

Young Adults With Klinefelter Syndrome And Anorchia Treated With Testosterone From Adolescence Have Normal Bone And Muscle Mass But Increased Central Adiposity

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Background

Decreased bone mineral density is reported in children and adults with Klinefelter Syndrome (KS) from DXA studies. Most are from mixed groups of testosterone treated and testosterone naïve individuals. A few studies have however reported decreased bone mass from DXA in testosterone treated KS individuals. Bone mass and body composition have not been previously evaluated in Anorchia (A). Clarifying the bone phenotype in these men with childhood onset hypogonadism is important to ascertain if any abnormal bone phenotype is part of the condition or due to adequacy of androgen replacement. There is currently no published study of DXA and pQCT in adults with KS and A treated from adolescence.

Hypothesis

Men with KS and A treated with testosterone from adolescence have normal bone mass and body composition.

Methods

Prospective cross sectional study of bone and body composition assessment using pQCT (4% radius and 66% tibia) and total body DXA in 20 hypogonadal young men (12 KS and 8 A) and 20 healthy controls matched for age and racial background. All KS and A were on Reandron 1000 mg 10-12 weekly. Results reported as median (range).

Results

	Controls	KS and A	p value
Age (years)	26 (20,44)	27 (19, 45)	0.97
Height (m)	1.79 (1.66, 1.98)	1.91 (1.72, 1.89)	0.24
BMI (kg/m ²)	24.9 (19.8, 30.6) 1/20 (5%) > 30 kg/m ²	26.8 (20.5, 54.6) 6/20 (30%) > 30 kg/m ²	0.06
History fractures	10/20	8/20	
Smoker	1/20	5/20	
Exercise (hours per week)	4 (2, 18)	3 (0, 15)	0.07
Atopic disease	9/20	4/20	
Inhaled/topical steroid	3/20	1/20	
Vit D supplements	2/20	2/20	
25 hydroxy Vitamin D (nmol/L)	N/A	44.5 (18, 93) 2/18 (11%) < 25 nmol/L	-
FSH (IU/L)	N/A	1 (1, 39) 8/19 (40%) < 1IU/L	-
Testosterone (nmol/L)	N/A	19.3 (7.7, 35.9) 4/19 (21%) < 10 nmol/L	-
Oestradiol (pmol/L)	N/A	118 (48, 237)	-

Conclusions

This first report of bone assessment using pQCT and DXA in young adults with **Klinefelter Syndrome and Anorchia treated with testosterone from adolescence** demonstrates:

- BMD within the normal population range
- No deficits in cortical or trabecular bone.
- Normal lean mass
- Increased central adiposity

Figure 4: DXA trunk:leg fat

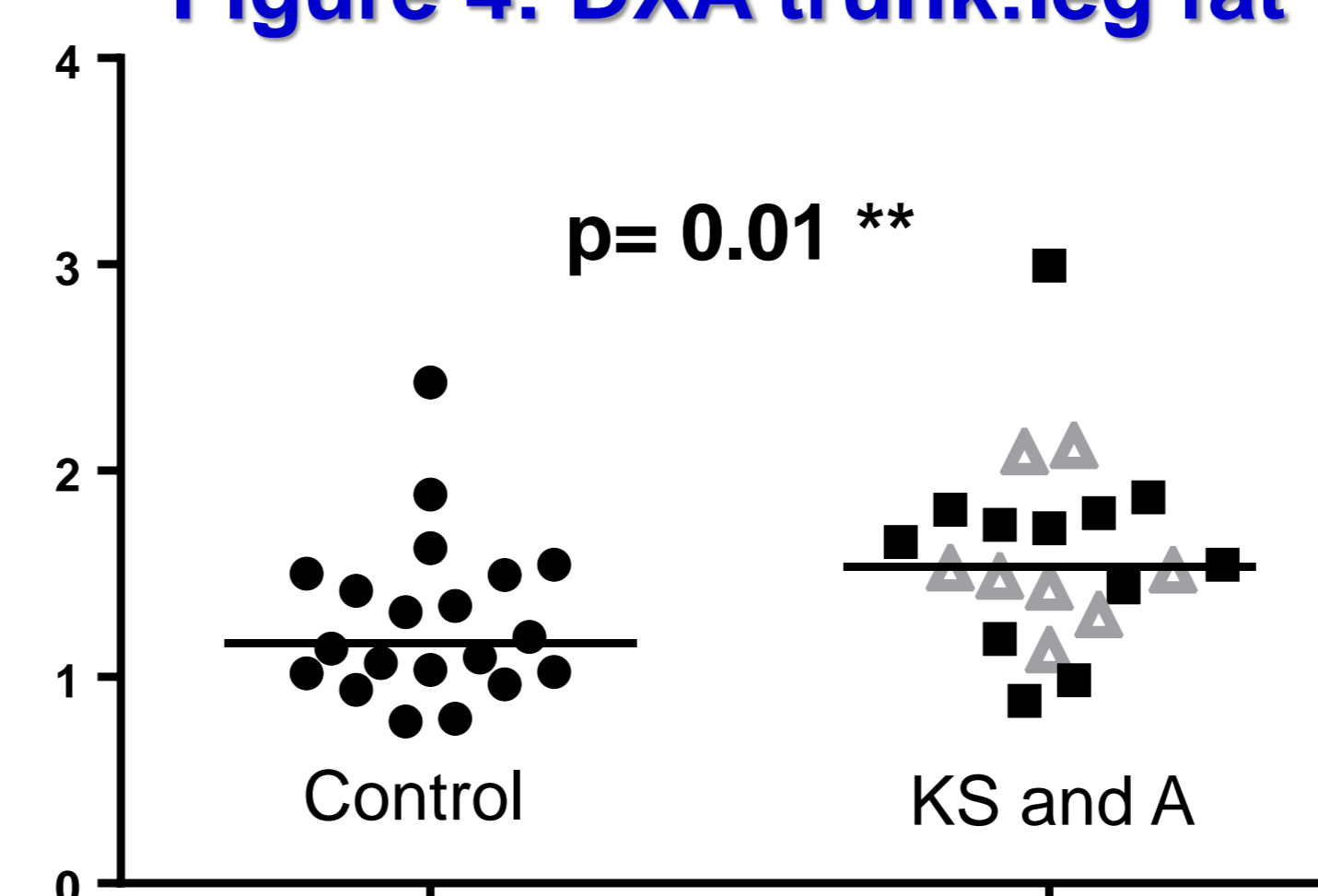
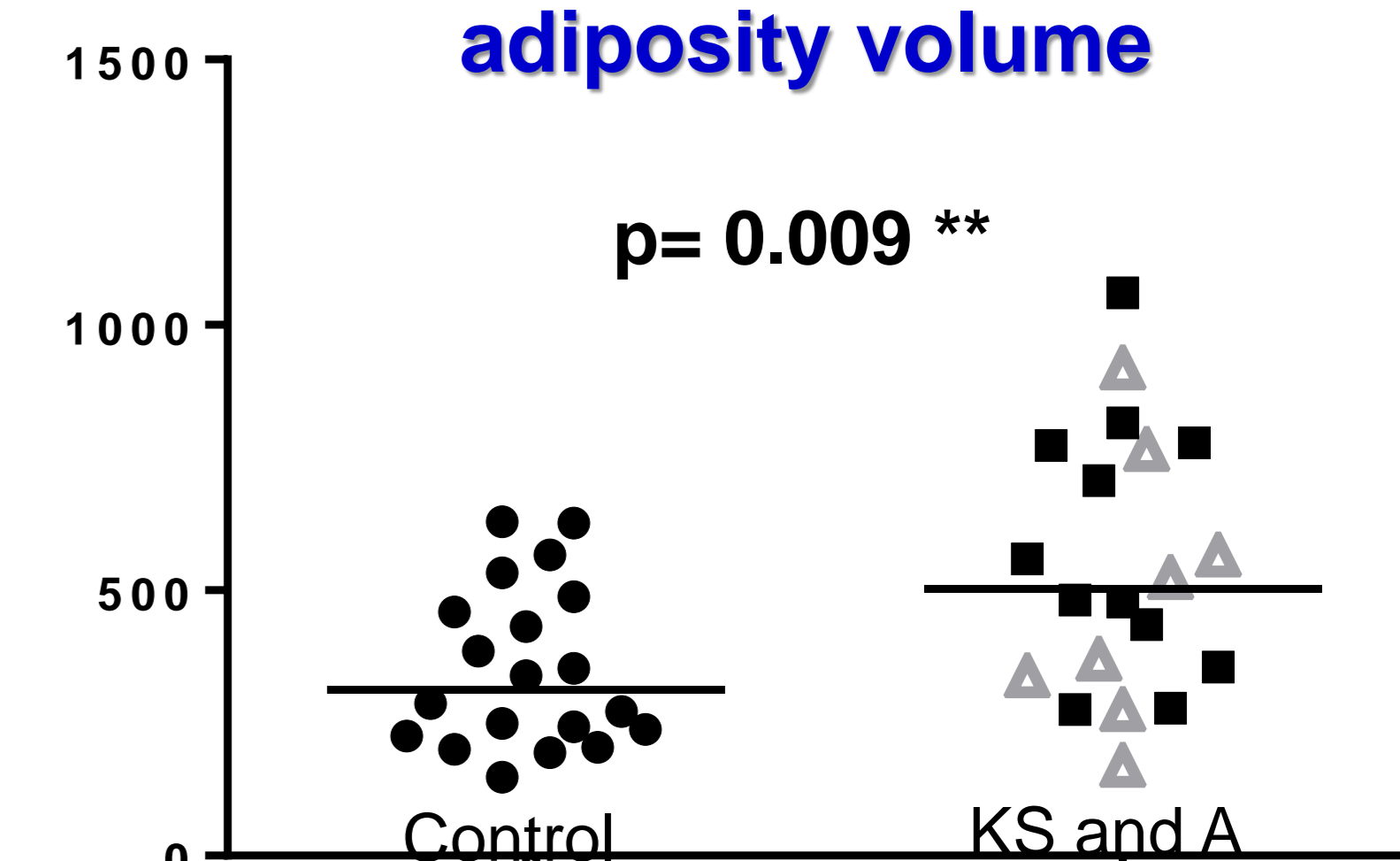


Figure 5: DXA estimated visceral adiposity volume



Despite mild, non significant ↑ BMI and ↑ DXA % fat, KS and CA have ↑ central and visceral adiposity

