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**Literature search results**

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<th>Search completed for:</th>
<th>Weight/Obesity management. Whole body DEXA scans for body composition. What is the evidence for its use in clinical practice?</th>
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**Search details**

Weight/Obesity management. Whole body DEXA scans for body composition. What is the evidence for its use in clinical practice?

**Resources searched**

NHS Evidence; TRIP Database; Cochrane Library; AMED; CINAHL; EMBASE; MEDLINE; Google Scholar

**Database search terms:**

weight; obes*; exp OBESiTY; BMI; adipos*; exp ADIPOSE TISSUE; exp ADIPOSE TISSUE DISTRIBUTION; exp ANTHROPOMETRY; exp BODY MASS INDEX; exp FAT FREE MASS; WEIGHT CONTROL; exp BODY WEIGHTS AND MEASURES; exp BODY WEIGHT CHANGES; exp WEIGHT REDUCTION PROGRAMS; exp WEIGHT SHIFTING; manage*; MANAGEMENT; BODY COMPOSITION; DEXA; DXA; "dual energy x-ray absorptiometry"; DENSITOMETRY, X-RAY, body; “whole body”; whole-body; body adj2 composition

**Evidence search string(s):**

(obesity OR weight) (control OR gain OR loss OR manage OR management) (DEXA OR DXA OR "dual energy x-ray absorptiometry") ("body composition" OR "body fat" OR "body mass" OR “lean mass”)

**Google search string(s):**

(~obesity OR ~weight) ~DEXA ~”whole body” ~”body composition”

**Summary**

There is a large quantity of research on the use of DEXA in the measurement of body composition in weight management. As you don’t specify whether you’re looking at obesity management, or weight control in relation to other conditions, I have included both. I have largely omitted research of a theoretical nature and those papers looking at athletes or veterans; As you are writing a business case, I have included papers looking at the efficacy
of DEXA scans in comparison to other methods of assessing body composition, and also any theoretical research which revealed a potential use for DEXA scans, as I thought you might find this useful.

**Guidelines**

**European Society for Paediatric Nephrology**

Guidelines by an ad hoc European committee on the assessment of growth and nutritional status in children on chronic peritoneal dialysis 2001

Both DEXA and BI are not essential parameters to be included within the nutritional assessment process and will depend on individual unit protocol.

**European Medicines Agency**

Guideline on Clinical Evaluation of Medicinal Products Used in Weight Control 2007

1. Baseline DXA scans should be carried out on all patients with anorexia nervosa
2. The technique of dual-energy x-ray absorptiometry (DEXA) has been shown to provide a direct, accurate, and precise measure of lean body mass and total fat mass, which allows quantification of fat mass in anatomically-defined regions of interest, and more precise evaluation of the impact of fat distribution.

**British Society of Gastroenterologists**

The management of adults with coeliac disease 2010

If a DEXA scan is abnormal but insufficient to commence therapy then it should be repeated after 3 years. If DXA is normal then it should be repeated at age 55 years in males or at the menopause in women.

**SIGN**

Eating Disorders in Scotland Recommendations for Management and Treatment Nov 2006

A baseline dual energy x-ray absorptiometry (DXA) scan in patients with anorexia nervosa. This should be repeated at least every two years until bone recovery has been achieved.

**Evidence-based reviews**

None found.

**Published research**

*From CINAHL*

1. Use of dual X-ray absorptiometry to measure body mass during short- to medium-term trials of nutrition and exercise interventions.

Author(s) Marinangeli, Christopher Pf, Kassis, Amira N

Citation: Nutrition Reviews, 01 June 2013, vol./is. 71/6(332-342), 00296643

Publication Date: 01 June 2013

Source: CINAHL

Available in *fulltext* from Nutrition Reviews at [EBSCOhost](https://www.ebscohost.com)

Available in *fulltext* from Nutrition Reviews at [EBSCOhost](https://www.ebscohost.com)
2. Agreement of bioelectrical impedance with dual-energy X-ray absorptiometry and MRI to estimate changes in body fat, skeletal muscle and visceral fat during a 12-month weight loss intervention.

Author(s) Pietiläinen, Kirsi H., Kaye, Sanna, Karmi, Anna, Suojanen, Laura, Rissanen, Aila, Virtanen, Kirsi A.
Citation: British Journal of Nutrition, 18 May 2013, vol./is. 109/10(1910-1916), 00071145
Publication Date: 18 May 2013
Source: CINAHL


Author(s) Hojan, Katarzyna, Molinska-Glura, Marta, Milecki, Piotr
Citation: Acta Oncologica, 01 February 2013, vol./is. 52/2(319-326), 0284186X
Publication Date: 01 February 2013
Abstract: Endocrine therapy (ET) is a common method of treatment in breast cancer patients; however, its negative impact on body composition, body physique (physical body shape/measurements), and quality of life (QoL) remains controversial. Previous studies have shown physical exercise can have a positive effect on QoL in breast cancer patients, especially premenopausal subjects. Objective. In this feasibility study, we sought to assess the impact that physical exercise had on body composition and QoL in premenopausal breast cancer patients undergoing ET, and to determine the appropriateness of further testing of this intervention in this patient group. Material and methods. This study involved 41 premenopausal female breast cancer patients before and after six, 12, and 18 months of ET. Aerobic training began in the 6th month and resistance training was added in the 12th month. Body composition was evaluated using dual-energy x-ray absorptiometry (DXA) scans, body physique was evaluated using anthropometric measurement techniques, and QoL was evaluated using questionnaires from the European Organization for Research and Treatment of Cancer. Results. The initial period of ET with no exercise resulted in a reduction in fat-free body mass (FFBM), an increase in fat body mass (FBM), and a decline in QoL scores. Adding aerobic training resulted in a reduction of FBM and percentage of android fat, and improved QoL scores. The introduction of resistance training further reduced percentage of android and gynoid fat, increased FFBM, and further improved QoL scores. Conclusion. ET negatively impacts body composition, body physique, and QoL of premenopausal breast cancer patients. This feasibility study shows that physical activity may improve QoL and reduce adverse effects of ET on body composition and body physique, indicating appropriateness for further investigation on the use of exercise programs in premenopausal breast cancer patients to improve the outcomes of therapy.
Source: CINAHL

4. Comparison between dual-energy X-ray absorptiometry and skinfolds thickness in assessing body fat in anorexia nervosa before and after weight restoration.

Author(s) El Ghoch, Marwan, Alberti, Marta, Milanese, Chiara, Battistini, Nino Carlo, Pellegrini, Massimo, Capelli, Carlo, Calugi, Simona, Dalle Grave, Riccardo
Citation: Clinical Nutrition, 01 December 2012, vol./is. 31/6(911-916), 02615614
Publication Date: 01 December 2012
Abstract: Summary: Background & aims: The aim of the study was to evaluate the correspondence between body fat mass composition (percentage) measured with dual-energy X-ray absorptiometry (DXA) and estimated by means of skinfold thicknesses (ST) measurement in patients with anorexia nervosa (AN), before and after weight gain. Methods: Percentage body fat (%BF) was measured with DXA and estimated by ST measurements using Siri, Brozek, and Heyward equations in 27 adult patients with AN before and after weight gain (pre- and post-treatment) achieved with inpatient treatment and in 42 healthy age-matched controls. Results: Due to Lohman criteria and Bland Altman
plot there is no correspondence between the %BF measured with DXA and the %BF estimated by predictive equations based on ST measurements in patients with AN before and after weight gain, with the exception of Brozek equation which showed a mild agreement in pre-treatment AN. However, a correspondence was observed between the two procedures in healthy controls. Conclusions: Our data supporting the use of ST measurements do not appear to be an alternative to DXA in estimating body fat percentage, before and after weight gain in patients with AN.

Source: CINAHL

5. Validation of body adiposity index as a measure of obesity in overweight and obese postmenopausal white women and its comparison with body mass index.

Author(s) Lemacks JL, Liu PY, Shin H, Ralston PA, Ilich JZ

Citation: Menopause (10723714), 01 November 2012, vol./is. 19/11(1277-1279), 10723714

Publication Date: 01 November 2012

Abstract: OBJECTIVE: The purpose of this study was to evaluate whether the recently developed body adiposity index (BAI) in Mexican American and African American women could be validated in postmenopausal American white women and to determine if it is a better obesity classification measure than body mass index (BMI) is in the latter population. METHODS: Total body percentage adiposity (%adiposity) measured by dual-energy x-ray absorptiometry (DXA) was compared with total body %adiposity predicted by BAI in 187 overweight/obese postmenopausal white women (mean ± SD %adiposity, 45.9 ± 4.9% and 38.3 ± 6.2% for DXA and BAI, respectively). SPSS 19.0 and Medcalc 11.6.1.0 were used to conduct Pearson's correlations (r), paired t test, receiver operating curve, and Lin's concordance coefficient (\(\rho_c\)) and to create Bland and Altman's limit-of-agreement plot. RESULTS: Pearson's correlation analysis revealed a strong association between DXA %adiposity and BAI (r = 0.78, P < 0.001), DXA %adiposity and BMI (r = 0.75, P < 0.001), and BMI and BAI (r = 0.90, P < 0.001). Bias correction factor was 0.51 between DXA %adiposity and BAI. Paired t test showed a significant mean difference between measurements (P < 0.0001), and the plot showed that BAI underestimated DXA %adiposity by 7.56%. Concordance coefficient (\(\rho_c\)) = 0.39; 95% CI, 0.33-0.46) revealed a poor agreement strength. There was no difference between the area under the curve statistic for BAI and BMI. CONCLUSION: Based on our results, BAI has limitations for use in a clinical setting in overweight/obese postmenopausal white women but may be practical for research applications and eventually developed into an easy method to estimate overweight/obesity in other settings.

Source: CINAHL

6. How good are BMI charts for monitoring children’s attempts at obesity reduction?

Author(s) Rudolf MC, Krom AJ, Cole TJ

Citation: Archives of Disease in Childhood, 01 May 2012, vol./is. 97/5(418-422), 00039888

Publication Date: 01 May 2012

Abstract: INTRODUCTION: Body mass index (BMI) is the pragmatic measure to assess children’s obesity clinically and BMI charts are widely used for counselling families about children's weight management over time. AIMS: To explore the variability in clinicians’ interpretation of BMI patterns and to ascertain the diagnostic accuracy of their judgement by relating it to change in body composition by dual-emission x-ray absorptiometry (DXA). METHODS: Data from 70 children who participated in a trial of a weight management programme for obese children were analysed. BMI was plotted on UK 1990 charts at baseline, 6 months and 12 months, and four clinicians experienced in obesity management independently scored the charts on a five-point scale for how successful children were in tackling their obesity over a 6-month period. Scores were compared with change in BMI, fat mass and lean mass z-scores as measured by DXA. RESULTS: 54 children (aged 8-15 years; BMI z-score 2.93 (SD 0.48)) had simultaneous BMI and DXA scans performed, giving 104 pairs of measurements 6 months apart. There was good consistency between clinicians’ scores for weight management and these related well to change in BMI and fat...
mass z-scores, but not lean mass z-score. They reported that measurement proximity to centile lines and crossing of lines influenced their confidence in making a decision and change in severe obesity was harder to judge as higher centile lines are so far apart. CONCLUSIONS: BMI charts are useful for assessing children's attempts at weight management, and provide a reasonably accurate indication of change in body fat. Recommendations are made regarding BMI chart design and guidance in interpreting measurements.

Source: CINAHL
Available in fulltext from Archives of disease in childhood at Highwire Press


Author(s) Davis NL, Bursell JD, Evans WD, Warner JT, Gregory JW
Citation: Archives of Disease in Childhood, 01 April 2012, vol./is. 97/4(312-315), 00039888
Publication Date: 01 April 2012
Abstract: INTRODUCTION: Rapid weight gain is often observed following initiation of insulin therapy in children with type 1 diabetes mellitus (T1DM) and girls are particularly at risk of becoming overweight. The authors evaluated body composition changes in children during the first year after diagnosis and related this to markers of cardiovascular risk.
METHODS: Body mass index (BMI) and body composition measured by whole body dual energy x-ray absorptiometry (DEXA) were assessed in 30 patients (18 boys) with T1DM 3-10 days after diagnosis, 6 weeks later and at 1 year, and on two occasions 1 year apart in 14 controls (8 boys). Cardiovascular risk markers were assessed in T1DM subjects at 1 year. RESULTS: T1DM subjects had lower BMI SD scores (SDS) at diagnosis than controls (mean (SD) BMI SDS -0.67 (1.34) vs 0.20 (1.14), p<0.05) and reduced percentage body fat (20.3% (4.6) vs 24.5% (7.7), p<0.05). T1DM subjects normalised their body composition at 6 weeks and this was maintained 1 year later. Girls with diabetes were thinner than boys at diagnosis (BMI SDS -1.64 (1.02) vs -0.02 (1.17), p<0.05) and at 1 year (BMI SDS -0.58(0.9) vs 0.65 (0.98), p<0.05). Girls had higher glycated haemoglobin (HbA1c) (8.8% (1.2) vs 7.8% (1.0), p<0.05), insulin dose (1.01 (0.30) vs 0.82 (0.18) U/kg/day, p=0.04), total cholesterol (4.30 (0.45) vs 3.79 (0.50) mmol/l, p<0.05) and high-density lipoprotein (2.62 (0.53) vs 2.02 (0.37) mmol/l). High sensitivity C reactive protein and fibrinogen were in the normal range and there were no differences between genders. DISCUSSION: Insulin deficiency at diagnosis of diabetes causes a catabolic state that is predominantly lipolytic. Body composition normalises within 6 weeks of treatment, though girls remain thinner than boys both at diagnosis and 1 year thereafter, in contrast to published findings. Despite girls being prescribed a larger insulin dose, their HbA1c and cholesterol levels are higher at 1 year suggesting increased insulin resistance and cardiovascular risk.
Source: CINAHL
Available in fulltext from Archives of disease in childhood at Highwire Press

8. Regional and whole-body dual-energy x-ray absorptiometry to guide treatment and monitor disease progression in neuromuscular disease.

Author(s) Skalsky AJ, Han JJ, Abresch RT, McDonald CM
Citation: Physical Medicine & Rehabilitation Clinics of North America, 01 February 2012, vol./is. 23/1(67-73), 10479651
Publication Date: 01 February 2012
Abstract: Dual-energy x-ray absorptiometry (DEXA) is a safe, noninvasive, inexpensive tool for managing patients with neuromuscular diseases. Regional and whole-body DEXA can be used to guide clinical treatments, such as determining body composition to guide nutritional recommendations, as well as to monitor disease progression by assessing regional and whole-body lean tissue mass. DEXA can also be used as an outcome measure for clinical trials.
9. Hypertension in type 1 diabetic patients—the influence of body composition and body mass index: an observational study.

**Author(s)** Abd El Dayem SM, Battah AA

**Citation:** Anatolian Journal of Cardiology / Anadolu Kardiyoloji Dergisi, 01 January 2012, vol./is. 12/1(60-64), 13028723

**Publication Date:** 01 January 2012

**Abstract:** OBJECTIVE: To estimate the influence of body composition and body mass index on blood pressure in type 1 diabetic patients. METHODS: This cross-sectional, observational study included 45 type 1 diabetic patients and 30 age and sex matched healthy volunteers. Blood pressure, anthropometric measurements, and body composition by dual X-ray absorptiometry (DXA) were done for all patients and controls. T-test, one way ANOVA and multiple regressions were used for statistical analyses. RESULTS: Twenty diabetic patients (44.4%) had hypertension. Hypertensive diabetic patients had the highest total fat mass %, soft tissue fat mass %, abdomen fat % and fat/lean ratio followed by non hypertensives and the least was the controls (p=0.0001). Abdominal fat % was the only parameter significantly associated with mean arterial blood pressure ([beta]-5.8, 95% CI: 3.7-8.0, p=0.0001) and systolic blood pressure ([beta]-8.6, 95% CI: 5.4-11.9, p=0.0001) by stepwise multiple regression analysis in the diabetic patients. In the contrary, abdominal fat % ([beta]-2.7, 95% CI: 0.9-4.5, p=0.006), duration of diabetes ([beta]-2.5, 95% CI: 1.4-3.5, p=0.0001) and fat/lean ratio ([beta]-11.7, 95% CI: 1.5-21.9, p=0.03) were related to diastolic blood pressure. CONCLUSION: Diabetes is associated with an increase in body fat especially abdominal, which leads to an increase in insulin resistance and decrease in lean mass. In type 1 diabetic patients, blood pressure depends on body mass index SDS and fat mass. Abdominal fat is the only factor related to mean arterial blood pressure and systolic blood pressure.

**Source:** CINAHL

Available in fulltext from Anatolian Journal of Cardiology / Anadolu Kardiyoloji Dergisi at EBSCOhost

10. Centrally located body fat is associated with lower bone mineral density in older Puerto Rican adults.

**Author(s)** Bhupathiraju, Shilpa N., Dawson-Hughes, Bess, Hannon, Marian T., Lichtenstein, Alice H., Tucker, Katherine L.

**Citation:** American Journal of Clinical Nutrition, 01 October 2011, vol./is. 94/4(1063-1070), 00029165

**Publication Date:** 01 October 2011

**Abstract:** Background: Fat mass is thought to be protective against osteoporosis, primarily because of its weight-bearing effect. Few studies have evaluated the association between abdominal fat mass (AFM) and bone health beyond its weight-bearing effect. Objective: We tested the hypothesis that higher body weight-adjusted AFM is associated with poor bone health. Design: A cross-sectional study was conducted in 629 Puerto Rican adults aged 47-79 y. Bone mineral density (BMD) of the femoral neck, trochanter, total femur, and lumbar spine (L2-L4) were measured by using dual-energy X-ray absorptiometry (DXA). AFM and total fat mass (TFM) were assessed by using body-composition software from whole-body DXA scans. Osteoporosis and osteopenia were defined as T-scores </= -2.5 and -1.0 to -2.5 SD, respectively, at the respective bone site. Results: After confounders were controlled for, body weight-adjusted AFM was inversely associated with BMD at all 4 bone sites in women and at the femoral neck in men. For TFM, small inverse associations were seen at the trochanter and total femur in women. In men, similar associations were seen at the 3 femur sites. In both sexes, the odds for osteoporosis or osteopenia at each of the femoral sites increased by 10-16% for every 100-g increase in body weight-adjusted AFM. Conclusions: Higher AFM was associated with poor bone health in this Puerto Rican sample. Efforts to reduce abdominal obesity will not only reduce the risk of chronic disease but may also improve bone health. This trial is registered at clinicaltrials.gov as
11. Effects of body composition and adipose tissue distribution on respiratory function in elderly men and women: the health, aging, and body composition study.

**Author(s)** Rossi AP, Watson NL, Newman AB, Harris TB, Kritchevsky SB, Bauer DC, Satterfield S, Goodpaster BH, Zamboni M

**Citation:** Journals of Gerontology Series A: Biological Sciences & Medical Sciences, 01 July 2011, vol./is. 66/7(801-808), 10795006

**Publication Date:** 01 July 2011

**Abstract:** BACKGROUND: Previous cross-sectional studies demonstrate positive associations of fat-free mass and negative associations of centrally distributed fat deposits with respiratory function in older adults. Few studies have evaluated whether greater losses of muscle and increases in fat are associated with more rapid decline in respiratory function in aging. METHODS: Nine hundred and fifty-seven men and 1,024 women aged, respectively, 73.6 ± 2.8 years and 73.2 ± 2.8 years at baseline were followed for 5 years. Body weight, waist circumference, bone mineral density, fat-free mass, fat mass and fat mass percentage as measured by DXA, abdominal subcutaneous and visceral adipose tissue, thigh muscle area, thigh intermuscular fat by CT and forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC) were evaluated at baseline and after 5-years follow-up. RESULTS: Cross-sectional analyses showed that height and thigh muscle area were positively and visceral adipose tissue negatively related to FEV1 and FVC. Increase in fat mass over five years was associated with concurrent FEV1 and FVC decline. In analyses stratified by weight-change categories, men and women who gained weight (vs stable/lost weight) had more rapid declines in FEV1 and FVC. CONCLUSION: In this well-functioning cohort, less muscle and greater abdominal fat were each associated with poorer lung spirometry cross-sectionally, whereas increase in fat mass over 5 years was associated with concurrent FEV1 and FVC decline. Weight gain and accompanying fat deposition may accelerate age-related declines in respiratory function.

**Source:** CINAHL

12. Air Displacement Plethysmography For Fat-mass Measurement in Healthy Young Women.

**Author(s)** Edwards, Heather L, Randall Simpson, Janis A, Buchholz, Andrea C

**Citation:** Canadian Journal of Dietetic Practice & Research, 01 June 2011, vol./is. 72/2(85-87), 14863847

**Publication Date:** 01 June 2011

**Abstract:** Purpose: Dual energy X-ray absorptiometry (DXA) and air displacement plethysmography (ADP) are commonly used to assess body composition. Accurate body fat measures are valuable in a variety of populations. Because DXA, the reference standard, is expensive and labour-intensive, determining whether these two methods are interchangeable is important. Methods: Forty-five female undergraduate students aged 21 to 33 with body mass indexes of 18.3 to 28.6 kg/m² were recruited from the University of Guelph. Each participant underwent one full-body DXA scan and one ADP assessment, to determine total percent fat mass (%FM). Results: The Pearson's correlation between %FM(DXA) (27.1 ± 4.8) and %FM(ADP) (26.1 ± 5.5) indicated good association (r=0.88, p<0.01). While Bland-Altman analysis revealed no systematic bias between the two methods (R²=0.07, p=0.08), large intraindividual variation occurred (95% confidence interval: -5.86% to 4.11%); this was related to height, weight, body-surface area, and lung volume. Conclusions: The two methods were significantly correlated. Mean %FM was not significantly different and no systematic bias between methods was observed. These findings indicate that ADP and DXA may be used interchangeably for determining %FM at the group level in healthy young women; a large intraindividual variation between the methods precludes interchangeability at the individual level.

Author(s) Nissen MJ, Shapiro A, Swenson KK

Citation: Clinical Breast Cancer, 01 March 2011, vol./is. 11/1(52-60), 15268209

Publication Date: 01 March 2011

Abstract: Purpose: This study aimed to identify predictors of changes in weight and body composition among women receiving chemotherapy for breast cancer. Patients and Methods: Data were from 49 women age 40-54 receiving chemotherapy for breast cancer. Weight, height, and body composition measurements from dual-energy x-ray absorptiometry (DEXA) scanning were completed at baseline (within 1 month of beginning chemotherapy) and 12 months. Caloric intake was assessed from food diaries at baseline, 6 and 12 months, and physical activity was measured by questionnaire at baseline, 3, 6, 9, and 12 months. Results: Baseline body mass index (BMI) was inversely associated with gains in weight (P = .01) and fat mass in torso (P = .006). Women of normal weight gained an average of 4.3 pounds and increased fat mass in torso and arms. Overweight women lost 3.0 pounds, and obese women lost 4.1 pounds, and neither group increased body fat. Decreased physical activity was associated with weight gain (P = .047). Additional predictors of increased fat mass in torso were younger age (P = .023) and treatment with tamoxifen (P = .015). Predictors of loss of bone mineral content included older age (P = .004) and treatment with aromatase inhibitor (P = .024), whereas treatment with bisphosphonate prevented bone loss (P < .0001). Conclusion: Women receiving chemotherapy for breast cancer who are of normal weight at the time of breast cancer diagnosis are more likely to gain weight and body fat during the following year than overweight or obese women.

