citations and newer research that cites your original article. Other resources, such as ISI Web of Science and Scopus, have similar features, but Google Scholar is the free-to-search option. The “related articles” link that is found directly below Google Scholar citations is another feature that helps connect users to similar citations.

Use the date ranges in Google Scholar to find newer citations

By default, Google Scholar ranks results in order of relevance, which gives some weight to the “cited by” numbers: it seems that the more a paper has been cited, the more likely it is to appear at the top of the search results. On the plus side, this means that important papers, those that have been cited often, are relatively easy to spot. The downside is that the cita-

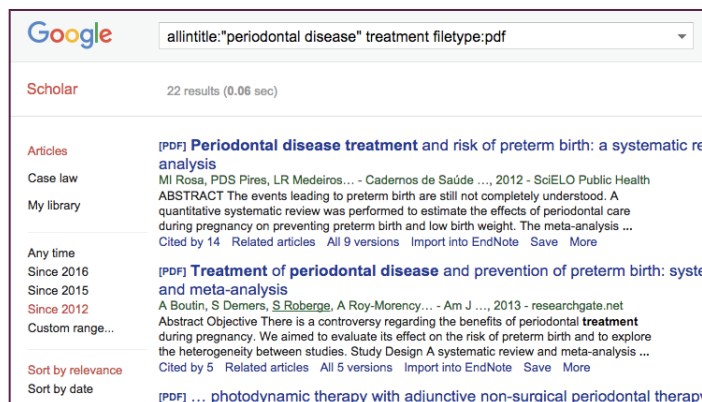


Fig 8 The Google Scholar results page, with date ranges on the left.

tion cycle is a long one, and it takes time to build up citation numbers. As a result, you will often see older citations at the top of Google Scholar result sets, which can be a limitation for practitioners of evidence-based practice who need to see the newest evidence. Therefore, when searching for clinical evidence it is important to make use of the Google Scholar date range options on the left side of the page (Fig 8).

Conclusions

It is not advocated for clinicians to rely entirely on one literature resource to fulfill their evidence-based practice needs. All resources have their strengths and limitations and no one resource will adequately address all clinical questions. Google and Google Scholar are part of a larger group of resources that help clinicians find the information they need to do their work effectively. Hopefully, the techniques outlined in this column will help clinicians more readily find that information when they are searching Google and Google Scholar.

Acknowledgments

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