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# Evaluating Physical Therapy for Adolescent Patients with Low Back Pain

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UNIVERSITY OF SAN DIEGO  
Hahn School of Nursing and Health Science

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

Kelly Gonzales, BSN

A portfolio presented to the

FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE  
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DOCTOR OF NURSING PRACTICE  
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## **Evaluating Physical Therapy for Adolescent Patients with Low Back Pain**

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**Running Title:** Physical Therapy for Adolescent Patients with Low Back Pain

## Abstract

**Background:** Low back pain is a condition affecting many people worldwide. The age of onset is variable, affecting all patient populations from childhood throughout the lifespan.

**Aims/Purpose:** The efficacy of physical therapy for adolescent patients with back pain seen in a pediatric orthopedic clinic was evaluated through comparison of pre and post-intervention pain scores. Patient compliance with physical therapy was monitored and evaluated against outcomes.

**Design:** A six-month retrospective chart review of adolescent patients with a diagnosis of low back pain. Patients with a diagnosis of low back pain were referred for physical therapy and provided with a home exercise program to reduce pain.

**Setting:** An orthopedic clinic specializing in low back pain affiliated with a large children's hospital.

**Participants:** A total of 50 patients with a diagnosis of low back strain were included.

**Results:** Eighteen patients were referred to a clinic-affiliated physical therapy provider, 20 were referred to an outside vendor. Twelve patients were not referred to physical therapy and opted for a home exercise program as the sole intervention for pain relief. At the conclusion of the project, no patients returned to clinic for unresolved pain.

**Conclusion:** The findings suggest the home exercise program patients had the same reduction of pain as the patients who attended physical therapy. Initial use of a home exercise program could be beneficial for many adolescents with low back pain. Those with unresolved pain could then be referred for physical therapy, thus making better use of physical therapy services and decreasing both family and health care system costs.

Keywords: Adolescent, physical therapy, back pain

## Background

The World Health Organization (WHO) identified disability associated with low back pain to be among the top ten diseases/injuries affecting daily living. WHO calculated years lost through disability (YLD) and found back pain to be rated as the second most common cause of YLD globally. This has remained unchanged from 2000 to 2011 (WHO, 2013). The Centers for Disease Control and Prevention (CDC) estimated the percentage of persons aged 18 and over with back pain above 25% (CDC, 2012).

Specific national statistics for adolescent back pain prevalence are not available through the CDC; however many studies have been performed to identify back pain in this patient population. A meta-analysis was conducted to identify the prevalence of low back pain in the pediatric population. The analysis supported an increased prevalence in this patient population, determined by examining the incidence of back pain in recent studies compared to older studies. There were higher prevalence rates in the recent studies; these rates are consistent with rates of low back pain demonstrated in adults, with a mean lifetime prevalence for low back pain of 36% (Calvo-Munoz, Gomez-Conesa & Sanchez-Meca, 2013).

Many children and adolescents seek treatment for back pain by their pediatricians. The orthopedic clinic at a southern California children's hospital cares for patients who continue to have back pain despite treatment by their pediatricians. The patients present with a variety of diagnoses, including scoliosis, spondylolysis, spondylolisthesis, herniated disc, and muscular strain. According to the Pediatric Orthopaedic Society of North America (POSNA), muscular strain is responsible for the majority of child and adolescent back pain (American Academy of Orthopedic Surgeons, 2015).

## Intervention/ Expected Outcome

A quality improvement project was completed in the orthopedic clinic affiliated with a large children's hospital. The plan of care for adolescent patients seen for low back pain consisted of a variety of pharmacologic and non-pharmacologic methods, with the majority of patients receiving referrals to physical therapy. The patients were instructed to return to the clinic at the conclusion of physical therapy if the pain persisted. The project included a retrospective review of the electronic medical record to measure pain scores on initial presentation with low back pain. The project also included a quantitative review of the mean number of physical therapy appointments prescribed by the provider as well as the mean number of appointments attended. Pain relief following physical therapy intervention was determined by comparing pain scores prior to and at the conclusion of physical therapy.