Figure 6: pQCT total density Z score 4% radius

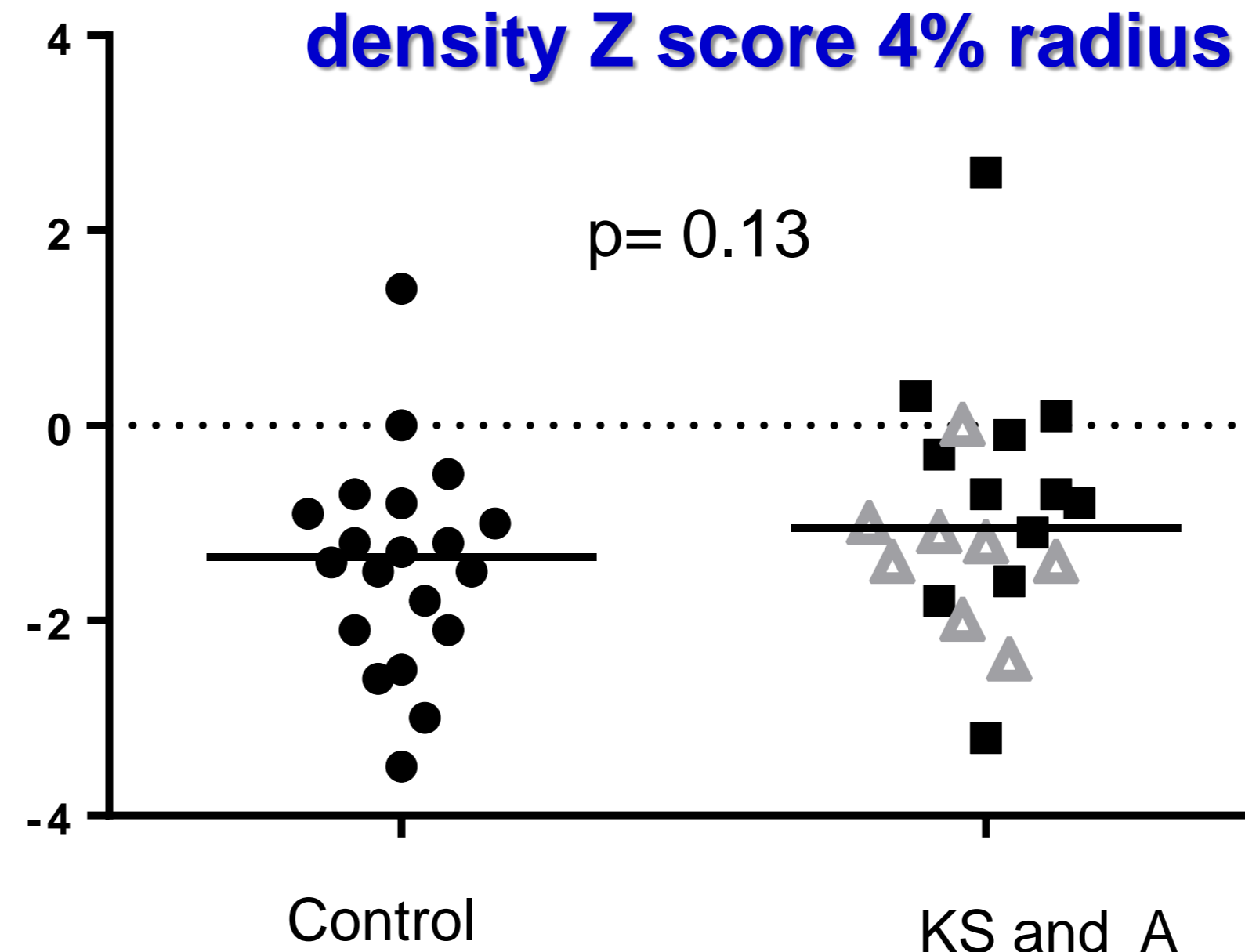


Figure 7: pQCT trabecular density Z score 4% radius

