Reclassification of Non-Invasive Bone Growth Stimulators
FDA Questions

Orthopaedic and Rehabilitation Devices Panel of Medical Devices Advisory Committee
September 8-9, 2020

1. FDA has identified the following risks to health of non-invasive bone growth stimulators based on available information for these devices, including the 2005 reclassification petition request from RS Medical Corp, data in PMA applications P030034, P850022/S009, and P910066/S011 available to FDA under section 520(h)(4) of the FD&C Act, published literature, and postmarket experience associated with use of these devices, along with the input from the 2006 Panel:

    - *Failure or delay of osteogenesis* – A patient could receive ineffective treatment, contributing to failure or delay of osteogenesis that may lead to clinical symptoms (e.g., pain) and the need for surgical interventions. Ineffective treatment could be a result of various circumstances (e.g., inadequate therapeutic signal output or device malfunction or misuse).
    - *Burn* – A patient or health care professional could be burned from the use and operation of the device. This could be a result of various circumstances including device malfunction (e.g., electrical fault) or misuse of the device (e.g., use while sleeping).
    - *Electrical Shock* – A patient or health care professional could be shocked from the use and operation of the device. This could be a result of various circumstances including device malfunction (e.g., electrical fault) or misuse of the device (e.g., use of AC current source during treatment).
    - *Electromagnetic Interference (EMI)* – A patient with electrically-powered implants (such as cardiac pacemakers, cardiac defibrillators, and neurostimulators) could experience an adverse interaction with the implanted electrical device via EMI or Radiofrequency Interference.
    - *Adverse Tissue Reaction* – A patient could experience skin irritation and/or allergic reaction associated with the use and operation of the device via the use of non-biocompatible device materials.
    - *Adverse Interaction with Internal/External Fixation Devices* – The signal output could be impacted by certain metallic internal or external fixation devices leading to inadequate treatment signals, device malfunction, or tissue damage.
    - *Adverse Biologic Effects* – A patient may experience adverse biologic effects resulting from prolonged exposure to the treatment signal via biologic interaction with the treatment signal at a cellular level. Excessive energy transmission could cause tissue damage or aberrant tissue behavior if signal output parameters exceed established safety thresholds.

    a. Please comment on whether this list completely and accurately identifies the risks to health presented by non-invasive bone growth stimulators.

b. Please comment on whether you disagree with inclusion of any of these risks, or whether you believe that any other risks should be included in the overall risk assessment when considering all indications for this device type.

2. Section 513 of the Food, Drug, and Cosmetic Act states a device should be Class III if:

- insufficient information exists to determine that general controls are sufficient to provide reasonable assurance of its safety and effectiveness or that application of special controls would provide such assurance, AND

- if, in addition, the device is life-supporting or life-sustaining, or for a use which is of substantial importance in preventing impairment of human health, or if the device presents a potential unreasonable risk of illness or injury.

A device should be Class II if:

- general controls by themselves are insufficient to provide reasonable assurance of the safety and effectiveness, AND

- there is sufficient information to establish special controls to provide such assurance.

A device should be Class I if:

- general controls are sufficient to provide reasonable assurance of the safety and effectiveness, OR
- insufficient information exists to:
  - determine that general controls are sufficient to provide reasonable assurance of the safety and effectiveness, OR
  - establish special controls to provide such assurance, BUT
    I. is not purported or represented to be for a use in supporting or sustaining human life or for a use which is of substantial importance in preventing impairment of human health, and
    II. does not present a potential unreasonable risk of illness or injury.

a. FDA believes that general controls alone are not sufficient to provide a reasonable assurance of safety and effectiveness for non-invasive bone growth stimulators. If you disagree, please discuss how general controls alone are sufficient to provide a reasonable assurance of safety and effectiveness for this device type. General controls may include:

i. Prohibition against adulterated or misbranded devices,
ii. Good Manufacturing Practices (GMP),
iii. Registration of manufacturing facilities,
iv. Listing of device types,

v. **Record keeping, etc.**

b. FDA does not believe that non-invasive bone growth stimulators are "life-supporting or life-sustaining, or of substantial importance in preventing impairment of human health." Do you agree with this assessment? If not, please explain why.

c. FDA does not believe that non-invasive bone growth stimulators present a "potential unreasonable risk of illness or injury" Do you agree with this assessment? If not, please explain why.

d. FDA believes sufficient information exists to establish special controls for non-invasive bone growth stimulators. Based on the information presented today, please discuss whether you believe that sufficient information exists to establish special controls that can provide a reasonable assurance of safety and effectiveness for this device type.

3. FDA proposes the following special controls for non-invasive bone growth stimulators to provide reasonable assurance of their safety and effectiveness.

(1) Clinical performance data must support the intended use of the product.

(2) Non-clinical performance testing must demonstrate that the device performs as intended under anticipated conditions of use. The following must be provided:
(i) Verification and validation of critical performance characteristics of the device, including characterization of the designed outputs of the device as well as the outputs that are delivered to the patient.
(ii) Thermal safety and thermal reliability testing.
(iii) Validation that signal characteristics are within safe physiologic limits.
(iv) Reliability testing consistent with the expected use-life of the device.

(3) Patient-contacting components of the device must be demonstrated to be biocompatible.

(4) Performance data must demonstrate the electrical safety and electromagnetic compatibility of the device.

(5) Appropriate software verification, validation, and hazard analysis must be performed.

(6) Labeling for the device must include the following:
(i) Warning against use on compromised skin or when there are known sensitivities;
(ii) Appropriate warnings for patients with implanted medical devices;
(iii) A detailed summary of the clinical testing, which includes the clinical outcomes associated with the use of the device, and a summary of adverse events and complications that occurred with the device;

(iv) A clear description of the device;
(v) Instructions on appropriate usage, duration, and frequency of use;
(vi) Instructions for maintenance and safe disposal;
(vii) Instructions for appropriate cleaning of any reusable components;
(viii) Specific warnings regarding user burns, electrical shock, and skin irritation; and
(ix) The risks and benefits associated with use of the device.

Please discuss whether these special controls appropriately mitigate the identified risks to health of this device type, and whether you recommend additional or different special controls.