The Effect of Focused Extracorporeal Shockwaves on Migration Activity of Mesenchymal Stem Cells (MSCs) Ex-vivo.

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In contrast to the omnipotent embryonic stem cells which can differentiate into all types of tissue, the so-called adult MSC`s, which are primarily found in bone marrow, exhibit a limited potential of differentiation. They can mainly differentiate into muscle, cartilage and bone tissue as well as into connective and fatty tissue. Thus to regenerate these tissues, MSC`S are required. The question arises as to which mechanism provides the route to the locus where they are needed. Up to now, a direct effect on the migration activity of MSC`S through high physical strain in sports activities was established only by one researched team at the Sports University of Cologne. Based on these findings we set out to produce a similar effect through the impact of external mechanical stress. And indeed, through the use of focused extracorporeal shockwaves (ESWs) we were the first to increase significantly the migration of MSC`s. The proof was obtained by means of the Boyden-Chamber assay in a pig skin model.
The fact that targeted and well-defined activation of MSC's is possible opens up the possibility to observe and monitor further signal and differentiation paths of MSC's. This potentially provides tremendous scope not only for therapeutic benefits of ESWs in the orthopaedic surgical domain, but also for cardiovascular regeneration.