

## Supplementary material

For the article entitled:

Reference values and clinical predictors of bone strength for HR-pQCT-based distal radius and tibia strength assessments in women and men

Authors:

Anna K. Stuck, Denis Schenk, Philippe Zysset, Lukas Bütkofer, Andrea Mathis, Kurt Lippuner

March 29, 2020

**Table 4. Summary of HR-pQCT and hFE Outcomes at the Distal Radius and Distal Tibia for Women and Men**

	<b>Women (N = 46)</b>	<b>Men (N = 41)</b>
	<b>Median (Iq, uq)</b>	<b>Median (Iq, uq)</b>
<b>Radius</b>		
Left side - n (%)	38 (83%)	34 (83%)
Good Quality Scan - n (%)	45 (98%)	41 (100%)
Total vBMD (mg HA/ccm)*	296 [268, 328]	328 [298, 366]
Trabecular vBMD (mg HA/ccm)*	148 [120, 169]	195 [182, 219]
Cortical vBMD (mg HA/ccm)*	936 [908, 953]	889 [871, 915]
Cortical perimeter (mm)*	65.6 [62.9, 68.9]	75.1 [72.4, 78.1]
Cortical porosity*	0.003 [0.002, 0.004]	0.006 [0.004, 0.007]
Cortical thickness (mm)*	1.07 [0.956, 1.16]	1.17 [1.09, 1.31]
Trabecular area (mm <sup>2</sup> )*	222 [202, 243]	285 [262, 313]
Cortical area (mm <sup>2</sup> )*	55.5 [51.0, 60.1]	71.3 [63.1, 77.4]
Strength (N)*	3959 [3127, 4847]	6366 [5123, 7768]
Stiffness (N/mm)*	28891 [24498, 32526]	42141 [36796, 50224]
<b>Tibia</b>		
Left side - n (%)	38 (83%)	34 (83%)
Good Quality Scan - n (%)	44 (96%)	41 (100%)
Total vBMD (mg HA/ccm)†	270 [235, 291]	302 [279, 330]
Trabecular vBMD (mg HA/ccm)†	203 [175, 221]	243 [209, 253]
Cortical vBMD (mg HA/ccm)†	859 [850, 888]	822 [798, 845]
Cortical perimeter (mm)†	114 [110, 118]	126 [120, 132]
Cortical porosity†	0.015 [0.011, 0.016]	0.024 [0.020, 0.032]
Cortical thickness (mm)†	1.08 [0.981, 1.21]	1.31 [1.11, 1.47]
Trabecular area (mm <sup>2</sup> )†	823 [767, 874]	995 [888, 1080]
Cortical area (mm <sup>2</sup> )†	95.8 [85.5, 104]	122 [104, 136]
Strength (N)†	12043 [8951, 14933]	18714 [14883, 21125]
Stiffness (N/mm)†	48633 [37218, 57995]	73268 [57024, 79872]

\*Missing for one woman; †missing for two women.

Abbreviations: HR-pQCT, high resolution pQCT; hFE, homogenized finite element analysis; vBMD, volumetric bone mineral density; sd, standard deviation; Iq, lower quartile; uq, upper quartile.

**Table 5. Percentiles with 95% CI of Radius and Tibia Strength for Women and Men estimated by Quantile Regression**

	Women		Men	
	N	Percentile (95% CI)	N	Percentile (95% CI)
<b>Radius strength (N)</b>				
2.50th	45	2155 (1636 - 2674)	41	4446 (3028 - 5864)
25.0th	45	3127 (2611 - 3644)	41	5123 (4512 - 5733)
50.0th	45	3959 (3457 - 4461)	41	6366 (5521 - 7211)
75.0th	45	4847 (4197 - 5498)	41	7768 (6830 - 8705)
97.5th	45	6616 (5705 - 7527)	41	9832 (7796 - 11867)
<b>Tibia strength (N)</b>				
2.50th	44	7259 (6237 - 8282)	41	11079 (9356 - 12801)
25.0th	44	9139 (7856 - 10421)	41	14883 (12803 - 16964)
50.0th	44	11715 (9670 - 13760)	41	18714 (16890 - 20538)
75.0th	44	14915 (13845 - 15985)	41	21125 (19388 - 22862)
97.5th	44	16671 (15907 - 17434)	41	24489 (20479 - 28500)

