



Surgery for Flatback Syndrome

At Chester County Hospital (CCH), Sherif Sherif, MD, is performing surgeries for flatback syndrome (FBS) to re-establish the natural curve at the lumbar spine and correct any concomitant damage the deformity may have caused.

Flatback Syndrome and Loss of Sagittal Balance

In addition to prior surgery, the culprits in FBS include aging, with loss of multiple disc space heights at the bottom of the spine, and bone diseases, such as ankylosing spondylitis. In flatback syndrome, the curve of the lumbar spine (L1-S1) flattens (see Fig. 1) resulting in loss of normal balance in the sagittal (side view) plane.

The head must be correctly positioned above the pelvis to maintain a neutral upright posture with minimal energy. To achieve normal balance, therefore, individuals with FBS are forced to bend their knees and retrovert the pelvis, which causes continuous firing of the hamstrings and back muscles. When combined with nerve compression in the lumbar spine (a typical presentation in FBS) these accommodations cause chronic, irremediable back and leg pain, increasing decompensation and debility over time.

Nonsurgical Treatment of Flatback Syndrome

The journey to flatback remediation begins with nonsurgical treatments—typically physical therapy and epidural steroid injection. If these efforts do not bring about a suitable resolution for FBS, surgical correction can offer substantial improvements in posture, quality of life and pain.

Surgeries for Flatback Syndrome at Chester County Hospital

As a specialist trained in the full spectrum of spinal surgeries, Dr. Sherif performs a combination of procedures to address FBS. This is necessary because the lumbar spine must often be accessed at different levels during FBS surgery to correct the syndrome and its related deformities. To establish lordosis at L4-L5 and L5-S1, for example, Dr. Sherif may perform an anterior lumbar interbody fusion (ALIF).

ALIF has several potential benefits, including the capacity to place a much larger cage for bone grafting than other fusion surgeries, with greater resulting stability and fusion. At CCH, anterior surgeries are always performed with the assistance of a vascular surgeon to ensure patient safety, and ALIF is often combined with supplementary procedures.

To access the remaining levels of the lumbar spine, Dr. Sherif may employ extreme lateral interbody fusion (XLIF). A side approach, XLIF has the advantage of being a minimally invasive technique that allows for a larger spacer and avoids the nerves behind and the major vessels in front of the spine.

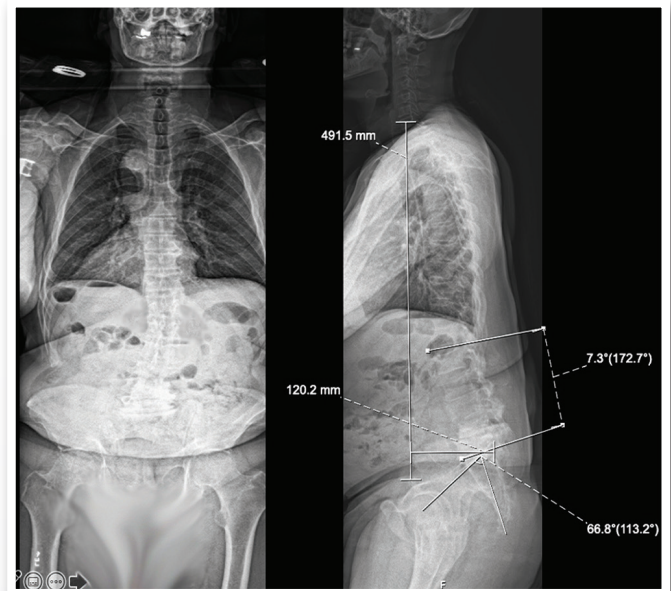


Figure 1: AP and lateral views showing degenerative changes in the lower lumbar spine, and measurements indicating lumbar pelvic mismatch.

CASE STUDY

Mr. M was referred to the Spine Center at Chester County Hospital with a history of L3-L5 decompression for severe spinal stenosis in his late 50s. Now age 64, he was profoundly stooped at presentation, and reported relentless lower back pain, bilateral shooting pains in his thighs and extremity numbness—all of which had forced him into early retirement. While reporting no change in bladder or bowel symptoms, and no weakness in his legs, Mr. M's medical history was complicated by the presence of a small abdominal aortic aneurysm being managed with observation.

Mr. M received a preliminary diagnosis of sagittal malalignment and spinal stenosis with neurogenic claudication. Mr. M's work-up included a series of diagnostic imaging tests including an EOS X-ray full-body scan (Figures 1 and 2A), which confirmed the sagittal malalignment, and found evidence of rotational instability at the lower lumbar spine. A subsequent MRI demonstrated a large disc herniation at the L4-L5 level with moderate to severe spinal stenosis.