The proposed solution for the management of back pain within the adolescent patient population was to implement non-pharmacologic therapies identified by the joint sub-committee of the American College of Physicians and the American Pain Society. Clinical guidelines for management of patients with low back pain that indicate patients should be given evidence-based information for low back pain. Patients are encouraged to remain active during the course of treatment (Chou & Huffman, 2007). It is further recommended that additional non-pharmacologic therapies (e.g., exercise therapy, yoga, cognitive-behavior therapy, acupuncture, or massage therapy) be provided for patients who do not improve with initial treatment (Chou & Huffman, 2007).

The intent of this project was to determine the effectiveness of physical therapy referrals in conjunction with a home exercise program compared to a home exercise

program alone. Patients were referred for physical therapy services based on presentation of symptoms and willingness of the family to commit to a physical therapy regimen. In addition, a formal education booklet was provided to the patient and family outlining exercises specific to developing strength in the core muscle group, yoga, mindfulness-based meditation, and acupuncture, as well as healing touch therapy.

#### Ethical Issues

The Institutional Review Board (IRB) governing the orthopedic clinic reviewed the project as Category 4 exempt status. A waiver for HIPAA authorization was also requested. The waiver of HIPAA authorization as well as the IRB exempt status was granted. The University of San Diego IRB also approved the project for dissemination of de-identified findings. A 6-month retrospective chart review was completed to retrieve the data required to evaluate the efficacy of physical therapy with a home exercise program compared to a home exercise program alone.

#### Project Details

During the 6-month chart review, 50 patients, aged 12-18 years, were seen that fit the diagnostic criteria for low back strain. All patients received radiologic examination to rule out stress fracture or spondylolysis. The patients also underwent a physical examination including complete range of motion and straight leg raise testing. Any patients with a positive straight leg raise test were eliminated from the chart review. The charts were reviewed to determine the number of referrals made to physical therapy. Data were then sub-divided into referrals to physical therapy services affiliated with the clinic or to an outside vendor. Patients referred to outside vendors were eliminated from the review. This was done to examine the effectiveness of physical therapy sessions as

determined by 0-10 numeric pain scores at each physical therapy visit included in the EMRs of the affiliated clinic. The rate of patients who returned to the clinic for continued pain following the completion of a 12-week physical therapy/ home exercise program combination as well as the return-to-clinic rates for the home exercise program alone were reviewed.

### Findings

A total of 18 patients (36%) received physical therapy with an affiliated provider, while 20 patients (40%) received physical therapy from an outside vendor. Twelve patients (24%) were not referred or declined to attend physical therapy. The number of physical therapy visits for the patients with an affiliated provider varied from 1 visit to a maximum of 24 visits. The mean number of physical therapy appointments prescribed was 14.7, with mean attendance of 8.6 visits. At the completion of physical therapy, there was a 2.3 point decrease in the mean post-physical therapy pain score. All patients seen during the data collection cycle were instructed to return to the orthopedic clinic after 12 weeks if resolution of pain was not achieved with either physical therapy in conjunction with the home exercise program or the home exercise program alone. At the completion of the project, no patients had returned to the clinic for unresolved pain suggesting that both approaches were effective in reducing low back pain in this population (see Figure 1).

### Discussion and Clinical Implications

Project outcomes were consistent with the findings of a randomized clinical trial completed in Sweden. In the Swedish study, a statistically significant reduction in low back pain was found with the completion of a home exercise program as well as the home

exercise program in conjunction with physical therapy (Ahlqwist, Hagman, Kjellby-Wendt, & Beckung, 2008). Since none of the patients seen during the data collection cycle returned to the clinic for unresolved low back pain, it is likely that the patients who were treated with a home exercise program as their sole therapy experienced improvement of symptoms at the same rate as the patients who completed physical therapy.

