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Case Report

A 60-year-old obese woman with osteoarthritis of the knee: a case-report

P. Christensen, B. F. Riecke, R. Christensen and H. Bliddal

The Parker Institute, Copenhagen University Hospital, Frederiksberg, Denmark

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Address for correspondence: Professor H Bliddal, The Parker Institute, Copenhagen University Hospital, Frederiksberg, DK2000 Frederiksberg, Denmark. E-mail: henning.bliddal@frh.regionh.dk

Summary

A case is presented of a 60-year-old woman with concomitant obesity and knee osteoarthritis. The bad knees prevented the patient from exercising; however, with a focused dietary intervention employing food supplements for the first period of 8 weeks, an ordinary low-energy diet for another 8 weeks, the patient lost 17.3 kg; and a further weight loss was achieved during 1-year follow-up totalling 30.6 kg. Lean body mass only changed slightly, 96.8% of the weight loss being fat mass. Along with this her metabolic syndrome decreased and her gait improved. It is suggested that a major weight loss is the treatment of choice in patients with this combination of diseases.

Keywords: Formula diet, lean body mass, obesity, osteoarthritis.

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Introduction

A 60-year-old woman was included in the weight loss trial 'Influence of weight loss or exercise on cartilage in obese knee osteoarthritis patients'. The patient had had knee pain for many years and was diagnosed with osteoarthritis (OA) of the knee, when she was 49 years. She was obese with a body weight of 124.3 kg and a body mass index (BMI)of 48 kg m^{-2}. Before entering the study she lived a very sedentary life, where she watched a lot of television. As she said: 'It was kind of all I could do. I think I had given up'.

How should the patient be evaluated and treated?

The clinical problem

Obesity leads to a large number of changes in the body, including musculoskeletal tissues with a natural focus on the weight-bearing joints in the lower extremity (1,2). Obesity and OA co-exist in an increasing part of the population, and disablement due to knee problems is a major factor for dependence on help from other people and increases with age (3). Approximately 25% of persons 55 years of age or older have had knee pain on most days in a month in the past year (4), and about half of them have radiographic OA in the knee – a group considered to have symptomatic knee OA (5). The term OA describes a common, age-related, heterogeneous group of disorders characterized pathologically by focal areas of loss of articular cartilage in synovial joints, associated with varying degrees of osteophyte formation, subchondral bone change and synovitis (6).

Obesity and OA intertwine in several ways, and the diseases share pathogenetic features and the development of one disease increases the risk of the other and may be the onset of a vicious circle (3). Pain is the most important problem for the patient with OA, and treatment must address the pain while function is maintained at the habitual level (6,7). The OA therapy has some basic components: in all cases, non-pharmacological therapy is advocated, to be supplemented by medication or surgical procedures only if first-line therapy is insufficient, resulting in a stepwise intensification of therapies (7). There is now evidence showing that the functional status is dramatically ameliorated by treating effectively the obesity of patients with co-occurring OA (8); with the short-term results equal to that of a joint replacement (9). According to the *Osteoarthritis Research Society International* (OARSI): 'Patients with hip and knee OA, who are overweight,

Table 1 Body composition at baseline, week 8, week 16 and week 68

Variable	Week 0	Week 8	Week 16	Week 68
Weight (kg)	124.3	110.6	107.0	93.7
Body mass index (kg m^{-2})	48	41.6	40.3	35.3
Fat mass (kg)	71.6	–	58.6	44.2
Lean body mass (kg)	45.6	–	43.1	44.7
Bone mineral content (g)	2763	–	2620	2601
Bone mineral density (g cm^{-2})	1.52	–	1.149	1.119

should be encouraged to lose weight and maintain their weight at a lower level' (10); A recommendation strongly support by all members of the guideline development group (100%).

The intervention

The primary outcome of the study was the number of patients responding to therapy according to the OMERACT-OARSI responder criteria (11,12). The three items of the OMERACT-OARSI responder criteria were assessed using a 10 cm visual analogue scale (VAS) with separate results for pain, disability and global evaluation of the patient. According to the guidelines of (OMERACT-OARSI) the Outcome Measures in Rheumatology; OARSI, The Osteoarthritis Research Society International osteoarthritis therapy response is defined as a high improvement in pain or function (≥50%) and an absolute change ≥20%, or an improvement in at least 2 of the 3 following; pain ≥20% and absolute change ≥10%; function ≥20% and absolute change ≥10%; patient's global assessment ≥20% and absolute change ≥10%. The trial lasted 68 weeks in total and was divided in three phases. The first 8 weeks was a formula diet only phase, second phase all participants made diet plans of approximately 1200 kcal day^{-1} using part formula/part conventional food. In the third phase the patients were randomized to a 52-week period of either continued dietary instruction, knee-exercise or control more information about the trial and the diet programme are in the accompanying paper in this issue by Christensen *et al.* (13).

