**Introduction:** Extracorporeal shock waves have been established as common mode of treatment for periarticular affections such as calcifying tendinitis and epicondylitis humeri radialis. Extracorporeal shock waves have also been discussed as treatment modality for avascular necrosis of the femoral head. Therefore we were interested in the effect of high energy extracorporeal shock waves on hyaline cartilage of the femoral head. As it is known the side effects of extracorporeal shock waves range from bone bruise over tendon rupture up to nerval damage. We were examining hyaline joint cartilage for signs of degeneration in an animal model. To be able to detect early changes of cartilage composition we used Tenascin-C as a marker which has been described to be upregulated in the early state of osteoarthritis and is not found in healthy rat joint cartilage. The results of our study show cartilage changes after high energy extracorporeal shock wave application on hip joints which have never been reported so far in the literature.

**Materials and Methods:** We used an animal model in which the right hip joint of 18 adult Sprague-Dawleys rats was treated with 1500 extracorporeal shock waves of 0.5 mJ/mm2 in vivo. The left hip joint and two untreated animals served as control. Contact radiographs were taken before and after extracorporeal shock wave application. At 1, 4 and 10 weeks after treatment the animals were sacrificed. Samples were fixed, decalcified and embedded in paraffin. 4 μm sections were stained with H&E and Safranin-O. For immunohistology a polyclonal antibody against rat tenascin-C was used. Serial sections were analysed by immunohistochemistry (IHC) for Tenascin-C. For this purpose, endogenous tissue peroxidase activity was blocked (10 minutes, 0.5% H2O2 in methanol) and the sections were washed with phosphate buffered saline (PBS; pH 7.4, 137 mM NaCl, 27 mM KCL, 83 mM Na2HPO4.12H2O, 5 mM KH2PO4; pH 7.4). To unmask antigens, the sections were treated with Chondroitinase (1mg/ml) in Tris buffered saline (TBS) for 6 minutes at 37°C followed by washing in PBS. Unspecific binding sites were blocked with 5% sheep serum. Afterwards tissue sections were incubated (all incubations were for 1 hour at room temperature) with a polyclonal rabbit antibody against rat 1:150 (from M. Chiquet) in TBS with 0.1% Tween 20 and 1% BSA. The sections were washed in Tris buffered saline (TBS) with 0.1% Tween 20 and incubated with a biotinylated goat anti-rabbit AB diluted 1:3000 in TBS with 0.1 % Tween and 1% BSA. After repetition of the washing steps, the sections were incubated with streptavidin-horseradish peroxidase (Amersham Bioscience, Zuerich, Switzerland) conjugate 1:2000 diluted in TBS with 0.1% Tween 20 and 1% BSA. After another wash with TBS, bound antibody was visualized with 3-amino-9-ethylcarbazole (Sigma Chemical Co., St. Louis, MO, USA) and the sections were embedded in Aquamount (BDH Laboratory Supplies, Poole, England). All standard reagents were purchased from Merck (Darmstadt, Germany).

**Results:** Plain radiographs did not show changes of the hip joints treated with extracorporeal shock waves. Microscopically, some of the hip joints 10 weeks after treatment did show a loss of proteoglycan in the hyaline cartilage. Apart from that there were no fissures or other surface alterations. The Mankin staging did not show significant changes after the application of high energy extracorporeal shock waves.

**Discussion:** According to our results Tenascin-C was found to be increased in hyaline cartilage of the femoral head 1, 4 and 10 weeks after high energy extracorporeal shock wave treatment. Tenascin-C which is an anti-adhesion molecule found in tissues undergoing remodeling has been shown to be increased in osteoarthritis. Concerning the fact that an increased signal for Tenascin-C was found in all groups after treatment we assume a long term effect. We conclude that high energy extracorporeal shock waves might cause degenerative effects on joint cartilage. The application of high energy shock waves to treat avascular necrosis of the femoral head should be reconsidered.