

**A critical appraisal of “Effects of 12-week core stabilization exercise
on the Cobb angle and lumbar muscle strength of adolescents with
idiopathic scoliosis”**

By

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Abstract

This critical appraisal identifies the strengths and weaknesses of the “*Effects of 12-week core stabilization exercise on the Cobb angle and lumbar muscle strength of adolescents with idiopathic scoliosis.*” In order to understand the entirety of the article, each section is criticized individually and with the purpose of finding an evidence-based intervention technique to incorporate into the field of physical therapy and throughout the medical profession. The article has many different areas to look into and assess the quality of the research done. These different areas include the introduction, methods, results, and discussion of the article and all have their own strengths and weaknesses to discuss. The introduction is clear and thorough, adding in research from the literature on the subject of idiopathic scoliosis. The methods include strong outcome measures, but may be challenging for a novice to perform. Lastly, the results and discussion of the article were well written and did an excellent job explaining the evidence of the research. Each of these variables lead to the conclusion discussed in the article that it is reliable and valid to use in our plans of care throughout most clinics involving the adolescent population.

Key words

Idiopathic scoliosis, Core stabilization exercise, Flexibility, Cobb angle, Adolescents

Introduction

The purpose of this appraisal is to assess the evidence provided through the study of idiopathic scoliosis in adolescent children. It is important that the evidence presented in the article is reliable and valid to the medical profession and general population. In order to apply the intervention confidently, professionals need to know that the research was conducted so that the variables mentioned were actually the ones being tested. As medical professionals, it is vital to practice evidence-based interventions and treatments. In the case of the current article, the researchers were testing how a core stabilization exercise program would affect adolescents with idiopathic scoliosis.

Methods

In the search to answer my clinical question I chose PubMed and the Physiotherapy Evidence Database because they both provide high quality evidence and are free students. The keywords used were “scoliosis AND PNF”, “scoliosis AND proprioceptive neuromuscular facilitation,” and “scoliosis and physical therapy.” The limits placed on my search is that the articles were experimental or clinical trials for the design type of research. I also wanted the most up-to-date research, preferably after the year 2000. The inclusion criteria included that the patients had been clinically diagnosed with scoliosis and would be treated with either core stabilization exercises or PNF. This inclusion criteria was chosen because it was broad enough to get a fair number of patients, but not so many that you could question which treatment is actually working. There were not nearly as many articles as expected, with only getting up to 213 hits before I began to review articles.

The article under critical appraisal was from the Journal of Exercise Rehabilitation in 2017, conducted by Kwang-Jun Ko and Seal Jung Kang in Seoul, Korea. I chose this article because it was clear and applicable to pediatric physical therapy.

Results

Summary of the study

This study researched the effects of core stabilization exercises for adolescents diagnosed with idiopathic scoliosis. Scoliosis is a disease of the spine that causes rotation or slant from a normal posture. The deviation from normal causes the muscles around the spine to be weak, chronic pain, respiratory dysfunction, and trouble breathing. The study consisted of 29 adolescent students with a Cobb angle of 10-20 degrees, who had been clinically diagnosed with scoliosis and had received some sort of treatment in the last 6 months. The group was then divided into 15 students who were a part of the exercise group and 14 students who were the control group. The Cobb angle, flexibility and lumbar muscle strength were measured and tested before and after the exercise program for both groups. The exercise group participated in a 12-week core stabilization program that was 3 times a week for 60 minutes. It consisted of back raises, abdominal curls, bridge exercises, leg press, and supermans. Based off the measurements and manual muscle tests performed before and after the exercise, the results showed that the Cobb angle of the exercise group decreased and their flexibility and lumbar muscle strength significantly increased. The control group did not show these improvements. The study shows that core stabilization exercise is an effective tool for treatment of idiopathic scoliosis of adolescents.

Appraisal of the study introduction

Critically appraising this article, it found that the introduction was very comprehensive and did a thorough job of providing background information not only on the pathology of idiopathic scoliosis, but also on the effects of exercise as treatment. The author did use literature to form a sound and rational study. Most of the research is current and primary sources of credible journals. The critical variables were well addressed in the introduction and throughout the entire article as well.