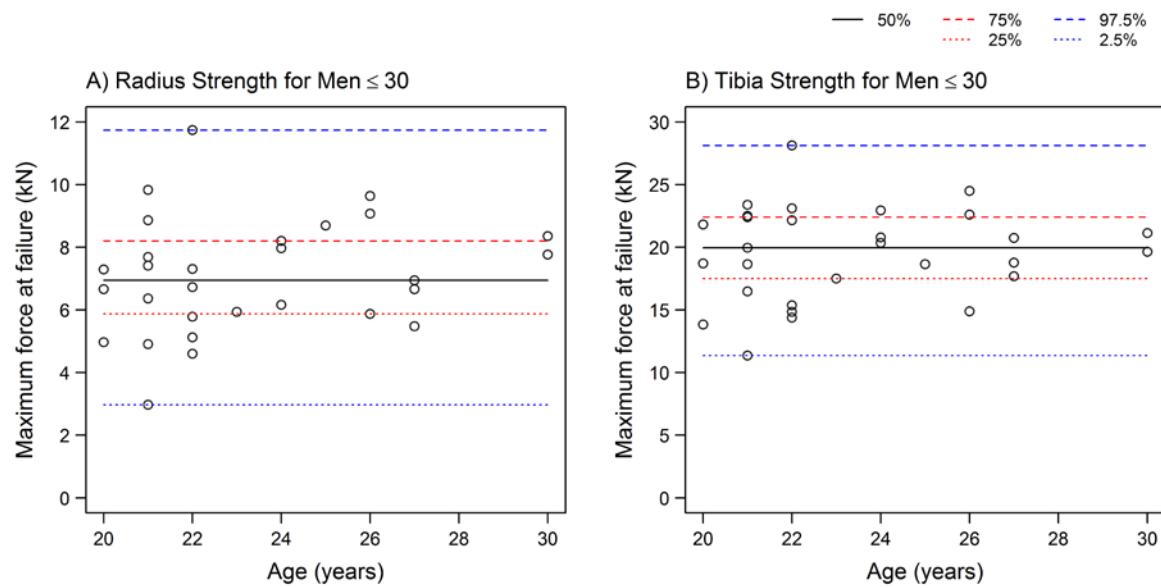
*Abbreviations: CI, confidence interval.*

**Table 6. Percentiles with 95% CI of Radius and Tibia Strength for Men aged ≤ 30 Years (n=29)**

Percentile (95% CI)	
<b>Radius strength (N)</b>	
2.50th	2969 (1205 - 4734)
25.0th	5870 (5029 - 6710)
50.0th	6945 (6053 - 7837)
75.0th	8205 (7235 - 9176)
97.5th	11740 (9695 - 13786)
<b>Tibia strength(N)</b>	
2.50th	11347 (8604 - 14090)
25.0th	17511 (14750 - 20273)
50.0th	19958 (18027 - 21889)
75.0th	22404 (20974 - 23835)
97.5th	28129 (24174 - 32083)