Based on the outcomes of this project, as well as the supporting evidence from the prior study, a practice protocol should be developed and implemented within the clinical practice. This protocol would outline conservative treatment incorporating a home exercise program with a return to clinic for unresolved pain at 12 weeks. If a patient returns to clinic, a referral to physical therapy would then be indicated. A significant reduction in treatment costs could be achieved for the patients and insurance companies. In addition, it was noted during the chart review that many patients either did not attend or cancelled physical therapy appointments the day of treatment. Initial conservative treatment prior to a physical therapy referral would limit the number of patients for whom physical therapy is not warranted, reducing the number of missed appointments and fostering better utilization of scheduled time at the physical therapy offices. More appropriate referrals would also save families time off work for their adolescents' therapy appointments as well as decreasing the need for copayments.

#### Project Limitations

Limitations of the project were due, in part, to unforeseen delays in the IRB approval process. This time delay resulted in use of a retrospective design based on record reviews. The original design included follow-up either by telephone or

mail/electronic survey for the home exercise program patients allowing the provider to gather pain scores at set intervals. This would have allowed for evaluation of the progression of the home exercise program to determine how long the patient continued to engage in the exercises to achieve relief of pain symptoms. Other limitations included the inability to access pain scores and other information for the patients referred to outside vendors for physical therapy. If this information were available, effects on pain scores among the affiliated vendor, the outside vendor, and the home exercise only groups could have been evaluated more effectively.

### Research Opportunities

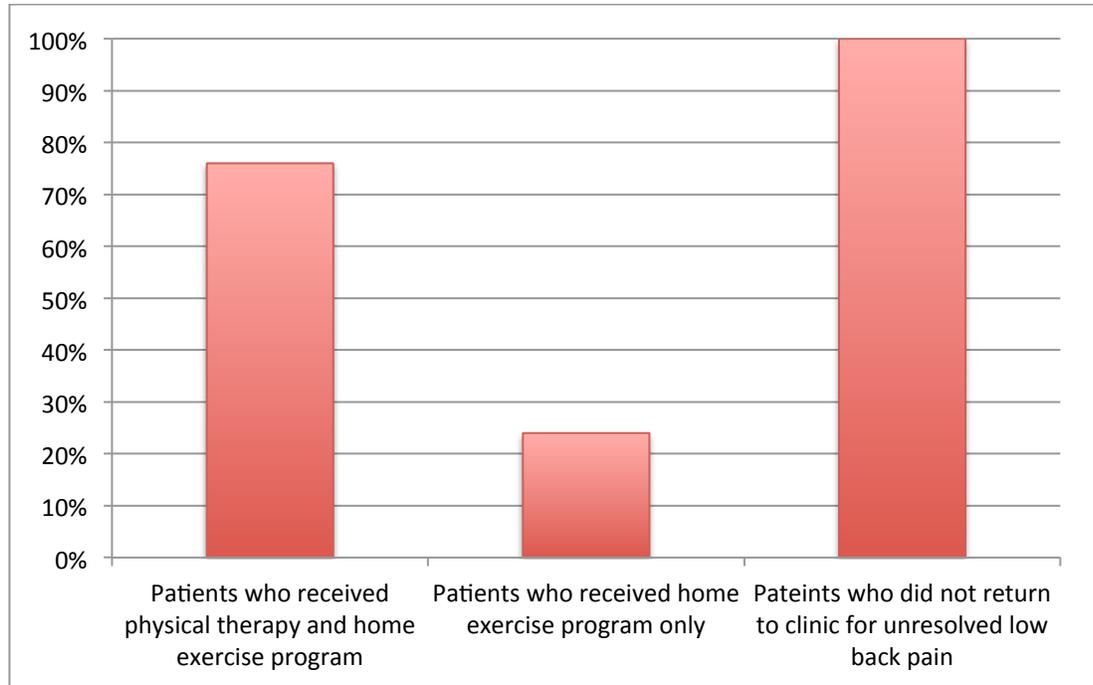
During the course of the literature review completed for this project, it was noted that the American Academy of Pediatrics, as well as the American Academy of Orthopedic Surgeons, acknowledge and support the use of complementary and alternative medicine (CAM) modalities. The campus at which the orthopedic clinic is located has several specialties that utilize CAM modalities as a part of an Integrative Medicine Department. However, there is a lack of evidence-based research for the use of CAM modalities in the pediatric patient population for outpatient/primary care treatment and referral. This is an avenue for further research to develop an evidence base that supports effective non-pharmacologic intervention for low back pain in the adolescent population.

