

Strong employees

Results of a bone density screening and subsequent micro-nutrient intervention in the context of workplace health promotion

Osteoporosis and its sequelae (e.g. restricted mobility or limited heart and lung function because of vertebral fractures in older people) are an issue that companies must increasingly take into account as an economic cost factor based on demographic developments.

As part of Biogena's employee health promotion programme, all employees and their families at risk of osteoporosis were offered the opportunity to have their bone density measured in 2013. Individuals with osteopenia (T-value < -1) or osteoporosis (T-score < -2.5) were able to participate in a six-month intervention with the ossein-hydroxyapatite-containing micro-nutrient preparation (Biogena Osteo Calbon Complex Gold).

The results of the six-month intervention confirm the results of previous observations: participants were able to increase the bone density of their spine by +0.44% and that of their hips by as much as +2.21%. There was a clear dose-effect relationship.

Regular use of a special micro-nutrient preparation (Biogena Osteo Calbon Complex Gold) is a dietary option for not only maintaining but also increasing bone density in osteopenia patients. Previous results from Biogena intervention studies were reproduced in this intervention.

Background

Osteoporosis – one of the most common diseases worldwide – will place an even greater burden on health systems because of increasing life expectancies and the resulting change in the age pyramid. In the future, people who are still economically active will also be affected to an increasing extent because of longer working lives. As a result, this topic is becoming increasingly relevant to business management.

Even the current data are worrying: For example, the Bone Evaluation Study (BEST) conducted in Germany in 2013 determined an osteoporosis prevalence of 14% in subjects over 50 based on insurance data.

Although women are more affected than men (24%)¹⁾, it is slowly becoming clear that osteoporosis is not exclusively a "women's disease"²⁾.

Because of the high economic costs that osteoporosis represents for companies with a growing number of older employees, it is worthwhile dealing with this topic at an early stage.

Within the framework of workplace health promotion, screening measures are an efficient way of addressing bone health.

The enormous consequences of this disease for the personal life perspective are usually completely underestimated by the individual. Because osteoporosis develops slowly and without symptoms or pain, early detection and prevention measures are not taken seriously enough.

Osteopenia is considered an optional precursor of osteoporosis. The identification of osteopenia (especially with existing risk factors) and a targeted intervention with nutritive components makes it possible to counteract bone mass loss at an early stage. The aim is to slow down or – ideally – even prevent the development of osteoporosis.

Study objective

The identification and treatment of employees with osteopenia or osteoporosis as part of workplace health promotion and verification of previous data demonstrating the increase in bone density in the hip and spine through supplementation with a special micro-nutrient preparation (Biogena Osteo Calbon Complex Gold).

Sequence of events

In December 2012, the risk of osteoporosis among Biogena employees (and relatives) participating voluntarily (n = 134) was surveyed in the context of workplace health promotion by means of a questionnaire. Factors for an increased risk include loss in weight, gastrointestinal diseases, food intolerances and allergies, long-term medication (thyroid hormones, corticoids, proton pump inhibitors, laxatives), and menopause/advanced age (men over 60). Participants with an increased risk (n = 77) had the opportunity to participate in a free bone density measurement. About half of this group (n = 34) accepted the offer. Measurements of hip and spine using X-ray absorptiometry (DXA) were performed at the Urania Diagnosis Centre in Vienna, the Schallmoos Institute of Radiology Medical Centre in Salzburg, and the St. Peter Osteoporosis Apparatus Group in Graz.

24 participants were diagnosed with osteopenia (T-value between -1 and -2.5) or osteoporosis (T-value < -2.5). This group started with a six-month intervention with the micro-nutrient preparation. In autumn 2013 another DXA measurement was carried out on the participants (n = 18; drop-out = 6).

Bone densitometry

Bone density measurements were performed using standardised DXA (dual X-ray absorptiometry) procedures on the lumbar spine and hip. The total values are calculated from several measuring points at the hip/femur and the spine and form the T-value. The T-value is a statistical quantity that represents the deviation of the measured bone density from the population of young, healthy adults. T-values between -1 and -2.5 indicate osteopenia; values < -2.5 without existing bone fractures indicate preclinical osteoporosis.

Initial values at the beginning of the intervention (T = 0)

18 participants who had completed the intervention and met all inclusion criteria were admitted for the final evaluation: Four men (M = 58.0 years) and 14 women (M = 53.8 years). 14 participants had osteopenia at T = 0, and four had osteoporosis. The mean value for bone density in the spine was 1.0047 g/cm² (calculated from measurements on four vertebrae each); in the hip, it was 0.8993 g/cm² (calculated from three measurement points on the left and right thigh bone in the hip area).

Intervention with a special micro-nutrient preparation

Biogena Osteo Calbon Complex Gold is a dietary foodstuff for the treatment of osteoporosis and osteopenia. It contains Calbon-N[®] (ossein-hydroxyapatite with protein-bound calcium and phosphorus), coral calcium (inorganic calcium), boron, silicon (containing silicic acid), and vitamins D3 and K2. Only 12 participants used the prescribed amount of three capsules daily; six reported having taken a reduced amount of an average of two capsules regularly over six months.

Earlier results

In a 2002 clinical study (Netherlands) of women with proven osteopathy, the main ingredient Calbon-N[®], a protein-bound ossein hydroxyapatite with defined proportions of calcium (32%), phosphorus (14%), and protein (10%), led to a 0.48% increase in bone density in the spine after six months. In the placebo group, a further decrease of 0.81% was measured during the same period.³⁾ In another clinical study conducted in 120 women in 2011, supplementation with ossein hydroxyapatite over three years showed a higher increase in serum osteocalcin and a stronger positive effect on bone density than the use of calcium carbonate.⁴⁾

A recent review of clinical studies and meta-analyses concluded that ossein hydroxyapatite shows significantly better results in maintaining bone density than calcium carbonate supplements.⁵⁾ Earlier results are already available for the combination preparation Biogena Osteo Calbon Complex Gold. In a placebo-controlled study with 33 osteopenic participants, which was conducted in 2012 in an Austrian family practice, six-month supplementation with Biogena Osteo Calbon Complex Gold maintained bone density in the spine (this was reduced by 13.3% in the placebo group). In the hip, bone density increased by 8.2% in the verum group and decreased by 4.2% in the placebo group.⁶⁾

Due to the positive results, this study was extended by six months (Phase 2). 12 participants from the original placebo group and eight from the verum group were supplemented daily with three capsules of Biogena Osteo Calbon Complex Gold.

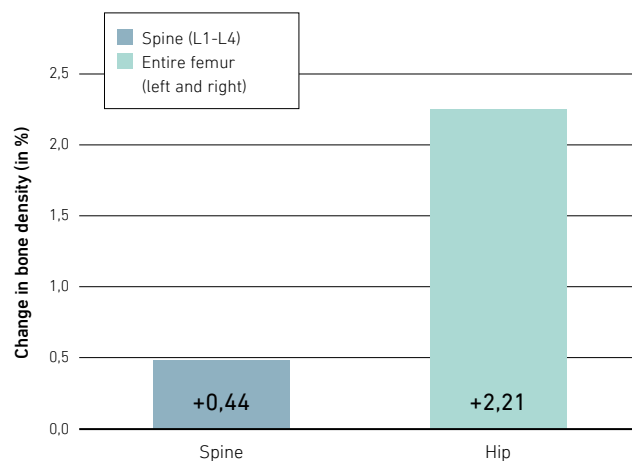
In participants who received supplements of Biogena Osteo Calbon Complex Gold for more than 12 months, bone density in the spine and hip increased by an average of 12.8% and 8.15%, respectively. The participants from the original placebo group were able to compensate for the bone density losses during the second phase of placebo intake or maintain the status.⁷⁾

Result of this intervention

The evaluation of the DXA measurements shows that an intervention with Biogena Osteo Calbon Complex Gold in individuals with proven osteopenia or osteoporosis not only leads to the preservation of but also an increase in bone density.

Participants in this intervention showed an increase in bone density from an average of 1.0047 g/cm² (T = 0) to an average of 1.0082 g/cm² (T = 6 months). Bone density in the hip (total femur) increased from an average of 0.8993 g/cm² (T = 0) to 0.9196 g/cm² (T = 6). This corresponds to an average increase in bone density of 0.44% in the spine and 2.21% in the hip (Fig. 1).

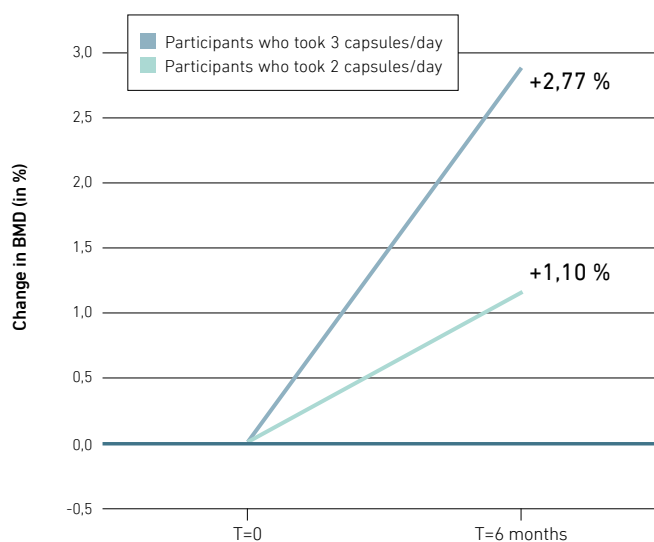
Fig. 1: Percentage rise in bone density of spine and entire femur through six-month intervention with Osteo Calbon Complex Gold (n = 18)



Relationship between effective quantity and increase in bone density

One third of the participants (n = 6) reported having reduced their daily intake from the recommended three to two capsules. A comparison of the change in bone density when taking two capsules versus three capsules suggests a dose-response relationship. Bone mineral density (BMD) in the hip increased by an average of 1.1% for those who took two capsules and by 2.77% for those who took three capsules during the six-month intervention period (Fig. 2). In the spine, BMD increase by 0.3% for those who took two capsules and by 0.51% for those who took three (Fig. 3).

Fig. 2: Change in bone density of the hip (in %) as a function of the absorbed effective volume



Conclusion

A reduction in bone mass should and can be counteracted. The offer of a dietary supplementation with proven effect is a simple, cost-effective and meaningful therapy option in the early stages of osteoporosis and osteopenia. Employees in companies can be sensitized to the topic of bone density within the framework of company health promotion and supported with dietary measures for the prevention of osteoporosis.

Summary

A practical first step in the early detection of osteopenia and osteoporosis is to identify individuals on the basis of known risk factors such as age, menopause, food intolerances, and medication.

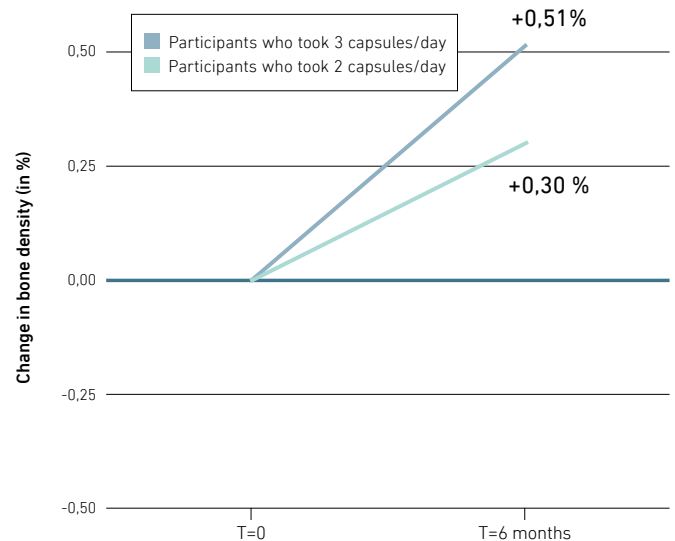
In 70% (n = 24) of the participants selected according to these criteria (n = 34), the suspicion of an existing bone mass loss was confirmed in the subsequent radiological DXA examination.

Through targeted supplementation with Biogena Osteo Calbon Complex Gold, a relevant (but not significant) increase in bone density in the spine and hip was achieved within only six months. The results of the intervention confirm those of previous studies carried out with this preparation. In addition, the recommended daily intake of three capsules showed better results than the intake of only two capsules.

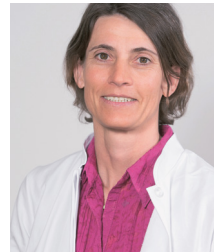
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Fig. 3: Change in bone density of the spine (in %) as a function of the absorbed effective volume



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