Source: CINAHL

Available in fulltext from Clinical Breast Cancer at EBSCOhost


Author(s) Fürstenberg A, Davenport A

Citation: American Journal of Kidney Diseases, 01 January 2011, vol./is. 57/1(123-129), 02726386

Publication Date: 01 January 2011

Abstract: BACKGROUND: Malnutrition is common in hemodialysis patients and closely related to increased morbidity and mortality. As such, simple, reliable, and easily available methods of determining nutritional status and recognition of short-term changes in body composition are desirable for routine clinical practice. STUDY DESIGN: Diagnostic test study. SETTING & PARTICIPANTS: 53 stable adult hemodialysis patients attending for thrice-weekly outpatient hemodialysis in a university tertiary hospital dialysis center. INDEX TEST: Comparison of dual-energy x-ray absorptiometry (DEXA) and multifrequency bioelectrical impedance analysis (BIA) using a tetrapolar 8-point tactile electrode system as 2 index tests of body composition. REFERENCE TEST: None. RESULTS: Assessment of whole-body composition showed that lean body mass measured using the 2 techniques correlated highly, with good method agreement shown using a Bland-Altman plot (r = 0.92; P < 0.001; bias, +1 g [95% CI, -1.173 to 1.175]), as did fat mass (r = 0.93; P < 0.001; bias, -157 g [95% CI, -1.251 to 937]). Similarly, segmental analysis of lean body mass showed strong correlations between lean body mass of the trunk and right and left legs with small bias (r = 0.85, 0.89, and 0.86, respectively; P < 0.001; Bland-Altman bias, -859, +364, and +552 g, respectively), but weaker correlations for lean body mass for the right and left arm (r = 0.69 and 0.75, respectively; P < 0.001; Bland-Altman bias, -240 and +12 g, respectively). Bone mineral content derived using multifrequency BIA overestimated that
measured using DEXA ($r = 0.77; P < 0.001; \text{bias}, +530 \text{ g} [95\% \text{ CI}, 422-638]$).

LIMITATIONS: Retrospective study in a healthy ambulant outpatient cohort.

CONCLUSIONS: Compared with DEXA, multifrequency BIA appears to be a robust tool for measuring and monitoring total-body fat and lean body mass in hemodialysis patients; however, there is less agreement in bone mineral content assessment between the 2 methods.

Source: CINAHL

15. Preoperative and postoperative agreement in fat free mass (FFM) between bioelectrical impedance spectroscopy (BIS) and dual-energy X-ray absorptiometry (DXA) in patients undergoing cardiac surgery.

Author(s) van Venrooij LM, Verberne HJ, de Vos R, Borgmeijer-Hoelen MM, van Leeuwen PA, de Mol BA

Citation: Clinical Nutrition, 01 December 2010, vol./is. 29/6(789-794), 02615614

Publication Date: 01 December 2010

Abstract: Summary: Background & aims: To measure undernutrition in terms of fat free mass (FFM), there are several options. The aim of this study was to assess agreement in FFM between the portable, bedside bioelectrical impedance spectroscopy (BIS) and relatively expensive, non-portable dual-energy X-ray absorptiometry (DXA) in patients undergoing cardiac surgery. Methods: In a prospective study, body composition measurements by BIS and DXA were performed two weeks prior and two months after cardiac surgery. Preoperative and postoperative agreement in FFM between BIS and DXA were analyzed with Bland and Altman plots. Results: Twenty-six patients were analyzed. BIS overestimated preoperative and postoperative FFM by 2 kg compared to DXA (2.3 kg (95%CI: −3.5–8.1 kg) and 2.1 kg (95%CI: −4.5–8.7 kg), respectively), BIS underestimated FFM change by −0.5% (95%CI: −8.4–7.5%). Conclusions: There is a large inter-individual variation between BIS and DXA. This hinders the interchange-ability of BIS and DXA in routine clinical practice and may lead to misclassifications and thereby inappropriate nutritional treatment and possible postoperative complications. To evaluate nutritional therapy in patients undergoing cardiac surgery, we advocate the use of DXA assessed FFM in parallel to BIS assessed extracellular and intracellular water and FFM.

Source: CINAHL


Author(s) Mok E, Letellier G, Cuisset J, Denjean A, Gottrand F, Hankard R

Citation: Clinical Nutrition, 01 October 2010, vol./is. 29/5(633-638), 02615614

Publication Date: 01 October 2010

Abstract: Summary: Background & aims: To compare the ability of bioelectrical impedance analysis (BIA) and skinfold thickness (ST) measurements to estimate changes in body composition in Duchenne muscular dystrophy (DMD). Methods: A secondary analysis was performed on 26 ambulatory DMD boys aged 3–11 y selected for a randomised trial of glutamine supplementation. We assessed fat free mass (FFM) and percentage fat mass (%FM) by BIA (monofrequency (50kHz) unit), ST measurements and a criterion method, dual-energy X-ray absorptiometry (DXA), and repeated these measures 5 mo later at 3 outpatient clinical investigation centers in France. Results: When compared with DXA reference method, ST overestimated change in FFM ($P <0.01$), whereas BIA estimates did not differ from DXA. Concordance plots revealed that when compared with DXA, ST overestimated the increase in FFM (mean: 0.6kg; 95% CI: 0.17 to 0.99) which led to an underestimation in %FM change (mean: −1.4%; 95% CI: −2.6 to −0.2), whereas BIA estimated change in FFM (mean: −0.05kg; 95% CI: −0.39 to 0.29) and %FM (mean: 1.3%; 95% CI: −0.06 to 2.7) more accurately. Conclusions: BIA method can be used to follow changes in nutritional status of ambulatory DMD children or to evaluate treatment efficacy.

Source: CINAHL

Author(s) O'Connor DP, Bray MS, McFarlin BK, Sailors MH, Ellis KJ, Jackson AS

Citation: Medicine & Science in Sports & Exercise, 01 October 2010, vol./is. 42/10(1959-1965), 01959131

Publication Date: 01 October 2010

Abstract: PURPOSE: Popular generalized equations for estimating percent body fat (BF%) developed with cross-sectional data are biased when applied to racially/ethnically diverse populations. We developed accurate anthropometric models to estimate dual-energy x-ray absorptiometry BF% (DXA-BF%) that can be generalized to ethnically diverse young adults in both cross-sectional and longitudinal field settings. METHODS: This longitudinal study enrolled 705 women and 428 men (aged 17-35 yr) for 30 wk of exercise training (3 d·wk(-1) for 30 min·d(-1) of 65%-85% predicted VO2max). The distribution of ethnicity was as follows: 37% non-Hispanic white, 29% Hispanic, and 34% African-American. DXA-BF%, skinfold thicknesses, and body mass index (BMI) were collected at baseline and after 15 and 30 wk. RESULTS: Skinfolds, BMI, and race/ethnicity were significant predictors of DXA-BF% in linear mixed model regression analysis. For comparable anthropometric measures (e.g., BMI), DXA-BF% was lower in African-American women and men but higher in Hispanic women compared with non-Hispanic white. Addition of BMI to the skinfold model improved the SEE for women (3.6% vs 4.0%), whereas BMI did not improve prediction accuracy of men (SEE = 3.1%). CONCLUSIONS: These equations provide accurate predictions of DXA-BF% for diverse young women and men in both cross-sectional and longitudinal settings. To our knowledge, these are the first published body composition equations with generalizability to multiple time points, and the SEE estimates are among the lowest published in the literature.

