

BACK PAIN – FYSH

continued from page 12

lolyolysis were symptomatic of LBP. Disc protrusions were more common in LBP groups than in non-LBP groups. Females with LBP had more disc protrusions than males with LBP (Kjaer 2005).

- **Familial tendency** — A familial tendency for LBP was noted in one study in which it was determined that children had an increased incidence of reported LBP if one or both parents had a history of LBP.
- **Asynchronous vertebral bone growth** — Asynchronous vertebral bone growth, such as is seen with facet tropism or with bilateral, sagittally aligned facets, has been identified as a potential cause of low back pain.
- **Adolescence** — Pediatric low back pain is more common during the rapid growth phase in adolescence, and is more commonly reported in children who participate frequently in sports.

Causes of Back Pain in the Pediatric Age-Group

The following conditions have been identified as causing back pain in the pediatric population.

- **Infections**
Diskitis
Osteomyelitis
- **Tumors**
Spinal column
Spinal cord
- **Trauma**
Falls
Motor vehicle injuries
Spondylolysis
Spondylolisthesis
Disc herniation
Lumbar ligament sprain
Facet tropism (Asynchronous vertebral facet joint development)
- **Inherited disorders**
Scheuermann's disease

Evaluation of the Child Complaining of Back Pain

The evaluation of the child presenting with back pain should always commence with a detailed history and physical exam. Important warning signs or red flags found during the history and physical exam should alert the chiropractor that a more serious cause of back pain may be involved. When taking the child's history, questions should be asked about the mechanism of injury, any exacerbating factors, and the frequency, duration and severity of the pain. During the physical examination, gait, postural alignment, trunk and hamstring flexibility, muscle strength and reflexes should all be checked in an attempt to localize and evaluate the level of pain.

Warning signs of serious problems include constant pain in a child younger than 11 years of age that lasts for several weeks or occurs spontaneously at night, repeatedly interferes with school, play or sports, or is associated with marked stiffness and limitation of motion, fever or neurologic abnormalities.

Pain at the lumbosacral junction may suggest spondylolysis or spondylolisthesis. Scheuermann's disease is diagnosed by the observance of wedging, irregularity or growth disturbance at three successive vertebral levels. Musculoligamentous pain, with or with-

out associated subluxation, may result from injury to or overuse of muscles or joints of the back, while rare causes of back pain can include discitis, tuberculosis, bone or spinal cord tumors.

Radiographic evaluation of the lumbar spine is considered to be essential in the pediatric patient presenting with back pain, first, to rule out pathology and second, since the diagnosis and choice of an appropriate adjusting protocol frequently depends on the radiographic findings. For example, the spinal adjustments used for a spondylolisthesis are quite different from those used for a capsular ligament sprain associated with facet tropism.

When evaluating the child with back pain, the following warning signs will help to rule out pathology thus increasing the possibility that the back pain is due to musculoligamentous injury.

Warning Signs for Pediatric Back pain

- **If the child is less than four years old.** Bone pain associated with pathology due to infection or neoplasm is a common cause of back pain in this age group.
- **Back pain that causes a functional disability.** Children like to play, and if the pain causes them to ask to miss sports, gym, or recess, the pain is serious.
- **Pain duration of greater than four weeks.** Traumatic musculoligamentous injuries should resolve in that time.
- **Presence of fever.** Fever suggests infection. If fever and back pain are present together then osteomyelitis should be ruled-out. First by x-ray, follow-up with radionuclide bone scan.
- **Presence of antalgic posture.** A postural shift of the trunk caused by the pain with the child chronically splinting to decrease the pain is frequently associated with disc herniation but can also be associated with pain caused by a bone tumor, e.g. osteoid osteoma.
- **Presence of a neurologic abnormality.** Muscle weakness, e.g. plantar flexors. A-reflexia, e.g. achilles. Dermatomal pain, e.g. lateral calf (L5).
- **Limitation of motion due to the pain.** Rule-out acute ligament sprain, fracture of the pars interarticularis, infection of joint or bone or spinal tumor. Also rule out hip pathology.

