

Exercise Mediated Improvements in Insulin Sensitivity and Metabolic Flexibility Are Not Inhibited by a Family History of Type 2 Diabetes

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ABSTRACT

A family history of diabetes (FH+) is considered a risk factor for the development of insulin resistance and type 2 diabetes. However, it is not known whether exercise induced improvement in insulin sensitivity (IS) and metabolic flexibility (MF) are impacted by a FH+, compared to those without (FH-). **PURPOSE:** To determine if a FH+ limits exercise induced improvements in IS, MF, body composition, and strength following an 8-week combined aerobic and resistance training intervention. **METHODS:** 20 sedentary, normoglycemic, Mexican-American males underwent 8-weeks of combined exercise training 3 times/week (35-min aerobic & 45-min resistance training/session). A controlled diet was provided 5 days before pre/post intervention tests. IS was assessed by hyperinsulinemic euglycemic clamp. MF was assessed by change in respiratory quotient (Δ RQ) at the insulin stimulated state of the clamp compared to the fasted state. Body composition was measured using DXA. Upper/lower body strength were measured by 1 repetition maximum bench press and leg strength dynamometer. **RESULTS:** IS significantly improved in both groups (FH- 3.05 \pm 0.25 to 3.74 \pm 0.29ml/kg estimated metabolic body size (EMBS), p=0.05; FH+ 3.53 \pm 0.46 to 4.83 \pm 0.51ml/kg EMBS; p=0.006). MF significantly improved in both groups (FH- 0.72 \pm 0.009 to 0.78 \pm 0.008, p=0.0006; FH+ 0.71 \pm 0.01 to 0.81 \pm 0.02, p=0.0001). Fat free mass significantly improved in both groups (FH- 55.62 \pm 2.19 to 57.71 \pm 2.06kg, p=0.02; FH+ 51.77 \pm 1.95 to 53.45 \pm 1.79kg, p=0.0002) Upper body strength (FH- 164.78 \pm 20.69 to 190.50 \pm 21.10lb, p=0.00001; FH+ 145.45 \pm 15.55 to 178.00 \pm 16.75lb, p=0.00001) and lower body strength (FH- 360.00 \pm 29.13 to 417.00 \pm 24.64lb, p=0.007; FH+ 346.36 \pm 20.63 to 419.50 \pm 15.99lb, p=0.00003) significantly increased in both groups. Degrees of improvement in IS was not different between groups (FH- 28.2 \pm 12.13% vs. FH+ 41.66 \pm 11.87%; p>0.05). **CONCLUSION:** FH+ is not a limiting factor for exercise induced improvements in IS, MF, body composition, and strength in normoglycemic Mexican Americans.