Source: CINAHL

18. Time course of bone loss in patients with anorexia nervosa.

Author(s) Olmos JM, Valero C, del Barrio AG, Amado JA, Hernández JL, Menéndez-Arango J, González-Macias J

Citation: International Journal of Eating Disorders, 01 September 2010, vol./is. 43/6(537-542), 02763478

Publication Date: 01 September 2010

Abstract: Objective To evaluate the time course of bone mineral density (BMD) in women with anorexia nervosa (AN) during 2-year follow-up. Method We prospectively studied 51 female with AN aged 18-38 years, and 40 age-matched healthy women (19-34 years). BMD was measured in lumbar spine (LS), femoral neck (FN), and total hip (TH) by DXA. Results At baseline, weight, body mass index, and lumbar and hip BMD were significantly (p < .001) lower in AN patients than in controls. Patients who gain weight showed a significant increase in BMD at FN (+1.6%; p < .05), and TH (+4.4%; p < .05) and lower nonsignificant changes in LS (+1.3%). Weight at entry, and percent change of weight were significant determinants (p < .05) of the variability in percent change of BMD at FN and TH, whereas weight at entry was the main determinant of bone modifications at lumbar spine. Discussion Our data emphasize the influence of weight gain in recovery of bone mass in AN patients, especially at the hip. © 2009 by Wiley Periodicals, Inc. Int J Eat Disord 2010; 43:537-542

Source: CINAHL
Available in fulltext from International Journal of Eating Disorders at EBSCOhost

19. Physical fitness, bone mineral density and associations with physical activity in females with longstanding eating disorders and non-clinical controls.

Author(s) Bratland-Sanda, S., Sundgot-Borgen, J., Rosenvinge, J.H., Rø, ø., Hoffart, A., Martinsen, E.W.
Citation: Journal of Sports Medicine & Physical Fitness, 01 September 2010, vol./is. 50/3(303-310), 00224707

Publication Date: 01 September 2010

Abstract: AIM: To examine (i) aerobic fitness, muscular strength, and bone mineral density (BMD) in female inpatients with longstanding eating disorders and non-clinical controls, and (ii) associated and explanatory factors for BMD among the inpatients. METHODS: Adult females with DSM-IV anorexia nervosa (AN), bulimia nervosa (BN) or eating disorders not otherwise specified (EDNOS) (n=59, mean(SD) age 30.1(8.5) yrs and ED duration 14.3 yrs) and non-clinical age-matched controls (n=53, mean(SD) age 31.3(8.3) yrs) accepted participation in this cross-sectional study. Measurements included accelerometer assessed and self reported amount of different types of physical activities, VO2max on treadmill, 1RM in leg and chest press, and BMD in lumbar spine (L2-L4), femur neck and total body analyzed by DXA. RESULTS: Muscular strength and BMD were lower in patients with AN, not in patients with BN or EDNOS, compared to controls. Aerobic fitness did not differ between patients and controls. BMD in the patients was positively associated with body weight, muscular strength and self reported high impact PA (min.w-1), not self reported general weight-bearing PA (min.w-1) or accelerometer assessed PA (counts.min). History of AN (28%) and muscular strength (9%) contributed significantly to explain the variance in total body BMD. CONCLUSION: Muscular strength and only high impact PA are associated with BMD in patients with longstanding ED. An implication of this is the need for more specific guidelines regarding types of PA recommended for this patient population. Special considerations should be made for severely malnourished patients, and for patients with osteoporosis.

Source: CINAHL

20. Effects of smoking cessation on body composition in postmenopausal women.

Author(s) Kleppinger A, Litt MD, Kenny AM, Oncken CA

Citation: Journal of Women's Health (15409996), 01 September 2010, vol./is. 19/9(1651-1657), 15409996

Publication Date: 01 September 2010

Abstract: Background: Smoking cessation is associated with weight gain, but the effects of smoking cessation on measures of body composition (BC) have not been adequately evaluated. The purpose of this study is to examine the effects of 16 months of cigarette abstinence on areas of BC measured by dual-energy x-ray absorptiometry (DXA). Methods: One hundred fifty-two postmenopausal women participated in a smoking cessation study using the nicotine patch. Secondary analyses were conducted on data from 119 subjects (age 56+/=7 years, range 41-78 years) who had had DXA scans at baseline and 16 months later. Participants were classified either as quitters (self-reported cigarette abstinence confirmed with exhaled carbon monoxide [co] </=8ppm at 3 and 16 months after quit date) or as continued smokers. BC was assessed using a General Electric Lunar DXA IQ machine. Four areas of BC (kg) were measured: whole body weight, fat mass, muscle mass, and functional skeletal muscle mass in arms and legs (ASM/ht(2)). Multivariate analysis of covariance (MANCOVA) assessed changes in BC in quitters vs. continued smokers between baseline and 16 months of follow-up. Increases in BC measures were evaluated as a function of increased calorie intake or change in physical activity, using linear regression. Results: Quitters significantly increased body weight ( p<0.001), fat mass ( p<0.001), muscle mass ( p’/0.04), and functional muscle mass ( p’/0.004) over time, when baseline BC measures and other confounding factors were controlled. Regression analysis indicated change in BC could not be accounted for by calorie intake or physical activity. Conclusions: Smoking cessation may be associated with increased fat and muscle mass in postmenopausal women. The novel finding of an increase in functional muscle mass suggests that smoking cessation could increase functional capacity. Further studies need to replicate these findings and examine mechanisms of these effects.

