

# Efficacy of Extracorporeal Shock-wave Therapy in Knee Osteoarthritis (animal study)

## Authors:

N.Ochiai\*,S.Ohtori\*,T.Saiasu\*\*,K.Takahashi\*,N.Takahashi\*,R.Murata\*,Y.Wada\*\*\*,H.Moriya\*

## Institution:

\*Department of orthopedic Surgery, Chiba university, School of medicine,

\*\*Division of Orthopedic Surgery, Chiba children's Hospital

\*\*\*Department of orthopedic Surgery, Teikyo Ichihara Hospital

## Introduction

There have been several reports on the use of extracorporeal shock waves in the treatment of pseudarthrosis, calcifying tendinitis, and tendinopathies of the elbow. However, there was no study for the treatment of knee osteoarthritis (OA).

[Purpose] To investigate the effect of shock wave application for knee OA, we analyzed changes in calcitonin gene-related peptide (CGRP)-immunoreactive (ir) dorsal root ganglion (DRG) neurons.

## Material and method:

We made knee OA rat using the method of transecting anterior cruciate ligament, medial meniscus and medial collateral ligament. We divided into 3 groups. 1) Non-treated group (6 knees) 2) Knee OA group (6 knees) 3) shock wave group (6 knees). Fluorogold (neurotracer) were injected into the medial knee joint 10 days before perfusion fixation using 4% paraformaldehyde. In the shock wave group, shock wave (1000 shots, 4Hz, 0.08mJ/mm<sup>2</sup>) applied to the medial knee joint 10 days after injection of fluorogold and perfusion fixation was performed 4 days after application of shock waves. We statistically analyzed the number of CGRP-ir fluorogold-labeled neurons among non-treated group, knee OA group and shock wave group.

## Result:

In the non-treated group, fluorogold-labeled dorsal root ganglion neurons innervating the medial knee joint were distributed in the L1 to L6 dorsal root ganglia. There were statistically significance between the non-treated group and knee OA group, and between knee OA group and shock wave group. Shock wave application reduced CGRP-ir neurons in DRG.

## Discussion and conclusion:

We previously reported that application of shock wave to rat skin reduced the CGRP expression in DRG neurons and degeneration of free nerve endings. But these studies were applied shock wave to the normal condition. So we do not know whether the same condition occurs in the pathological condition. This study was applied shock wave to the pathological model and also confirmed the reduction of CGRP-ir neurons in DRG. These data shows that extracorporeal shock wave therapy may be useful for the treatment of knee OA.