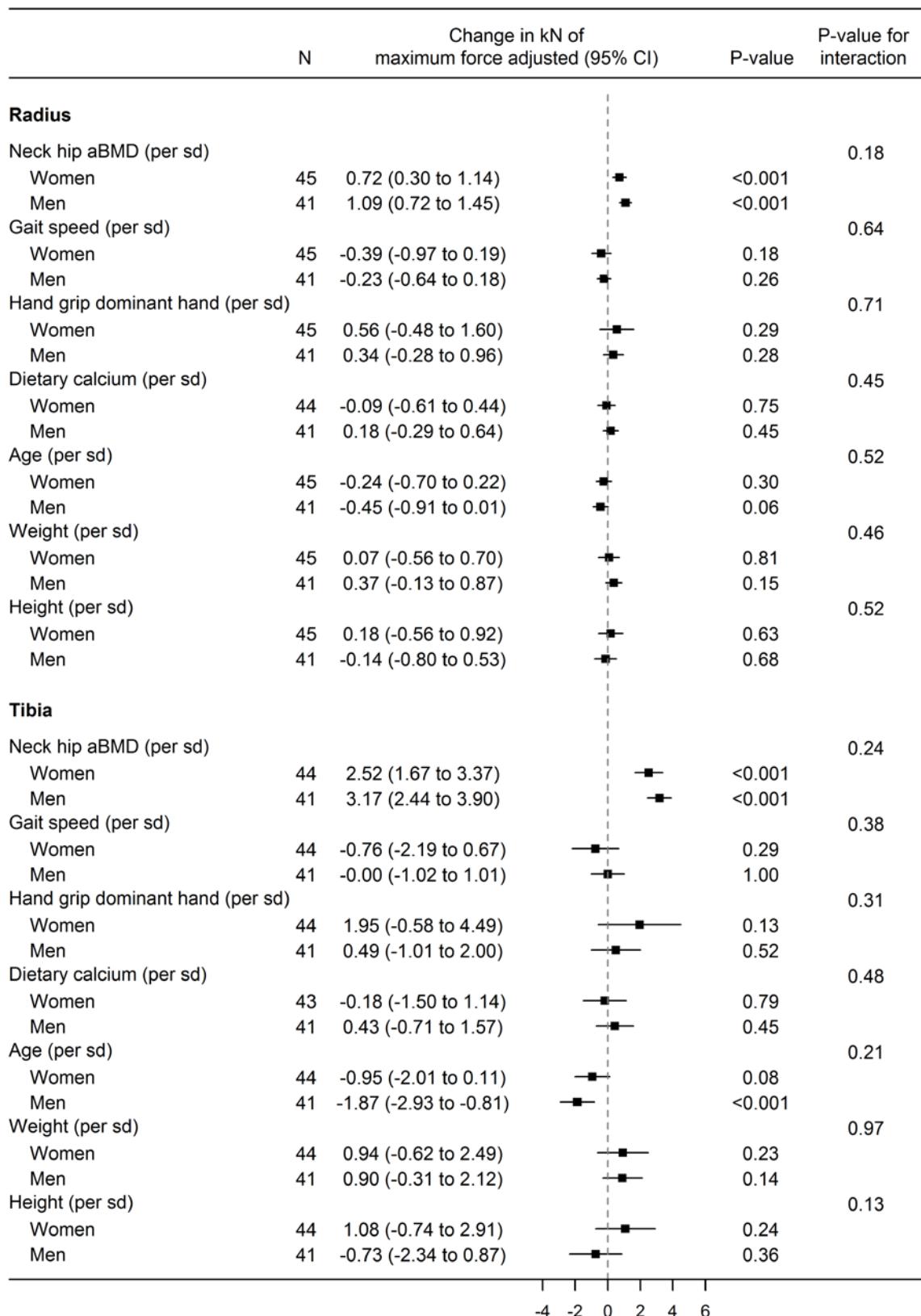
*Abbreviations: CI, confidence interval*