Source: CINAHL

Available in fulltext from Journal of Women's Health at EBSCOhost
21. Dual-energy x-ray absorptiometry to measure the influence of a 16-week community-based swim training program on body fat in children and adolescents with intellectual disabilities.

**Author(s)** Casey AF, Rasmussen R, Mackenzie SJ, Glenn J

**Citation**: Archives of Physical Medicine & Rehabilitation, 01 July 2010, vol./is. 91/7(1064-1069), 00039993

**Publication Date**: 01 July 2010

**Abstract**: OBJECTIVE: To use dual-energy x-ray absorptiometry (DXA) to measure the effects of a 16-week community-based swim training program on percent body fat in children and adolescents with intellectual disability (ID). DESIGN: Convenience sample. SETTING: University sport complex and exercise science laboratory. PARTICIPANTS: Children and adolescents (n=8; mean age +/- SD, 13.1 +/- 3.4 y), 2 girls and 6 boys with ID, of varying fat levels (11%-35%). INTERVENTION: A swim training program lasting for the duration of 16 weeks with three 1-hour sessions held at a 25-m pool each week. MAIN OUTCOME MEASURE: Assessing percent body fat at pretest and posttest through the use of DXA. RESULTS: After the 16-week exercise training program, we observed a 1.2% median increase in body fat percentage with a range from -0.3% to 4.5%. Wilcoxon matched-pairs signed-ranks tests suggest that these results are statistically significant (P=.039; exact). CONCLUSIONS: Exercise training alone proved ineffective in reducing percent body fat in 8 children and adolescents with ID. Further research should consider implementing a combined diet and exercise program. To gauge the effectiveness of intervention programs, valid methods and complex measurement tools such as DXA should be used to assess changes in percent body fat in such a heterogeneous population.

**Source**: CINAHL


**Author(s)** Nagelkirk PR, Scalzo R, Harber M, Kaminsky LA

**Citation**: International Journal of Sports Medicine, 01 July 2010, vol./is. 31/7(458-462), 01724622

**Publication Date**: 01 July 2010

**Abstract**: This study explored the coagulation and fibrinolytic responses to acute resistance training in young women and aimed to determine the influence of body composition on these variables. Healthy young women aged 23+/-5 yrs participated in the study. Body fat and fat distribution were assessed using DEXA. Each subject performed 6 sets of 10 leg extension repetitions at an intensity associated with 70% of 1-repetition maximum. Markers of coagulation (TAT), fibrinolytic stimulation (tPA) and inhibition (PAI-1) were assessed before and immediately after exercise. tPA activity increased in response to acute resistance exercise (p<0.05), however, there was no change in TAT or PAI-1 activity. Percent body fat was negatively correlated to the tPA response to exercise (r=-0.44), and positively related to PAI-1 at baseline (r=0.47) and post-exercise (r=0.47), and to post-exercise TAT (r=0.44). Android/gynoid fat ratio was negatively related to post-exercise tPA (r=-0.43), positively related to PAI-1 at baseline (r=0.61) and post-exercise (r=0.62) and to post-exercise TAT (r=0.43). These physiological responses suggest women with elevated body fat may be at increased risk of an adverse thrombosis-related event both at rest and during exercise compared to leaner women.

**Source**: CINAHL

23. Comparison of methods to assess body fat in non-obese six to seven-year-old children.

**Author(s)** L’Abée C, Visser GH, Liem ET, Kok DEG, Sauer PJJ, Stolk RP

**Citation**: Clinical Nutrition, 01 June 2010, vol./is. 29/3(317-322), 02615614

**Publication Date**: 01 June 2010
Abstract: BACKGROUND & AIM: Different non-invasive methods exist to evaluate total body fat in children. Most methods have shown to be able to confirm a high fat percentage in children with overweight and obesity. No data are available on the estimation of total body fat in non-obese children. The aim of this study is to compare total body fat, assessed by different methods in non-obese children. METHODS: We compared total body fat, assessed by isotope dilution, dual energy X-ray, skinfold thickness, bioelectrical impedance analysis, combination of these methods as well as BMI in 30 six to seven-year-old children. RESULTS: The children had a mean BMI of 16.01kg/m(2) (range 13.51-20.32) and five children were overweight according to international criteria. Different methods showed rather different absolute values for total body fat. Bland-Altman analysis showed that the difference between the DEXA method and isotope dilution was dependent on the fat percentage. Children with the same BMI show a marked variation in total body fat ranging from 8% to 22% as estimated from the isotope dilution method. CONCLUSION: Non-invasive methods are presently not suited to assess the absolute amount of total body fat in 6-7 years old children.

Source: CINAHL


Author(s) Bross R, Chandramohan G, Kovesdy CP, Oreopoulos A, Noori N, Golden S, Benner D, Kopple JD, Kalantar-Zadeh K

Citation: American Journal of Kidney Diseases, 01 May 2010, vol./is. 55/5(885-896), 02726386

Publication Date: 01 May 2010

Abstract: BACKGROUND: Protein-energy wasting is common in chronic kidney disease and is associated with decreases in body muscle and fat stores and poor outcomes. The accuracy and reliability of field methods to measure body composition is unknown in this population. STUDY DESIGN: Cross-sectional observational study. SETTING & PARTICIPANTS: 118 maintenance hemodialysis patients were seen at the General Clinical Research Center at Harbor-UCLA Medical Center, Torrance, CA. INDEX TESTS: Triceps skinfold, near-infrared interactance, and bioelectrical impedance analysis using the Segal, Kushner, and Lukaski equations. REFERENCE TEST: Dual-energy x-ray absorptiometry (DEXA). RESULTS: Participants (42% women, 52% with diabetes, 40% African Americans, and 38% Hispanics) were aged 49.4 +/- 11.5 (mean +/- SD) years, and had undergone dialysis therapy for 41.1 +/- 32.9 months. Body mass index was 27.0 +/- 6.0 kg/m(2). Using DEXA as the reference test, the bioelectrical impedance analysis-Kushner equation, triceps skinfold, and near-infrared interactance were most accurate of the index tests in estimating total body fat percentage, whereas bioelectrical impedance analysis-Segal equation and bioelectrical impedance analysis-Lukaski equation overestimated total body fat percentage. Bland-Altman analyses and difference plots showed that bioelectrical impedance analysis-Kushner and near-infrared interactance had the smallest mean differences from DEXA, especially in women (1.6%, 0.7%, and 1.2%, respectively). Similar results were observed in African American participants (n = 47). LIMITATIONS: Measurements were performed 1 day after a hemodialysis treatment, leading to more fluid retention, which may have affected the reference and index tests differently. CONCLUSIONS: Using DEXA as the reference test, both near-infrared interactance and bioelectrical impedance analysis-Kushner method yield more consistent estimates of total body fat percentage in maintenance hemodialysis patients compared with the other index tests. Near-infrared interactance is not affected by skin color. Field methods with portable devices may provide adequate precision.

