



August 19, 2005

Division of Dockets Management
Food and Drug Administration
5630 Fishers Lane
Room 1061 (HFA-305)
Rockville, MD 20852

Re: Docket 2005P-0121

Dear Sir or Madam:

I am writing in opposition to the RS Medical petition to reclassify external bone growth stimulator ("BGS") devices from Class III to Class II. Please find attached my comments, which detail the reasons why all BGS devices should remain in Class III.

I have conducted extensive research on BGS technology, and have regularly used these devices in my practice as an orthopedic spine surgeon. While the devices currently approved by the FDA are supported by clinical data demonstrating both safety and effectiveness in generating bone growth, there remains much to learn about how this effect is achieved at the cellular level. Further, each of the currently approved BGS technologies differ so significantly from each other that it is inappropriate to consider them safe and effective until they have undergone rigorous clinical study.

I therefore believe strongly that all BGS devices must be assessed individually, and released only on the basis of clinical data demonstrating that the device is not only effective but is safe for the indications purported. Patients undergoing spinal fusion and those with fracture non-unions will face significant financial, social, and medical harm if they are subjected to treatment with unproven technology.

Approving the RS Medical petition to down classify these devices would be scientifically and ethically unsound.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. Linovitz", is written over the typed name.

Raymond J. Linovitz, M.D., F.A.C.S.

2005P-0121

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For the following reasons, I, Dr. Raymond J. Linovitz, oppose the RS Medical petition to reclassify external bone growth stimulator (“BGS”) devices from Class III to Class II.

I have been a practicing orthopedic surgeon for 28 years and, for the past 23 years, have focused my practice on the treatment of spinal disorders. My patients suffer from spinal [orthopedic?] disorders resulting from trauma, degenerative disease, infections and deformity. As a clinician I have performed thousands of spinal surgeries, including spinal fusions and have extensive experience with the risks, indications, and postoperative care associated with this procedure. In addition, for over 10 years, I have used BGS technology in my clinical practice as an adjunct to spinal fusion surgery. I continue to utilize BGS devices based on their strong record of safety and efficacy. Finally, I have also conducted clinical research in connection with the data submitted to the FDA for the initial premarket approval (“PMA”) application for the SpinaLogic medical device, and served as the principle investigator in the only randomized double-blinded study of the use of combined magnetic field (“CMF”) devices as an adjunct to spinal fusion surgery.¹

As a clinician, I have used these BGS devices extensively in my practice, and, as a researcher, I have been involved in the clinical development of BGS devices through the PMA approval process. Based on my experience, I stand in strong opposition to RS Medical’s proposal to abandon the PMA process for BGS devices. In particular, I am concerned that the reclassification of BGS devices to Class II will expose patients to ineffective treatment regimens. Small changes in new BGS devices, even those new devices that may be substantially similar to one that has been approved by FDA pursuant to a PMA application, may result in a less safe or effective device. Given the nature of these devices, and what we know (and don’t know about) how they work on a cellular level, I believe that clinical testing is the only way to ensure that a new BGS device will be effective.

Our current understanding of BGS devices only allows us to demonstrate safety and efficacy for a *specific* device in a *specific* clinical circumstance. For example, the 2002 *Spine* study, in which I was the principle investigator, demonstrated that a specific device (SpinaLogic, OrthoLogic, Tempe, AZ), utilizing a specific waveform (combined magnetic field defined by numerous parameters [identify]), in a specific clinical setting (as an adjunct to one-level or two-level fusions without instrumentation) was safe and effective. In that study, we found a statistically significant difference between the active treatment group and controls, with 64% in the treated group healed at 9 months compared with 43% of patients with placebo devices. The conclusion of our study was that combined magnetic field treatment of 30 min/day as an adjunct

