Health Link
Healthy living after treatment of childhood, adolescent, and young adult cancer

CHILDREN'S ONCOLOGY GROUP

Scoliosis and Kyphosis after Cancer Treatment

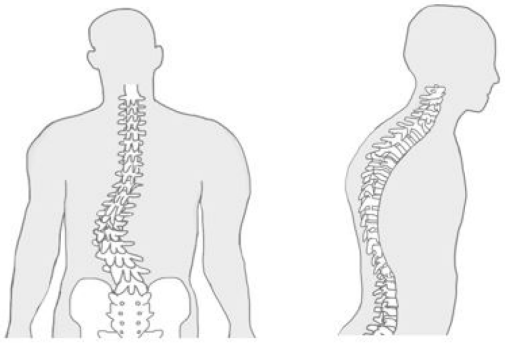
The spine, or "backbone" is a group of bones stacked in a straight line down the middle of the back, held together with muscles and ligaments. Treatment for childhood cancer can sometimes result in abnormal curvatures of the spine, known as scoliosis and kyphosis.

What is scoliosis?

Scoliosis is a sideways rotation of the spine. Instead of appearing as a straight line when viewed from the back, the spine appears curved, like the letter "S" or the letter "C."

Signs of scoliosis may include:

- Uneven shoulder blades
- Uneven hips
- Uneven waist
- "Leaning" of the back to one side
- Head not centered above pelvis
- One leg longer than the other



Scoliosis Kyphosis

What is kyphosis?

Kyphosis is an abnormal rounding of the upper part of the back. When viewed from the side, it may appear as if the person is slouching or has a "hump" on the back.

What causes scoliosis?

Scoliosis occurs in many young people, especially teenagers, and is most often "idiopathic," meaning that the cause is not known. However, people who underwent surgery involving the spine or chest, or those who received radiation to the chest, abdomen, or spine, especially when combined with surgery, are at increased risk for uneven development of the muscles, bones, and soft tissues of the back, resulting in scoliosis.

What causes kyphosis?

Kyphosis sometimes develops from stretching of the spinal ligaments, causing the natural curve of the spine to increase. Kyphosis can also be caused by uneven development of the back muscles and ligaments as a result of radiation.

What are the risk factors for scoliosis after treatment for childhood cancer?

Cancer treatment-related risks include:

- Surgery involving the spine or chest (not including placement of a central line)
- Radiation to the trunk (including any area from the shoulders down to the pelvis), especially if:
  - The dose was 20 Gy (2000 cGy/rads) or higher.
  - Younger age at the time of radiation treatment.
  - The radiation treatment area was to one half of the chest or abdomen.
  - There was also surgery to the chest, abdomen, or spine.
- A tumor in or near the spine
- Individuals with neurofibromatosis are also at increased risk.

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How is the diagnosis made?

Signs of scoliosis or kyphosis may be detected on physical examination. X-rays of the spine confirm the diagnosis. Scoliosis is diagnosed when there is at least a 10-degree lateral (side-to-side) curve on the x-ray. Kyphosis is diagnosed when there is at least a 50-degree curve on the x-ray.

What treatment is needed?

Treatment for kyphosis and scoliosis is usually done in stages. The first stage is usually "observation." During this stage, the curve is closely monitored, especially during periods of rapid growth, such as during puberty. If the curve does not get worse, observation may be all that is necessary.

If the curve progresses, the next step is usually bracing (a plastic body brace worn under the clothing). The goal of bracing is to halt progression or help correct the abnormal spinal curvature.

The final treatment step is surgery. This is done in cases of serious curves that are not manageable with observation or bracing alone.

What monitoring is required?

If scoliosis or kyphosis is suspected, an x-ray of the spine should be obtained. If the curve is more than 10 degrees for scoliosis or more than 50 degrees for kyphosis, a referral is usually made to an orthopedic (bone) specialist.

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Additional health information for childhood cancer survivors is available at *www.survivorshipguidelines.org*

Note: Throughout this *Health Links* series, the term "childhood cancer" is used to designate pediatric cancers that may occur during childhood, adolescence, or young adulthood. Health Links are designed to provide health information for survivors of pediatric cancer, regardless of whether the cancer occurred during childhood, adolescence, or young adulthood.

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