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CASE REPORT
Reconstructive

Extracorporeal Acoustic Wave Therapy and Multiple Symmetric Lipomatosis

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Summary: Acoustic waves are mechanical waves recently used to activate tissue metabolism by exploiting the cell permeabilization caused by their passage. We report a case of a retroauricular lipoma in a 44-year-old woman affected by multiple symmetric lipomatosis and treated with extracorporeal acoustic wave therapy. The adipose thickness of the lipoma was reduced from 35.8 to 21 mm, with increased softness at palpatory examination. *(Plast Reconstr Surg Glob Open 2015;3:e430; doi: 10.1097/GOX.0000000000000407; Published online 22 June 2015.)*

First applied in the 1980s in Germany as an electrohydraulic generator and quickly developed in the last 60 years for orthopedic, physiatric, and urological purposes, extracorporeal acoustic wave therapy (EAWT) is now applied by electromagnetic supply of mechanical waves, which, unlike ultrasound technology, are characterized by short length (<10 µs), high peak pressure (>100 MPa), rapid rise in pressure, and a frequency spectrum between 16 Hz and 20 MHz.[1,2]

These waves are capable of crossing gases, solids, and liquids, and thanks to their mechanism of action that allows them to expand at a speed greater than that of sound, their propagation disturbs and changes intramolecular bonds. The change in fluid pressure leads to a cavitation effect, with microdamage to tissues, especially visible at the point on which the waves are focused. At present, the possibility of changing the wave focus has led to better control of the destructive cavitational effect and to the use of EAWT to activate tissue metabolism. As hypothesized, wave passage through tissues, such as skin, extracellular matrix, vessels, adipose tissues, and inflammatory cells, leads to neoangiogenesis, vasodilation, stimulation of proliferation, release of growth factors, and anti-inflammatory effects.[3,4]

The recent creation of a new handpiece, based on defocused supply of the acoustic wave, now allows superficial treatment of, for example, subcutaneous adipose tissue deposits, by exploiting 2 effects[5–8]: (1) mechanical effect, because of increased cell permeability, with consequent enzymatic (lipase) demolition of fats and cellular lysis (reduction of adipose thickness) and (2) stimulated production of new collagen and elastin fibers, together with activation of hematic and lymphatic systems (dermoepidermal strengthening).

In light of these premises, we treated a retroauricular lipoma in a patient affected by multiple symmetric lipomatosis,[9,10] a rare disease of unknown etiology with an incidence of 1:25,000, more frequent in adult males, often associated with alcohol abuse and other diseases, such as diabetes, somatic and autonomic neuropathy, and clinically characterized by the presence of multiple, symmetrical, noncapsulated lipomas, mostly in the neck and upper trunk. Histologically, the deposits are not capsulated and are represented by small adipocytes, with a slight increase in vascular and fibrous elements, and infiltration across the fasciomuscular and vasculonervous planes.

CASE REPORT

A 44-year-old woman, surgically treated several times for multiple symmetric lipomatosis, presented

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Fig. 1. Retroauricular lipoma.

a retroauricular lipoma (Fig. 1). She reported pain and limited sleep, because of the inability to rest her head on the pillow. Clinically, the lipoma was hard, fibrotic, and 35.8-mm thick, as confirmed by ultrasound (Fig. 3A).

After informed consent, the lipoma was treated with EAWT (Cellactor SC1, Storz Medical, Switzerland) applying only the defocused planar handpiece once a week, for a total of 8 sessions (Fig. 2). The energy range was 0.09–0.27 mJ/mm^2, with a consequent frequency of 5–3 Hz and a total number of pulses of 1200 per session.

Fig. 2. Treatment with defocused EAWT.

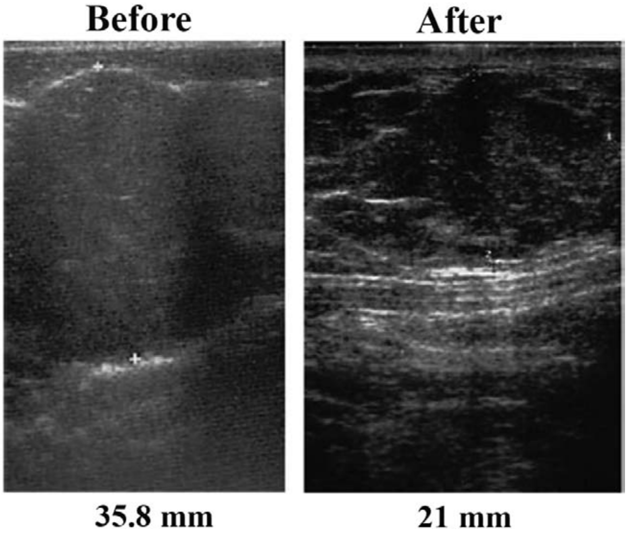

Fig. 3. Ultrasound examination of adipose thickness: (A) pretreatment and (B) posttreatment at 1 month.

RESULTS

One month after the end of treatment, a further ultrasound scan was taken to check adipose thickness, which had been reduced from 35.8 to 21 mm (Figs. 3, 4), clinically evident as increased softness at palpation. The patient reported less pain and increased hours of sleep. The treatment was well accepted by the patient, because of the absence of anesthesia, pain and scarring, noninvasivity, and feasibility in a medical office.

CONCLUSIONS

EAWT is a noninvasive treatment, painless, and well accepted by patients. In view of its features and the results obtained, it may be a good alternative or adequate

Fig. 4. Posttreatment picture at 1 month.

support to traditional treatment in patients affected by diseases requiring multisession surgical therapy.

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