Algorithm for Differentiating Causes of Back Pain in Children

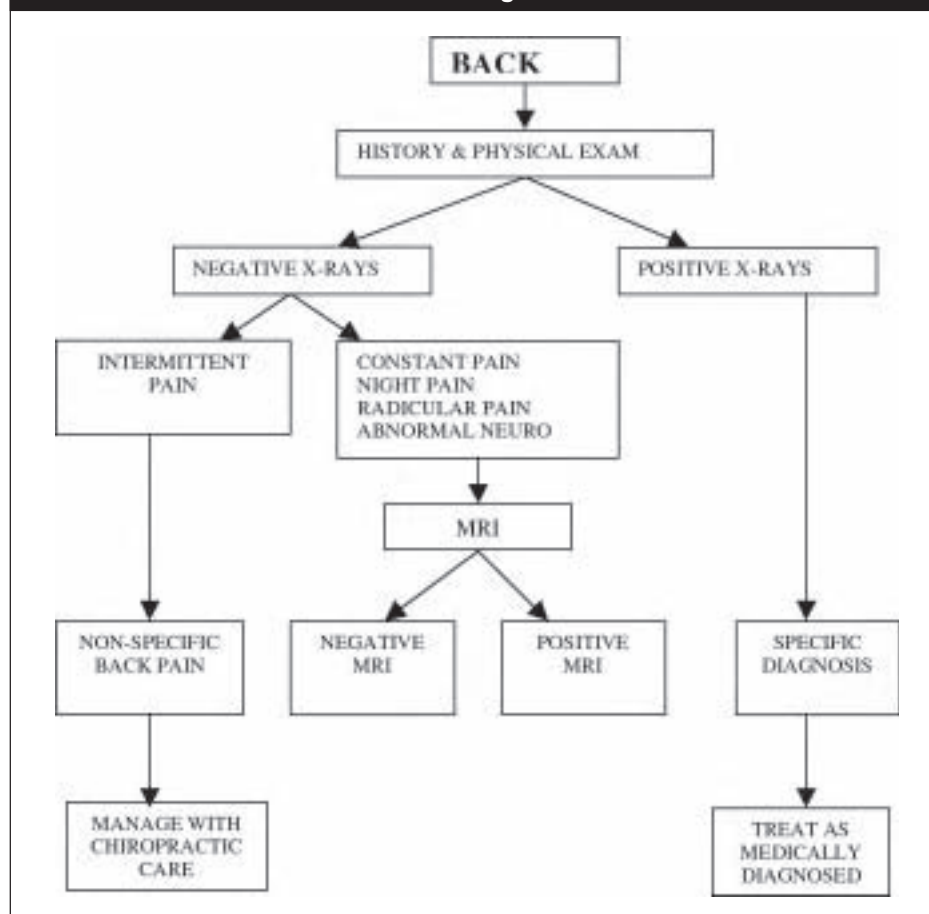
Pediatric patients require a systematic approach to treating back pain that minimizes the number of diagnostic studies without missing specific diagnoses. Feldman, et al, 1999, produced an algorithm for identifying pathological causes of pediatric back pain.

Using this algorithm, the positive predictive value for pathology was high, e.g. for radicular pain (100%), abnormal neurological examination (100%), and night pain (95%). Radicular pain and an abnormal neurological examination also had high positive predictive value (100%).

Management and Spinal Adjusting Protocols for Pediatric Back Pain

The most common causes of low back pain in children identified by Duggleby (1997) include spondylolysis, spondylolisthesis, Scheuermann's disease, facet tro-

Pediatric Back Pain Algorithm (Feldman 1999)



pism and musculo-ligamentous injury associated with vertebral subluxation. For the more serious pathological causes of back pain that occur less frequently prompt referral to an appropriate medical facility is required.

Management of back pain depends on an accurate identification of the underlying cause. In most cases this will require spinal imaging, commencing with plain film radiography. Radiographic evaluation of the lumbar spine is considered to be essential in the pediatric patient presenting with back pain, since the identification of etiology and choice of an appropriate adjusting protocol is dependent on the radiographic findings.

Asynchronous Spinal Development (Facet Tropism)

Facet tropism is a condition in which the lumbar facet joints are asymmetrically aligned, demonstrating variation in the angulation of the joint surfaces between the left and right sides of the same vertebral segment. Anatomically, the lumbar facet joints are significantly involved in weight bearing, a significance which increases as the intervertebral discs become thinner. In the upper lumbar spine, at the L1-2 to L3-4 levels, the facet joints have a more sagittal orientation, while in the lower lumbar spine, at the L4-5 and L5-S1 levels, the orientation is more toward the coronal plane.

With facet tropism, the loss of bony stabilization of the facet joints creates the potential for stretching and resulting inflammation of the capsular ligaments of the sagittally aligned joint.

The condition appears to be exacerbated by any sport or activity which involves repetitive, forceful hyperextension of the lumbar spine, e.g. volleyball or basketball. The effect of hyperextension on a sagittally aligned joint can be to cause unilateral, anterior translation of the involved facet of the superior vertebra. This movement can cause capsular ligament sprain, with resulting inflammation of the capsular ligaments, which is responsible for the onset of low back pain symptoms. The finding of acute back pain following forceful

lumbar hyperextension such as occurs with basketball, volleyball and tennis is highly consistent with this diagnosis.

• **Evaluation** — Clinically, the symptom picture is one of a specific site of palpable tenderness in the lumbar spine, which correlates with the location of the sagittally aligned joint. With facet tropism, confirmation of the diagnosis is provided by the radiographic finding of a sagittally orientated intervertebral facet which correlates precisely with the side and level of pain. The most accurate diagnosis for this condition is lumbar ligament sprain, but facet syndrome can also be used.

• **Management** — Chiropractic care for the child with an acutely painful back, due to facet tropism, requires carefully applied spinal adjustments, strengthening exercises and short-term limitation of activities. Specific adjustments should be applied to any joint fixations in the lumbosacral region, being careful to avoid the sagittally aligned facet joint, since this joint is already hypermobile. Side-posture adjustments to the lumbar spine, with the involved side up, should be avoided as these may exacerbate the patient's symptoms. Strengthening exercises for the abdominal muscles are essential to provide added stability to the region, particularly to the anterior lumbar spine. Exercises which involve hyperextension or rotation of the lumbar spine should be avoided as they may tend to aggravate the patient's problem.

The low back symptoms usually resolve in early adult life, but may return again in the third or fourth decade as the patient's muscle tone reaches that all too common stage called "deconditioning".

• **Research** — Research studies support the clinical findings and the above suggested pathomechanics.

One study which examined the incidence of facet tropism using plain film radiographs, CT scanning and MRI in 76 asymptomatic subjects found an