Orthofix Bone Growth Stimulation.
The Healing Advantage®
Orthofix PEMF expedites callus formation

- In a recent animal study, the callus volume and rate of callus formation was 25% and 55% greater at day 16 with Orthofix PEMF compared to untreated limbs.5
- Animal testing of an alternate proprietary waveform did not increase callus volume or rate of callus formation.

ORTHOFIX PEMF HEALS FRACTURE NON-UNIONS

The effect of Physio Stim PEMF on fracture non-unions was demonstrated in an open trial PMA study7,8 which followed 181 patients with 193 fractures who had not healed on their own after nine or more months. In addition, Orthofix Patient Registry Data of 724 patients presenting 859 individual fractures treated with Physio-Stim resulted in the following outcomes:

Orthofix PEMF is proven successful in treating all of the following:7,8

- Open and/or closed fractures
- Casted and/or non-casted fractures (without windowing)
- Fractures treated with internal and/or external fixation

Bone has electrical qualities. In its healthy physiological condition, bone maintains a dynamic balance between positive and negative charges. Bone fracture changes the polarity at the fracture site to an electronegative environment. This negative polarity indicates that the body's natural repair process has begun. In certain cases the electronegative environment may not be sufficient to maintain the natural healing process and nonunion may occur.1,2,6

- PEMF enhances the electrical polarity by inducing an electrical field at the fracture site which supports the natural healing process and stimulates fracture repair.1,2,6
- PEMF bone growth stimulation generates a time varying magnetic field within the body. This, in turn, induces an electrical field that cannot be produced from a static magnetic field. The electric potential created by PEMF stimulates fracture healing.

PEMF increases vascularity, increases mineralization of osteoid material, and promotes osteoblastic migration in bone healing:

PEMF stimulates growth of blood vessels2

PEMF stimulates osteoblasts3

PEMF stimulation expedites callus formation and initiates calcification4,5

The effective treatment area within the body generated by the Physio-Stim magnetic field.

6. Zultan; Seminars in Orthop. 1:4 242-252, 1988
8. Physio-Stim PMA 850007 – 02/21/86. Supplement - 12/21/86
Peer reviewed studies demonstrate the rapid effect of the Orthofix PEMF signal on cellular signaling pathways which lead to bone formation:

**PEMF activates mTOR early in the cellular response**
- Patterson et. al.\(^9\) report for the first time that the mTOR pathway is activated within minutes of PEMF exposure. mTOR is a critical protein in the mediation of cell growth and proliferation.

**mTOR and PI3-kinase are important signaling components for osteoblasts**
- Kozawa et al., 2001, reported that BMP-4 also leads to phosphorylation of p70 S6 kinase, raising the possibility that PEMF and BMPs affect osteoblast function by activation of the same signal transduction pathway(s).\(^9,10\)

**S6 activation is considered an indicator of cellular anabolism**
- Patterson et. al.,\(^9\) showed that mTOR, its immediate downstream target (p70 S6 kinase) and the p70 S6 kinase downstream target (the ribosomal protein S6) were all phosphorylated by PEMF in MC3T3-E1 cells.

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**PEMF induction of intracellular signaling events associated with anabolic bone cell responses has been validated**
- Exposure of bone cells to the Orthofix PEMF signal induces immediate intracellular signal transduction events consistent with those associated with anabolic bone cell responses.\(^11\)
- PEMF induces rapid phosphorylation reactions of select intracellular signaling molecules in an osteoblast-like cell line, clearly indicating that bone cells immediately recognize this physical stimulus in real time.\(^11\)
- These results show that PEMF can induce intracellular signaling responses of comparable kinetic time frame and approximate intensity level to those induced by short-term insulin or PTH exposure.\(^11\)

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**CASE STUDY**
A 60-year-old arthritic female presents with delayed union of a closed proximal radius fracture. A Physio-Stim Model 3202 was prescribed eight weeks post-injury.
Model 3202
Primary Treatment Sites:
Radius, Carpals and Metacarpals

Model 3313
Primary Treatment Site:
Clavicle

Model 3314R & 3314L
Primary Treatment Site:
Right and Left Proximal Humerus

Model 3313
Primary Treatment Site:
Clavicle

Model 3303
Primary Treatment Sites:
Distal Tibia and Fibula, Tarsals and Metatarsals and Casted Applications

Model 3202
Primary Treatment Sites:
Distal Tibia and Fibula, Tarsals and Metatarsals

Model 3303
Primary Treatment Sites:
Distal Tibia and Fibula

Model 3313
Primary Treatment Sites:
Distal Femur, Tibia and Casted Applications

Model 3315
Primary Treatment Sites:
Femoral Head and Neck, Greater and Lesser Trochanters

BREG Vectra Boot with Model 3303
Primary Treatment Sites:
Distal Tibia and Fibula, Tarsals, Metatarsals

New design provides more flexibility and comfort

LCD treatment countdown clock shuts off automatically when treatment is complete

3 hour wear time

Instant information panel with LCDs for ongoing operational status

Self-contained unit allows unrestricted patient mobility. No restraining cords, control units or battery packs

Adjustable strap for comfortable fit

Worn over a cast, brace or clothing

Smart technology can provide outcome reports and hardcopy patient compliance monitoring

Your Distributor is: