Back pain is surprisingly common among adolescents and young athletes, but cases require further investigation to identify causes and treatment recommendations.

A thorough history and a comprehensive physical exam are key steps in evaluating pediatric back pain, with recommendations about which cases should be referred to an orthopedic specialist and which cases can be managed in the primary care setting.

Start With the Basics — A Thorough History
The answers to the following questions will provide nearly all of the information needed to differentiate a benign issue requiring conservative management from a more serious condition. The answers will also help you determine whether to simply treat the symptoms or whether a complete radiographic study is necessary.

1. Characterize the back pain.
   - Is the patient’s description of the pain helpful? “I have pain everywhere” is less helpful than “I can put my finger on it because it hurts everywhere.”
   - How long has the pain been present? Is it acute (less than 4 weeks), subacute (4-12 weeks), or chronic (over 12 weeks)?

2. Determine the location of the pain.
   - Establish whether the pain is lumbar, thoracic, or cervical. If the pain is thoracic or cervical, ask if the patient has missed school or sports because of the pain, whether the pain is worse with certain positions, movements, or activities, or if it is associated with other symptoms such as nausea, vomiting, or fever.

3. Consider the patient’s age and check neurological signs.
   - Is the patient 10 or younger? The younger the patient, the more worrisome the back pain becomes, because a pediatric abnormality is more likely to be the cause. Ask about transient paraparesis, paralysis, numbness or paresthesias, and determine if bowel or bladder function is affected. Neurological impairment signals a more complex condition.

4. Listen for these reassuring signs.
   - Ask if the patient has missed school or sports because of the pain, whether the pain has improved over time, and if the pain responds to nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen. Additionally, discuss whether the pain is intermittent or activity-related, generalized or focal.

Back pain is uncommon among children who are under 10 years old, but the incidence of back pain increases for adolescents. A study of 754 European teenagers states, “A total of 1180 (20.5%) teenagers reported one or more episodes of low back pain (LBP), of whom 900 (76.3%) had consulted a health provider.” Not surprisingly, adolescents have a higher incidence of back pain than nonadolescents.

For primary care providers, the key questions are—when is back pain the result of overuse or muscle strain? When is the pain symptomatic of more serious pathology, such as a herniated disc, spondylolisthesis, scoliosis, Scheuermann’s disease, osteomyelitis, dactylitis, leukaemia, tumors, or ankylosing spondylitis? What follows is a practical guide to evaluating pediatric back pain, with recommendations about which cases should be referred to an orthopedic specialist and which cases can be managed in the primary care setting.
If the pain is increasing beyond what is reimbursed to NSRL, is general-ized or is activity-related, it is likely to be the result of muscle strain or injury, or if the patient participates in normal activities, (i.e., pain does not prevent him or her from participating), the back pain has likely just been what is typically expected; the exception would be a highly competitive athlete or dancer who may be suffering from chronic pain despite significant pain.

An absence of all of the “red flags” listed above is reassuring.

To be aware of these red flags:
Associated findings like those mentioned below are definitely cues for concern. Pursue additional testing at this time:

- Associated with constitutional symptoms like fever, malaise, night sweats, unexplained weight loss, easy bleeding or bruising.
- Worsened at night or if it wakes the patient from sleep.
- Associated with neurologic symptoms
- Acute, unexplained or non-fatiguing pain that is not responsive to rest.
- Fever, malaise.
- Constant (not activity-related)

Complete a Comprehensive Exam for Back Pain
Evaluate patients while they are standing, walking bending at the waist and on the exam table. Include these exams:

Standing and walking – Are the shoulders level? Does the kyphosis or lordosis of the spine, hips or knees look normal? Is the lumbar lordosis normal? Is the pelvis level? Does the patient limp? Is the patient’s back straight? Does the patient stand with a list or with bent knees?

Appearance – Look for rash, bruising or ecchymoses, which are suggestive of leukemia. Check for cutaneous manifestations of dysraphism by hair patches, dimples and deep muscle atrophy.

Guide to Imaging Studies for Pediatric Back Pain Evaluation – What to Request and When

Radiographs
- For trauma or a history that suggests the pain is not muscular, start with AP and lateral radiographs, unless otherwise indicated.
- For lumbar involvement, avoid pelvic shadowing.
- For lateral radiographs for suspected spondylolysis.
- Flexion/extension view to evaluate for spondylolisthesis.

MRI
- Reserve MRI for cases in which the back pain has lasted more than six weeks and is not responding to NSAIDs or therapy.
- Consider adding a T2 coronal if the patient’s history and physical examination suggest back pain or radicular pain.
- MRI is an unreliable study for identification of old, inactive fractures.
- MRI IS important if there are obvious red flags during history-taking that suggest possible underlying infection or neoplasm.
- Request an additional magnetic resonance imaging study in conditions apart from acute stress reactions or fractures, spondylolysis, epiphyseal, spinous process, spinal vascular, or bone tumors.

