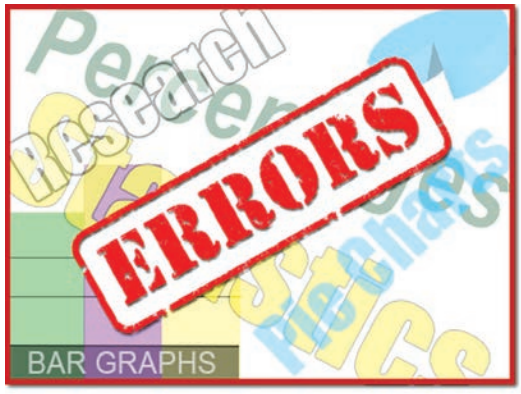

Reliability of Medical Research

Are we in trouble?

BY JARROD SHAPIRO, DPM

Practice Perfect is a continuing every-issue column in which Dr. Shapiro offers his unique personal perspective on the ins and outs of running a podiatric practice.

As an academic podiatrist teaching at one of our colleges and running a residency program, one spends a reasonable amount of time participating in and thinking about journal clubs and medical research. Typically, one participates in three to four journal clubs per month and reviews somewhere around six to ten articles over the month. Some faculty partners hate journal clubs. These things can sometimes get a little long in the tooth, especially when you delve deeply into the biostatistics part.

Journal Clubs Uncover the Truth about Clinical Research Articles

Journal clubs are an important part of both the educational process for our students and residents, but also a key method to remain current and active in an ever-changing field. They also serve as a key component of evidence-based practice. It's especially sad that at least 95% of the time, the articles reviewed turn out to be junk.

It's incredibly rare that our journal clubs come out at the end saying, "Wow, this article is really going to change how we practice podiatric medicine and surgery." Sad, right?

Is It Us?

One might think this is unique to podiatry, that somehow our profession is particularly bad at performing research. Not even close. Take a look at the orthopedic literature, for example. There's no shortage of junk research from them. Even the *Journal of Bone and Joint Surgery* has published research with poor methodology. It's better than some of our journals, but still not great. One of the things they do is publish a level of evidence for each study. Not to argue the merits of that idea (it's a good one), but there are too many times where their evidence level doesn't match the study. In cases like this, they're just putting lipstick on a pig. It may have pretty lips, but it's still a pig.

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In April 2015, the Wellcome Trust had a symposium on just this subject in London that looked at the "reproducibility and reliability of biomedical research".[1] They state that possibly as much as half of the scientific literature may be untrue.[1] Is there any evidence to this?

It All Starts with the Abstract

Let's start with the abstract. Pitkin and colleagues[2] looked at 44 abstracts from each of six medical journals (the big ones—*JAMA, NEJM, Lancet, Annals of Internal Medicine,* the *Canadian Association Medical Journal,* and the *British Medical Journal)* published over a 15-month period. Abstracts were considered inconsistent if the information in the abstract was either different or absent from the actual study.

They found inaccurate abstracts in these journals ranging from 18%–68%! We're just talking about the abstract itself. We're not even considering the actual methodology. So… the abstract, the part of a journal article that is most commonly read, has a high rate of inaccuracy.

It Ends with the Citations

If the abstract is the beginning, what about the end? How accurate are the citations? Luo, et al. analyzed the citations and quotations in 249 references and 408 quotations from 25 articles published in five orthopedic journals.[3] They found a citation error rate of 41% (103 errors out of 249 references), and a quotation error rate of 20% (80 errors out of 408 quotes). Not even the references are accurate!

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And the Study Design Isn't so Great Either

How about the middle? If the beginning and the end contain inaccurate information, what about the actual research? For the sake of time (and my own sanity), let's take one representative part of the methods of research studies: the statistics. Parsons and colleagues surveyed 100 orthopedic journal articles using a validated survey model.[4] They found significant failing of study design, statistical analysis, and the presentation of results:

- In 17% of studies, the conclusions were not justified by the results.
- In 39% of studies, the researchers used the wrong statistical methods.
- In 17%, a different analysis could have made a difference in the overall conclusions.

It's the Best We've Got—Make It Better

Are you surprised by these results? Almost every journal article we review in our journal clubs have methodological or reporting errors. It makes one question the basis for our practice of medicine. Never mind the concept of repeating studies. How many studies actually repeat a prior study to see if it was accurate? Very few. Some have suggested creating a research subspecialty of confirmatory research, which is a great idea.

So, what do we do with all this? We shouldn't just give up and say, "That's how it is." Instead, we should all demand more from our researchers. We need to create clear methodological protocols for research to limit the amount of variability. If our journals publish peer-reviewed articles that are inaccurate, we need to write in to those journals and complain. Finally, until all of this inaccuracy changes, we each need to be highly skeptical of what we read. Don't simply believe something because it is written. Use your mind and your own judgment to determine if a study has valid results, and if you should use those results to change your clinical practice. Until that blue sky day of perfect research occurs (don't hold your breaths), it's best to remain a skeptic. **PM**

Finally, until all of this inaccuracy changes, we each need to be highly skeptical of what we read.

References

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