Mrs O managed to lose 30.6 kg in total during the 68 weeks. At baseline 71.6 kg of her weight was fat mass and 45.6 kg was lean body mass. After the first 16 weeks she had lost 17.3 kg; of these 2.5 kg were lean body mass, which is around 14.5% of the weight loss. During the last phase of the study she increased her lean body mass, which can probably be explained by her becoming more physically active. Table 1 shows the changes in Mrs O's body composition throughout the study. Mrs O had hypertension when she entered the study. Her blood pressure was 156/106 mmHg and she was using anti-hypertensive medication. After the intensive period with formula diet only her blood pressure had fallen to 122/89 mmHg and it remained stabile during the rest of the study period and her blood pressure medication was reduced. At baseline Mrs O also had elevated levels of blood lipids. As presented in Table 2 both her total cholesterol, low-density lipoprotein cholesterol and her triglycerides were too high. After the weight loss these variables are close to normal.

Table 2 Lipidprofile at baseline, week 8, week 16 and week 68

Variable	Week 0	Week 8	Week 16	Week 68
Total cholesterol (mmol L^{-1})	8.0	5.3	6.3	6.1
HDL cholesterol (mmol L^{-1})	1.55	1.47	1.53	1.68
LDL cholesterol (mmol L^{-1})	5.1	3.2	4.0	3.7
Triglycerides (mmol L^{-1})	3.05	1.3	1.66	1.68
Blood glucose (mmol L^{-1})	5.5	6.0	5.7	5.3

HDL, high-density lipoprotein; LDL, low-density lipoprotein.

In total, 192 patients were included in the trial. The typical knee OA patient participating was a 62-year-old woman, with a BMI of 37, representing 25–30 kg of excess body weight. The patients lost on average 12% of their initial body weight after the first 16 weeks and 64% met the OMERACT-OARSI responder criteria. The results fulfilled the expectations of an intensive dietary programme in these patients.

On radiographs of the knee of Mrs O (see Figs 1,2), a severe OA was found in both the medial femurotibial and the patellofemoral compartments, while only moderate in the lateral compartment, corresponding to a Kellgren–Lawrence (14) score of 4 in the former and a score of 2 in the latter.

Mrs O experienced a significant pain relief after the diet therapy at week 16 (Fig. 3). Although at week 68 her pain score was almost at baseline level, her self-reported symptom score was reduced in the same period (Fig. 4).

In the gait laboratory, her walking speed increased from 1.35 m s^{-1} at baseline to 1.43 m s^{-1} at week 68. Despite the increase in walking speed her absolute knee joint loading was reduced by 22.3%. In this study in general there was a 1.6 larger reduction of the knee joint loading than could be explained by the corresponding loss in body mass.

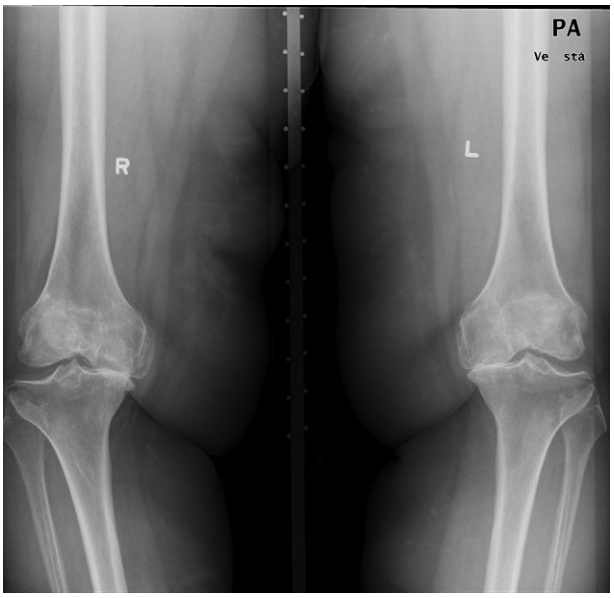

Figure 1 Standing radiogram anterior-posterio of the knees of our patient at baseline before weight loss. The medial compartments (tibiofemoral) are worn down with a severe osteoarthritis, grade 4. Note the masses of soft tissue surrounding the knee. VAS, visual analogue scale.

