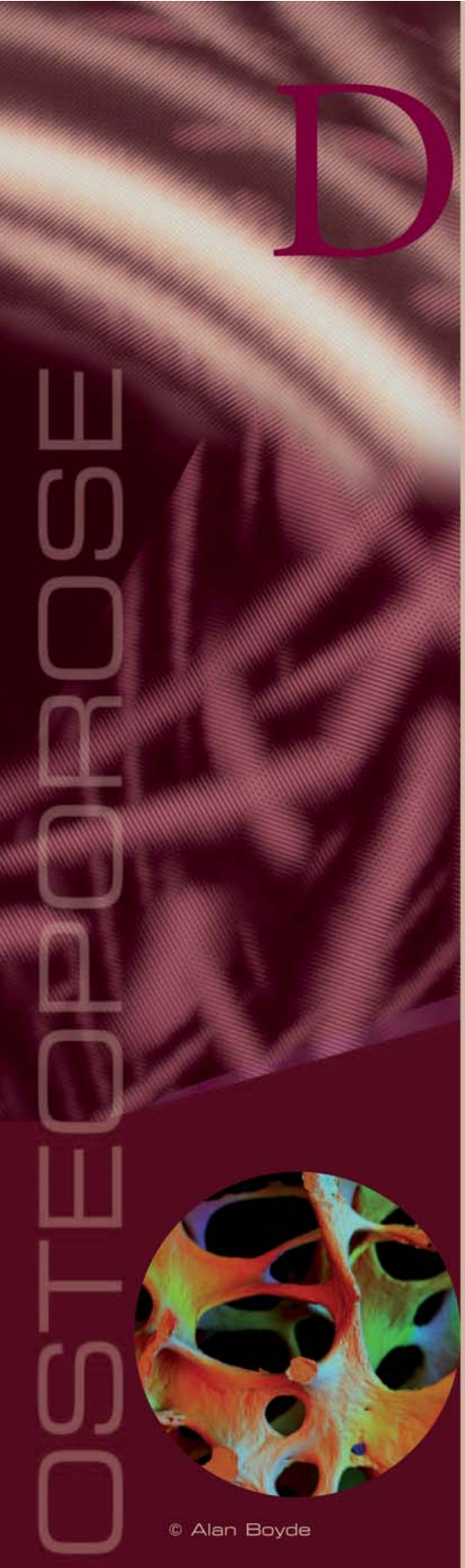

The demographic changes currently taking place in populations across the world pose increasing challenges to modern medical practices. With respect to osteoporosis, this has meant a steady increase in sufferers with more or less pronounced symptoms. So far, conservative osteoporosis treatment has tended to be based primarily on medication, with a secondary emphasis on prevention and avoidance of risk factors (being overweight, life-style changes, underlying diseases, concomitant medication, lack of exercise). The primary aim of osteoporosis treatments is to stop the progressive reduction in bone mineral density, to increase bone density and to lower the risk of fracture.

The aim of the present study was to demonstrate the effects of MBST® Magnetic Resonance Therapy on bone mineral density.

Materials and Method

A total of 54 patients were given whole-body MBST® Magnetic Resonance Therapy between January 2004 and March 2006. Of these, 41 were assessed after 6 months. Of the seven dropouts, one patient died from unrelated causes before completion of treatment, two patients were diagnosed with a malignant underlying diseases during treatment, one patient had to undergo hip surgery, and the remaining nine patients exhibited normal bone density (T-Score < -1.5).

The study only included patients with a bone density as found in osteopenia or manifest osteoporosis prior to treatment.

This was ascertained by QCT (Quantitative Computed Tomography) on the lumbar spine performed by a radiology centre. The 6-month follow-up examinations were performed by the same centre under standardised conditions.

The patients also underwent a standardised checklist-based osteological assessment (medical history, clinical examination, laboratory examinations, risk profile, underlying diseases, e.g. osteomalacia, presence of osteoporotic fractures, medication). Patients who had already suffered osteoporotic vertebral body fractures or were receiving treatment with Teriparatide, were excluded from the study to avoid any falsification of the bone density measurement results.

Patients who were receiving treatment with bisphosphonates or selective estrogen receptor modulators were assessed as a separate subset.

Patients also received a basic therapy comprising calcium and Vitamin D3 (1000 IU), and hydrated with approx. 2 litres of fluids prior to and in addition to Magnetic Resonance Therapy treatment.

The treatments were administered over 10 consecutive weekdays (with a 2-day weekend break), at the same time every day, using a conventional whole-body Magnetic Resonance Therapy couch (Osteo-DolorMed) manufactured by Medtec Medizintechnik, Wetzlar. Each treatment (10x) lasted 1 hour (10 x 1).

