

What Are the Benefits to Orthopaedic Residents of Understanding Research Methodology?

Deana Mercer MD¹

1. UNM Department of Orthopaedics & Rehabilitation

Understanding research methodology offers the same benefits to residents as to all clinicians: it helps all of us take better care of our patients.

Every month, hundreds of clinical and basic science articles are published by myriad journals offered to guide clinical practice. The conclusions drawn by the authors (as well as readers) is of highly variable quality and often conclusions are not supported by the methodology. As clinicians reading these articles, we must be able to efficiently determine which have followed a reasonable methodology that supports the authors' conclusion. Before changing one's practice based on a scientific article, the clinician needs basic tools to ascertain that the article's conclusion is the result of rigor in a) generating a hypothesis and specific aims, b) sound methodology, accurate statistical analysis, and c) generating a conclusion which is supported by the study findings. The report also needs to be interpreted within the context of existing knowledge and one's own personal experience.

Medical school trained doctors do not typically have much specific training in research methodology.¹ The National Institutes of Health (NIH) and the Clinical Translational Science Centers (CTSC) recognize this. These institutions have created and funded specific programs to address this deficiency. One of the programs offered at the University of New Mexico, in which I had the opportunity to participate, is the "Master of Science in Clinical Research" (MSCR). The program is geared towards the clinician and the courses pertain to medical practice. The curriculum for the MSCR program was generated by clinicians, for clinicians. It is a 2-year curriculum taught by PhDs and MDs dedicated to improving research quality. The courses provide tools to become a better researcher and critical reader of the literature. This opportunity to further research understanding through the MSCR program is available to orthopaedic residents and fellows, although this rather arduous 3-year process is not readily incorporated into orthopaedic residency curriculum. Completing this program demonstrated to me how important enhanced understanding of research methodology is to orthopaedic residents.

Having completed this master's program in clinical research, I now have a much better understanding of research methodology and techniques. For the resident

surgeon who does not have the benefit of this specific training, I believe the old adage "it takes one to know one" can be applied. The orthopaedic resident can acquire a functional, practical working knowledge of research methodology (to "know one") by completing a research project (to "take one"). This is a much more efficient and appropriate way (with a steep learning curve, which is good) to acquire this important skill at the appropriate level than alternatives like a research year or a 3 year curriculum with a much longer learning curve to acquire the skill. The practical aspect of a specific research project and the tangibility of a publication contribute to this efficient steep learning curve. Completing a research project also brings the orthopaedic resident into a contributor role to the orthopaedic knowledge fund rather than merely being a consumer of other people's efforts. Everyone should contribute something to the common good at some point in life and this is a perfectly timed opportunity for the orthopaedic resident to contribute to the orthopaedic community fund of knowledge. How do we know that the A2 pulley should be released to treat trigger finger? Because someone in the past put in the time and effort to perform research and determine and report that this was an effective technique. We can pay homage to this and other past work by each making a contribution on our own, while becoming more skilled at the same time.

One of the best ways to become a better critical reader of the literature, an invaluable and necessary skill, is to actually perform research. Completing a research project provides a practical understanding of the many difficulties inevitably encountered, as well as the practical realization of executing an "ideal" methodology.

Also integral to completing a project is to understand the potential for errors to creep into the data. I was told by one of my mentors to be very critical when reading scientific journals for a variety of problems. Sometimes the methodology does not support the conclusions. Outcome assessment may be biased. Poor results may be excluded. I have been told to expect that "there is a lie in every paragraph," which does not render the information useless but does instill some skepticism and reservation before applying the conclusions of a report to a clinical situation. We cannot base our care of patients and change our clinical practice on poor quality work, so how do we sort the "wheat from the

chaff” and recognize the difference? A scientific paper published by a well-respected clinician with a flawed conclusion may become accepted treatment despite faulty methodology and lack of scientific rigor. We can prevent this by insisting upon rigor in research methodology and conclusion generation, both in our own work and in our acceptance of published works.

One need not profess a career in research to understand these principles. Struggling through the research process on 1 or 2 projects offers a basic understanding of the limitations of the process itself and is never wasted effort. It is an important part of resident education, as it lays the basis for a lifetime of adult learning, and we must support it wholeheartedly. Completing a research project and understanding research methodology is as important to an orthopaedic resident as is the acquisition of diagnostic acumen, knowledge base, inter-personal affect, and surgical skill.

References

1. Schrier RW. Ensuring the survival of the clinician-scientist. *Acad Med.* 1997;72(7):589-94.