

**A critical appraisal of “The effectiveness of core stabilization
exercise in adolescent idiopathic scoliosis: A randomized
control trial”**

By

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Abstract

The ability to critically appraise a research article is of utmost importance for any student in a doctoral program. This critical appraisal attempted to analyze research that looked at the benefit of the addition of core stabilization on various outcome measurements (Cobb angles using radiograph, apical vertebral rotation in Adam's test, trunk asymmetry using the Posterior Symmetry Index (PSI), cosmetic trunk deformity using the Trunk Appearance Perception Scale (TAPS) and the quality of life using the Scoliosis Research Society-22 questionnaire). The student found that the increasing prevalence of adolescent idiopathic scoliosis (AIS) rationalized the need for this research. Overall the student found that there were moderate improvements in many of the outcome measurements, which gives reason to include core stabilization and strengthening with the treatment of future patients

Key Words

Adolescent idiopathic scoliosis, core stabilization, curve magnitude, posture, rehabilitation, scoliosis, clinical appraisal

Introduction –

The ability to critically appraise a research article is of utmost importance for any student in a doctoral program. Moreover, the ability to use the findings of clinical based research in the integration of clinical practice is the cornerstone of effective treatments for clients and patients. In the ever-changing field of physical therapy, clinical research should begin as clinicians are involved in didactic coursework as a student, on clinical rotations, and throughout the length of a career. The purpose of this term paper was for the student to clinically appraise a research article. The revised clinical question that was used to locate an appropriate research article was, “Can core strengthening, stabilization, and postural rehabilitation effectively reduce the cobb angle of adolescents with idiopathic scoliosis?”

Methods –

To begin the research process, the student was introduced to various databases that may be used to search for articles. These databases were all accessed through the Angelo State University Library system to ensure that the student would be granted full access. The research databases that the student used were: PubMed, SAGE journals, and CINAHL. An interesting aspect of the research process is that some of the PubMed articles would only provide links to journals on different sites (i.e. SAGE journals). This is important to note in that if you do not have full access through a university system- you may be charged to view the article. Additionally, the student found that using the keywords “scoliosis and core strength” on PubMed and “scoliosis posture therapy” on CINAHL was appropriate to find multiple articles to clinically appraise. It is important to note that there were no limits placed on the search, as the student was not sure of the exact study that he was looking for. By not using any exclusion factors, more articles

were found— totaling 4 on PubMed and 48 on CINAHL. Moreover, one of the 4 articles that were found on PubMed required the student to use the article title and find it through SAGE journals by accessing this specific database through the Angelo State University Library system. Overall there were three articles out of the 52 total “hits” that were similar to the student’s research question. After examining all three of the possible articles, the student felt that the article titled- “The effectiveness of core stabilization exercise in adolescent idiopathic scoliosis: A randomized control trial” would be the best to review as it matched most closely with the research question set forth previously.

As mentioned previously, the title of the article that was clinically appraised was “The effectiveness of core stabilization exercise in adolescent idiopathic scoliosis: A randomized control trial”. This article was published in Prosthetics and Orthotics International Journal Volume 4 pages 303-310 in 2017. Interestingly, the impact factor of this journal is 1.185, cited in 2016. The authors of this study were Gözde Gür, Cigdem Ayhan and Yavuz Yakut, and it was completed at a modern and private Physiotherapy and Rehabilitation clinic at Hacettepe University located in Çankaya/Ankara, Turkey. The student found it very interesting that the authors wrote in English while the headquarters of the Prosthetics and Orthotics International journal (POI) is located in Brussels, Belgium. After a quick review of the POI journal, the impact factor, and the authors, the student felt as if this would be an appropriate article to answer the clinical question of, “Can core strengthening, stabilization, and postural rehabilitation effectively reduce the Cobb angle of adolescents with idiopathic scoliosis.”

Results –

The article written by Gözde Gür, et. al. is, most broadly, a randomized control trial which wanted to look at how the addition of a stabilization protocol with typical scoliosis rehabilitation would effect different outcome measures (dependent variables). This study followed a randomized control trial design with both pretest and posttest measures that included- Cobb angles using radiograph, apical vertebral rotation in Adam’s test, trunk asymmetry using the Posterior Symmetry Index (PSI), cosmetic trunk deformity using the Trunk Appearance Perception Scale (TAPS) and the quality of life using the Scoliosis Research Society-22 questionnaire. The authors gathered baseline information of the participants and used all of the aforementioned outcome measures to look at the benefit of core stabilization in adolescents with scoliosis.

This article began much like all current peer reviewed articles – with a lengthy and thorough introduction to the topic at hand – adolescent idiopathic scoliosis (AIS). To the credit of the authors, the introduction has many positive attributes. The authors began by giving a broad introduction to AIS, including the definition and the age groups most affected and even hypotheses on why this might be the case. Moreover, they introduced the idea of poor core muscle strength and how it can negatively affect spinal curvatures in at-risk age groups. The researchers did an adequate job giving a description of how current physical therapy treatments are beneficial for spinal deformities and even began to describe specific exercises that are currently used in scoliosis rehabilitation. Finally, it is worth noting that the authors used multiple outside resources to explain how current

treatment methods can be beneficial, however, there is a lack of research on core strength- which is what they chose to examine.