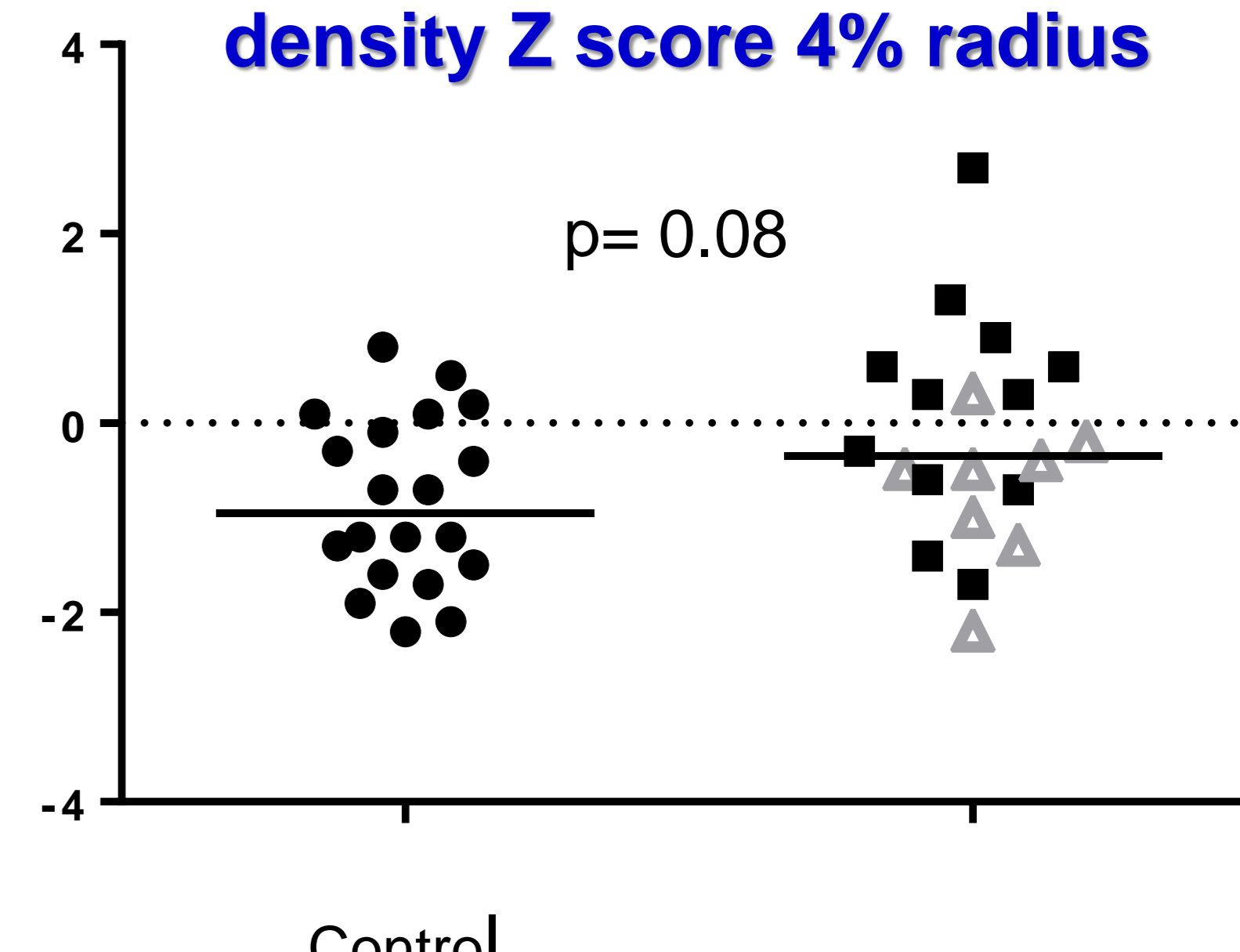


Figure 8: pQCT total bone area 4% radius

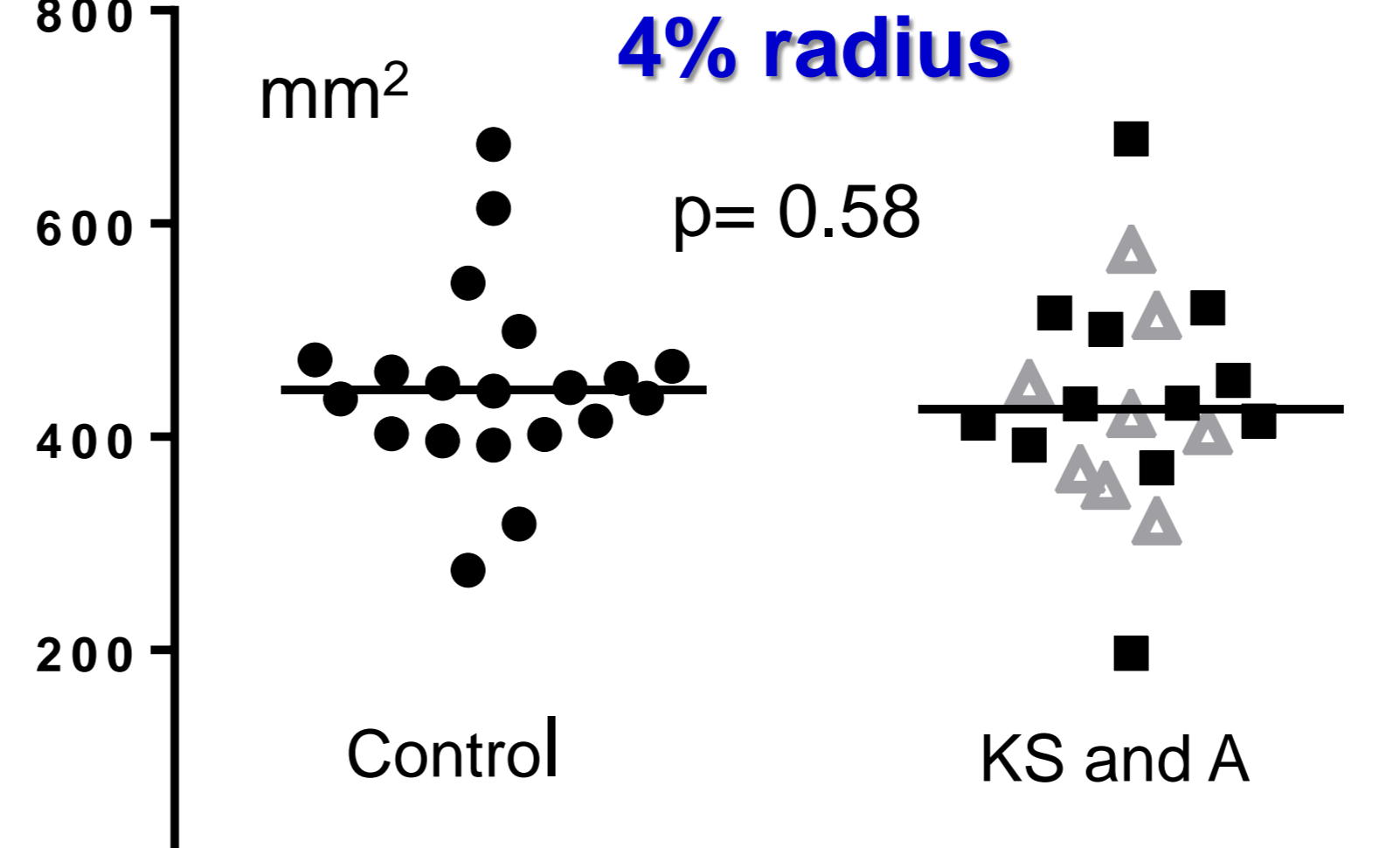


Figure 9: pQCT trabecular area 4% radius