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Figure 1

Comparison of Physical Therapy to Home Exercise Program



WIN Poster Abstract

EVALUATING PHYSICAL THERAPY FOR ADOLESCENT PATIENTS  
WITH LOW BACK PAIN

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**Purpose:**

The purpose of this project was to evaluate the efficacy of physical therapy and provide patient education on various care modalities that are available for the treatment of low back pain in the adolescent patient population.

**Background:**

Low back pain is a condition affecting many people worldwide. The age of onset is variable, affecting all patient populations from childhood throughout the lifespan. The World Health Organization (WHO) estimated the disability associated with low back pain to be among the top ten-diseases/ injuries to affect daily living. According to WHO, back pain is the second most common cause of years lost to disability (YDL) globally. This has remained unchanged from 2000 to 2011 (WHO, 2013).

Overall national statistics for adolescent back pain prevalence are not available; however many studies have been performed to identify back pain in this patient population. A meta-analysis to identify the prevalence of low back pain in the pediatric population indicated an increased prevalence in this patient population. Recent studies

reveal higher prevalence rates; these rates are consistent with rates of low back pain demonstrated in adults, with a mean 36% lifetime prevalence for low back pain (Calvo-Munoz, Gomez-Conesa & Sanchez-Meca, 2013).

**Project Approach:**

The efficacy of physical therapy for the adolescent patient with back pain currently seen in a pediatric orthopedic clinic was evaluated through comparison of pre and post-intervention pain scores. A patient education brochure to decrease the recurrence of low back pain and disability was provided and included strength training for core abdominal muscles as well as integrative care options including yoga, healing touch and meditation.

**Results/ Outcome:**

All patients seen during the data collection cycle were instructed to return to clinic in 12 weeks if resolution of pain was not achieved with either the home exercise program or home exercise program in conjunction with physical therapy. At the completion of the project, no patients had returned to the clinic for unresolved low back pain.

For the patients who had received physical therapy, there was a 2.3 mean decrease in post- therapy pain scores compared to the pain scores collected at initial evaluation of lumbar strain.

**Conclusions:**

Since none of the patients returned for continued pain, even those who did not pursue physical therapy, it is likely that the home exercises resulted in improvement. A practice protocol should be developed and implemented in the clinical setting to outline conservative treatment with a home exercise program with return to clinic instructions for unresolved pain at 12 weeks. If a patient returns to clinic, a referral for physical therapy would be indicated. This is consistent with evidence on the effects of conservative treatment prior to initiation of a PT referral and could significantly reduce treatment costs.

The effects of a detailed patient education brochure for patients diagnosed with low back strain, including a home exercise program (core strengthening and hamstring/ quadriceps stretching) as well as Complementary Alternative Medicine (CAM) therapies that are effective for decreasing disability related to low back pain need to be examined.

# Evaluating Physical Therapy for the Adolescent Patient with Low Back Pain

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## BACKGROUND

Low back pain affects all patient populations from childhood throughout the lifespan. World Health Organization (WHO) ranks low back pain amongst the top ten diseases/ injuries affecting daily living. An estimated \$90 Billion annually is spent on management of low back pain (WHO, 2013).

A meta-analysis to identify the prevalence of low back pain within the pediatric population indicated an increased prevalence. Adolescent patients have been identified to have a mean 38% lifetime prevalence of low back pain (Calvo-Munoz, Gomez-Correa, & Sanchez-Meca, 2013).