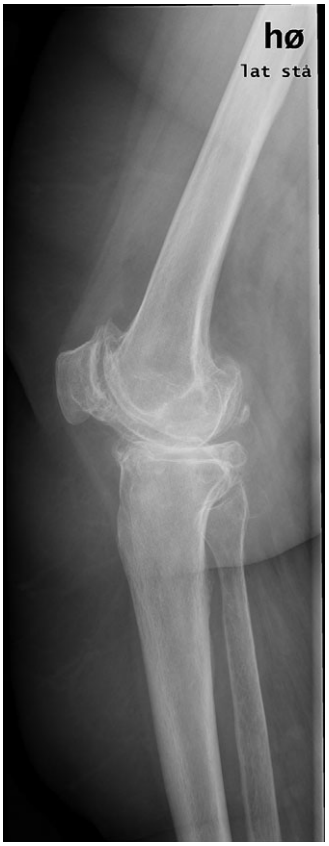

Figure 2 Lateral radiogram of the same patient. Also the compartment between the knee cap and femur is heavily attacked by osteoarthritis with joint space narrowing and formation of osteophytes. Knee injury and osteoarthritis outcomes score (KOOS).

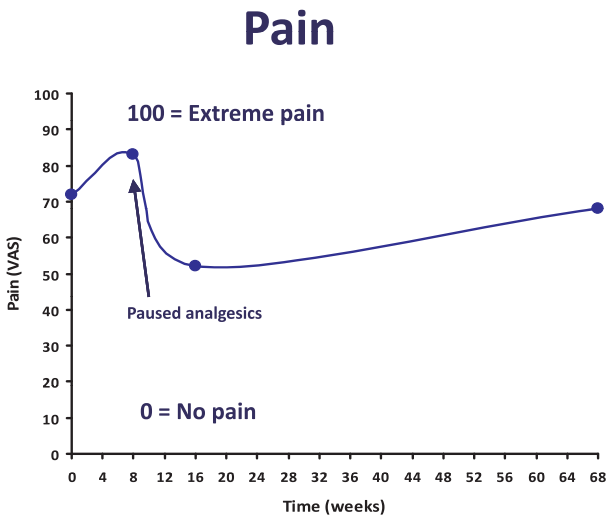

Figure 3 Pain reported by the patient on a Visual Analogue Scale (VAS). The rapid weight loss gave a decrease in pain from severe to moderate over the first 16 weeks and this result was maintained during follow-up of 52 weeks. In the first phase of 8 weeks the patient stopped taking pain killers.

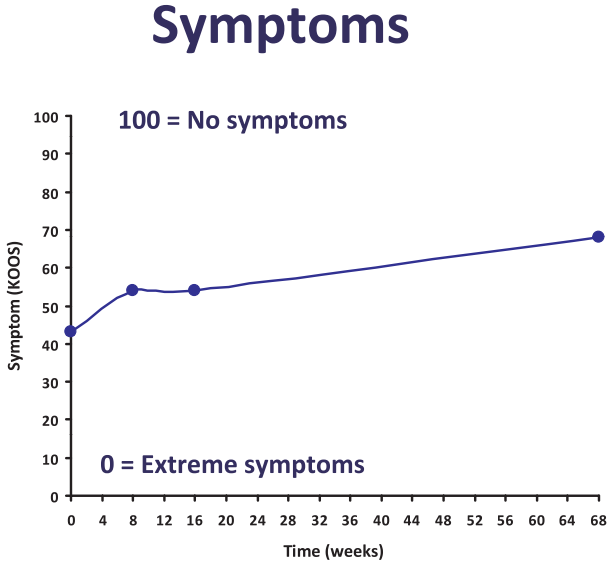

Figure 4 Symptoms evaluated using Knee injury and Osteoarthritis Outcomes Score (KOOS). KOOS is developed as an instrument to assess the patients' opinion about their knee and associated problems.

In conclusion this patient with severe knee OA have lost 30.6 kg in a period of 68 weeks, reducing her BMI from 48 kg m^{-2} to 35.3 kg m^{-2}, with 96.8% of the weight loss being fat mass.

She went from hypertensive to normotensive and her anti-hypertensive medication was reduced. Her blood lipids were improved although she still might need some lipid lowering therapy. She reported more or less the same

pain as at baseline, but she was able to be more physically active, with a higher walking speed, reduced load on her knees and reduction of symptoms, with a higher quality of life. As she said: 'I have a totally different life now'.

Conflicts of Interest Statement

Pia Christensen, Birgit Falk Riecke, Robin Christensen and Henning Bliddal received travel grants to attend scientific meetings from the Cambridge Manufacturing Company.

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