

# Histological Findings in Human Osteoarthritis (OA) Treated with ESWT

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ESWT has been used for treatment in different pathologies that compromise cartilage and corresponding subchondral bone . The aim of this report is to evaluate the effects of shock waves on this special anatomical region and compare them with our histopathological results in ESWT-treated soft-tissue shoulder pathologies.

From July 2004 to November 2005 , 15 patients (6 male , 9 female, mean age = 61 years.) with knee OA (13), elbow OA (1) and trapezius-mtc OA (1), were accepted for a single treatment of shockwaves (2,000 shocks /0.33mJ/mm<sup>2</sup>, Orthospec/Medispec) focused on the area of OA clearly displayed in MRI-gadolinium.

According to protocol, these patients underwent delayed arthroscopic treatment and osteochondral biopsies (6 to 10 weeks post-ESWT application). During the same period we collected 15 osteochondral biopsies from patients with OA, and 5 osteochondral samples from patients with prosthetic solutions for complex joint fractures. All biopsies underwent the same treatment of habitual stains for this kind of tissue and examination under light microscope.

**HISTOLOGICAL RESULTS:** 1. There were no differences in the histopathological aspect of OA between the treated and control cases, suggesting that ESWT does not produce distortion or more damage in these tissues. 2. In the cartilage of OA-ESWT cases there was no observed necrosis of cartilage cells or damage to isogenic groups, which were surrounded by a normal matrix with normal collagen arcades as in normal control cases. 3. Cartilage in treated cases remained quiescent with no observation of mitosis, but in some patients there was an intense matrix basophilic reaction. 4. The review of subchondral bone and bone marrow features between three groups of samples depicted no large differences; however in some material there was an observed increase of neo-hypermuskularized active vessels with more cellularity associated in bone marrow areas, quite similar to those seen in shoulder tendinosis treated with ESWT. 5. There was no evidence of scarring, fibrosis, necrosis or anaplasia- displasia phenomena.

The reactive features of bone marrow blood-vessels are quite similar to those found in others ESWT-treated tissues. The fact that some blood vessels cross over to rest in calcified cartilage (Clark ,1990) and the probable relationship between these blood vessels and the reparative process in this special anatomical area are particularly interesting in light of our findings that shockwaves could improve epiphyseal microcirculation. This deserves more research efforts. Our histological observations in different human tissues indicate that ESWT treatment does not cause more structural damage or cellular lesions and that the neo-vascular response is consistent in doses of 2,000 to 4,000 shocks at 0.33/mJ/mm<sup>2</sup>.