

Supplemental Information

Bone Mineral Content (BMC):

Pre-Trial and Post-Trial BMC

Pre-trial BMC of lumbar spine is significantly higher ($p=0.009$) in the healthy weight group. However, pre-trial BMC of leg ($p<0.001$) and whole body ($p<0.001$) are significantly higher in the overweight/obese group. Post-trial BMC of lumbar spine shows no significant difference ($p=0.263$) between the healthy weight and overweight/obese group while the BMC of leg ($p<0.001$) and whole body ($p<0.001$) is higher for the overweight/obese group. The mean (± 1 standard error) pre-trial and post-trial BMC with are reported in table1.

Table 1 Participant pre-trial and post-trial BMC by weight class

Body Segment	Mean Pre-Trial BMC (g)		Mean Post-Trial BMC (g)	
	Healthy Weight	Overweight/obese	Healthy Weight	Overweight/obese
Lumbar Spine	23.85 \pm 0.306	22.38 \pm 0.466	25.471 \pm 0.370	24.688 \pm 0.592
Leg	177.27 \pm 2.174	211.45 \pm 4.271	196.602 \pm 2.452	241.517 \pm 4.926
Whole Body	1003.758 \pm 9.142	1132.112 \pm 17.062	1076.579 \pm 10.254	1239.539 \pm 19.272

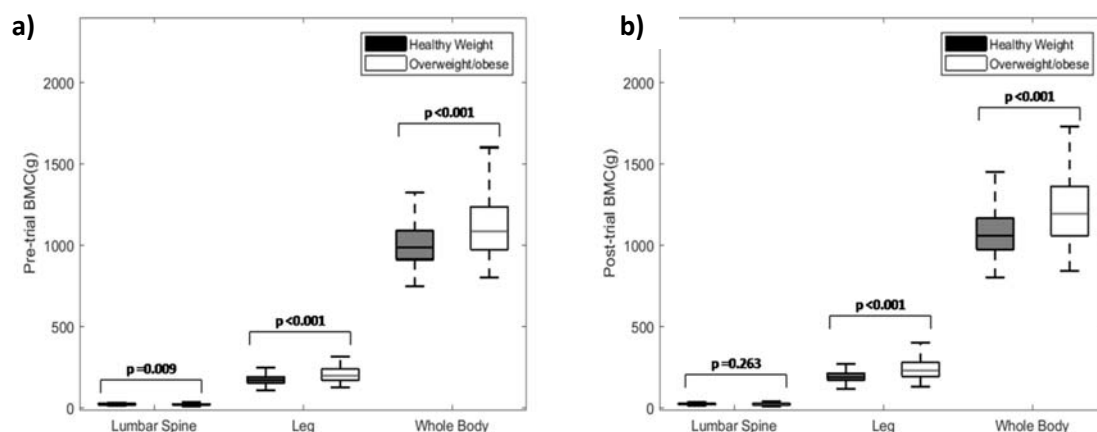


Figure 1: Baseline BMC (a) Pre-trial (b) Post-trial. Pre-trial BMC of lumbar spine is higher in healthy weight group while the post-trial BMC shows no significant difference between the groups. Pre-trial and post-trial mean BMC of legs and whole body is higher in overweight/obese children compared to the healthy weight group. The upper and lower boundaries on the box-plot represent the 25th and 75th percentile in the data respectively with the median being represented by the mid-line. The non-outlier extremes in the data are shown by the whiskers.

Mean Change in BMC over time:

Over a period of 9-months, Δ BMC (Difference of post-trial and pre-trial values) shows a significant increase in leg ($P < 0.001$) and whole body ($P < 0.001$) and lumbar spine ($P < 0.001$). The increase in BMC in obese/overweight children is significantly higher than healthy-weight group in legs ($P < 0.001$) and whole body ($P < 0.001$) while there is no significant difference in the increase of BMC of lumbar spine in both groups ($p = 0.131$).