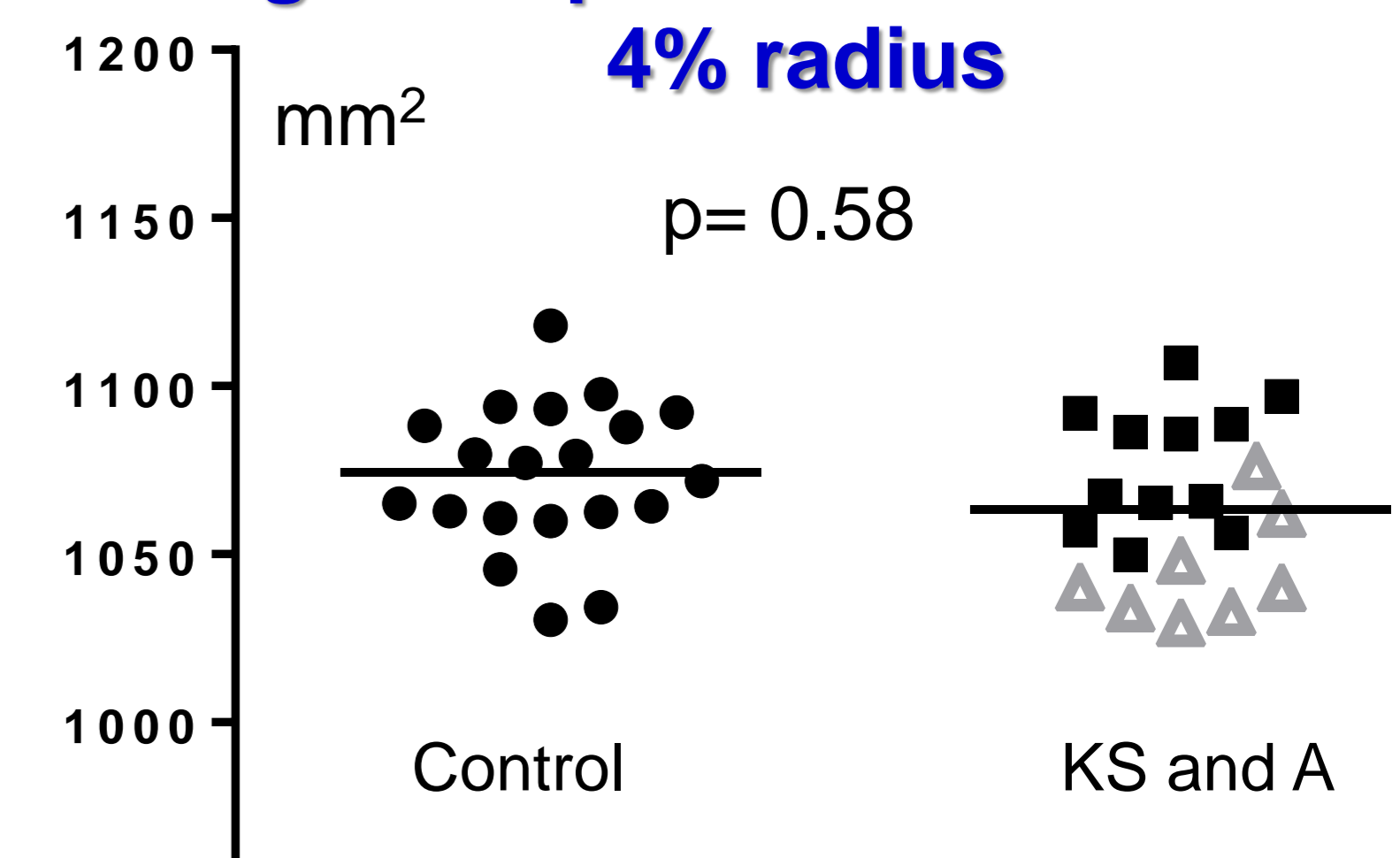


Figure 1: DXA Total body BMD Z score

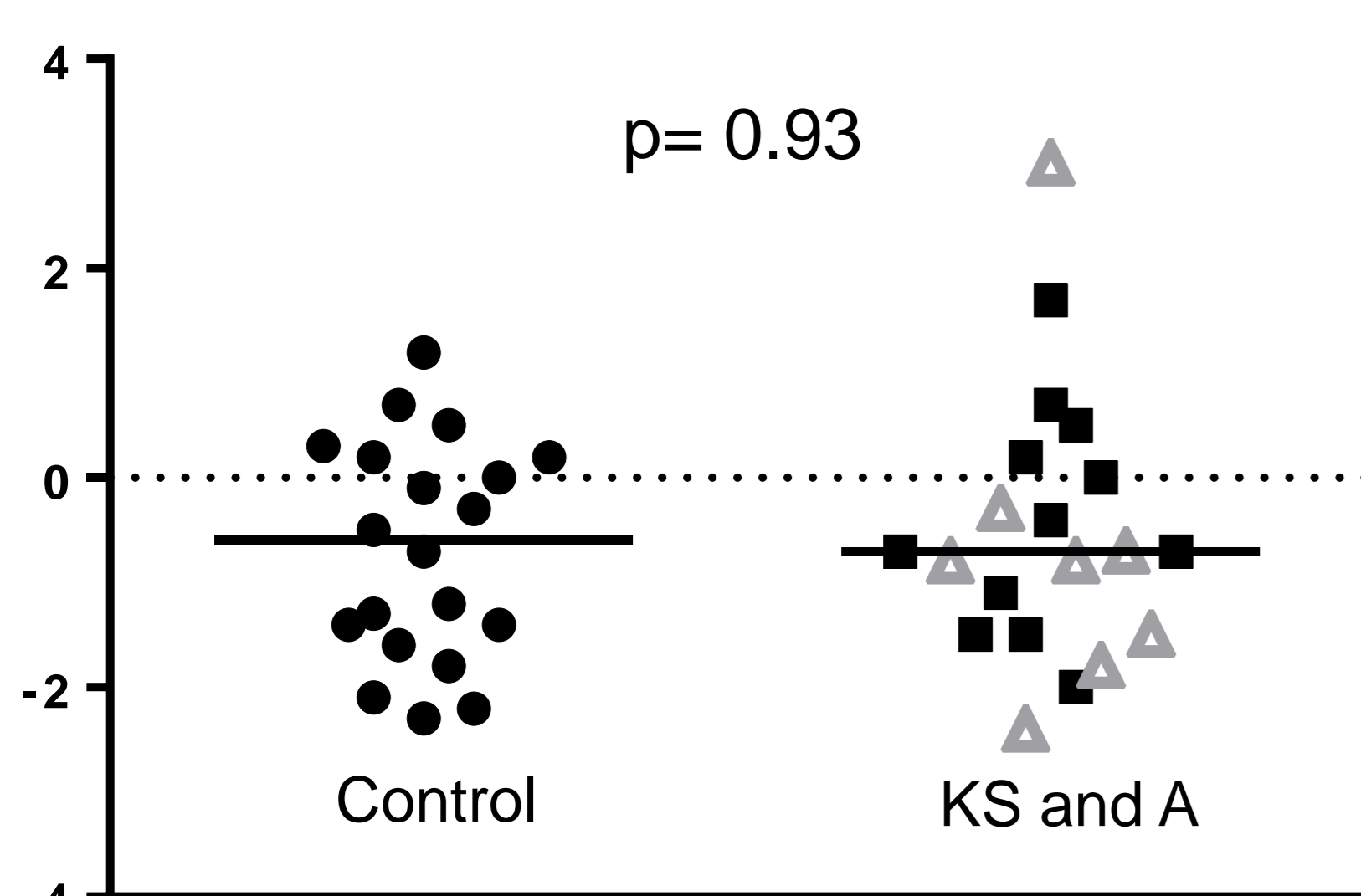