The clinical setting has several specific clinics established daily for treatment of low back pain in the adolescent patient population.

## AIM/PURPOSE

The purpose of this project was to evaluate the efficacy of physical therapy and provide patient education on various care modalities that are available for the treatment of low back pain in the adolescent patient population.

## EVIDENCE

A meta-analysis concluded physical therapy was effective in the treatment of low back pain in the adolescent patient. Use of physical therapy for adolescent low back pain resulted in significant decreases in pain scores measured before and after therapy (Calvo-Munoz, Gomez-Correa, & Sanchez-Meca, 2013).

A randomized control trial found a statistically significant reduction in low back pain with the completion of a home exercise program as well as a home exercise program in combination with physical therapy (Al-Hajawi, Hagman, Kjellby-Wendt & Securing, 2008).

## PRACTICE INNOVATION

The efficacy of physical therapy for the adolescent patient with back pain currently seen in a pediatric orthopedic clinic was evaluated through comparison of pre- and post-intervention pain scores as well as return to clinic rates for unresolved low back pain 6-12 weeks after intervention.

A patient education brochure was provided and included strength training for core abdominal muscles as well as integrative care options including yoga, healing touch and meditation to decrease the recurrence of low back pain and disability.

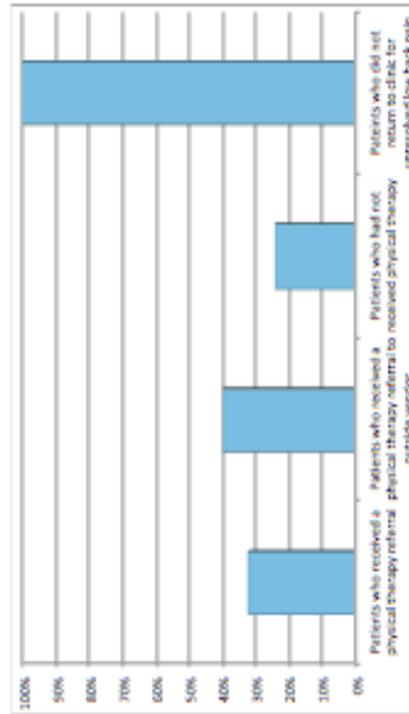
## EVALUATION METHOD

A retrospective chart review was performed to identify adolescent patients with back pain who were given a home exercise program as well as those patients who were prescribed physical therapy in addition to the home exercise program as the primary treatment for low back pain.

Pre- and post-intervention pain scores reported in a 0-10 numeric pain rating scale were compared to determine the efficacy of the physical therapy prescribed.

Return to clinic rates were compared between the home exercise group and the physical therapy/ home exercise combination group.

## GRAPHS



## REFERENCES

Available on request

## RESULTS

All patients seen during the data collection cycle were instructed to return to clinic in 6-12 weeks if resolution of pain was not achieved with either home exercise program or home exercise program in conjunction with physical therapy. At the completion of the project, no patients had returned to the clinic for unresolved low back pain.

For the patients who had received physical therapy, there was a 2.3 mean decrease in post physical therapy pain scores compared to the pain scores collected at initial evaluation of lumbar strain.

Since none of the patients returned for continued pain, even those who did not pursue physical therapy, it is likely that the home exercises resulted in improvement.

## CLINICAL IMPLICATIONS

A practice protocol should be developed and implemented within the clinical setting. This protocol would outline conservative treatment of a home exercise program with return to clinic instructions for unresolved pain at 12 weeks. If a patient returns to clinic, a referral for physical therapy would be indicated. This is consistent with evidence on the effects of conservative treatment prior to initiation of a PT referral and could significantly reduce treatment costs.

The effects of a detailed patient education brochure for patients diagnosed with low back strain, including a home exercise program (core strengthening and hamstring/ quadriceps stretching) as well as Complementary Alternative Medicine (CAM) therapies that are effective for decreasing disability related to low back pain needs to be examined.

