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Taylor R. Walker

The University of Vermont

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Promoting spine health for adolescent athletes

Taylor Walker
Medical Student, Class of 2025
The Robert Larner M.D. College of Medicine at the University of Vermont
Problem Identification

During my time at Evergreen Family Health and Sports Medicine, I met a number of patients experiencing chronic low back pain (LBP) attributed to overuse or injury while participating in high school sports.

The prevalence of back pain in adolescent athletes ranges from 37-58%, and lifetime prevalence is reported to be as high as 84% [1-4]. Risk increases with increasing age and level of competition. Participation in combat sports and sports that require repetitive hyperextension, such as gymnastics, are frequently associated with increased risk for back pain. Downhill skiing and snowboarding, as well, are associated with higher prevalence of back pain. Most back pain is due to injury, and lumbar pain is most common [5].

A differential diagnosis of back pain in adolescent athletes may include:

- Soft tissue sprains, strains, and muscle contusions
- Spondylolysis, spondylolisthesis
- Disk herniation
- Hyperlordosis secondary to adolescent growth spurt, Scheuermann's kyphosis, or scoliosis
- Infectious, inflammatory, or neoplastic causes [6]

Not all injuries or etiologies of LBP can be avoided, but the aim of this project is to promote spine health in adolescents by educating young athletes about preventative practices, management of non-specific low back pain, and the importance of clinical assessment. Education is a life-long resource that can help young athletes stay healthy and live well as they age.
Public Health Cost

An estimated 10-15% of affected adolescents will develop chronic back pain later in life, and back pain causes significant morbidity [1]. It is the #1 cause of years lived with disability and the 3rd leading burden of disease in terms of disability adjusted life years in the United States [7]. Direct medical expenditures and loss of GDP productivity related to back pain is estimated to total $635 billion annually in the US [8].

Back pain can affect many aspects of one’s life; adults with chronic low back pain have higher rates of unemployment, depression, obesity, receiving disability, and having a mean household income <$20,000 compared to those without pain [9].

Fortunately, exercise and education have demonstrated preventative efficacy [10]. Additionally, most adolescents with low back pain can be managed with conservative treatment or physical therapy. Core strengthening, mindfulness-based stress reduction, and yoga are attainable, low-cost practices for young athletes that are proven to reduce pain [6, 11, 12, 13].
Community Perspectives

I feel like my pain started because I had bad form with my landings on the floor [in gymnastics]. I wish I had done more at the time to get to the bottom of it. When you're young, you can fix those things like technique and posture and train differently. Now it's something I deal with every day.

Patient perspective

I went to a sports medicine conference recently and was talking to other athletic trainers in the area about developing handouts for common sports injuries like ankle sprains and concussions. It's difficult to provide information to athletes when you don't have a single resource, and there's a lot to communicate. You want to give people the right tools. There is definitely a need.

Athletic Trainer perspective

There are a lot of things people can be doing at the gym for prevention, but there isn't a lot of instruction or monitoring happening at the gym in high-school. You want to point people in the right direction. The National Strength and Conditioning Association (NSCA) has videos on their website for lifting techniques, and the Watkins-Randall core strengthening program, for example, are things I recommend.

Physician perspective

Most low back pain improves with self-care. [An individual] may benefit from medicine, exercises, or manual therapy. Other treatments for back pain include massage, acupuncture, and yoga. The best plan is often a mix of treatments.

University of Vermont Webpage on “Low Back Pain”
Results/Response

The response to this project was positive. The physicians and athletic trainers at Evergreen felt this project would benefit to their patients. They agreed that educating young athletes about sports medicine concerns is important and effective for preventing chronic disease and promoting wellness. They also agreed that providing information about when to seek medical evaluation can reduce risk of detrimental outcomes and may reduce unnecessary health care expenditures.

Local high school athletic trainers also supported this project from concept to production and felt it would benefit their student-athletes. They felt the brochure would appeal to students because it offered clear, specific advice and provided a wide range of suggestions for management and prevention and stimulating resources.
Intervention and Methodology

Interview local athletic trainers and sports medicine physicians to gain insight on the problem of lower back pain in Vermont adolescent athletes and their recommendations for management and prevention.

Research safety and efficacy of provider recommendations for adolescents in peer-reviewed literature.

Research local resources.

Write and develop informational brochure about adolescent low back pain including recommendations for back pain prevention, management, local resources, and “red flag” signs indicating urgent medical evaluation.