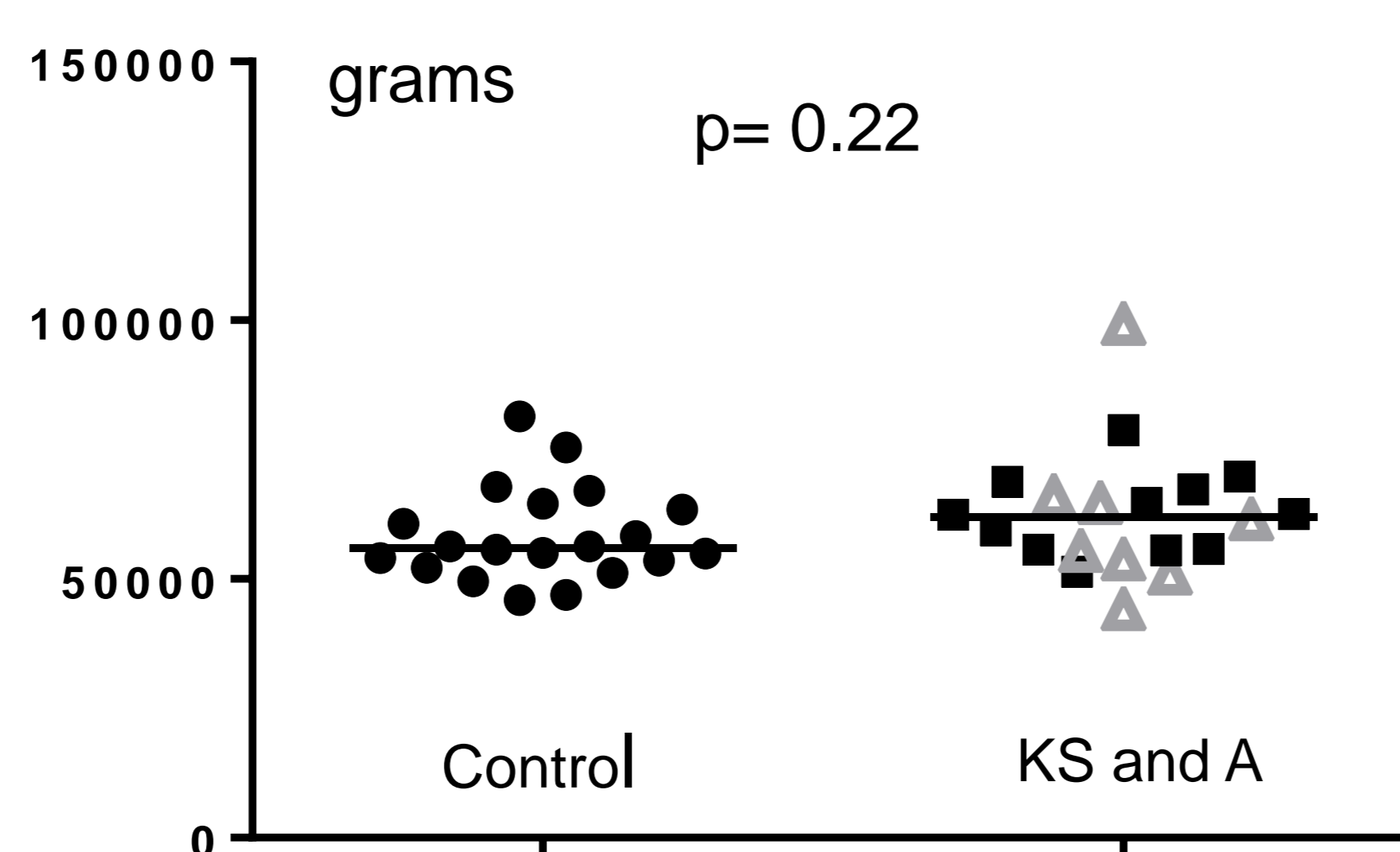


Figure 2: DXA lean mass



No difference in pQCT cortical density and cortical area at 4% radius (Data not shown)