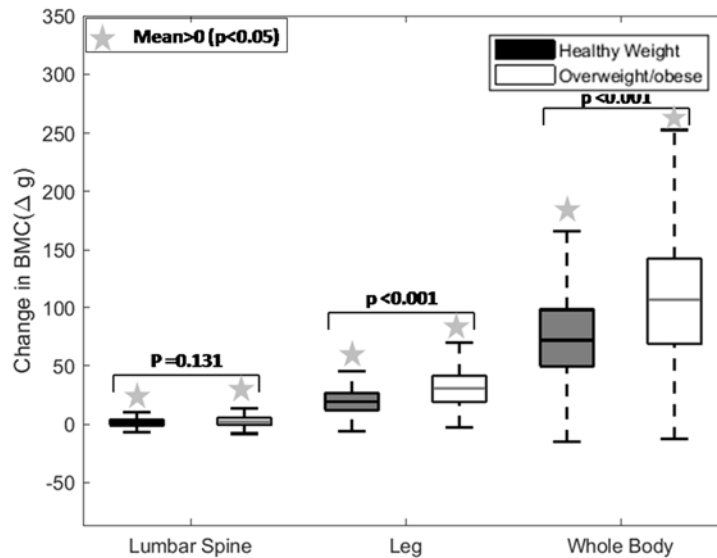


Figure 2: Change in BMC over a 9 month period by weight class. Overweight/obese children increased their BMC in leg and whole body more than the healthy weight group. There is no significant difference in the change in BMC of lumbar spine between the groups.

Mean change in BMC due to Physical Activity Intervention:

The 9-month physical activity intervention significantly increased the BMC in the leg ($P = 0.007$) and whole body ($p < 0.001$), compared to the waitlist group. However, the effect of exercise on the BMC of lumbar spine ($p = 0.160$) is not significant. The change in BMC due to the physical activity intervention is not significantly different in the healthy weight and overweight/obese groups. [weight status x treatment in lumbar spine ($p = 0.889$), leg ($p = 0.921$) and whole body ($p = 0.569$)].

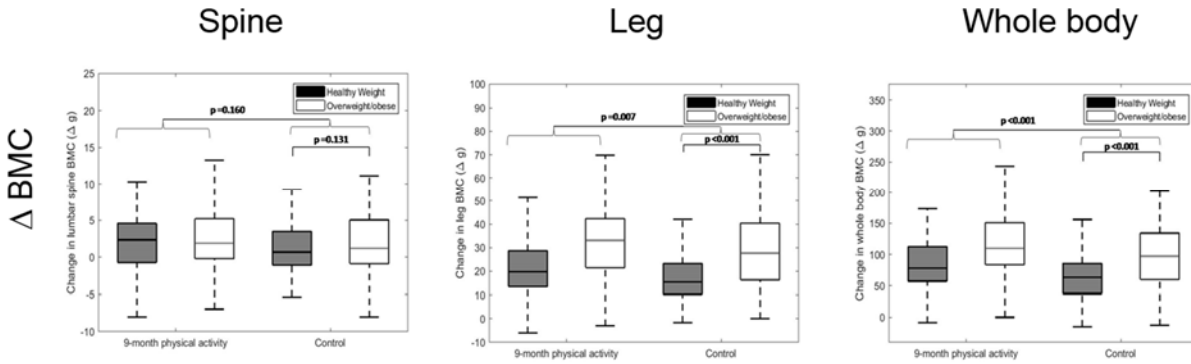


Figure 3: Change in BMC over a 9-month period by weight class and treatment for the lumbar spine, leg and whole body. Increase in BMC is greater in overweight/obese than healthy weight in control group. Increase in BMC in physical activity group is significantly higher than control group for leg and whole body.

Bone Area:

Pre-Trial and Post-Trial Area

Pre-trial bone area of lumbar spine is significantly higher ($p < 0.001$) in the healthy weight group. However, pre-trial bone area of leg ($p = 0.003$) and whole body ($p < 0.001$) are significantly higher in the overweight/obese group. Similarly, post-trial bone area of lumbar spine is higher ($p < 0.001$) for healthy weight group while that of leg ($p < 0.001$) and whole body ($p < 0.001$) is higher for the overweight/obese group.

