

Z Wave for Capsular Contracture After Breast Implant

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By Marc J. Salzman, M.D.

The non-invasive Z Wave radial shockwave device (Zimmer MedizinSystems, Irvine, CA and Zimmer MedizinSysteme GmbH, Neu-Ulm, Germany) is a combination skin tightening and body contouring system utilizing precision transmission of mechanical energy to improve local microcirculation and lymphatic drainage, and destabilization of fatty and connective tissue structures. Key advantages include pain-free treatment with no downtime, high safety and extreme ease of use, and growing versatility. It functions as a stand-alone application but has gained additional renown when used in conjunction with other fat reduction and other therapies as a massage and skin tightening component.

The safety of Z Wave lends it to experimental use; a safe device can be employed in novel, intuitive ways without fear of causing harm to the patient. We obtained the device in order to maximize our body contouring results, but applied Z Wave in an attempt to relieve the plantar fasciitis of one of the staff nurses, with resolution after six treatments. As a plastic surgeon I would normally not be treating this condition but given its safety and reports of use by orthopedic surgeons, we decided to try. Theorizing that improvement of local connective tissue (in this case, the plantar fascia, which is very thick) may be behind this success, it stood to reason that similar treatment of capsular contracture after breast implant surgery may be possible; this could be easily and safely tested. This application has been suggested and tested in the literature as well.

No anesthesia, analgesia, or other pretreatment protocol is required; the patient simply comes in, undergoes treatment, and leaves with no effect on their day-to-day life because there are no side effects or downtime. Satisfaction is high because persistent results are easy to obtain with little hassle.

Capsular contracture, or 'hardening' of the breast after implant surgery, is believed to result from infection post-implantation. This minor irritation causes a reaction within the body forming scar tissue around the foreign object, in this case a breast implant, which hardens; normally the tissue capsule is soft and pliant. This condition is more likely to

develop in smokers. There are a number of different treatment options, including surgery, but more recent study (including histology) has suggested that shockwave therapy (Z Wave) is a viable and potentially powerful therapy for capsular contracture.

Our first test was to take breast implants and apply Z Wave to them directly at maximum settings to determine how easily the device could damage the implant itself; implants from all three major brands were tested in this manner, and none were damaged.

Our first patient was a woman seeking replacement of a damaged 30-year-old implant (subglandular placement) with a subsequent increased likelihood of developing capsular contracture. Within four weeks we noticed development of Baker Scale Grade II capsular contracture and with consent, decided to treat. We started at very low settings (to tolerance) and increased to maximum tolerance, which increased over the course of therapy. After three sessions there was no capsule, and about three years later she returned with capsular contraction and fluid buildup on the opposite side, but the treated breast result had persisted (Grade I capsule).

A course of treatment includes four to ten sessions (average of six) at intervals as little as 24 hours, so a patient can even fly in, stay a week, and leave with a successful outcome. Short intervals are ideal because the capsule is still forming, and inhibiting an immature



Marc J. Salzman, M.D.
Plastic Surgeon
Salzman Cosmetic Surgery and Spa

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capsule repeatedly prevents the capsule recovering, so a minimum of two to three sessions per week is recommended. Treatment consists of applying Z Wave for ten to fifteen minutes to the breast using moderate settings that are tolerable to the patient. Patient tolerance increases over the course of treatment, as they become accustomed to the sensation and the capsule softens, reducing tissue resistance which may contribute to discomfort. We have not yet reached maximum settings and, given the result, achievement of maximum settings is not necessary for successful treatment. The capsule will soften to Grade I rapidly.

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The goal of treatment is to catch the problem early (a few weeks or months) after surgery, when the capsule is still at Grade II and still forming. Higher grade, established capsules will probably not respond to treatment, although early Grade III capsules may, if caught early enough. In our experience, the mechanical energy safely delivered using Z Wave cannot adequately distend a mature Grade III or IV capsule. This therapy allows early capsule treatment, mitigating the need for later surgical intervention.

One challenge to treatment is that slight palpable hardening of the implant with subsequent elevation at about one month may initially result from incomplete muscle release during surgery. Is the elevation and tightness from incomplete muscle release, or early capsule formation? Both may feel similar. HRUS can help by locating the point of division of the pectoralis muscle and comparing it to that of the other side.

Since our first patient we've treated more than 25 patients with more than 75% experiencing complete resolution of the capsule. This success rate is, most likely, lower than it would otherwise be because many of our early patients were inherited and tended to have more established capsules than the ideal.

Larger-scale controlled trials would yield a better understanding of the range of responses to treatment based on capsule grade and other factors, as well as further delineate ideal settings and protocol. However, given the safety and ease-of-use seen with Z Wave, any practitioner can safely perform this treatment and expect noticeable results using the simple guidelines stated above.

FOR FURTHER READING

Chen PC, Kuo SM, Jao JC, et al. Noninvasive Shock Wave Treatment for Capsular Contractures After Breast Augmentation: A Rabbit Study. *Aesthetic Plast Surg* 2016 Jun;40(3):435-45.

Wu YC, Jao JC, Yang YT, et al. Preliminary study of non-invasive shock wave treatment of capsular contracture after breast implant: animal model. *Conf Proc IEEE Eng Med Biol Soc* 2013;2013:1108-11.



Z Wave^{Pro} Radial
Pulse Technology

Zimmer
AestheticDivision

3 Goodyear, Suite B
Irvine, CA 92618
tel (800) 327-3576
fax (949) 727-2154
info@zimmerusa.com
www.zimmerusa.com
shop.zimmerusa.com