Figure 10: pQCT cortical area 66% tibia

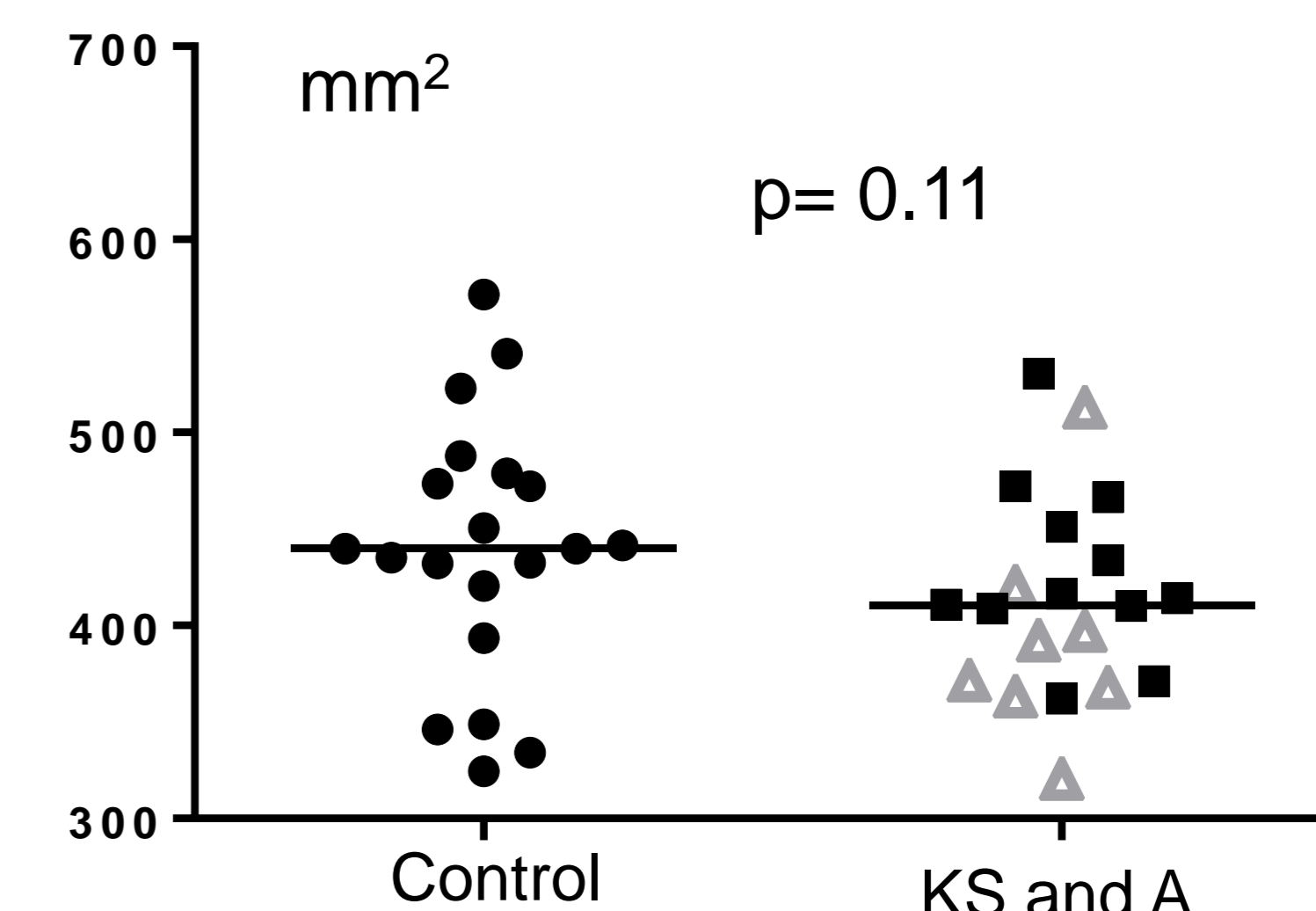
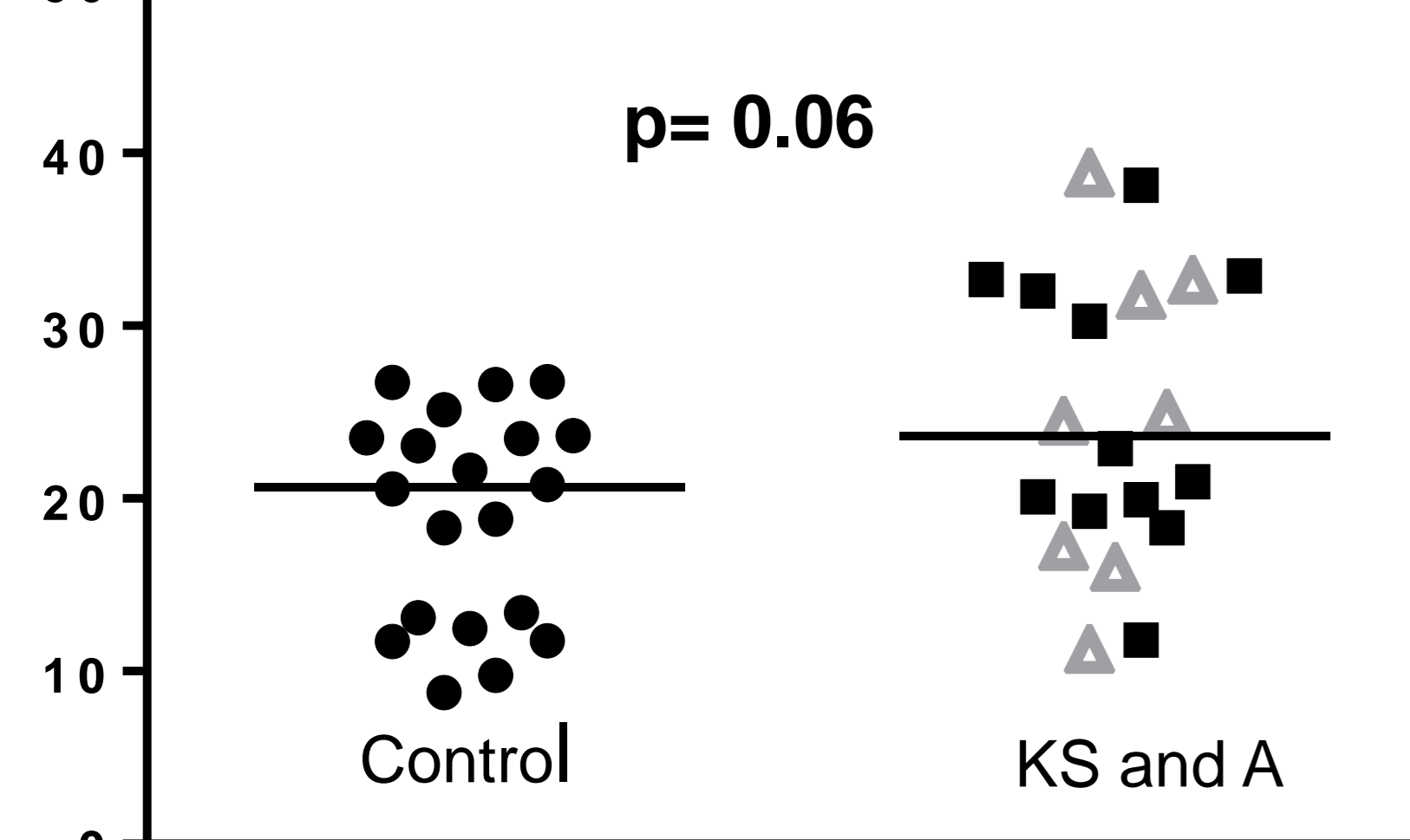


