Editorial: The Institution's Role in Training Chiropractors to Analyze the Literature Effectively

A recent issue of *Dynamic Chiropractic* (1) highlighted a dispute of the results from a stroke/manipulation study published in the May 2003 issue of *Neurology*, according to chiropractic researchers. In their article, the American Chiropractic Association released a statement that the study was flawed and overflowing with errors and omissions. Two prominent chiropractic researchers, Dr. Michael Haneline and Dr. Anthony Rosner, responded to the conclusions reached in the study. Of the errors and omissions presented, four are noted as examples. First, no information specified the type of provider who delivered spinal manipulative therapy. Second, the study failed to identify individual qualifications and background in performing spinal manipulation. Third, the article failed to present an even weight of documented benefits and risks of spinal manipulation. Last, the fourth criticism of the study identified by the chiropractic researchers was the lack of appropriate references, demonstrating a weak review of the literature. With these and the other findings presented, the stroke/manipulation study is transformed from scientific truth to social tabloid.

According to Sinderman (2), successful application of the scientific method requires the following "classical" steps: creation of a hypothesis; acquisition of relevant data through experimentation and observation; revision of the hypothesis as the data are interpreted; and finally, synthesis of all available data and formation of a concept. Sinderman also identified a taxonomy of controversies. Of these, two controversies support the chiropractic researchers' rebuttals to the stroke/manipulation study: opposition toward interpretation of the data and claims of inadequacy that the data support the study's conclusions.

With this in mind, good research is fundamental to the curriculum of all accredited chiropractic institutions. To facilitate advancements in research and the dissemination of knowledge and information, Flanagan and Giordano (3) identified three objectives that all chiropractic institutions must complete when training the future chiropractor as both a clinician and researcher. First, research must enable knowledge acquisition that self-validates scope and interest of the institution's faculty and professional disciplines. Second, the institution must secure both extramural and intramural funding from public and private sectors for its research activities. And third, the institution must foster political justification through its relationship with outside publics that support research endeavors, as well as provide all publics with knowledge and information as a respected product of the institution's research process.

Therefore, the institution of chiropractic is responsible for training its graduates and field practitioners to analyze the literature correctly and effectively, since many studies have numerous errors and omissions that are unacceptable in resolving the research question (4). Fundamental to human thinking and logic within a study is to understand all components of the author's reasoning. Paul (5) identified eight

basic elements present in all thinking. These essential elements can serve as tools for the reader to analyze the literature for gross errors and omissions and use the findings in formal rebuttal and scientific debate. Hence, the reader becomes an agent of quality assurance, whereby today's scientific-social tabloids may be retransformed into scientific, peer-reviewed journals.

The following basic elements of reasoning (6) serve as a primer in literature analysis. Every study should have a **purpose** that is justified and well stated. Every study should answer at least one **question** that should directly relate to the study's purpose (research question) clearly and as unbiased as possible. The author/principal investigator must present **information** that is relevant and essential to all issues. Likewise, the author/principal investigator should use fundamental **concepts** to present key ideas that are justified. **Assumptions** should be minimal and identified by the reader. The **inferences** (conclusions) should follow all relevant information. When issues are complex, alternative inferences should be considered. Moreover, the reader should be able to identify the author's/principal investigator's **point of view**. Sensitivity must be shown to different lines of reasoning. Finally, there must be a focus on **implications** (consequences). What would happen if the reader followed the conclusions of the study? Do the aforementioned elements lead to the conclusions? Does the information answer questions and justify the study's purpose?

To preserve the "business" of science and the scientific method, the trained chiropractor can use the tools presented to identify deficiencies, errors, and/or omissions within peer-reviewed studies and publish rebuttals to a study's conclusion. These rebuttals can be published in peer-reviewed journals as editorials or letters to the editor. Most peer-reviewed journals have a section in the back that gives instructions for manuscript submission. For more information, contact the authors of this editorial or any research department chair of an accredited chiropractic college or university.

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