Lateral Radiographic
- Lateral radiographs show abnormal lumbar lordosis, thoracic kyphosis, scoliosis, neural foramina, disc space narrowing.
- Identify sources of pain, especially with forward bending.
- Evaluate for lordosis or scoliosis.
- Assess for dense bony tissue.
- Scoliosis Radiographs
- Examine bony anatomy for suspected vertebral, burst or compression fractures.

Special tests – Include these additional exams, if you suspect:
• Spondylolisthesis – check extension in single stance and palpate spinous processes for symptoms of left or right shift. If the patient has left or right lateral flexing and the spine, presume a unilateral pars stress fracture/spondylolysis on the right, if the spine is bilaterally, presume that the pars stress fracture/spondylolysis is bilateral.

- Herniated nucleus pulposus or apophyseal ring avulsion straight leg raise
- Consider the test positive if any pressure of passive elevation Reproductive pain is reproduced.
- Use the straight leg raise specifically tests nerve roots that contribute to the affected extremity. If the patient has a back involvement (L1, L2, L3), perform a femoral stretch test, because these are the nerves that innervate to the femoral nerve.

Cervical radiography – Screening test
- Turning the patient’s head in the direction of the suspected cervical radiculopathy while tipping and extending the neck in the same direction will cause torticollis compression. That compression by turning the head in the contralateral direction will reproduce the radiculopathy and pain radiating down the affected upper extremity.

Follow in Clinic or Refer?
- The history and physical exam will help determine the severity and acuity of the patient’s back pain.
- If there are red flag issues, send the patient to be evaluated by a physical therapist who provides care for children and follow up with the patient’s primary care physician. If there is uncertainty or red flags for an MRI, request appropriate radiographs and lab tests. See Page 2 for a guide to imaging studies. If screening radiography points to possible pathology, refer the patient to an orthopedic specialist that will perform an exam to determine the need for surgical attention.

In summary, we recommend a history and physical with red flag markers should prompt imaging studies and a referral to a specialist.

Imaging Studies

Differentiation between Fractures

Vertebral Fracture
- Acute pain when standing.
- MRI – Look for increased signal intensity on STIR.

- CBC with differential, peripheral smear, erythrocyte sedimentation rate.

- Disc Herniation
- Pain worse with spine flexion.
- Extension?

- Cervical radiculopathy – Spurling’s test
- Is the pain worse with spine flexion?
- Extension?

- Neurologic exam
- Examine bony anatomy for suspected vertebral, burst or compression fractures.

- Herniated nucleus pulposus or apophyseal ring avulsion straight leg raise
- Consider the test positive if any pressure of passive elevation Reproductive pain is reproduced.
- Use the straight leg raise specifically tests nerve roots that contribute to the affected extremity. If the patient has a back involvement (L1, L2, L3), perform a femoral stretch test, because these are the nerves that innervate to the femoral nerve.
Special tests – Include these additional exams, if you suspect:
- Spondylolysis – check extension in single leg stance and palpate posterior spinous processes.

If the patient has pain while standing on the right leg and extending the back, the test is positive.

- The left leg is extended and the spine is observed; a unaltered pain pattern stressing single leg stance on the right side. If the spinal column is bilaterally palpated, then the pain pattern stressing single leg stance is spondylolysis.

- Herniated nucleus pulposus or apophyseal ring avulsion – straight leg raise

  Consider the test positive if any degree of passive elevation increases pain. Any change upward affects the straight leg raise.

- Special tests specifically tests nerve roots, which contribute to the syndrome, as clinical symptoms are consistent with local signs.

Follow in Clinic or Refer?

- The history and physical exam will help determine the severity and acuity of the patient's back pain. If there are no red flags, the patient may be managed by a primary care provider who provides care for children and follow up with the patient's primary care physician. If the patient has red flags, request appropriate radiographs and lab tests. Page 2 for a guide to imaging studies. If screening radiographies point toward a serious condition, refer the patient to an orthopedic specialist who may order an appropriate MRI.
Refer Red Flag Issues Immediately
Refer patients suspected of having leukaemia to a pediatric oncologist. If patients have any of these conditions, refer them immediately to a specialist.

- Vertical fractures
- Apophyseal ring fractures
- Acute paraspinal abscesses
- Osteoid osteoma
- Osteolysis
- Ankylosing spondylitis
- Cervical spondylolisthesis

Special tests – Include these additional exams, if you suspect:
- Spondylolisthesis – check extension in single left and right position
- MRI with IV contrast – determine extent of bony and soft tissue involvement. If there is any fracture, request appropriate radiographs and lab tests.

Follow in Clinic or Refer?
The history and physical exam will help determine the severity and acuity of the patient's back pain. If there are no red flags, refer the patient to be treated by a primary care physician who provides care for children and follow up with the patient's primary care physician. If there are red flags, request appropriate radiographs and lab tests. If Page 2 for a guide to imaging studies. If screening radiographs point to a problem of concern, refer the patient to an orthopedic surgeon who will order an MRI to an orthopedic specialist who will order an MRI before referring to another specialist.

1 Prevalence of nonspecific low back pain in schoolchildren aged between 13 and 15 years. Pain was defined as: pain lasting for at least one week, pain occurring more than once a week, pain not radiating or waking the patient at night. Most patients do not complain of back pain with lower extremity radiation.

