SUCCESSFUL TREATMENT OF OSTEOPOROSIS USING THE MAGNETIC FIELD THERAPY TREATMENT

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The present study, led by Associate Professor Dr. W. Passath and Prof. Dr. G. Leb of the Medical Clinic of Karl Franzen University, Graz, covered the selection of patients, their treatment as well as all monitoring examinations. Karl Franzen University has provided for evaluation the original data on the treatments and density measurements.

1. Summary

A total number of 36 female patients aged 46 to 61 (\(\bar{x}=53.3\)) were given a Magnetic Field Therapy (hereinafter: "MFT patients"). The course of therapy consisted in each case of 30 treatments of 45 minutes each, extended over a period of 8 to 12 weeks. The bone density of each individual patient was measured prior to the MFT treatment as well as 3, 6 and 12 months thereafter. As supplementary therapy the patients received estrogens, calcium and vitamin D3.

In the 36 patients having bone densities in the Z-score region from -2.74 up to +0.05, the bone metabolism value was \(5.81\%\) within one year after termination of the therapy (\(p \leq 0.0001\)).

Out of that group, in 23 patients aged 46 to 61 (\(x=53.6\)) suffering from osteoporosis and with bone density in the Z-score region from -2.74 up to -1.04, a bone density increase of 7.5\% was established within one year after the termination of the MFT therapy (\(p<0.0001\)). A control group consisting of 35 patients aged 37 to 62 (\(\bar{x}=53.1\)), who received the same medication, showed a bone density increase of about 0.8\%.

According to the supplementary medication received, the following sub-groups were distinguished among the MFT patients:

- Estrogens for less than three months
- Estrogens for over twelve months
- No estrogens
- Pre-menopausal.

An evaluation of the bone density increase in these sub-groups showed no significant differences.

The therapy at the chosen magnetic field strength showed neither subjective or objective side-effects.

2. Introduction

2.1 The disease, occurrence and frequency
Osteoporosis, a demineralisation of the bony skeleton which starts out from the axial skeleton, has been often considered by the afflicted as an inescapable fate. Only in the last twenty years did osteoporosis in the various forms it assumes become more and more the subject of systematic medical research.

Investigations of the frequency of this condition in European countries and in the U.S.A. show that about 30% of the female population aged over 50 suffer from the disease or are at risk of being afflicted by it. In addition, about 10% of men over 60 also contract it. In Japan the relative number of osteoporosis patients out of the total population is higher still.

In the Federal Republic of Germany alone, 7 to 8 million people suffer from this disease. Their number will keep mounting sharply.

The changed lifestyle which has become common in the last decades, of relatively slight physical exertion with simultaneous lack of movement in professional and private everyday life, which often goes together with unwise diet and unbalanced nutrition, has led in the past in the age groups 15 to 35 to comparatively slight build-up of bone density. When this age group reaches the fifth decade of their life, the number of people threatened by osteoporosis will definitely increase.

2.2 Phenomenology and consequences

An early onset of inability to work leads to social deterioration of the patients and hence to a considerable socio-political problem.

Together with accelerated loss of bone density, the patients usually suffer sharp pains, often associated with fractures in the plates of the lumbar vertebrae and a marked decline in mobility (19, 22, 23, 24, 26, 36, 37, 42, 49, 50).

Even slight traumas give rise to spontaneous fractures and fractures of the femur neck, lead to hip-joint necrosis and expensive hip surgery, and in many cases finally reduce the patient to a relief case. The statistics show that around 20% of all patients die following these operations.

It is an outstanding medical, social and economic necessity to arrest bone decay through osteoporosis in order to prevent the occurrence of spontaneous fractures.

2.3 The possibilities of medication

The various pharmaceutical means at our disposal at present, such as estrogens, calcium and vitamin D3, can serve to compensate in part for the accelerated post-menopausal bone decay and the usually reduced assimilation of nutritional calcium (20, 34, 45, 46, 51, 53, 54).

The isolated build-up of fluorides and the irreversible arrest of decay through the use of such agents as bio-phosphanates are matters on which opinions are divided (1, 17, 18, 38).
The distance of the vertebrae from the muscles of the back is determined by means of a depth-meter designed by Haas, without resorting to X-rays.

The bone density of the patient was measured prior to the treatment as well as three months after the treatment, using the DPA, DEXA or QCT procedures. A significant increase of bone density was observed. In the course of the therapy the patients stated that a subjective improvement of their well-being was felt already after ten to twenty sessions, expressed in easing of the pains as well as in improvement of mobility. These first positive results led to a further investigation, undertaken in the medical clinic of the Karl Franzen University, Graz, under the direction of Prof. Dr. G. Krejs.

The guidelines for the therapy were determined by Haas.

3. Patients, Material and Method

3.1 General

With the therapeutic equipment placed at our disposal it was possible to treat the area of the entire spinal column, which is the place most prone to osteoporosis. Our aim was to examine critically the effectiveness of the M.F.T. procedure. To that end 44 female patients were given a treatment cycle consisting of 30 hours of therapy, divided over 8 to 12 weeks.

In the following we report on our experience with the application of this method and on the results obtained in respect of alterations in bone density.

In parallel, a control group was picked from among the ambulatory patients of the clinic and subjected to comparative observation. Both the MFT patients and the control group received supplementary medication in the form of estrogens, calcium and vitamin D3.

The subjective feeling of well-being, including in particular also any side-effects, was recorded by questioning following each treatment.

