

Osteochondral Lesions as an Indication for ESWT

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The treatment of osteochondral lesions is realized in the field of high-end-technologies. In arthroscopic techniques the cartilage tissue is refreshed by abrasion and retrograde drilling. For the localized chondral defect various types of cartilage-transplantation such as OATS and mosaic-plasty are applied.

Aim of the treatment of cartilage damage of the joint always is to restore the congruent surface of the joint and the complete covering with cartilage tissue.

ESW showed in vitro a proliferation of chondrocytes and even in vivo we were able to show these results in single-case-publications.

The idea of the working-mechanism of extracorporeal shockwaves has expelled from primarily assumptions of the mechanical destruction of the treated tissue and therefore causing a remodelling process. The shockwave rather shows an aimed induction of bioengineering process in the sense of activating the cell metabolism via "second-messenger"-cascades.

Mediators like NO appeared in the focus of interest. Such signal transducing substances are able to cause a transformation of transmembranous proteins and activating them. By "second-messenger"-Pathways the intracellular metabolism is affected. The transformation of mechanical stress, produced by ESW, into a cellular answer is named mechanotransduction.

Regarding the cartilage-tissue cell-regeneration is induced by the mechanical stress. Chondrocytes have a very slow metabolism. In terms of an intact tissue-formation an expanding growth is not necessary. This information is processed by the intracellular and transmembranous adhesion-molecules. If there is a defect detected this will lead to the activation of repairing processes. In cartilage-tissue this process remains slowly and therefore shows a remaining defect or a less thickened coverage of the joint.

The aim is to stimulate these mechanisms by ESW and therefore gaining a thickened covering of the chondral defect with a primary cartilage tissue.

The shockwave treatment is performed in combination with a diagnostic arthroscopy in order to get a documentation of the chondral defect of the surface and the stage of the osteochondrosis.

The study included 87 patients, 59 male and 28 female.

Following to the pictorial report the patients with an OD or a degenerative/traumatic chondral lesion receive a single treatment with an electrohydraulic generated shockwave in general anaesthesia.

After shockwave treatment an immobilisation of the joint and a waiting period for sportive activities is performed for 2-6 weeks. Clinical controls and MRI-examination show the outcome.

If the patients agree a "second-look"-arthroscopy and histologic findings will be performed, but in reality most of the now pain-free patients do not agree to undergo a second arthroscopy.

As shown in previous publications the treatment of the OD shows a very good and good result in 70% and in another 14% the progression of the affected area could be stopped. Additional to the good subjective results we have never seen any treatable side effects.

At this time we are not able to reveal valid data on the treatment of degenerative/traumatic chondral lesions and therefore we can only show single-cases.

For treating chondral-lesions in the sense of arthritic disease there will be further pilot-trials that are performed in the mean-time. It is to be shown how the microbiologic effects of shockwaves are transformed to the cells, hardening the hypothesis of a bioengineering effect of shockwaves. Afterwards a valid animal-experiment has to be studied.

In the scientific research and clinical studies the positive effect of shockwaves on cartilage has been shown. These effects and the hypothesis of a mechanotransductional effect are to be investigated in comprehensive study.

In order of the efficacy, the lack of complications and the slight effort applying shockwaves this could be a sensible alternative to the acknowledged methods in the treatment of chondral damage.