Katherine Brooke-Wavell[1], Rachel L Duckham[1,2], Tahir Masud[3], Rachael Taylor[3], Denise Kendrick[4], Hannah Carpenter[4], Dawn A Skelton[5], Susie Dinan-Young[6], Richard Morris[7], Hayley Ladd[1], Steve Iliffe[4]

[1]School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, UK
[2]Present Address: Institute for Physical Activity and Nutrition Research, Deakin University, Australia
[3]Healthcare for Older People, Nottingham University Hospitals NHS Trust, Nottingham, UK
[4]School of Medicine, University of Nottingham, Nottingham, UK
[5]School of Health and Life Sciences, Glasgow Caledonian University, Glasgow, UK
[6]Department of Primary Care & Population Health, University College London, London, UK
[7]School of Social and Community Medicine, University of Bristol, Bristol, UK

CAN EXERCISE PROTECT AGAINST VERTEBRAL DEFORMITY? THE PROACT65+ BONE STUDY

Background: Exercise may protect against vertebral fracture by increasing bone strength or producing postural adaptation that may modify loading to the vertebrae but very few studies have examined the influence of exercise on vertebral deformity.
Objective: The Otago Exercise Programme (OEP) involves home based strength and balance training. The Falls Management Exercise (FaME) programme also incorporates group exercise including further spinal extensor training. This study aimed to compare effectiveness of FaME and OEP interventions relative to usual care on vertebral heights and incidence of vertebral deformity.
Methods: Participants were 319 men and women, aged (mean $\pm$ SD) 72 $\pm$ 5 years who were recruited through primary care and randomised by practice to FaME, OEP or a usual care group. The spine was scanned in lateral decubitus position using Dual-energy X-ray Absorptiometry (DXA) (GE-Lunar Prodigy) prior to randomisation and following the 24-week intervention. Dual-energy Vertebral Assessment was used to calculate the anterior, middle and posterior heights of T8-L4 vertebral bodies, and detect vertebral deformities. Repeated measures general linear model (GLM), adjusted for gender and age was used to assess vertebral dimensions over time. Alpha level was set at $P<0.05$.
Results: A total of 268 participants (FaME n=95; OEP n=74; usual care n=99) with sufficient vertebral morphometry data were included in the analysis. Four new deformities (OEP: 1, FAME: 2 and Usual care: 1) were detected over the 6-month intervention. Changes in mean vertebral heights were small (ranging from -0.1 to 0.2 mm). There was no significant main effect of time ($p=0.69$) and changes over time did not differ between groups (time x group interaction $p=0.49$).
Discussion: The number of incident deformities was low and there were no statistically significant changes in vertebral height over the six month period. There is a need for longer-term studies to examine the potential role of exercise in preventing vertebral deformity.
Conclusion: Exercise interventions targeted at preventing falls, that included progressive strength exercises, did not influence vertebral height or prevent vertebral deformity.