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When it comes to care of the spine, the spectrum of conditions and patients that we care for here at Children’s is remarkable: from athletic back pain to severe scoliosis, from infants to young (and some not-so-young) adults, from kids with severe medical problems to high school valedictorians. While it’s impossible to present an exhaustive review, I would like to highlight new and novel information relating to the pediatric and adolescent spine.

Improved diagnostic tools
First, I’ll describe a couple of novel diagnostic tools we have to evaluate the spine in the orthopedic clinic. The long-term impact of a child’s exposure to radiation has gained a lot of attention lately. We take this very seriously in our clinic and do everything we can to minimize exposure. EOS is a new imaging system that allows us to obtain better-quality images with 14 times less radiation exposure than a routine scoliosis X-ray, and Children’s Orthopaedics/Spine Center has the only one in Wisconsin. It is how we prefer to obtain all spine X-rays, and given that many of our patients require numerous films throughout their treatment, the reduction in radiation exposure is significant. Another technology that we utilize is completely radiation free. The Milwaukee Spinal Scanner (developed here at Children’s) uses topographical mapping of our patients’ backs to track the progress of scoliosis.
Casting for early onset scoliosis
One of the most challenging populations that I work with is early-onset scoliosis. Infantile idiopathic scoliosis is a disorder for which there has been an exciting new advance in management. These patients have normal anatomy (when there is abnormal vertebral structure it is defined as congenital scoliosis) and no known diagnosis causing their scoliosis (neurologic or otherwise). Previously it was assumed that these children required bracing for a period, but they inevitably went on to spinal surgery with special instrumentation while still growing and then an eventual spinal fusion. EDF (elongation, derotation, flexion) casting has revolutionized management. This was pioneered by Prof. Mehta in the United Kingdom. I learned the technique from her and have been performing it here at Children’s ever since. It is a casting technique that has the potential to “cure” scoliosis in these patients and allow them to avoid ever needing any spinal surgery. My results have been very promising, and it is a program that I have become passionate about because of the huge difference it can make in these children’s lives.

Research on bracing
Another recently published article was groundbreaking in the evidence it provides to support the utilization of bracing. The Bracing in Adolescent Idiopathic Scoliosis Trial was published in the fall 2013 in the New England Journal of Medicine. It was the first time that this treatment method had been rigorously evaluated. The multicenter, randomized prospective study was funded by the National Institutes of Health. The results were so overwhelmingly in favor of the benefit of bracing that the NIH actually stopped the study before its completion, stating that it would be negligent to continue to allow patients to go unbraced. For 75 percent of patients randomly assigned to wear a brace, curves did not progress to the 50 degree threshold for surgery at skeletal maturity, while among those who did not wear a brace, just 42 percent did not progress to the surgical threshold. This also emphasizes the critical importance of early detection of scoliosis so that bracing can be initiated at an appropriate time.

The role of physical therapy
More controversial than bracing, the efficacy of physical therapy in scoliosis treatment is a frequent topic of conversation. The bottom line: At this point there is not the same level of evidence to support the impact of PT on scoliosis. There are many different schools of thought as to the best type of therapy. At Children’s, the spine physicians and physical therapy teams work together to evaluate all of the different PT methodologies. Because we are not bound to any one school of thought, our physical therapists can incorporate the most beneficial components of various programs. This gives our therapists a unique ability to treat their patients. We continue to evaluate the efficacy of physical therapy treatment and hope someday to have the same level of evidence to answer the question of how beneficial physical therapy is in scoliosis management as we have for bracing. At a recent meeting of our international Scoliosis Research Society, of which I am a member of the non-operative committee, we had many meaningful conversations about the importance of generating solid scientific evidence in relation to this debate. I hope there will be more news to come.

Back pain
A common source of significant low back pain in the adolescent population is spondylolysis. This is a stress fracture of the pars interarticularis (the region of the vertebra where the pedicle meets the lamina – I know, flashbacks to med school anatomy). It is present in about 6 percent of the population, about 1 out of every 20 people. The classic patient is involved in a sport with forceful repetitive back extension, such as a football lineman or a gymnast. Their pain is typically
exacerbated with activity and low back extension. On examination, they often have very tight hamstrings and unbalanced core strength. The diagnosis can be confirmed by EOS, radiographs or advanced imaging (CT, MRI or SPECT scan). The treatment is related to the duration of symptoms and the severity and displacement of the fracture. Initial treatment is almost always pain control, rest from the aggravating sport and aggressive physical therapy. After treatment, the vast majority of our patients return to their sports and activities without restrictions.

References

2. Lim, Tassone, Liu, Thometz, Lyon, Correlation of Idiopathic scoliosis assessments between newly developed Milwaukee Topographic Scanner and Quantec, Stud Health Technology Inform, 2012;176: 255-8

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