¹ Linovitz, R.J., Pathria, M.; Bernhardt, M., Green, D., Law, M.D., McGuire, R.A., Montesano, P.X.; Rehtine, G., Salib R.M., Ryaby, J.T., Faden, J.S., Ponder, R., Muenz, L.R., Magee, F.P., Garfin, S.A. (2002) Combined magnetic fields accelerate and increase spine fusion: a double-blind, randomized, placebo controlled study. *Spine* 27(13):1383-88.

to spinal fusion surgery increases the probability of successful spine fusion. I do not believe that these data could be used as evidence of safety and effectiveness of a CMF device with a similar but slightly different waveform, even if utilized in a similar patient population, in a similar clinical context, and for a similar duration. The specificity of BGS technologies and their sensitivity to minor alterations in waveform properties, design, and manufacturing suggest that a similar device could be less efficacious or show no effect in promoting spinal fusion. There is also the potential that a minor alteration in electro or electromagnetic field characteristics could have markedly different effects on bone and other tissues, thus raising entirely different safety concerns.

RS Medical's petition fails to recognize these limitations in the clinical data and makes overly broad conclusions and extrapolations about the data's applicability to future BGS devices that they propose would be reviewed by FDA under the 510(k) procedures. In fact, the petition's assertion that clinical trials would not be necessary to ensure safety and efficacy of future devices completely mischaracterizes the medical community's current understanding of how and why BGS technology works in stimulating bone growth. *In vitro*, cellular, and animal experiments demonstrate that BGS devices are very specific and sensitive to minor variations in electro and electromagnetic wave forms. Minor variation in the waveform of a BGS device may similarly impact clinical efficacy in humans. The RS Medical petition does not address the potential issues of safety or effectiveness that will result from the variations of the PMA-approved waveforms that will almost certainly result from a reclassification. As a result, the RS Medical petition is fatally flawed.

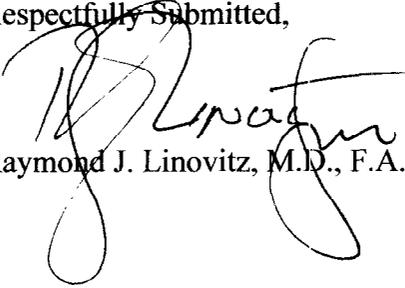
In addition to these inadequacies in RS Medical's petition, I also believe that further clinical research is greatly needed to gain a complete understanding of how BGS devices work, and, in particular, those devices that utilize CMF technology. Our study was the first prospective randomized and placebo-controlled study for CMF technology as an adjunct to spinal fusion surgery. Other clinical studies are needed to elucidate the extent to which other BGS devices, with different field parameters, in other clinical scenarios, function to promote bone growth. The RS Medical petition, if accepted, would effectively eliminate the incentive to perform this much-needed research.

The marketing of new BGS devices without supporting clinical data would increase patient risk. Spinal fusion is used to treat a number of debilitating disease states that often cause significant pain and morbidity. Thus, maximizing success in spinal fusion therapy is essential to patient care. Fortunately, the currently available BGS devices have an excellent record of safety and efficacy in this context. If FDA were to allow future devices to market without clinical trials, patients will not only be exposed to the risk of decreased efficacy, but also to the risks associated with unnecessary exposure to untested electromagnetic devices. If clinical trials were abandoned, it is very likely that less or non-effective devices would be used clinically by physicians who would equate a 510(k) cleared device with assurance of safety and efficacy equivalent to that associated with the devices that were approved through the PMA process. Such less effective devices could lead to either decreased fusion rates or prolonged time to fusion, which would expose patients to increased risk of immobility, pain, disability, and increase the likelihood of surgery. Beyond this potential for decreased efficacy, such future devices would pose unknown risks from the effects of untested electromagnetic fields at a

cellular level, potentially including cardiac arrhythmias, decreased bone growth, or malignant transformation.

In light of the flawed scientific reasoning used by RS Medical, the need for future clinical studies of BGS devices, and the potential for increased risk to patients, I strongly urge that FDA deny the RS Medical petition and continue the current process of PMA approval for BGS devices.

Respectfully Submitted,



Raymond J. Linovitz, M.D., F.A.C.S.