Table 2 Participant pre-trial and post-trial Bone Area by weight class

Body Segment	Mean Pre-Trial Bone Area (cm ²)		Mean Post-Trial Bone Area (cm ²)	
	Healthy Weight	Overweight/obese	Healthy Weight	Overweight/obese
Lumbar Spine	35.34±0.361	31.66±0.496	36.77±0.411	33.55±0.592
Leg	234.61±1.549	245.31±3.160	244.133±1.627	265.33±3.608
Whole Body	1283.05±5.712	1346.58±13.031	1323.300±6.239	1423.72±14.633

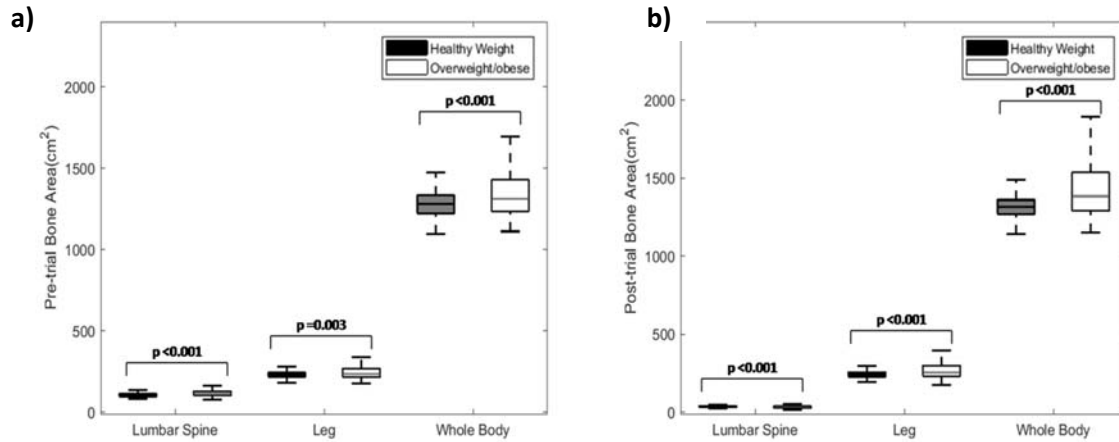


Figure 4: Baseline bone area (a) Pre-trial (b) Post-trial. Pre-trial and post-trial bone area of lumbar spine is higher in healthy weight group while the pre-trial and post-trial bone area of legs and whole body is higher in overweight/obese children compared to the healthy weight group.

Mean Change in Bone area over time:

Over a period of 9-months, Δ area (Difference of post-trial and pre-trial values) shows a significant increase in lumbar spine ($P < 0.001$), leg ($P < 0.001$) and whole body ($P < 0.001$). The increase in bone area in overweight/obese weight children is significantly higher than healthy weight group in legs ($P < 0.001$) and lumbar spine ($P < 0.001$) while there is no significant difference in the increase of area of whole body in both groups ($p = 0.409$).

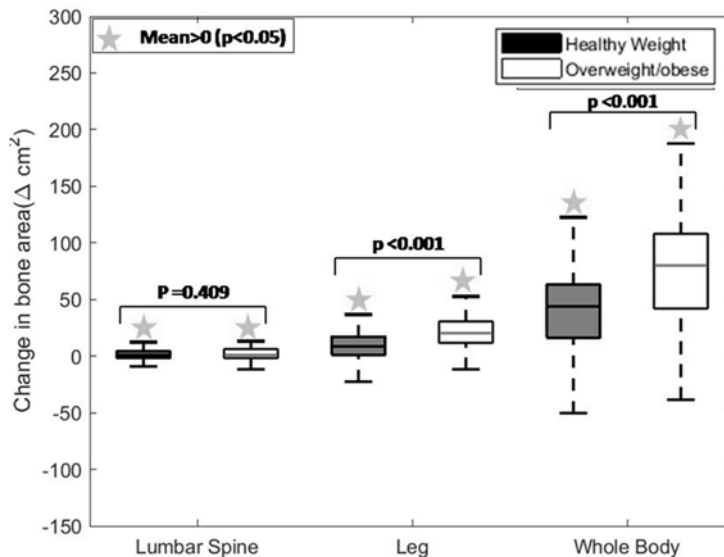


Figure 5: Change in bone area over a 9 month period by weight class. Overweight/obese children increased their bone area in lumbar spine and leg more than the healthy weight group. There is no significant difference in the change in bone area of the whole body between the groups.

Mean change in Bone Area due to the Physical Activity Intervention:

The 9-month physical activity intervention significantly increased the bone area in the whole body ($p=0.01$) compared to the waitlist group. However, the effect of physical activity on the area of lumbar spine ($p=0.493$) and leg (0.573) is not significant. The change in area due to the physical activity intervention is not significantly different in the healthy weight and overweight/obese groups. [weight status x treatment in lumbar spine ($p=0.918$), leg ($p=0.798$) and whole body ($p=0.467$)].