On the other hand, there were some parts of the introduction that could be improved upon. To begin, the authors did not provide adequate information on differences in varying curvatures such as mild, moderate, or severe – or the measurement of these differing curvatures. The student believes that there should have been a more in-depth introduction to how the varying curvatures are measured and what can objectively quantify mild, moderate or severe AIS. Another possible weakness of this introduction is that the author uses some “old” or “outdated” resources to write the introduction- including some from the early 1980’s. Lastly, the introduction did not introduce the objective or subjective dependent variables – rather opting to include them in a different section.

The methods of this study appeared to be written very well. This study used a randomized control trial, prospective, and longitudinal design - which almost always improves the overall quality of the research. The authors did employ specific inclusion criterion to help minimize any significant differences between each subject and between the experimental and control groups. The authors made sure to manage all of the groups the exact same way except for the independent variable that they were testing- the core stabilization exercises. Lastly, the methods section of this paper is where the authors decided to introduce and explain the different outcome measures and referenced their reliability and validity to outside resources.

The main drawback that the student found in the methods was a lack of explanation of the different stabilization exercises. Although the authors did a good job explaining the different possibilities of exercises that were included for core stabilization and strengthening (scapula position, rib placement, ect.), they did not include the exact protocol they used. It is not to be assumed that all physical therapist and rehab professionals will know the exact protocol of each of the various core strengthening/stabilization exercises that were listed.

The results of the study are presented in a clear and concise way. The authors only needed 2 different charts, including the baseline characteristics of the subjects and each outcome measure that they used as the dependent variables. The authors did an adequate job of addressing how the results quantified the aim of the study and reported all of the outcome measures and any statistically significant differences in both the subjects and that of the dependent outcome measures.

There were, however, a few small drawbacks of how the authors presented the findings of the core stabilization group. The main disadvantage of the written results was in the order that they were listed/written. Unfortunately, the authors did not report the results in the same order that they were introduced previously in the article- making it more difficult for the reader. Overall, this is a small disadvantage that does not take away from the quality of the results but rather the ease of reading.

Finally, at the end of the article, the authors offered their hypotheses on the findings of the study. The authors did a fantastic job indicating the meaning of the findings – going further in depth into core and postural strength and how it is crucial for

the progression or regression of AIS and even cited outside research to support the results and their hypotheses. Another strength of the results was that even though the authors wanted to support their findings- they made reference to possible limitations and the clinical significance of the findings when compared to the statistically significant results.

Although the discussion section of this article is written in a very clear and organized fashion- even providing some interpretation of the results, the authors did not recommend any future studies that could be done to further improve the possible results of the study. Additionally some of the research they referenced was from outdated articles (29,30). Overall these are small disadvantages and the results section was done very well.

Discussion –

This article and its findings are very important for physical therapy practice in that scoliosis is a fairly common spinal deformity “present in 2%-4%” of children. Due to fact that this is a fairly common spinal deformity, there is a high need for additional research with hopes of decreasing the magnitude of curvature for those effected. This study is very relevant to the student’s research question in that it looks at both current treatment exercises and the addition of core stabilization. The article does a good job not disregarding older treatments that have been shown to be beneficial – but rather examines further improvement through adding core stabilization.

The student believes that the use of core stabilization could be beneficial for those with AIS. The findings of the article showed that there were statistically significant changes in the lumbar AVR (decreased rotation) and in pain measurements in the treatment group when compared to the control group. Although the pain and rotation results were statistically significant – the clinical significance is questionable. The reduction in both of these scores is small when compared to that of the control group. This being said, however, there were reductions (improvements) in many of the other outcome measurements- proving to be helpful in curve magnitude through Cobb angle measurements, trunk deformity, postural symmetry and quality of life – even though not statistically significant. Overall, the benefits of adding core stabilization far outweigh the possible risks- which are small in the stabilization exercises that are mentioned in this study.

Although the only statistically significant results (pain and AVR) are small- there was a correlation between the addition of core stabilization and decreased spinal curvature magnitude, trunk deformity, postural symmetry and quality of life more so than with traditional bracing and treatment. Although my confidence in the clinically significant values of pain and AVR is low- I feel that the overall results point to this treatment style being a net positive. I can anticipate using core stabilization for scoliosis patients in the future because of some of the benefits listed in this study. Not only did this study point to possible benefits to those who have AIS, appropriate core strength is crucial for many other activities in life and the overall mobility of patients. It is for this reason that I will include core stabilization with future patients because the benefit far outweighs the risk.

To conclude, this was an good research article, which helped answer the question of, “Can core strengthening, stabilization, and postural rehabilitation effectively reduce

the Cobb angle of adolescents with idiopathic scoliosis.” This study found that although not statistically significant, there was a reduction of the Cobb angle (along with other outcome measures), which proved to be beneficial for the patients in this study and the treatment of future patients with AIS. The addition of core stabilization to traditional AIS treatment plans may prove to be beneficial for Cobb angles, AVR, PSI, (TAPS) and the overall quality of life of scoliosis patients.