The only weakness found is the lack of information for incidence of scoliosis among the world population and specifically the United States population. Although there were three that I think were slightly outdated, being published in the 1980s.

Appraisal of the study methods

The strengths assessed in the methods of the research article is the studies' experimental design type, which means they have at least one group receiving treatment and another group not receiving treatment. The article was a prospective, longitudinal study that was easy to understand. The intervention was described well and in enough detail that other individuals in the future could replicate the study. Each group was managed the same way throughout the study and the data collection except that the exercise group completed the core stabilization program. The subjects all had similar sociodemographic characteristics and similar pathologies within the given inclusion range.

One of the weaknesses found in the methods was that it was zero-blinded, which can cause bias in the research and the results. The article also did not specifically state if the clinicians measuring the outcomes were blinded. Lastly, the statistical analysis was not extensive enough to provide a comprehensive explanation if whether not the results were significant.

Appraisal of the study results

The result section is written in an organized and clear manner. The details are presented effectively and answer each research question that was asked. The results address the research question about the effect of exercise on the Cobb angle and lumbar muscle strength of adolescents with scoliosis. Both aims, the Cobb angle and lumbar muscle strength results, were presented in this section. The tables in this article are clear and easy to read.

Although there were many strengths including the authors presentation of each outcome measure, but not detailed to the point where they stated specific differences. The authors spoke very generally about the results and did not give each number for the different group differences. Also, the authors did not mention any concept about MCID before analyzing the data. The NNT was also not calculated or presented in this article.

Appraisal of the study discussion

For the strengths of the discussion, the authors went into detail about idiopathic scoliosis and how the treatment studied affected patients with this pathology and other pathologies similar. They applied the findings clearly and clinically. The authors incorporated the findings to a few other studies they had found about lumbar muscle strength and Cobb angle decreases with core stabilization exercises and what that meant for their study.

Although they did tie in some findings, I would have like to see a few articles from the existing literature. I think they could have gone in more detail about the specific variables tested. Lastly, the authors did not suggest any future study be conducted.

Discussion

The significance of knowing that core stabilization exercises not only increases lumbar muscle strength, but that it decreases the Cobb angle means a more focused plan of care for our adolescent patients with idiopathic scoliosis. With evidence behind our interventions, we have better confidence and purpose with our patients. The article about treatment for scoliosis moves the field of physical therapy forward in knowing and understanding why therapists choose to do what they do. The interventions and outcome measures therapists use in treating scoliosis and all other movement pathologies should remain reliable and valid for the best prognosis for the patient. This article also helps answer my clinical question directly so that I may better understand scoliosis and how to treat it effectively.

“Effects of 12-week core stabilization exercise on the Cobb angle and lumbar muscle strength of adolescents with idiopathic scoliosis,” is a reliable and valid source to use to support core stabilization exercise as an intervention for adolescents with idiopathic scoliosis. The potential benefits of using this appraised intervention is that the patients will have a better quality of life with decreased pain, due to a decreased Cobb angle and increased lumbar muscle strength. A potential risk of using it may be that since there wasn't a strong statistical analysis, the intervention may not be applicable for the US population or people with slightly different pathologies. The potential benefits of using core stabilization exercise for these patients outweigh the risks. Even if the patient only has partial response to the intervention, it will largely increase how much activity they can perform and be more functional in their day-to-day routine. Something that could reduce the argument against the appraised intervention is that they only

tested adolescents in Korea, which doesn't mean that a population of students elsewhere will respond equally to the treatment.

It is crucial for a physical therapy professional to assess the validity of the paper before applying it to their plan of care. Personally, I feel I have enough confidence in the research validity of this article in order to consider using it on my future patient because of the way the experimental methods tested the dependent variables of Cobb angle and lumbar muscle strength in accordance to the outcome measures. I also feel that I anticipate implementing the intervention safely and appropriately in a clinical setting given my knowledge, skill levels and resources in the future because the methods and tools therapist used are commonly used the clinic already.

In conclusion, this critical appraisal is applicable to many different areas of physical therapy and the general medical field. In order to take the most from research, it is crucial that appraisals are done among all research physical therapists plan to use to support our intervention tools and techniques. In this case, the appraised research helped advance the field of physical therapy by providing reliable, sound evidence for treatment of idiopathic scoliosis for adolescents.