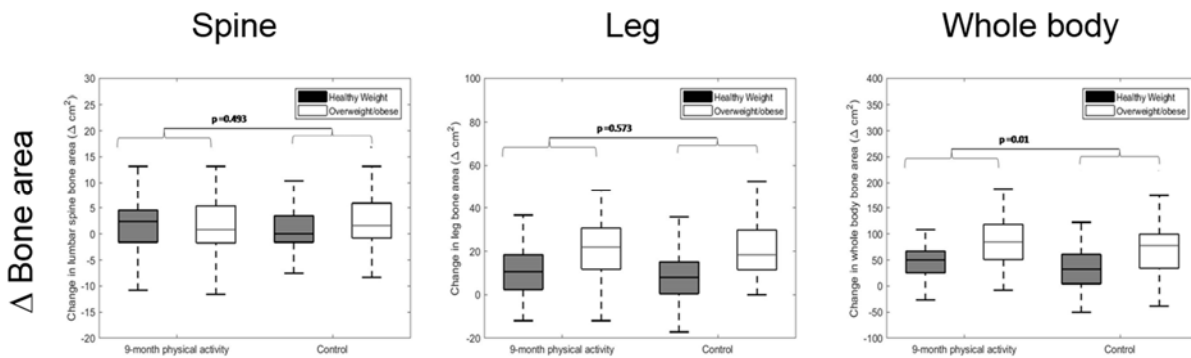


Figure 6: Change in bone area over a 9-month period by weight class and treatment lumbar spine, leg, and whole body. Increase in bone area is greater in overweight/obese than healthy weight in control group for leg and whole body. Increase in bone area in physical activity group is significantly higher than control group for whole body.

Bone Mineral Density (BMD):

Pre-Trial and Post-Trial Area

Pre-trial BMD of lumbar spine ($p<0.001$), leg ($p<0.001$) and whole body ($p<0.001$) is significantly higher in the overweight/obese group. Similarly, post-trial BMD of lumbar spine ($p<0.001$), leg ($p<0.001$) and whole body ($p<0.001$) is significantly higher in the overweight/obese group compared to the healthy weight group.

Table 3 Participant pre-trial and post-trial BMD by weight class

Body Segment	Mean Pre-Trial BMD (g/cm ²)		Mean Post-Trial BMD (g/cm ²)	
	Healthy Weight	Overweight/obese	Healthy Weight	Overweight/obese
Lumbar Spine	0.674±0.005	0.703±0.007	0.691±0.005	0.729±0.008
Leg	0.752±0.005	0.853±0.007	0.801±0.006	0.900±0.007
Whole Body	0.780±0.004	0.836±0.005	0.811±0.004	0.865±0.005

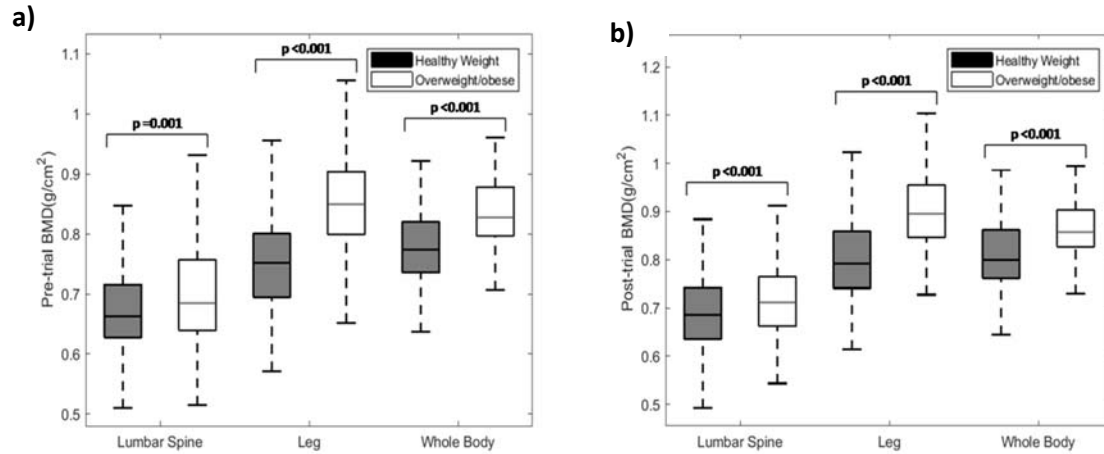


Figure 7: Baseline BMD (a) Pre-trial (b) Post-trial. Pre-trial and post-trial BMD of lumbar spine, legs and whole body is higher in overweight/obese children compared to the healthy weight group.

