

Treatment of osteoporosis with defocused extracorporeal shock wave therapy: a clinical pilot study

Marianne Koolen¹, Moyo Kruyt¹, Cumhuri Öner¹, Wolfgang Schaden², Harrie Weinans^{1,3,4}, Olav van der Jagt⁵

1 Department of Orthopaedics, University Medical Centre Utrecht, Utrecht, the Netherlands

2 Department of Traumatology, AUVA Trauma Center Meidling, Vienna, Austria

3 Department of Rheumatology and Clinical Immunology, University Medical Centre Utrecht, Utrecht, the Netherlands

4 Department of Biomechanical Engineering, Faculty of Mechanical, Maritime, and Materials Engineering, Delft University of Technology, Delft, The Netherlands

5 Department of Orthopaedics, Elisabeth-TweeSteden Hospital, Tilburg, the Netherlands

1. Introduction

Defocused extracorporeal shock wave therapy might stimulate bone formation to reduce the fracture risk. In this study we assessed the safety of defocused extracorporeal shock wave therapy and its effects on bone mass.

2. Materials & Method

A clinical pilot study with twelve female patients free of bone disease undergoing elective surgery of the lower extremity or elective spinal surgery under general anesthesia received 3.000 electrohydraulic generated defocused extracorporeal shock waves (energy flux density 0.3 mJ/mm²) to one distal forearm. The contra lateral forearm served as a control. We examined the effect on bone mass with the use of repeated dual energy X-ray absorptiometry measurements and we measured patient discomfort around the therapy.

3. Results

No difference in bone mineral content and density was measured six and twelve weeks after therapy. Shock wave therapy occasionally caused transient erythema or mild hematoma, but no discomfort in daily life or (late) adverse events.

4. Discussion

Defocused extracorporeal shock wave therapy is a safe treatment, but no increase in bone mass on the forearm was found at 0.3 mJ/mm² energy flux density. In this (under powered) study we were not able to demonstrate that a single treatment with defocused shock wave therapy in unselected patients had any effect in terms of BMD or BMC. A power analysis indicated that 174 patients are required to show an effect size of 0.3 with a power of 80%.