

## Does Your Back Hurt? Then Put Down that Butt!

Each year, an estimated 443,000 Americans die prematurely from smoking or exposure to secondhand smoke. Despite these known risks, approximately 46.6 million American adults smoke cigarettes.

It may not be as well-known, but smokers are more prone to back pain and spine problems than nonsmokers. There are many reasons for this, including:

- Nicotine restricts the flow of nutrient and oxygen-rich blood to the discs that cushion their vertebrae and increases the rate of degenerative change. One study of smoker and non-smoker twins showed increased disc degeneration on MRI scans of the smoking group. A study of more than 6,000 patients positively linked low back pain with smoking.
- Smoking reduces calcium absorption and prevents new bone growth, which increases the risk of an osteoporotic fracture. In fact, one study shows that the risk of hip fracture is increased by 1.3% in female smokers. In a study of identical female twins, one member of each set was a smoker and one was not. A significant decrease in bone density was observed in the female smoker group.



If you are a smoker and are considering spinal surgery, your spine professional will likely counsel you to quit smoking. By quitting smoking before surgery, you will give your body the very best chance of healing well and it can actually affect the overall success of your surgery. Some facts:

- Nicotine retards both wound and fracture healing by reducing the amount of oxygen in the healing wound and impairing collagen production. In fact, one study showed that 90% of a study group's postoperative infections occurred in patients who smoked.
- For those who require spinal fusion surgery, smoking has been shown to negatively impact the rate of successful fusion. One study demonstrated that the rate of nonunion (which means the vertebrae did not properly fuse) in smokers was 40 percent and the nonunion rate in non-smokers was only 8 percent. The study authors suspect that this was caused by a low oxygen level in the smokers' blood.

To help you quit smoking, the American Cancer Society offers the following helpful advice: [American Cancer Society "How to Quit"](#)

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<http://www.spineuniverse.com/treatments/surgery/cigarette-smoking-its-impact-spinal-fusions>

#### Prevalence of Cigarette Smoking

According to the American Cancer Society, "48 million adults (25.7 million men and 22.3 million women) were current smokers in the United States in 1997."

Many of these adult smokers started during their teenage years. Unfortunately, even today people still begin to smoke cigarettes despite published statistics that show its negative impact on health. The adverse effects of smoking include nicotine addiction, an increased risk of lung and other types of cancer, higher rates of arteriosclerosis (hardening of the arteries) and heart disease, as well as decreased life expectancy.

Cigarettes contain dried tobacco leaves and flavorings, which include more than 4,000 chemicals. Some of these substances are harmless until burned and breathed. Cigarette smoke can be divided into two categories: (1) distinct particles and (2) gases. The following table is a partial list of the substances in cigarette smoke.

#### Distinct Particles

Aniline  
Benzanthracene  
Catechol  
Harmane  
Naphthalene  
Nicotine  
Phenol  
Quinoline  
Toluene

#### Gases

Acetone  
Carbon Dioxide  
Carbon Monoxide  
Formaldehyde  
Hydrazine  
Hydrogen Cyanide  
Nitrogen Oxides  
Pyridine  
3-Vinylpyridine

#### Cigarettes and the Body

Cigarette smoking adversely affects many of the body's life-sustaining systems, as shown below.

Body System	Purpose	Cigarettes' Impact
Respiratory	Ventilates the lungs, exchanges oxygen and carbon dioxide.	Decreases lung function Increases mucous production, increases coughing, and possibly increases infections
Circulatory and blood vessels	Delivers oxygen and nutrients to cells and carries away carbon dioxide and waste.	Hinders circulation due to plaque deposits and narrowing of blood vessels
Digestive tract	Breaks food down into absorbable components to feed the body and eliminates waste.	Irritates digestive tract and hinders absorption of nutrients

### **The Spine and Cigarette Smoking**

Bone is a living tissue dependent on the functions and support provided by the other body systems. When these systems are not able to perform normally, bone is unable to rebuild itself. The formation of bone is particularly influenced by physical exercise and hormonal activity, both of which are adversely affected by cigarette smoking.

Many smokers have less physical endurance than nonsmokers, mainly due to decreased lung function. Cigarette smoking reduces the amount of oxygen in the blood and increases the level of harmful substances, such as carbon monoxide. This, combined with the effects of smoking on the heart and blood vessels, can limit the benefits from physical activity.

In men and women, cigarette smoking is known to influence hormone function. Smoking increases estrogen loss in women who are perimenopausal or postmenopausal. This can result in a loss of bone density and lead to osteoporosis. Osteoporosis causes bones to lose strength, becoming more fragile. This silent disease is responsible for many spine and hip fractures in the United States.

### **Spinal Fusion and Cigarette Smoking**

Defined Spinal fusion is a surgical procedure used to join bony segments of the spine (e.g. vertebrae). In order for the fusion to heal, new bone growth must occur, bridging between the spinal segments. Sometimes fusion is combined with another surgical technique termed spinal instrumentation. Instrumentation consists of different types of medically designed hardware such as rods, hooks, wires, and screws that are attached to the spine. These devices provide immediate stability and hold the spine in proper position while the fusion heals.

Spinal fusion (also termed arthrodesis) can be performed at the cervical, thoracic, or lumbar levels of the spine. It takes months to heal. Your doctor may order post-operative radiographs (x-rays) to monitor the progress of this healing.

The long-term success of many types of spinal surgery is dependent upon successful spinal fusion. In fact, if the fusion does not heal, spinal surgery may have to be repeated. A failed fusion is termed a nonunion or pseudoarthrosis. Spinal instrumentation, although very strong, may even break if nonunion occurs. Needless to say, spine surgeons try to minimize the risk of this happening.

### **Cigarette Smoking and Failed Fusion**

Certain factors have been found to affect the success of spinal fusion. Some of these factors include the patient's age, underlying medical conditions (e.g. diabetes, osteoporosis), and cigarette smoking. There is growing evidence that cigarette smoking adversely affects fusion. Smoking disrupts the normal function of basic body systems that contribute to bone formation and growth. As mentioned previously, new bone growth is necessary for a fusion to heal.

Research has demonstrated that habitual cigarette smoking leads to the breakdown of the spine to such a degree that fusion is often less successful when compared to similar procedures performed on non-smokers. In a study of patients undergoing anterior cervical fusion (fusion of the neck), it was observed that smokers had an increased rate of nonunion (up to 47%) as compared to non-smokers.<sup>1</sup>

Another study evaluated tobacco use in patients who underwent lumbar (low back) fusion. The patients who smoked had failed fusions in up to 40% of cases, compared to only 8% among non-smokers.<sup>2</sup> Similar findings have been reported in other studies as well.

### **Post-Operative Infection**

Cigarette smoking compromises the immune system and the body's other defense mechanisms, which can increase the patient's susceptibility to post-operative infection. A study conducted by Thalgot et al showed that cigarette smoking was a risk factor for infection following spinal fusion.<sup>3</sup>

**Conclusion**

Clearly, cigarette smoking is detrimental to spinal fusion. People who are facing fusion or any spinal surgery should make every effort to stop smoking. Quitting the habit beforehand will decrease the associated risks and increase the likelihood of a successful spinal fusion surgery.

Your physician recognizes the importance of smoking cessation and can provide information about available treatment options.