Patients were questioned and assessed both prospectively, before the start of treatment, after completing treating, three and six

Offprint from ORTHODOC. 05/2008

The treatment of osteoporosis with MBST® Magnetic Resonance Therapy

Authors: Dr. med. Thomas Handschuh,
Prof. Dr.med. habil. Christian Melzer
Waldkrankenhaus (Forest Clinic) Bad Düben, Specialist Clinic for Orhtopaedics
Gustav-Adolf-Straße 15a, 04849 Bad Düben, Germany
email: Th.Handschuh@gmx.de

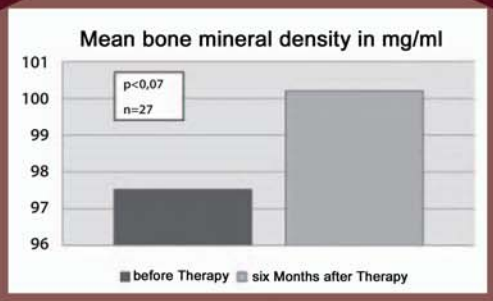

Fig.1a

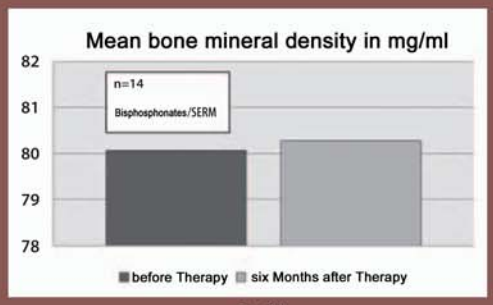

Fig.1b

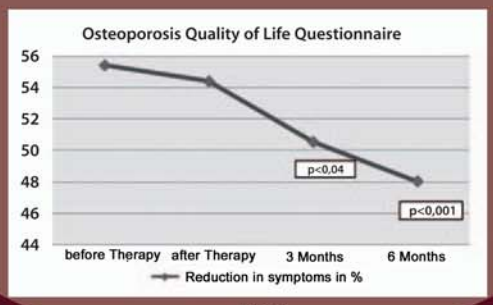

Fig.2

months post treatment. The scores used for these assessments were a modified Fairbank Score, the Roland-Morris Low Back Pain and Disability Questionnaire, the Osteoporosis Quality Of Life Questionnaire, and a Numerical Analog Scale for assessing peak pain, pain at rest and chronic pain [4,5]. Bone mineral density was assessed by QCT before the start and six months after completion of treatment. The scores and questionnaires were analysed using a T-Test for paired samples.

Results

The study involved the assessment of a total of 41 patients. These were divided into one group of 27 participants and one group of 14 patients that were receiving long-term treatment involving bisphosphonates or selective estrogen receptor modulators.

Participants' mean bone density (in mg/ml), as measured by means of LS QCT, before the start of Magnetic Resonance Therapy amounted to 97.5 mg/ml (SD: 16.9).

At the six-month follow-up, bone density had, on average, increased to 100.2 mg/ml ($p < 0.05$, SD: 15.8).

The group of 14 patients who were receiving long-term medication-based treatment for their osteoporosis did not show any significant increases in bone mineral density at the six-month follow-up (Fig. 1a, 1b).

The Osteoporosis Quality Of Life Questionnaire assesses pain, restrictions on daily activities, domestic chores, exercise, leisure and social activities, perception of overall health, and psychological well-being, and is therefore a good indicator of patient's overall quality of life.

The Osteoporosis Quality Of Life Questionnaire results recorded by this study did not show any signficant difference with respect to quality of life during and immediately after treatment. However, patients' quality of life did improve significantly during the course of the first six months after treatment. This improvement directly correlated to increases in bone density (Fig. 2). The modified Fairbank Score and Roland-Morris Questionnaire produced similar results (Fig. 3, 4).

The analysis of the most reliable indicator of the pain experienced by participants – the Numerical Analog Scale for assessing peak pain, pain at rest and chronic pain – showed that there was no change to participants pain at rest during and immediately after treatment. All of these three types of pain had, however, also significantly diminished at the three and six-month follow-up (Fig. 5).

Discussion

It is not that long ago that the positive effects of Magnetic Resonance Therapy on the regeneration of cartilage structures, stimulation of chondrocyte synthesis, in vitro reduction of proteoglycan degradation, and the treatment of chronic and acute back pain were finally verified [3, 6-13].

It is not that long ago that the positive effect of Magnetic Resonance Therapy on the proliferation rates of both chondrocytes and osteoblasts were finally verified. This study investigated the effect of Magnetic Resonance Therapy on the bone mineral density of patients with manifest osteoporosis. All patients experienced a significant increase in bone density 6-months after treatment.