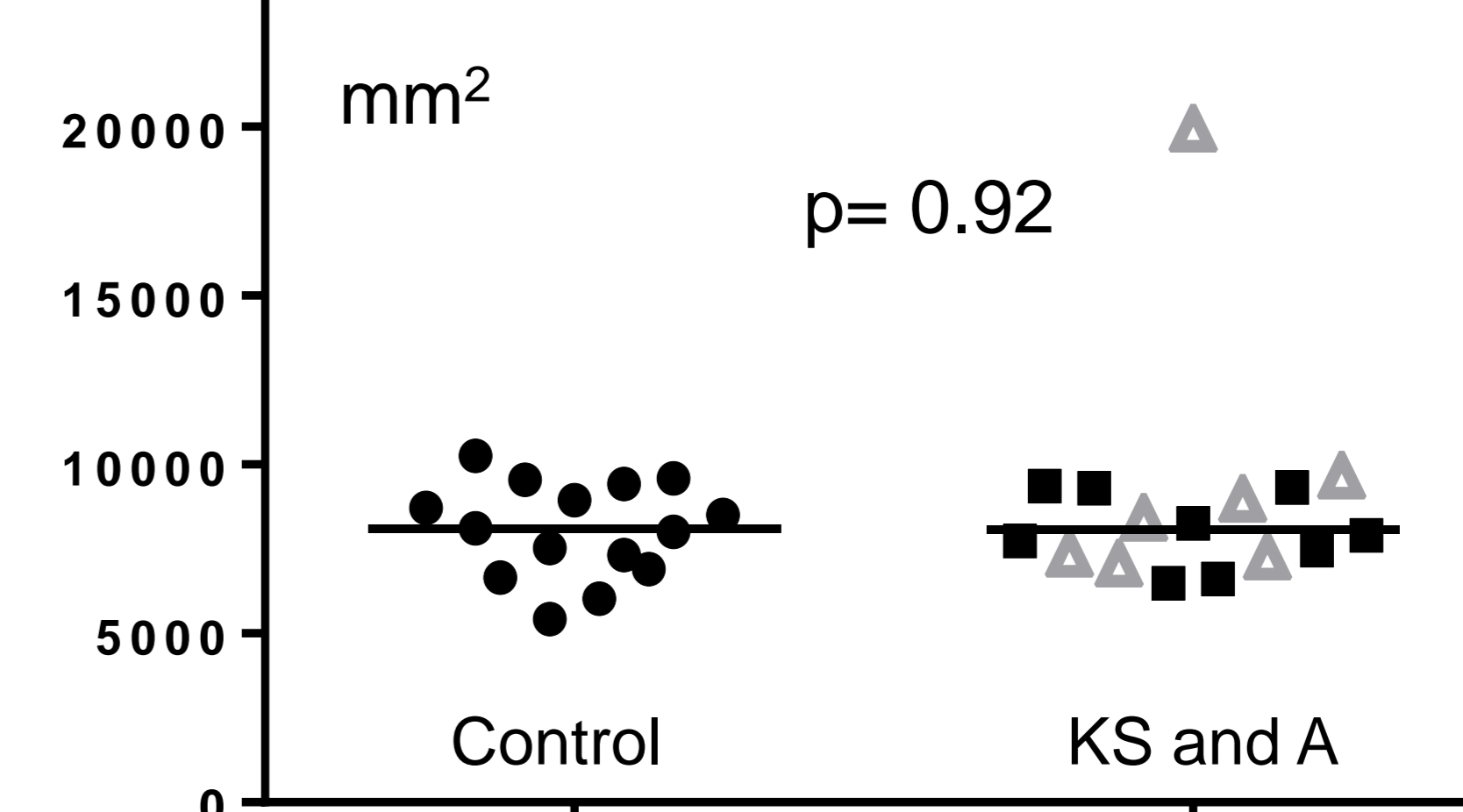
Figure 3: DXA % fat



DXA BMD Z score and lean mass ↔ in KS and CA

Marginal non significant ↑ % fat in KS and A

Figure 11: pQCT muscle area 66% tibia



No difference in DXA absolute bone mineral density, bone mineral content, bone area and bone mineral density T score (Data not shown)

No difference in pQCT muscle density, cortical density and fat/muscle are at 66% tibia (Data not shown)