

## **Effects of unfocussed shockwave treatment in human soft tissue: preliminary study**

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In this study the AA. studied the possible structural and ultrastructural changes in the human soft tissues (ligament and muscle) treated with radial shockwaves.

The radial shockwaves are pneumatically generated and emitted at the tip of the applicator and coupled into the human tissue, until to a depth of up to 35mm.

A patient, affected by an impingement syndrome at the right shoulder and treated with shockwaves therapy three months before, was underwent an operation, in the course of which we performed a biopsy of the subacromial ligament and supraspinatus muscle.

For light microscopy the tissue are fixed in 10% formaldehyde and embedded in paraffin. 5  $\mu$  sections was stained with hematoxylin and eosin and Mallory trichrome stain. For the electron microscopy the tissues were fixed in isotonic buffered glutaraldehyde 3% for 5 hours at 20 ° C and rinsed in 0,1 M cacodylate buffer. After dehydration of the specimens, cross-sections of 0,04  $\mu$  were stained.

At the light microscopy examination we have not observed evidence of inflammation in both tissues. In the ligament we revealed a slight stromal sclero-hyalinosis with an increase of collagenous production and activated fibroblasts, including plentiful wrinkled endoplasmic reticulum. In the muscle we observed an increase of the interstitial connective tissue with fiber cell, including a lot of subsarcolemmal mitochondria and a slight increase of lipid.

These preliminary observations on the human soft tissues, treated with shockwaves demonstrated the absence of inflammatory figures in the ligament with remedying changes. The evidence in the muscle of the subsarcolemmal mitochondria accumulation is probably connected to the development of a "fibrositis".