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Letters to the Editor

Dear Sir,

Ecker and Skelly advise us how to conduct a winning literature search (*Evidence-Based Spine-Care Journal* 2010; vol 1 (issue 1): 9–14). The search example they provide, however, contains several flaws, major and minor ones. These flaws are:

- incorrect use of Medical Subject Headings in PubMed (MeSH);
- incorrect use of Boolean logic;
- incorrect use of truncation;
- exclusion of relevant freetext subject terms;
- no use of term-weighting;
- no warning for the adverse effects of PubMed-limits.

I would like to demonstrate these flaws by providing more details. First of all let me show the search chart which the authors provide:

Search term(s)	# citations
"Spinal fracture" [MeSH] OR vertebral compression fracture	16023
"Spinal fracture" [MeSH] OR vertebral compression fracture AND "osteoporosis" [MeSH]	3718
"Spinal fracture" [MeSH] OR vertebral compression fracture AND "osteoporosis" [MeSH] AND "surg*"	911
"Spinal fracture" [MeSH] OR vertebral compression fracture AND "osteoporosis" [MeSH] AND "Surg*"	54

Limits: only items with abstracts, humans, clinical trial, English, publication date from 1990–2010

The major flaw in all four search variants is the MeSH-term "Spinal Fracture". This MeSH-term does not exist at all. The plural version, "Spinal Fractures", however does exist. If one types the singular version "Spinal fracture"[MeSH] in the PubMed search bar, zero references will be retrieved. So if we adjust the first query, an improved version goes like this:

"Spinal fractures"[MeSH] OR vertebral compression fracture

If we look at the second query, we see another flaw: the illogic use of boolean operators. In this query, no brackets were used in conjunction with the OR- and AND-operators. The correct use of such logic operators is imperative for a winning search. Brackets improve the semantic relationship between the keywords:

("Spinal fractures"[mesh] OR vertebral compression fracture) AND "osteoporosis"[MeSH]

In the third query, a new, third concept is introduced: surgery. However, the authors only use surg*. As such, this query results on the 12th of July 2010 in 1.972.843 references. However, due to the truncation of this term, the PubMed-function of automatic translation of a word in relevant MeSH-headings or subheadings will be lost - the third flaw in this query. My version, surg* OR surgery, retrieves on the 12th of July 2010 2.894.391 references. The word surgery will be automatically translated to "surgery"[Subheading] and "surgical procedures, operative"[MeSH], and will better the results significantly (an increase of 30%). Also, and here is the fourth flaw, only the MeSH "Osteoporosis" is used: the combined use of both MeSH and free-text words is essential, otherwise, among others, the most recent references, which are not fully indexed yet, will be missed. My suggested version looks like this:

("Spinal fractures"[MeSH] OR "vertebral compression fracture" OR "vertebral compression fractures" OR "spine fracture" OR "spinal fracture" OR "spine fractures" OR "spinal fractures" OR "vertebral fracture" OR "vertebral fractures") AND ("osteoporosis"[MeSH] OR osteoporosis[tw] OR osteoporotic[tw]) AND (surg* OR surgery)

Furthermore, the search could be improved by the inclusion of freetext versions of the phrase osteoporotic spine fracture:

("osteoporotic spine fracture" OR "osteoporotic spine fractures" OR "osteoporotic spinal fracture" OR "osteoporotic spinal fractures" OR "osteoporotic vertebral fracture" OR "osteoporotic vertebral fractures" OR ("Spinal fractures"[mesh] OR "vertebral compression fracture" OR "vertebral compression fractures" OR "spine fracture" OR "spinal fracture" OR "spine fractures" OR "spinal fractures" OR "vertebral fracture" OR "vertebral fractures") AND ("osteoporosis"[mesh] OR osteoporosis[tw] OR osteoporotic[tw])) AND (surg* OR surgery)

Subsequently, these results could be slimmed down by weighing the core component of the question: osteoporotic spine fracture as the major topic. This can be accomplished by the use of Major Subheadings and the use of title words:

("osteoporotic spine fracture"[ti] OR "osteoporotic spine fractures"[ti] OR "osteoporotic spinal fracture"[ti] OR "osteoporotic spinal fractures"[ti] OR "osteoporotic vertebral fracture"[ti] OR "osteoporotic vertebral fractures"[ti] OR ("Spinal fractures"[majr] OR "vertebral compression fracture"[ti] OR "vertebral compression fractures"[ti] OR "spine fracture"[ti] OR "spinal fracture"[ti] OR "spine fractures"[ti] OR "spinal fractures"[ti] OR "vertebral fracture"[ti] OR "vertebral fractures"[ti]) AND ("osteoporosis"[majr] OR osteoporosis[ti] OR osteoporotic[ti])) AND (surg* OR surgery)

Finally, the authors limit results to several more or less formal PubMed-limitations, eg, humans. These limits have to be discouraged, because by using such limits, the most recent references, which have not been enriched by check tags such as human or clinical trial, will be lost, although these items are or could be in actual fact human studies or clinical trials.

So, the authors final statement, I feel, is rather poignant: "Use of personnel with specialized expertise in conducting such searches may provide the best results and be the most resource effective."

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RESPONSE FROM EBSJ AUTHORS

Jan W Schoones' letter regarding the article on literature searching is appreciated. We regret that the "s" in the "Spinal Fractures" term was not caught in the final editing of the article so as to provide the correct MeSH term. With regard to the use of the Boolean operators and structure, yes, the correct format is ("Spinal fractures"[mesh] OR vertebral compression fracture) AND "osteoporosis"[MeSH]. Again, we are aware of the proper form and regret that this was not caught during editing.

The intent was to show a simple example for sequential combining of terms to address the clinical question and narrow the search to a reasonable number of citations for review. The sample could be rewritten as follows:

Search	Search Term(s)	# Citations
# 1	"Spinal fractures" [MeSH] OR vertebral compression fracture	9,411
# 2	#1 AND "osteoporosis" [MeSH]	7,219
# 3	#2 AND "Surgical procedures, operative"[Mesh]	981
# 4	#3 Limits: only items with abstracts, clinical trial, English, published in the last 10 years	75

As the author is obviously well aware, there are many strategies for doing literature searches and applying nuances for enhancing the search such as using subheadings, title words and other tools, all of which are important to a full structured search. Our intent was to keep the concepts as simple as possible.

In some cases, an exhaustive search is needed (and the expertise of someone well-acquainted with in-depth searching is important, if available), whereas in other instances, a relatively simple and quick search will suffice. While expanded and exhaustive searches may yield many citations, a large proportion of them may not be relevant. The intent of the article presented was to provide a simplified overview of the concepts and process to just get people started and provide links to resources for them to explore in greater depth the art and science of searching. The intent was not to provide a definitive search strategy.

The overarching objectives of this article were to help busy clinicians formulate an answerable question using PICO or PPO (which is the first and most important step) and to provide an initial list of potentially appropriate databases, describe the basic concepts of structuring a search based on the PICO/PPO and give links to resources with tutorials that may assist them with learning the very basics of searching. Based on an appreciation of such basics, clinicians and others may have the opportunity to make best use of the time and expertise of those with more advanced searching skills. We regret that the errors may have distracted readers from these objectives.

Respectfully submitted,
Andrea C Skelly, PhD, MPH

RESPONSE FROM EBSJ EDITOR-IN-CHIEF

As Editor of EBSJ we very much appreciate the keen observations provided by Jan W Schoones. In our attempt at trying to raise the scientific methodology know-how of our readership we fell short in our example provided, but find solace in having attracted qualitatively very valuable insights from EBSJ readers around the world. This important reader contribution underscores two important considerations:

- 1. The importance of Medical Subject Headings (MeSH) in medical writing and their application in searches (please look for an article on this subject in a future EBSJ).*
- 2. The special insights gained by a trained librarian, such as Jan Schoones. In this age of widely accessible databases and search tools the specialized training of a librarian can remain a very valuable asset, as this letter to the editor shows.*

*Editor-in-Chief and Scientific Editor-in-Chief:
Jens Chapman, MD*