

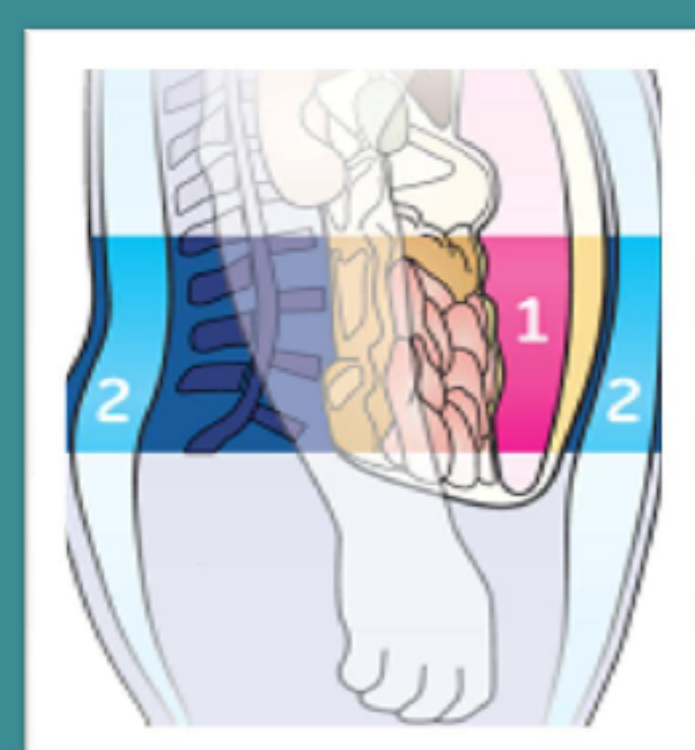
Association of bone mineral density with DXA-determined adipose tissue volume and concentrations of selected hormones in young adult women

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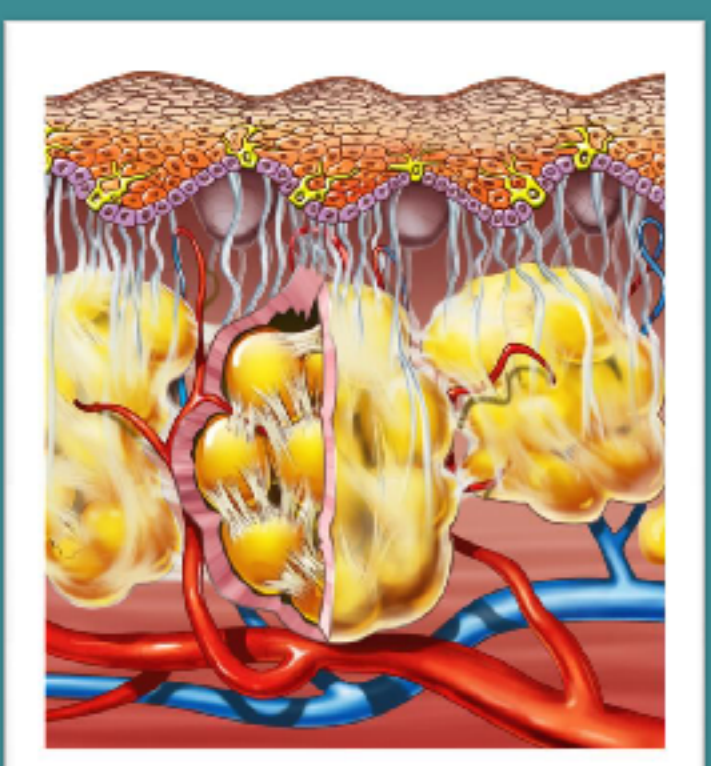
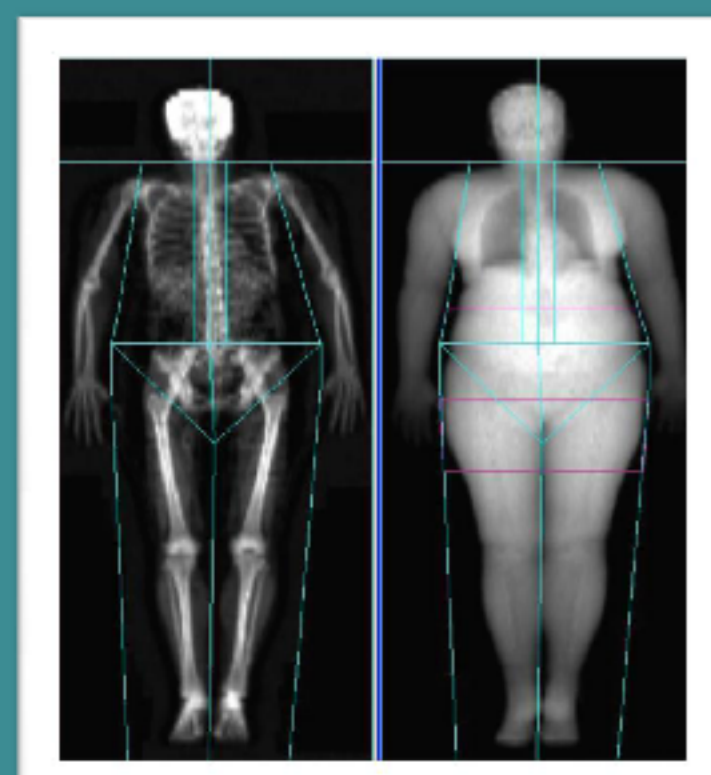
Objectives:



The question if obesity may protect against osteoporosis is still a matter of discussion. A breakthrough in this debate may be the introduction of a state-of-the-art densitometric software (Core Scan) suitable for fast and accurate volumetry of total body fat (BF), including android (A), female-type (F) and visceral fat (VAT) volumes.

The aim of the study was to analyze an association between bone mineral density (BMD), concentrations of selected hormones, BF, A, F and VAT volumes in young adult women.

Methods:



Material and methods: The study was a retrospective analysis of densitometric scans and laboratory parameters of 108 women (age: 20-33 years). Two groups of patients were identified based on their body mass index (BMI), with BMI <25 kg/m² and >25 kg/m². The list of analyzed variables included body height and weight, BMI, BMD, DXA-determined DXA (GE Lunar Prodigy; Madison, WI, USA; 14CoreScan™ H8801CP) BF, A, F and VAT volumes, concentrations of TSH, FT3, FT4, FSH, LH, estradiol, PRL, DHEA-SO₄, androstendion, testosterone, SHBG, 17-hydroxyprogesterone, levels of glucose and insulin measured after an overnight fast and during glucose tolerance test.

Results:

Results: Irrespective of the analyzed area (BF, A, F, VAT), adipose tissue volume correlated significantly with BMD L1-L4, BMD total, blood concentrations of free estrogens and testosterone (p<0.000). Moreover, a significant relationship was found between VAT volume and concentrations of insulin after an overnight fast, as well as at 60 and 120 min of glucose tolerance test (p<0.000). Finally, VAT volume correlated inversely with blood concentration of SHBG (p<0.003). The two groups of patients differed significantly in terms of their mean values of densitometric parameters (p<0.000).

Conclusions:

Greater volume of subcutaneous and visceral fat is likely associated with higher BMD in young adult women and therefore may protect them against osteoporosis. However, high volume of body fat may also predispose to polycystic ovary syndrome and type 2 diabetes mellitus.

References:

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 Zhang W, Ma X, Xue P, Gao Y, Wu X, Zhao J, Wang Y, Li S. Associations between fat distribution and volumetric bone mineral density in Chinese adults. *Endocrine.* 2014 Dec;47(3):862-8. doi: 10.1007/s12020-014-0252-8. Epub 2014 Apr 5.

Parameter	Group A BMI < 25 SD	Group B BMI >25 SD
Age	27,2	27,4
Growth [cm]	165,4	167,3
Body mass [kg]	58,7	88,9
TSH [ug/ml]	2,15	2,34
fT3 [pg/ml]	3,07	3,18
fT4 [ng/ml]	1,20	1,24
FSH [mIU/ml]	7,78	5,39
LH [mIU/ml]	13,9	11,10
Estradiol [pg/ml]	68,9	74,4
Prolactin [ng/ml]	19,3	27,0
DHEAS [ug/ml]	253,5	272,5
Androstendion [ng/ml]	3,88	4,13
Testosterone [ng/ml]	0,27	0,49
SHBG [nmol/l]	80,26	46,49*
17-OHP [ng/ml]	1,33	1,43
BMD L ₁₋₄ [g/cm ²]	1,15	1,26*
T-score	- 0,22	0,69*
BMD total body [cm ²]	1,12	1,25*
T-score	0,36	1,66*
Total body fat (BF) [g]	57068	88115
Total body fat (BF) [%]	31,70	43,93
Including android (A) [g]	3922	6998
Including android (A) [%]	29,8	50,5
female-type (F) [g]	9743	13944
female-type (F) [%]	35,4	43,9
visceral fat (VAT) [g]	196	1091*
visceral fat (VAT) [cm ³]	208	1156*
P<0,05*		