**Fig. 4. Percentiles of Radius and Tibia Strength for Men aged  $\leq 30$  Years (n=29).**



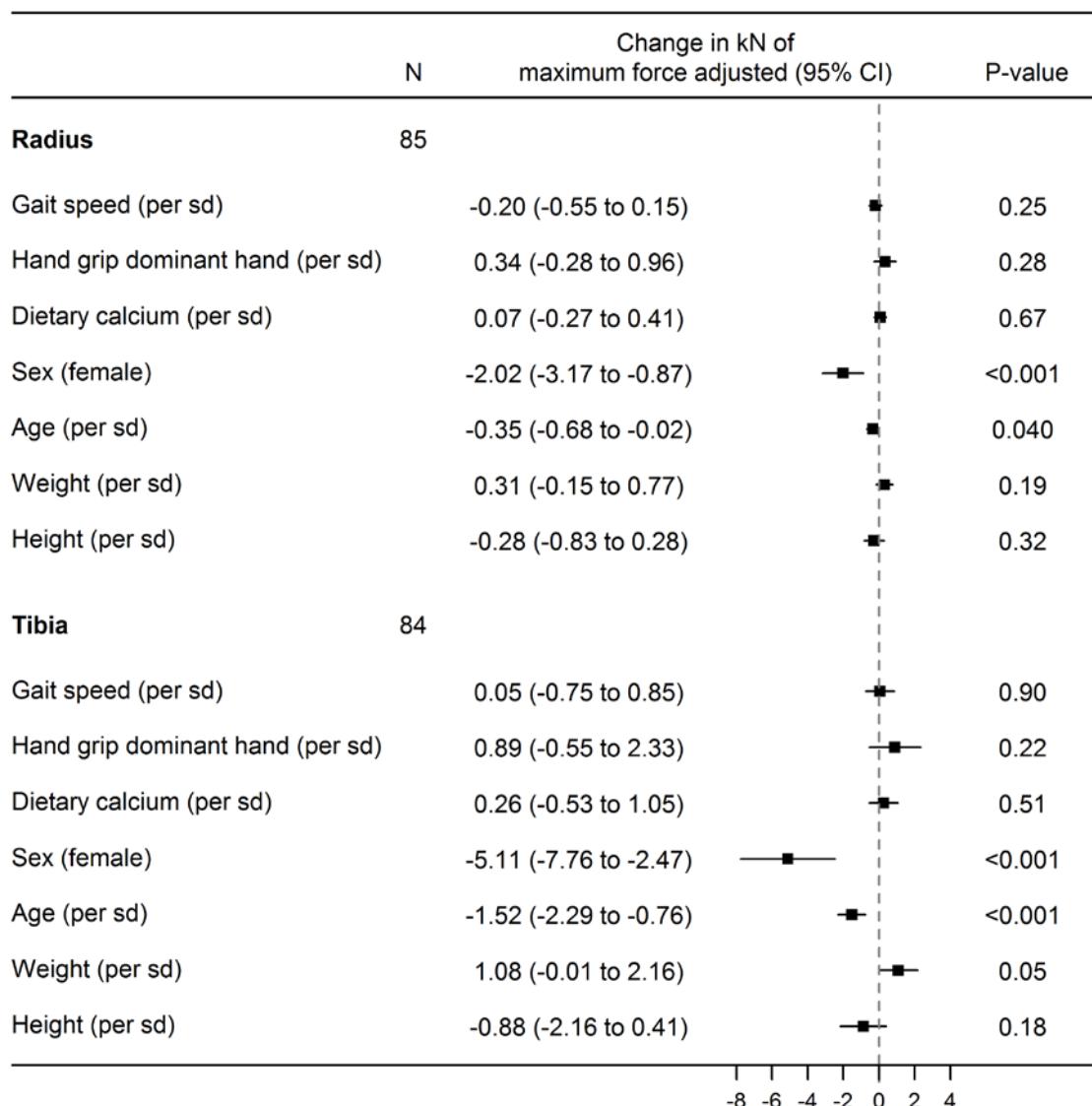
The raw data is indicated with circles.

**Fig. 5 Simple Linear Regression Models for each Variable including an Interaction with Sex**



Abbreviations: aBMD, areal bone mineral density; CI, confidence interval.

**Fig. 6 Multivariable linear regression model for radius and tibia strength without total hip aBMD**



Abbreviations: aBMD, areal bone mineral density; sd, standard deviation.