

An introduction to

Spinal alignment

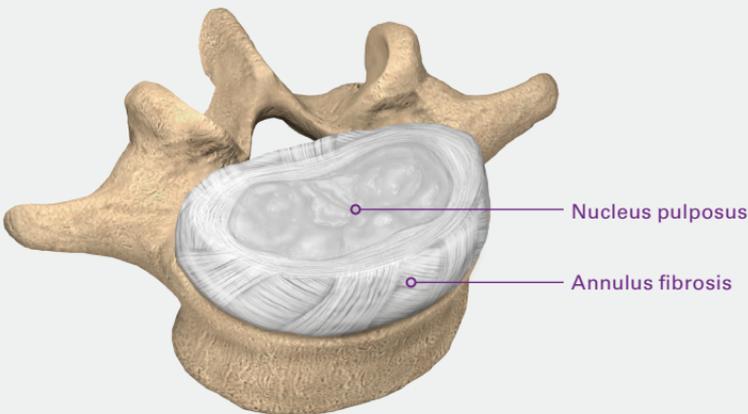
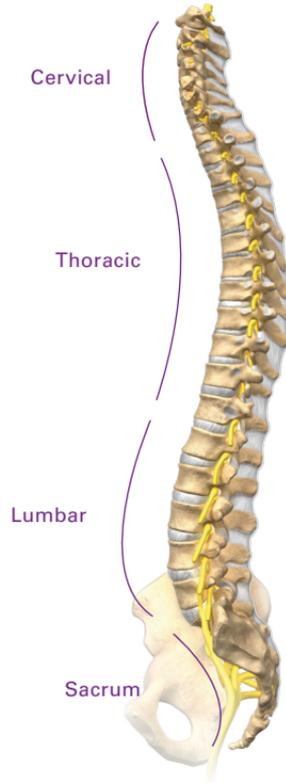
This booklet provides general information on spinal alignment. It is not meant to replace any personal conversations that you might wish to have with your physician or other member of your healthcare team. Not all the information here will apply to your individual treatment or its outcome.



About the spine

The human spine is made up of 24 bones or vertebrae in the cervical (neck) spine, the thoracic (chest) spine, and the lumbar (lower back) spine, plus the sacral bones.

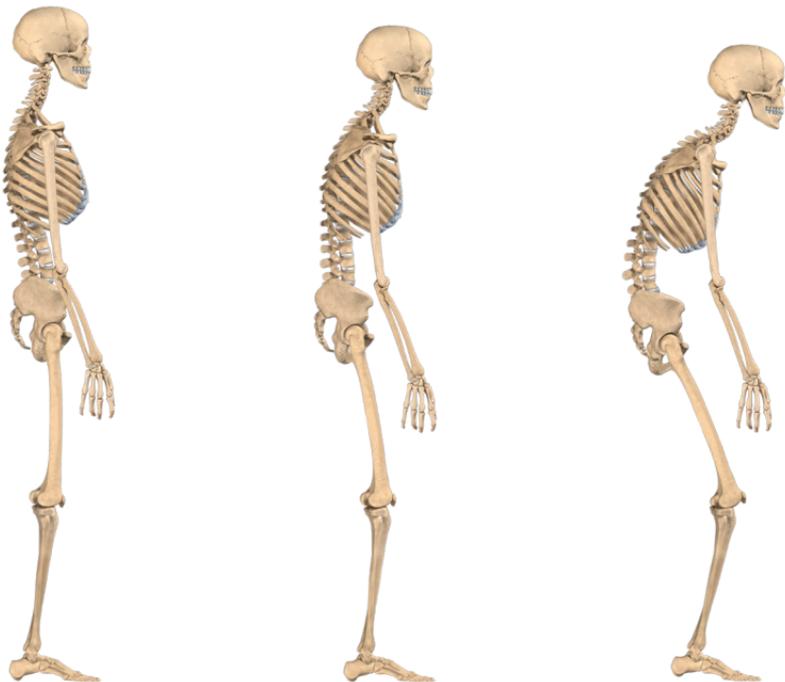
Vertebrae are connected by several joints, which allow you to bend, twist, and carry loads. The main joint between two vertebrae is called an intervertebral disc. The disc is made of two parts, a tough and fibrous outer layer (annulus fibrosis) and a soft, gelatinous center (nucleus pulposus). These two parts work in conjunction to allow the spine to move, and also provide shock absorption.



About spinal alignment

Spinal alignment refers to how the head, shoulders, spine, hips, knees, and ankles relate and line up with each other. Studies have shown that a properly aligned spine is associated with a higher quality of life.¹ When the spine is out of alignment, the body's tendency is to compensate in order to maintain balance and a horizontal gaze (ability to look up straight). For example, a person could compensate by rotating the hips forward. This can lead to stress on muscles and joints, ultimately causing the body to try to compensate even more.

The body's tendency to compensate during aging



1. Terran J, Schwab F, Shaffrey CI, et al. The SRS-Schwab adult spinal deformity classification: assessment and Clinical Correlations based on a prospective operative and nonoperative cohort. *Neurosurg* 2013;73(4):559-68.