2 Girls. Pain worse in morning.

3 Rigid kyphosis on extension or 70 degrees. He also had findings consistent with Scheuermann’s kyphosis (cervical, thoracic, thoracolumbar, or lumbar prominences). He did, however, have some kyphotic deformities in the thoracic, thoracolumbar, or lumbar prominences. He did, however, have some kyphotic deformities in the thoracic, thoracolumbar, or lumbar prominences.

4 The patient’s primary care physician was advised of the physical examination and was asked to look for scoliosis.

5 He had a history of anxiety and insomnia and takes melatonin and anxiolytics. He also has some postural or urological activities because of back pain.

6 During the examination, he was alert, oriented in all and noted no back pain. He had normal lordosis and had no tenderness to palpation of spinal or paraspinal muscles. His skin examination of his back demonstrated no cutaneous abnormalities. There was no muscle spasm, tenderness, or systemic signs. His skin examination of his back demonstrated no cutaneous abnormalities. There was no muscle spasm, tenderness, or systemic signs.

7 He also had findings consistent with Scheuermann’s kyphosis (cervical, thoracic, thoracolumbar, or lumbar prominences). He did, however, have some kyphotic deformities in the thoracic, thoracolumbar, or lumbar prominences.

8 The examination of his back highlighted some vertebral anomalies (idiopathic scoliosis). He had no pain or muscle spasm within normal limits. He was noted to have a postural angle of approximately 70 degrees and on the left of approximately 50 degrees. He had some kyphosis on extension and flexion. His right buttock was tender to palpation. He had some kyphosis on extension and flexion.

9 There was some evidence of correction of his kyphosis, some of the kyphosis seemed structural. He had no pain with lumbar extension.

10 The examination of his back highlighted some vertebral anomalies (idiopathic scoliosis). He had no pain or muscle spasm within normal limits. He was noted to have a postural angle of approximately 70 degrees and on the left of approximately 50 degrees. He had some kyphosis on extension and flexion. His right buttock was tender to palpation. He had some kyphosis on extension and flexion.

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Tenner Guillaume, M.D., is an orthopedic surgeon who specializes in spine surgery. His professional interests include management of pediatric congenital and idiopathic scoliosis as well as isthmic spondylolisthesis. He received his medical degree from the University of Minnesota Medical School. He completed an internship and residency at the University of California – San Francisco through the Twin Cities Spine Center in Minneapolis. Guillaume has presented research, posters and abstracts and has professional publications. He is a member of the American Academy of Orthopaedic Surgeons and the North American Spine Society. He is a candidate for membership in the Scoliosis Research Society and the American Spine Society. He is a candidate for membership in the American Academy of Orthopaedic Surgeons and the North American Spine Society. He is a candidate for membership in the Scoliosis Research Society and the American Spine Society. He is a candidate for membership in the American Academy of Orthopaedic Surgeons and the North American Spine Society. He is a candidate for membership in the Scoliosis Research Society and the American Spine Society.

To make a referral, call 651-325-2200 or 855-325-2200 (toll-free).

Key Insights

Back pain is surprisingly common among adolescents and young athletes, but cases require further investigation to identify causes and treatment recommendations.

Start With the Basics – A Thorough History

Electronic theatre, conducting a back pain examination. The more focal the pain, the easier it will be to potentially identify an underlying cause. Nonfocal, diffuse pain (“My whole back hurts” or “I can’t move”) is more likely.

Characterize the back pain.

When to Sit Up and Take Note

For primary care providers, the key questions are—when is back pain the result of trauma? Unremitting or more subtle? Has it grown progressively worse? Is the pain recurrent, related to activity or worse at night? Is the pain associated with constitutional symptoms, such as unintentional weight loss, fevers, chills or malaise?

Determine the location of the pain.

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For pediatric neurosurgeons, pediatric rehabilitation medicine specialists and allied practitioners.

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For primary care providers, the key questions are—when is back pain the result of trauma? Is the pain acute? The result of trauma? Unremitting or more subtle? Has it grown worse? Is the pain excessively worse? Is the pain recurrent, related to activity or worse at night? Is the patient 10 or younger? The younger the patient, the more worrisome the back pain is.

The answers to the following questions will provide nearly all of the information needed to differentiate a benign issue requiring conservative management from a more serious condition. The answers will also help you determine whether to simply treat the symptoms or whether a complete radiographic study is necessary.

1. Characterize the back pain.
2. Determine the location of the pain.
3. Consider the patient’s age and check neurological signs.
4. Listen for these reassuring signs.

For more information, please refer to this issue’s article on evaluating pediatric back pain, with recommendations about which cases should be referred to an orthopedic specialist and which cases can be managed in the primary care setting.

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References


Our redesigned newsletter includes these new features:

- “Key Insights” a summary on P. 3
- Links and a QR code for quick access to relevant resources on the Gillette website.

Although the newsletter has a new design, the editorial focus remains on providing a focused and comprehensive look at pediatric health issues.

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