To ascertain Mr. M's potential for further fusion surgery, a CT scan was then performed, which identified free (unfused) disc space at L5-S1 and sufficient pedicle diameters, and a DXA scan, which excluded osteoporosis. An ALIF surgery was planned to reinstate lordosis at both the L4-L5 and L5-S1 disc spaces with a pelvic fusion to achieve greater correction of the deformity via posterior bony releases, followed by stabilization of the spine using screws and rods.

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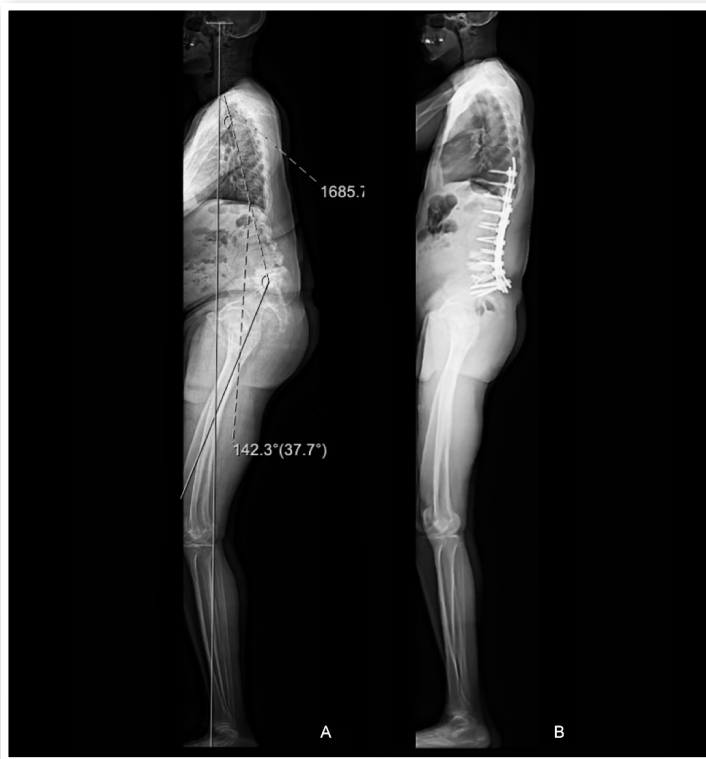


Figure 2: Comparison between pre-operative and three month post-operative full length standing x-ray showing the difference in posture, and the disappearance of compensatory mechanisms.

CASE STUDY *(Continued)*

At surgery, Dr. Sherif initiated a retroperitoneal approach for an ALIF to reach L5-S1 and cleared the disc space. He then inserted a large cage spacer with sufficient angle to restore the lordotic curve and secured it with screws at the bottom surface.

Following x-ray confirmation of a 30 degree lordotic curve at L5-S1, a manual palpation of the aorta (performed to determine its mobility) discovered previously undisclosed calcifications, precluding the intended ALIF surgery at L4-L5. It was determined that the amount of correction achieved at the lower level was sufficient to proceed with the pelvic fusion, and the anterior incision was closed.

Mr. M was then placed in the prone position for a T10-to-pelvis fusion to achieve greater correction of the deformity via posterior bony releases, followed by stabilization of the spine using screws and rods. This was subsequently achieved with the addition of bone grafting.

After an uneventful recovery, Mr. M went home on post-operative day six. In the following weeks, he began a slow recovery, entering physical therapy at 6 weeks, and beginning advanced pain management. At three months, he was able to stand upright with no leg pain and minimal back pain. By six months, Mr. M had lost almost 30 pounds as a result of increased physical activity (Figure 2B) and had returned to his full-time occupation.

FACULTY TEAM

The Spine Program at Chester County Hospital provides access to the full spectrum of open and minimally-invasive surgeries, as well as the latest surgical and diagnostic technologies in the region, and the resources of Penn Medicine and its partner institutions.

Performing Surgery for Flatback Syndrome at Chester County Hospital

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► About Sherif Sherif, MD



A graduate of the Faculty of Medicine at Tanta University, Dr. Sherif completed an adult spine deformity and minimally invasive spine surgery fellowship at Penn Medicine, and completed spine fellowships at Massachusetts General Hospital/Newton-Wellesley Hospital, and the University of Rochester, NY, as well. Dr. Sherif's

clinical interests include degenerative spine disease using minimally invasive spine surgery and 3D navigation technology, and complex/revision conditions requiring conventional open surgical techniques. He specializes in adult spine deformity including scoliosis, kyphosis, and postural malalignment (flat back syndrome) using posterior, lateral, and anterior spine approaches, and also treats patients with spine trauma, spine infections and tumors.

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