Mean Change in BMD over time:

Over a period of 9-months, Δ BMD (Difference of post-trial and pre-trial values) shows a significant increase in lumbar spine ($P < 0.001$), leg ($P < 0.001$) and whole body ($P < 0.001$). The increase in BMD in overweight/obese children is not significantly different compared to the healthy weight group in lumbar spine ($P < 0.112$), legs ($P < 0.639$), and whole body (0.403).

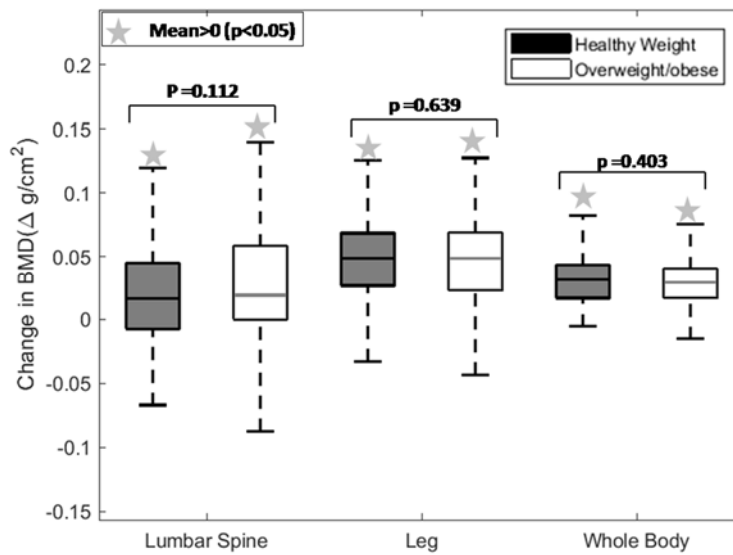


Figure 8: Change in BMD over a 9 month period by weight class. There is no significant difference between the increase of BMD in lumbar spine, leg and whole body of healthy weight and overweight/obese group.

Mean change in BMD due to Physical Activity Intervention:

The 9-month physical activity intervention significantly increased BMD in the lumbar spine ($P < 0.022$), leg ($P < 0.001$) and whole body ($P < 0.001$) compared to the waitlist group. The change in BMD due to the physical activity intervention is not significantly different in the healthy weight and overweight/obese groups. [weight status x treatment in lumbar spine ($p = 0.447$), leg ($p = 0.891$) and whole body ($p = 0.912$)].

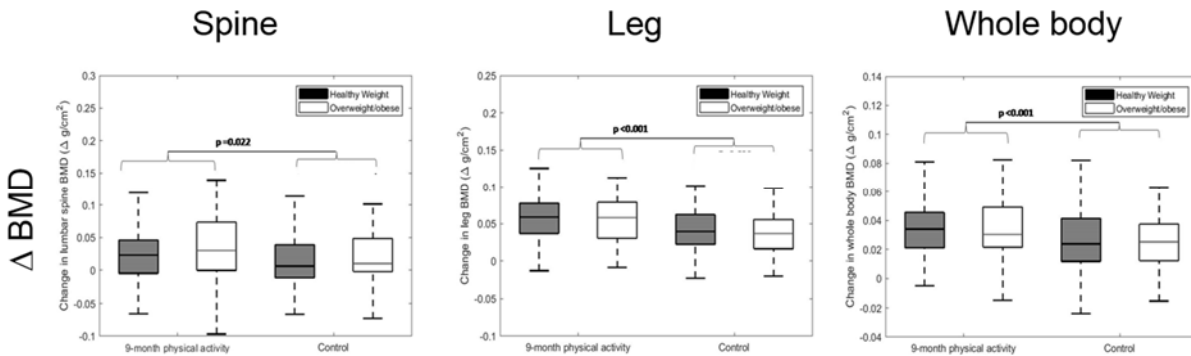


Figure 9: Change in BMD over a 9-month period by weight class and treatment lumbar spine, leg and whole body. Increase in BMD in physical activity group is significantly higher than control group for lumbar spine, leg and whole body.