Case Studies: The Alpha and Omega of Evidence-Based Practice

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Clinical case studies are a forum for clinicians to communicate unique findings and experiences when diagnosing or managing a condition. Most case studies deal with only one to two patients; therefore, case studies are considered to be a foundational level of evidence. In other words, they commonly fall relatively low on the hierarchy of the best available clinical research.

While there are issues related to the internal and external validity of case studies with regard to the inherent biases introduced with such a small number of patients (n of 1), case studies serve as educational narratives for the development of new insights in clinical practice, education, and research. Furthermore, case studies offer an excellent opportunity for clinicians to engage in scholarly activity and contribute to the profession’s body of knowledge. Though case studies have historically been the primary mode of disseminating clinical information, currently there are few outlets for case studies available, and many journal editorial boards are questioning the value and impact case studies have on furthering research and clinical practice.

One of the major challenges for case study authors is determining what is a unique contribution to the body of knowledge? In the broader medical literature, case studies provide a medium for the description of new conditions and their potential etiological factors, prognostic timelines, and potentially advantageous therapeutic strategies. Within the sports medicine field, there is typically a narrower scope of case studies, with that scope focused generally on either diagnosis or management.

Briefly, in diagnosis-oriented cases the uniqueness of a case study is typically directed toward conditions that may not be often seen by clinicians, in order to raise awareness of signs and symptoms for more appropriate and timely recognition. For management-oriented cases, new intervention strategies which show promise in a patient’s response and prognosis are discussed. These types of case studies can certainly spark changes within clinical practice and research to explore new clinical frontiers, but are case studies still genuinely useful for making clinical decisions when the vast majority of what clinicians might experience has already been discussed? Are case studies really just a sideshow, providing nominal interest but not really contributing to knowledge? The answer to this very important question may reside within the context of evidence-based practice.

Evidence-based practice (EBP) has been defined as the integration of the best available research, clinical expertise, and a patient’s values when making clinical decisions. The central principle of EBP is that each patient is unique and decisions for the course of the patient’s care must be made at the “n of 1” level. Every year, as more evidence is presented to the clinician, it is unknown whether that evidence actually results in enhanced outcomes for a patient with that individual’s unique values and preferences. Case studies offer a unique opportunity to enrich our body of knowledge with EBP outcomes for the “n of 1” decisions we need to make.
The model we propose is one that places both diagnosis-oriented and management-oriented case studies in a framework to demonstrate the utility of these clinician reports. Through the continuum of exploration and validation we can see the circular nature of the case study, and trace that continuum from the beginning (exploration) to the end (validation) of clinical evidence and its usefulness in clinical decision-making.

Typically, diagnostic-oriented case studies focus on identifying and refining the process of recognition of a condition, with the general focus on unique conditions or rare comorbidities that might be missed or misdiagnosed. These types of reports are, of course, useful and raise the level of awareness to these conditions. This then also sets in motion a course of scientific exploration to identify certain diagnostic features consistent within the condition, etiological factors related to its onset, and prognostic timelines for its resolution. This is the exploration phase of the Case Study Model: discovering novel features that need to be described to other clinicians.

Within the realm of EBP, certain diagnostic tools, such as clinical prediction rules (CPRs), have been developed to assist clinicians with making diagnoses. As clinicians, we should ask if those rules have ever been tested outside of the research study in which they were presented. In other words, are the CPRs for a given condition any better than a typical examination? A clinician who uses a set of described CPRs and has an affirmative diagnosis of that condition has demonstrated the validity of the tool in making the appropriate clinical decision. This would serve then to validate the CPR in the real-life clinical practice setting at the target level of application, the “n of 1”. Clinicians who were not part of the original study team who developed the CPR provide enhanced external validity of the CPR. This represents the validation phase of the Case Study Model: demonstration that the best available evidence provided in the literature actually works in reality.

Similarly, management-oriented case studies focus on identifying novel techniques for the treatment and rehabilitation of a condition. These typically include the use of a new modality or technique that potentially offers benefit for both patients and clinicians. This can be the initiation of scientific inquiry (exploration) into the potential underlying mechanisms and comparative benefit of the new technique. In testing previously described interventions (validation), the case study serves to report the success (or failure) of a particular previously published intervention for a given condition. In intervention studies, such as randomized controlled trials (RCT), there is strict control over the inclusion and exclusion of patients, the intervention timelines and progressions, and the outcomes measured. While this certainly enhances the ability to draw cause and effect conclusions about the efficacy of an intervention, would the effects still hold up in the less controlled real-world setting of clinical practice? Testing a pro-

![Image](https://via.placeholder.com/150)

**The Case Study Model “n of 1”**

**Application** of the best available evidence derived from:
- Clinical trials, clinical prediction rules, critically appraised topics, systematic reviews, and meta-analyses

**Does it work in “real life”?”**

**Validation**

**Exploration**

**Discovery** of novel insights for a clinical condition from one patient, fostering scientific exploration into:
- Epidemiology, etiology, diagnosis, prognosis, treatment, and prevention

**What is unique and needs to be shared?**

*Figure*  The cycle of case studies from beginning to end.