Effectiveness of a combined lifestyle intervention using dietary counselling and resistance exercise in obese older adults with type 2 diabetes (the PROBE study)

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Introduction

Current guidelines for type 2 diabetes focus on weight loss, with loss of muscle mass as potential negative side effect. This study evaluated the effect of a 3-month lifestyle intervention including dietary counselling and resistance exercise on body composition and glycemic control in obese older adults with type 2 diabetes, with additional protein supplementation.

Methods

Older adults between 55-85 y with obesity and (pre-) type 2 diabetes followed a hypocaloric diet (-600 kcal/day) including 10x/week a 21 g whey protein drink enriched with leucine and vitamin D (800 IU) or isocaloric control drink (150 kcal), combined with strength and interval training provided by personal trainers (1 hour, 3x/wk). Participants received individual dietary counselling (6 sessions, 2½ h in total) and 1-hour educational group sessions, biweekly. At baseline and after 13 weeks, total body weight, fat mass, fat free mass, visceral fat, total lean body mass (Dual-Energy X-ray Absorptiometry), waist circumference, HbA1c, 400m walk time, and leg strength (10-RM leg press) were recorded. Changes in study parameters were tested using a paired samples t-test ($p<0.05$).

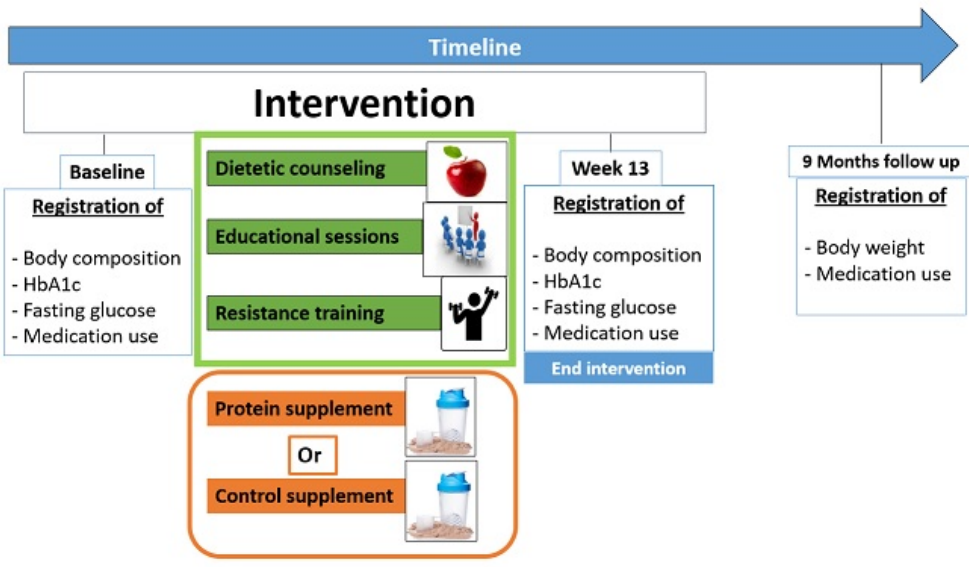

Figure 1. Study overview

Conclusions

The combined lifestyle intervention using dietary counselling and resistance exercise preserved fat free mass during weight loss and improved HbA1c and physical performance in obese older adults with type 2 diabetes.
A whey protein drink enriched with leucine and vitamin D increased total body lean mass during the intervention.

Results

Dropout rate in this combined lifestyle intervention was 15 % (18/123 participants). Mean age was 66±6 y and 65 % was male. Subjects lost 2.7 ± 3.0 kg ($p<0.001$) body weight, while total lean body mass was preserved (+0.1 ± 1.9 kg, $p=0.62$) and fat mass was reduced (-2.6 ± 2.3 kg, $p<0.001$). Waist circumference (-4 ± 4 cm, $p<0.001$), visceral fat (-8 ± 17 %, $p<0.001$), and HbA1c decreased (-4.9 ± 7.8 mmol/mol, $p<0.001$) and 29 % of participants lowered their diabetes medication. 400m walk time decreased (-9 ± 27 s, $p=0.002$) and leg strength increased (+52 ± 42 kg, $p<0.001$). Participants consuming the protein drink increased total lean body mass compared to the control group (+0.56 vs. -0.34 kg, $p=0.017$).

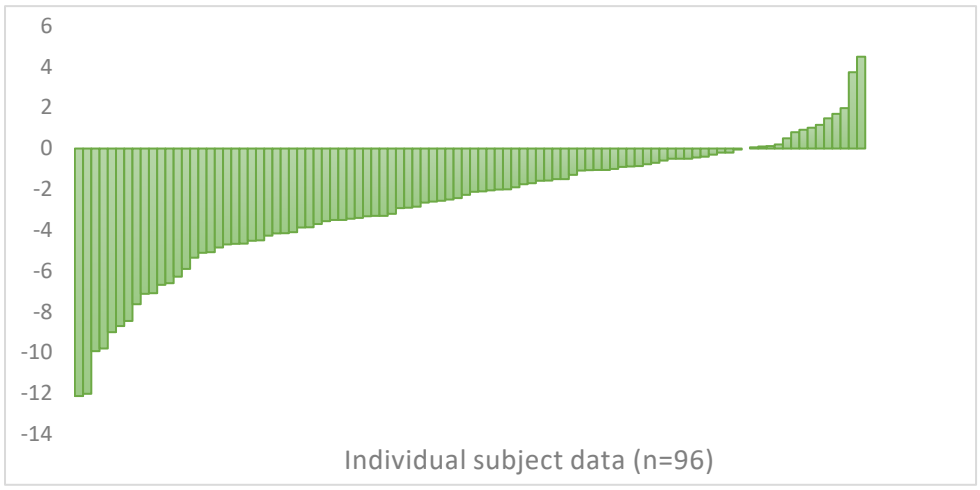

Figure 2. Individual changes in body weight (kg)

Figure 3. Individual changes in fat mass and fat free mass (kg)