Supply the brochure to activities director/athletic trainer at local high school to distribute to student athletes.
Intervention and Methodology

PREVENTION
37-55% of high school athletes will experience back pain.

Certain sports put athletes at higher risk. Athletes participating in team sports, combat sports, high-impact sports (including skiing or snowboarding), and gymnastics are more likely to experience back pain. Older high school athletes are also more likely to have back pain than younger athletes.

As a young athlete, it is important to develop healthy habits for spine health to prevent injuries and make it easier to recover from injuries by using skills you have already practiced.

Luckily, you are already practicing good prevention by reading this brochure!

Research shows that regular exercise and education are the 2 most impactful things a person can do to prevent back pain.

Other recommendations:
- The Watkins-Randall Core Stabilization Program
  - 8 full-body exercises that can be performed from level 1 (easiest) to level 5 (hardest, weighted with dynamic movement)
  - SEE QR CODE 1

Watch Your Technique:
- The National Strength and Conditioning Association has a video library showing proper technique for common gym exercises
  - SEE QR CODE 2
- At the gym, start light and increase weights slowly. Generally, avoid maximum weight squats or deadlifts.

Stretches Required:
- Tight hip flexors and hamstrings are a risk factor for back pain
  - SEE QR CODE 3

MANAGEMENT
Ouch! What to do now...

FIRST
Pay attention to "red flag" symptoms that indicate urgent medical evaluation

- You can't urinate or you can't control your urination.
- You have "saddle anesthesia" or numbness around your genitals/rectum.
- Muscle weakness or numbness in both legs.
- Difficulty walking.
- Pain wakes you up from sleep.
- Pain radiates below the knee.
- Pain does not improve despite rest and use of NSAIDs.

If these apply to you, call your doctor, or visit the emergency room.

Most cases of back pain in young athletes can be managed with self-care and physical therapy.

Guided physical therapy involves working with a trained professional who can help you identify the mechanism of your pain and develop a plan specific to your goals and current limitations.

Local physical therapy practices include:
- VASTA Performance Training and Physical Therapy
- Epix Physical Therapy
- Long Trail Physical Therapy

and more—

Dr. Matthew Loomer, Team Physician for the University of Vermont Catamounts, recommends relative rest for non-specific back pain.

"Not doing any movement for a week will likely make things worse. For most back injuries, you want to keep some movement to give things an opportunity to heal and settle."

- Avoid strenuous exercise.
- Perform slower, bodyweight movements and gradually increase intensity over 1-4 weeks.
- Use oral or topical NSAIDs for pain relief.
- Heat or ice packs can also reduce pain. Use for 10-15 minutes 3x per day.

Consider a formal assessment with your doctor if things don't improve by 4-6 weeks.

More for Spine Health:
- Weekly yoga has shown similar effectiveness to physical therapy for reducing back pain and maintaining physical and mental wellness while injured.
- Other mindfulness practices (meditation, body scan, progressive muscle relaxation) have also been shown to reduce chronic pain.
- Education is a life-long tool. Knowing your body and understanding anatomy can make your exercise and treatment plans more effective.
Evaluation of effectiveness

- Follow up survey for high school athletic trainers assessing 1) the feasibility and ease of providing this information to students compared to current advising practices 2) perceived patient health literacy about LBP 3) number of follow up visits for visiting hours for individuals with LBP 4) adverse outcomes

- Follow up survey for patients or individuals with LBP assessing 1) feasibility and ease of implementing suggestions 2) skills learned or resources utilized 3) duration and severity of symptoms 4) health care utilization and expenditure

- Likert scale or group discussion

Limitations

- Brochure must be distributed to athletes via athletic trainer
- Brochure must be read by students and students must engage with recommendations
- Adolescent athletes may not visit with athletic trainer unless they are symptomatic thereby limiting prevention
- Unable to assess feasibility of intervention and make improvements given short time-span of project
- Unable to answer questions about brochure content, potentially limiting the impact of educational materials
- Unable to work with individual athletes to address concerns and formulate individual care plans
Recommendations for future interventions

- Repeat this process (interview, research, develop educational material, distribute) for other common injuries or sports medicine concerns in adolescents
  - Concussion, ankle sprain, or patellofemoral pain

- Translate this brochure to Spanish or other languages and modify appropriately to distribute to migrant farm workers, another Vermont population at increased risk for back pain and injury

- Organize in-person education sessions with local high school sports teams to increase impact and provide opportunity for questions
References