

Table S9 Prediction performance of polygenic score using different sets of height and BMI associated SNPs.

Base Phenotype	Known trait-associated SNP set ^a	N(SNPs) ^b	R^2	Association with disc displacement score ^c			Association with disc degeneration score ^c		
				sgn(β)	R^2	p -value	sgn(β)	R^2	p -value
Height	European GWAS	622	5.76%	+	0.003%	8.04E-01	+	0.135%	9.40E-02
	Asian GWAS	109	3.87%	-	0.013%	5.99E-01	-	0.018%	5.46E-01
	European + Asian GWAS	656	6.99%	-	0.012%	6.24E-01	+	0.001%	8.83E-01
BMI	European GWAS	92	1.24%	+	0.016%	5.64E-01	+	0.053%	2.94E-01
	Asian GWAS	30	1.01%	+	0.122%	1.10E-01	+	0.330%	8.67E-03 ^d
	European + Asian GWAS	101	1.63%	+	0.030%	4.26E-01	+	0.112%	1.26E-01

a. Known trait associated SNPs were collected from following references: European GWAS of Height (N=253K; Wood AR et al. 2014. Nat Genet. 46:1173-86), Asian GWAS of Height (Combined Stage I+II N=94K; He M et al. 2015. Hum Mol Genet. 2015. 24:1791-800), European GWAS of BMI (N=234K~322K; Locke AE 2015. Nature. 518:197-206), and Asian GWAS of BMI (Stage I N=87K, Stage II N=5~47K; Wen W et al. 2014. Hum Mol Genet 23:5492-504). Different studies may report different SNPs at the same loci. We applied following procedures to combine results from different studies. When merging between GWAS and the exome-chip study, for each GWAS SNP if there was at least one exome-chip SNP located within 1Mb, it was replaced by the nearest exome-chip SNP. Similarly, when merging European and Asian studies, we replaced each European SNP with the nearest Asian SNP within 1Mb distance.

- b. Number of SNPs in the HKDD cohort that passed QC and have minor allele frequency ≥ 0.01 .
- c. Association with disc herniation and degeneration scores are evaluated by linear regression adjusting for age, sex and previous spine injury.
- d. The association of Asian BMI PGS with disc degeneration score was driven by one SNP rs16858082. Whether or not it represents a pleiotropic locus needs further replication.