The active principle of MBST® Magnetic Resonance Therapy is based on the regulation of electric charges in accordance with the drop in the potential of a cell. If cells are placed inside a strong electromagnetic field and exposed to a high-magnetic frequency, the protons inside the cells' hydrogen atoms will resonate with this frequency – i.e. align themselves with it.

The electromagnetic field generated by the special, static multiple-coil system employed by a MBST® device causes the protons of the cells' hydrogen atoms to align their poles (spin axis) with this field. The hydrogen atoms' energy levels are then influenced through specific changes in the frequency of the electromagnetic field which are achieved through the use of radio frequencies with modulated treatment sequences. The subsequent spin induced in the hydrogen protons increases their energy, which is dissipated to the surrounding tissue in a highly effective manner when the field direction is subsequently changed again. The use of these ion dynamics for therapeutic purposes is based on the assumption that they induce regenerative processes (bone regeneration, pain behaviour). The aim of this study, which was inspired by the positive effects in vitro on the proliferation and life span of osteoblasts [6], was to verify the effect of Magnetic Resonance Therapy on bone mineral density.

All of the 27 study participants experienced a significant increase in bone mineral density six months after the completion of treatment.

The 14 patients who underwent long-term treatment with bisphosphonates and SERMs, however, did not experience any significant changes in their bone density six months after completion of treatment. It is currently assumed that this is likely to be due to the stabilising effect that bisphosphonates and SERMs have on bone structure. The activity scores (OQOLQ, Fairbank, Roland-Morris) evidenced a significant improved in overall quality of life for all participants six months after completion of treatment.

These results [11,12,13] and the study's findings that MBST® Magnetic Resonance Therapy is not associated with any serious side effects [6,8,9], are both in keeping with the data available in the literature. The only exception to this was a short-term increase in peak pain and pain at rest during and immediately after treatment. Although the reasons this are not currently understood,

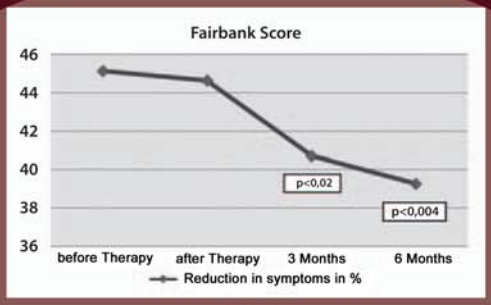

Fig. 3

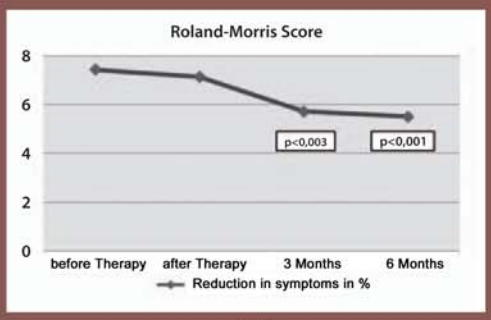

Fig. 4

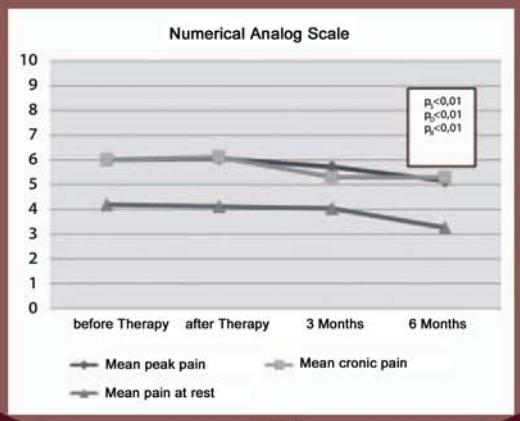

Fig. 5

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it is assumed that this increase in pain is a manifestation of the body's response (increase in the bone's metabolic rate) to the treatment.

Conclusion

MBST® Magnetic Resonance Therapy is an innovative and easy to use treatment procedure, that is not associated with any side effects, and that will stabilise and increase bone density, reduce symptoms, and increase the overall well-being of patients in the short-term when used in conjunction with a basic supplementation therapy of calcium and Vitamin D3.

It does not have any effect on the bone density of patients undergoing long-term treatment with bisphosphonates and SERMs.

MBST® Magnetic Resonance Therapy also proves an interesting treatment option with respect to the costs associated with its use as opposed to those associated with the long-term medication-based treatment of osteoporosis.

Since there is not, at present, any comparative data nor any data on the long-term use of MBST® Magnetic Resonance Therapy, its long-term effects and benefits in the conservative treatment of osteoporosis will yet have to be investigated.

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Event Notice:
Berlin 2008,
Orthopaedics Congress
23rd October, 16:50 hrs
Hall 2, ICC Berlin
Scientific talk by
Prof. Dr. Werner Kullich:
Functional improvement in finger joint arthritis through the therapeutic use of magnetic resonance