Causes of malalignment

There are several causes that may contribute to the spine being out of alignment. The majority are related to the natural aging process, in which the tendency is for the spine to curve beyond the normal range. Genetics can also play a contributing role if a person is born with a malaligned spine or predisposition for malalignment. Other causes include complications from a previous spine surgery (e.g., adjacent segment disease), trauma, or tumors. Malalignment can lead to back pain.

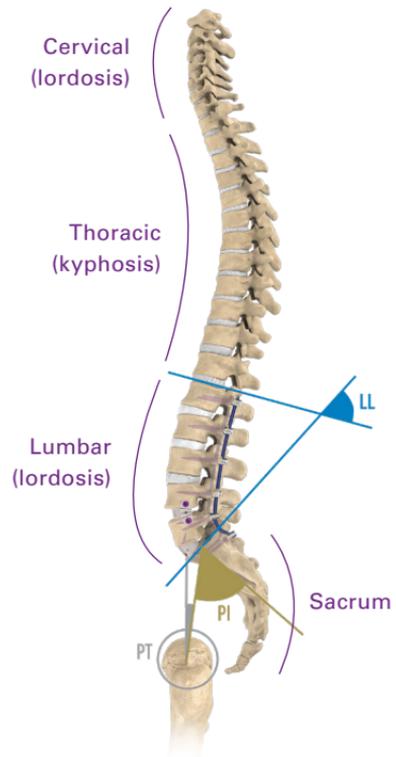
What are treatment options?

Many symptoms related to back pain as a result of malalignment may be treated without surgery via methods that involve medication, rest, heat, and physical therapy. It is important that you speak to your physician about the best options for you.

If your symptoms do not improve with other methods, your physician may suggest spinal surgery. Surgery is reserved for those who do not gain relief from nonoperative forms of treatment, patients whose symptoms are increasing or worsening, and/or patients who present a spinal condition that indicates the need for surgery.

Addressing spinal alignment during surgery

When planning for your surgery, your surgeon may choose to take certain measurements of your spine to help determine the best course of action. For example, your surgeon may measure the degrees in the curvature of your lower back (lumbar lordosis), as well as certain angles of your pelvis (pelvic incidence). Studies show that the relationship between these two measurements can help determine your spinal alignment.²⁻⁵ A common goal in the surgery is to achieve proper spinal alignment.



2. Lafage V, Schwab F, Skalli W, et al. Standing balance and sagittal plane spinal deformity: analysis of spinopelvic and gravity line parameters. *Spine* 2008;33:1572-8.
3. Lafage V, Schwab F, Patel A, et al. Pelvic tilt and truncal inclination: two key radiographic parameters in the setting of adults with spinal deformity. *Spine* 2009;34:E599-E606.
4. Schwab F, Patel A, Ungar B, et al. Adult spinal deformity-postoperative standing imbalance: how much can you really tolerate? An overview of key parameters in assessing alignment and planning corrective surgery. *Spine* 2010;35:2224-31.
5. Schwab FJ, Blondel B, Bess S, et al. Radiographical spinopelvic parameters and disability in the setting of adult spinal deformity: a prospective multicenter analysis. *Spine* 2013;38:E803-E812.

Your surgeon may choose to place one or more implants into your disc space. These may include hyperlordotic implants which can help restore proper disc height as well as the lordosis in your lower back. Generally, some method of fixation will also be used to act as a stabilization device (internal brace) to help hold everything in place while fusion (bone healing) occurs.



Software solutions are available to help surgeons calculate and evaluate spinal measurements, the type of implant(s) needed, and where to place them during surgery. Through surgical planning software, a surgeon has the ability to model the surgery beforehand, set goals, and then confirm the outcome postoperatively.



Surgical planning software

Glossary

Kyphosis is the natural curvature of the thoracic portion of the spine.

Lordosis is the natural curvature of the lumbar and cervical portions of the spine.

Lumbar lordosis (LL) is the spinal curvature in the lumbar spine.

Pelvic incidence (PI) is a spinal measurement derived from the fundamental relationship between the sacrum and the pelvis.

Spinal alignment refers to how the head, shoulders, spine, hips, knees, and ankles relate and line up with each other.



Notes

Resources

For information on spinal procedures and conditions, please visit:

nuvasive.com

If you would like to learn more about patient support and education for chronic back, leg, and neck pain sufferers and their loved ones, please visit:

thebetterwayback.org

If you have any questions about spinal alignment or spine surgery, please call or visit your physician, who is the only one qualified to diagnose and treat your spinal condition. This patient information brochure is not a replacement for professional medical advice.

About **The Better Way Back**[®]

The Better Way Back is a nationwide patient support program created by NuVasive[®], a leader in developing minimally invasive, procedurally-integrated spine solutions. The Better Way Back is a free community built on the power of empathy, and is dedicated to providing hope, support, and information to individuals suffering from chronic back, leg, or neck pain.

Through its Patient Ambassador Program, The Better Way Back pairs patients considering spine surgery with patients who have previously undergone a spine procedure. Ambassadors volunteer their time to discuss their experiences in order to provide additional, first-hand perspectives.

To learn more about The Better Way Back, please



call **1-800-745-7099**



visit **thebetterwayback.org**



text "TBWB" to **858-360-8292**

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