## KNOWLEDGE GAP

The American Academy of Pediatrics and the American Academy of Orthopedic Surgeons acknowledge and support the use of Complementary Alternative Medicine (CAM) modalities. Although both agencies support CAM modalities for acute and chronic pain, there is a deficiency of evidence based research for the use of CAM modalities in the pediatric patient population for outpatient primary care treatment and referral.

## Stakeholder Presentation

### Evaluating physical therapy in adolescent patients with low back pain

Kelly Gonzales, DNP Student  
University of San Diego

### PICO Question

- In the adolescent patient with low back pain, does physical therapy in addition to a home exercise program decrease the presence of low back pain.
- **P-Adolescent patient with low back pain**
- **I- Physical therapy**
- **C- Compared to patients with only home exercise program**
- **O- Decrease the presence of low back pain**

### Aims/ Purpose

The purpose of this project was to evaluate the efficacy of physical therapy and provide patient education including home exercises for the treatment of low back pain in the adolescent patient population

### Background and Significance

- Low back pain affects all patient populations from childhood throughout the lifespan.
- World Health Organization (WHO) ranks low back pain amongst the top ten diseases/ injuries affecting daily living. (WHO, 2013)
- A meta-analysis to identify the prevalence of low back pain within the pediatric population indicated an increased prevalence. Adolescent patients have been identified to have a mean 36% lifetime prevalence for low back pain (Calvo-Munoz, Gomez-Gonessa, and Sanchez-Mesa, 2013).
- The clinical setting has several specific clinics established daily for treatment of low back pain in the adolescent patient population.

### Practice Change and Model

The IOWA model of Evidence based practice (EBP)

Identification of a clinical or knowledge based problem in need of change

Identify if this is a priority for the organization  
Conduct a literature Review

Is there a significant research base?  
Is this an ebp project?  
Is this original research?

Pilot the change in practice?  
Continue to review current literature  
Implement change in practice

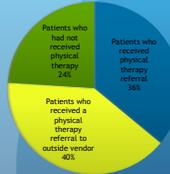
Disseminate Data

### DNP project timeline

- Patients seen in clinical setting
- Identification of problem
- Narrow broad ideas into specific focus
- Obtain IRB approval in a changing system
- Data collection
- Presentation to stakeholders including a re-formulated patient education brochure (upcoming at stakeholders presentation)

## Data Collection

### Physical Therapy Referral Data



A retrospective chart review was completed to include a 6 month (6/01/2014-12/31/2014) snap shot of the adolescent patients presenting with non-pathologic diagnosis of low back strain.

- Spondylolysis- stress fracture
- Spondylolisthesis- slip in vertebra caused by stress fracture
- Scoliosis
- Patients abnormal clinical findings other than pain were excluded from review

## Outcome Analysis

All patients were given return to clinic instructions for continued pain/ discomfort following treatment of 6-12 weeks.

Patients who received a home exercise program had the same return to clinic rate as the patients who Received physical therapy and home exercise program combined.

There were a number of patients who did not complete the prescribed physical therapy and were discharged from care by the therapist for numerous no-shows on day of appointments.

Patients who were seen by pt at an outside vendor were not recorded for decrease in pain scores; however these patients as well have the same return to clinic rate as the other patients in the chart review.

## Implications for future treatment of Adolescent patients with low back pain

- Given that patients did not return to clinic for unresolved pain, it can be surmised that the home exercise program is as effective as physical therapy in addition to a home exercise program.
- The financial implication for the patient/ family is not having to pay a co-pay for physical therapy upon initial injury when outcomes are consistent with the use of a home exercise program.
- The insurance companies of the patients see a decrease in payment for physical therapy appointments.
- The physical therapy offices may be able to more efficiently schedule patients without the burden of patient from this chart review who were no-show at day of appointment.

