One thing we persistently teach to our kinesiology students is the concept of the inverse relationship between stability and mobility when it comes to anatomical structures and their functions. For example, any of our students would be able to tell you that the osseous ring of the pelvic girdle is very stable—that the pelvis has sacrificed mobility for stability. This functional trade-off allows for, in part, the efficient transfer of ground reaction forces and muscular forces for gait to occur. In contrast, the structural–functional relationship of the shoulder girdle has enhanced mobility, at the expense of stability, in order for us to be able to move our upper extremities into a variety of positions to manipulate and interact with our environment. Most importantly, we want students to understand that the characteristics of one are not inherently better than another, but that the anatomical structure is very important to dictating (and is dictated by) the joint’s functional purpose (see Figure 1). As structure and function interact and provide characteristics of our joints, a balance is struck to optimize the mobility–stability relationship. Where the demand for mobility increases, stability is sacrificed, and vice-versa.

This editorial is not a functional anatomy lesson, but an illustration of the reciprocal relationship that can also be seen in research. Within the evidence-based practice (EBP) model, we often focus on the hierarchy of clinical evidence, with meta-analyses, systematic reviews, and randomized controlled trials near the top, and case studies near the bottom (see Figure 2). We would like to back up and look at the broader picture of scientific research to examine an inverse relationship that exists there as well—not between stability and mobility—but rather between internal and external validity in research studies.

The best-available research evidence, one of the three prongs of evidence-based practice, does require that studies be conducted in a way that is (1) systematic (data collection follows an orderly design), 
logical (the methods allow investigators to draw accurate conclusions), (3) empirical (results are based on methodically collected data), (4) reductive (data can be reduced down into meaningful variables to answer the research question), and (5) replicable (the methods are documented to allow others to reproduce them in the same manner). In other words, it is required that a scientific approach to solving problems and answering questions is used. Based on the research question, there are specific research designs that can be implemented to develop a scientific answer which fulfill these five elements mentioned above. Each research design has its own strengths and limitations, but one type of research is not better than another. Rather, each has its own inherent ability to maximize the relationship between two types of scientific validity in the context of the question being asked.

We would like to describe a continuum (see Figure 3) of clinical research that spans from the basic (explains or predicts underlying biological, physiological, or biomechanical mechanisms) to the population (the trends among large groups of people). As depicted in Figure 3, the level of control (internal validity) within basic science studies is high; researchers are meticulous in ensuring that the ability to draw causality between what is being manipulated and what is being measured is maximized. For example, many animal studies will use genetically identical creatures, thereby essentially eliminating any variability other than the factors that the investigators aim to manipulate. However, there is a cost as these highly-controlled studies lack generalizability, or the ability to project results on the target population (humans) since there is little variation in the subjects used and their relationship to humans is weak. The subjects (genetically identical animals in this case) are so similar to each other that any creature that may even slightly deviate from this type of animal may not produce similar results. To some readers, this may seem too irrelevant and not applicable to clinical practice. However, what is gained is the ability to conclude that the factors that were manipulated in the study most likely caused the observed results. For basic research, generalizability is sacrificed for control in order to elucidate specific underlying mechanisms. To move to the other side of this continuum, researchers studying epidemiological trends encounter the variability that comes with studying large groups of people (population research). No matter how well-defined the population, there are so many inherent individual differences that investigators cannot account for all of these. To some readers, this may seem sloppy and neglectful to those all-critical steps to producing good research. For epidemiological research, control is sacrificed for generalizability (the ability to state, with confidence, universal conclusions that are common to the greater population). As depicted in Figure 3, the level of control for epidemiological studies is low; researchers are charged with revealing the common threads within incredibly diverse populations. This research, while low on the control side, is critically important to elucidating the trends that affect the population at large, which can generate important scientific inquiry.

Within this continuum exist study designs that combine both aspects of applied and clinical research—studies in which samples of human participants are examined to develop answers to important research questions. Within these studies, researchers have to account for the inherent diversity of participants while attempting to implement control to develop potential causal links between what is being manipulated (the independent variable) and what is being measured (the

![Figure 3](Best-available research evidence continuum.)