

# Health Awareness

## The Biology Of Bone Healing

(NAPSA)—Broken bones are common. Most people have at least one fracture in their life. Most fractures—about 90–95 percent—heal without a problem. Simple breaks are often treated with a splint or cast. More complicated fractures may require surgery, including screws, plates or rods to keep the pieces of bone together while the bone heals. In both cases, doctors try to prevent too much movement as unstable fractures don't heal well.

During the repair process, the fracture goes through several stages, including inflammation, soft callus, hard callus, and remodeling. At the end, if everything has gone well, the patient regains full function and is pain-free.

On rare occasions, bones don't heal as expected. Doctors use the term delayed union for a fracture that takes longer than normal to heal. Eventually, a fracture that fails to improve is called a non-union, which requires additional treatment.

The actual time bones need to heal depends on a number of variables, including injury location, severity, and patient risk factors. One of the keys to proper healing is a good blood supply, which delivers oxygen, nutrients and cells to the fracture site. Several of the risk factors for delayed union or non-union are linked to reduced blood supply.

Patients at risk for non-union include cigarette smokers, diabetics and the elderly, as they can have problems regenerating blood vessels. Nicotine directly affects bone healing, and a recent study showed that on average, fractures take six weeks longer to heal in smokers than in non-smokers.<sup>1</sup> The same study reported that smokers have more than twice the risk of non-union compared with non-smokers.<sup>1</sup>



**Patients can use ultrasound technology to help broken bones heal.**

For those patients who experience a non-union, there is an easy to use and effective product to help the healing process. It's called the EXOGEN® Ultrasound Bone Healing System.

EXOGEN is a unique, FDA-approved device that delivers low-intensity pulsed ultrasound (LIPUS) to the fracture site. In clinical studies, a 20-minute daily treatment with EXOGEN healed 86% of established non-unions<sup>2</sup> without additional surgery. Furthermore, smokers who received EXOGEN for a non-union healed at comparable rates to non-smokers.<sup>3,4</sup>

One possible explanation for why LIPUS works in smokers is that it increases the growth of blood vessels at the injury site. In a pre-clinical model of diabetic fracture healing, LIPUS treatment restored to pre-diabetic levels the expression of a key growth factor and the number of new blood vessels.<sup>5</sup>

To learn more about EXOGEN, visit [www.exogen.com](http://www.exogen.com).

1. Sclaro JA, Schenker ML, Yannascoli S, Baldwin K, Mehta S2, Ahn J. Cigarette smoking increases complications following fracture: a systematic review. *J Bone Joint Surg Am*. 2014 Apr 16; 96(8):674-81.

2. A non-union is considered to be established when the fracture shows no visibly progressive signs of healing, EXOGEN User Guide 81081790 Rev 0.

3. Gebauer D, Mayr E, Orthner E, Ryaby JP. Low-intensity pulsed ultrasound: effects on nonunions. *Ultrasound Med Biol*. 2005;31(10):1391-1402.

4. Mayr E, Möckl C, Lenich A, Ecker M, Rüter A. Ist niedrig-intensiver Ultraschall bei der Behandlung von frakturheilungsstörungen wirksam? *Unfallchirurg*. 2002; 105:108-115.

5. Coords M, Breitbart E, Paglia D, et al. The effects of low-intensity pulsed ultrasound upon diabetic fracture healing. *J Orthop Res*. 2011; 29(2):181-188.

EXOGEN is a bone growth stimulator that uses low-intensity pulsed ultrasound (LIPUS) for the accelerated healing of certain fresh fractures and healing of nonunion fractures (excluding skull and vertebrae). There are no known contraindications. Patients may experience ultrasound gel sensitivity. Please reference full prescribing information at [exogen.com/us/patient-resources](http://exogen.com/us/patient-resources).