### Evaluating Physical Therapy for the Adolescent Patient with Low Back Pain

Kelly Gonzales, BSN, DNP student  
Mary Jo Clark, PhD, RN Susan Bonnett, PhD, APRN Mary Lou Scott, MSN, NNP

**BACKGROUND**  
Low back pain has become an epidemic throughout the lifespan. Adolescent patients with low back pain are often referred to physical therapy for management of low back pain (Garcia-Conesca, 2013). A meta-analysis to identify the prevalence of low back pain in the pediatric population indicated an increased prevalence. Adolescent patients have identified to have a high prevalence of low back pain (Garcia-Munoz, Gomez-Conesa, & Sanchez-Meca, 2013). The clinical setting has several specific clinics established daily for treatment of low back pain in the adolescent patient population.

**AIM/PURPOSE**  
The purpose of the project was to evaluate the efficacy of physical therapy and provide patient education on various care modalities that are available for the treatment of low back pain in the adolescent patient population.

**APPROACH**  
A retrospective chart review of physical therapy was conducted in the treatment of low back pain in the adolescent patient population. Data was collected on pain scores measured before and after therapy (Clark, Bonnett, Gomez-Conesa, & Sanchez-Meca, 2013).

**CONCLUSION**  
A retrospective chart review of physical therapy was conducted in the treatment of low back pain in the adolescent patient population. Data was collected on pain scores measured before and after therapy (Clark, Bonnett, Gomez-Conesa, & Sanchez-Meca, 2013).

**PRACTICE INNOVATION**  
The efficacy of physical therapy for the adolescent patient with low back pain was evaluated through a retrospective chart review of low back pain patients as well as return to clinic rates for untreated low back pain in 12 weeks after intervention.

A patient education brochure was provided and included strength training for core abdominal muscles as well as therapeutic care options including yoga, heating/cooling and medication to increase the effectiveness of the low back pain and disability.

**EVALUATION METHOD**  
A retrospective chart review was conducted to identify adolescent patients with low back pain who were given a home exercise program as well as those patients who were identified physical therapy in addition to the home exercise program as the primary treatment for low back pain. Pre- and post-intervention pain scores reported in a VAS to measure pain rating scales were compared to determine the efficacy of the physical therapy intervention.

Return to clinic rates were compared between the home exercise group and the physical therapy home exercise combination group.

**RESULTS**  
All patients were given the data collection tools and instructions for use. 100% of patients who received a home exercise program or home exercise program in conjunction with physical therapy returned to the clinic for continued low back pain. For patients who had received physical therapy, there was a 2.3 mean decrease in post physical therapy pain scores compared to the pain scores collected at initial evaluation of low back pain. Since none of the patients returned for continued pain, there were no no-shows at physical therapy. It is likely that the home exercises were not implemented.

**CLINICAL IMPLICATIONS**  
A clinical protocol should be implemented and implemented within the clinical setting. The protocol should include comprehensive treatment of a home exercise program with 10-15 minute instructions for untreated pain at 12 weeks. If a patient returns to clinic, evidence for physical therapy would be indicated. This is consistent with evidence for physical therapy and could prior to initiation of physical therapy and could significantly reduce treatment costs.

**KNOWLEDGE GAP**  
The American Academy of Pediatrics and the American Academy of Orthopedic Surgeons acknowledge and support the use of complementary, integrative medicine, yoga, meditation, although both agencies support CAM practices for acute and chronic pain, there is a lack of evidence based research for the use of CAM modalities in the adolescent patient population (Clark, Bonnett, Gomez-Conesa, & Sanchez-Meca, 2013).

**REFERENCES**  
Available on request

**GRAPHS**

Group	Return to Clinic Rate (%)
Patients who received physical therapy	100%
Patients who received physical therapy referral to outside vendor	100%
Patients who had physical therapy referral to outside vendor	100%
Patients who did not return to clinic for unresolved low back pain	0%

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Calvo-Munoz, I., Gomez-Conesa, A., & Sanchez-Meca, J. (2013) Prevalence of low back pain in children and adolescents: A meta-analysis. *Biomed Central Pediatrics*, 13, 14-25. doi 10.1186/1471-2431-13-14.

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