3.2 The treatment programme

In order to achieve success in the therapy, 30 separate sessions were allowed in each case, whereby each session extended over 45 minutes. The treatments were administered either daily, or every second or every third day. The entire treatment cycle extended over 8 to 12 weeks. Treatments were given in the morning as well as in the afternoon, so that professionally-active people could also be included. Patients were questioned in daily visits concerning effects and side-effects, which were recorded, the supplementary medication therapy was monitored and the execution of the recommended isometric and gymnastic exercises was verified.

3.3 Patient selection

The patients invited to participate in this treatment programme were women in whom osteoporosis involving loss of bone density and requiring treatment had been diagnosed up to
- Estrogens for less than 3 months (n = 14);
- Estrogens for more than 12 months (n = 8);
- No estrogens (n = 11);
- Pre-menopausal (n = 3).

<table>
<thead>
<tr>
<th></th>
<th>MFT group</th>
<th>Control group</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Score &lt; -1</td>
<td>All</td>
<td>Score &lt; -1</td>
</tr>
<tr>
<td>Patients</td>
<td>n = 23</td>
<td>n = 36</td>
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<tr>
<td>Lumbar vertebrae</td>
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<td>n_LV = 141</td>
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<tr>
<td>Age</td>
<td>( \bar{x} = 53.56 \text{ Y} )</td>
<td>( \bar{x} = 53.33 \text{ Y} )</td>
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<td></td>
<td>( s_x = 4.33 )</td>
<td>( s_x = 4.34 )</td>
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<tr>
<td>Age group</td>
<td>46 to 61 Y</td>
<td>46 to 61 Y</td>
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<tr>
<td>Height</td>
<td>( \bar{x} = 160.9 \text{ cm} )</td>
<td>( \bar{x} = 161.4 \text{ cm} )</td>
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<td></td>
<td>( s_x = 3.88 )</td>
<td>( s_x = 4.6 )</td>
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<tr>
<td>Weight</td>
<td>( \bar{x} = 58.73 \text{ kg} )</td>
<td>( \bar{x} = 59.16 \text{ kg} )</td>
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<tr>
<td></td>
<td>( s_x = 9.62 )</td>
<td>( s_x = 9.4 )</td>
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Table 1: Detailed patient data, including mean age, the age span, mean height and mean body weight of the patients in all four sub-groups.

Lumbar vertebrae no. 1 to 4 were measured for bone density, as a rule. In a few cases only the measurements of lumbar vertebrae no. 2 to 4 were taken into account, so that the total number of lumbar vertebrae given is slightly less than that expected by simple reckoning for the group.
Eight of the patients were not included in the evaluation, on the following grounds:

1. The measurement values of a 36-year-old patient (pre-menopausal) were included only in the graphic representation, but not in the statistical processing. This patient reached an increase of bone density by about 22% without any kind of supplementary medication. The initial Z score was -2.86.

2. The measurement values of a 37-year-old patient were also not taken into account - her height was 166 cm and her weight increased from 76 to 87 kg - because the measured bone density increase

3. In the case of one patient the initial bone density determinations and the first control measurements following the MFT therapy were carried out with another bone densitometer. The measured values of bone density are not comparable and were therefore disregarded in the statistical evaluation.

4. The measurement of bone density values of one patient were discarded after an initial measurement showed a fall of bone density by -22% and then, in a repeated measurement, a rise by +24%.

5. For one patient it was recorded that her subjective feeling was excellent, because she was no longer in any pain, but the bone density measurements for this patient fluctuated very much - evidently due to erroneous assignment of a lumbar vertebrae - and thus disregarded.

6. 7 and 8. In the case of 3 patients, calcitonin therapy was administered in parallel to the MFT therapy. The increase in bone density of this patient sub-group lies in the same range as the other density increases. Due to the small number of therapy combinations a statistically relevant conclusion is not given. In order to avoid misinterpretation, this group was left out of the evaluation and is not included in the statistical conclusion.
Discussion and Outlook

In this study it could be shown that the bone density increase initiated by the newly-introduced magnetic field therapy achieved for patients with marked osteoporosis improvements of +7.5%, or of +5.8% for all patients, as measured one year after the end of therapy, a result which is most significant \( p < 0.0001 \) as compared with the control group.

In parallel to the investigation undertaken at Graz, investigations were also undertaken in the in Munich with different therapy parameters. The result was an unambiguously positive correlation of bone density increase and magnetic field intensity, up to a well-defined intensity. By adopting these data, bone density increases from 10 up to 15% were achieved. Future studies are expected to yield similar results, without any subjectively unpleasant or damaging side-effects.

Encouraged by the positive results obtained in Graz and in Munich, further studies are now under way in Great Britain and in Italy.

Additional and more comprehensive studies would be necessary in order to provide satisfactory answers to existing and newly-arising questions. Thus, for instance, it must be examined whether stagewise application of M.F.T. may achieve yet higher increase in bone density and/or a longer staying period of the positive effect. In particular for patients suffering from severe osteoporosis, whose bone density lies below the spontaneous fracture limit, it should be examined in what way it may be possible to raise their bone density above that limit.

In further investigations it must also be examined whether and to what extent concomitant or alternating medications can be applied together with M.F.T. to achieve a synergistic effect.

Problems of detail could, in the future, be differentiated with the help of the new generation of bone densitometry apparatus having improved absolute accuracy of 1% and reproducibility of 0.5%, which would then also make it easier to carry out lateral lumbar vertebrae measurements.

Despite the fact that alleviation of pains up to complete freedom from pain, improvement of mobility and general well-being achieved through M.F.T. is significant, the subjective improvement reported by patients is not included among the successful results of M.F.T. as reported in this study.

The analgesic effect of M.F.T. should be further and more pointedly studied in further investigations.

Another important research area seems to be, according to observations so far carried out, the study of changes of serum parameters.