Source: CINAHL

25. Changes in objective and self-reported measures of physical capacity after an intervention in obese older women.

Author(s) Bouchard DR, Soucy S, Sénéchal M, Dionne IJ, Brochu M
The aim of this study was to determine if objective and self-reported measures of physical capacity are two equivalent methods to detect changes following an intervention in obese older women. 36 obese women aged between 55 and 75 years participated in a 3-month study with the aim of improving physical capacity by caloric restriction and/or resistance training. Physical capacity was measured objectively with 10 different tests and self-reported with the SF-36 physical functioning score (SF-36 PF score). Then the performance-to-objective tests were computed using quartiles to provide a baseline global physical capacity score. The mean percentage of change of the 10 tests as well as the SF-36 PF score were also calculated after the study. Body composition was measured by dual-energy X-ray (DXA) absorptiometry. The baseline global physical capacity score and the SF-36 PF score were significantly correlated at baseline (r = 0.43; P < 0.01). Eight out of the 10 objective tests of physical capacity improved after the intervention, while no improvement was observed for the SF-36 PF score. On average, percentage of change in physical capacity was 4.1 ± 5.9% for the SF-36 PF score and 11.1 ± 2.9% for the objective measures. However, no significant correlation was observed between percentage of changes between the two approaches after the intervention (r = 0.32; P = 0.07). Based on these results, the method used to quantify physical capacity after an intervention may have major implications on the outcomes. The methods used should be carefully analyzed in regard to the objective of the study.

Source: CINAHL

Available in fulltext from Journal of Women and Aging at EBSCOhost

26. Measurement of body composition in burned children: is there a gold standard?

Author(s) Branski LK, Norbury WB, Herndon DN, Chinkes DL, Cochran A, Suman O, Benjamin D, Jeschke MG

Citation: JPEN Journal of Parenteral & Enteral Nutrition, 01 January 2010, vol./is. 34/1(55-63), 01486071

Publication Date: 01 January 2010

Abstract: BACKGROUND: Maintaining lean body mass (LBM) after a severe burn is an essential goal of modern burn treatment. An accurate determination of LBM is necessary for short- and long-term therapeutic decisions. The aim of this study was to compare 2 measurement methods for body composition, whole-body potassium counting (K count) and dual x-ray absorptiometry (DEXA), in a large prospective clinical trial in severely burned pediatric patients. METHODS: Two-hundred seventy-nine patients admitted with burns covering 40% of total body surface area (TBSA) were enrolled in the study. Patients enrolled were controls or received long-term treatment with recombinant human growth hormone (rhGH). Near-simultaneous measurements of LBM with DEXA and fat-free mass (FFM) with K count were performed at hospital discharge and at 6, 9, 12, 18, and 24 months post injury. Results were correlated using Pearson's regression analysis. Agreement between the 2 methods was analyzed with the Bland-Altman method. RESULTS: Age, gender distribution, weight, burn size, and admission time from injury were not significantly different between control and treatment groups. rhGH and control patients at all time points postburn showed a good correlation between LBM and FFM measurements (R(2) between 0.9 and 0.95). Bland-Altman revealed that the mean bias and 95% limits of agreement depended only on patient weight and not on treatment or time postburn. The 95% limits ranged from 0.1 +/- 2.9 kg for LBM or FFM in 7- to 18-kg patients to 16.3 +/- 17.8 kg for LBM or FFM in patients >60 kg. CONCLUSIONS: DEXA can provide a sufficiently accurate determination of LBM and changes in body composition, but a correction factor must be included for older children and adolescents with more LBM. DEXA scans are easier, cheaper, and less stressful for the patient, and this method should be used rather than the K count.

Source: CINAHL

27. Rheumatoid cachexia, central obesity and malnutrition in patients with low-active
rheumatoid arthritis: feasibility of anthropometry, Mini Nutritional Assessment and body composition techniques.

Author(s) Elkan A, Engvall I, Cederholm T, Hafström I

Citation: European Journal of Nutrition, 01 August 2009, vol./is. 48/5(315-322), 14366207

Publication Date: 01 August 2009

Abstract: BACKGROUND AND AIMS: The concurrent decrease in fat free mass (FFM) and increase in fat mass (FM), including central obesity, in patients with rheumatoid arthritis (RA) may be related to increased cardiovascular morbidity as well as to functional decline. The objectives of this study were to evaluate body composition and nutritional status in patients with RA and the feasibility of bioelectrical impedance (BIA) to detect rheumatoid cachexia. METHODS: Eighty RA outpatients (76% women), mean age 61 (range 22-80) years and with mean disease duration of 6 (range 1-52) years, were assessed by body mass index (BMI), waist circumference (WC), whole-body dual-energy X-ray absorptiometry (DXA), BIA and the Mini Nutritional Assessment (MNA). RESULTS: Fat free mass index (FFMI; kg/m(2)) was low in 26% of the women and in 21% of the men. About every fifth patient displayed concomitant low FFMI and elevated fat mass index (FMI; kg/m(2)), i.e. rheumatoid cachexia. BMI and MNA were not able to detect this condition. Sixty-seven percent had increased WC. Reduced FFM was independently related to age (p = 0.022), disease duration (p = 0.027), ESR (p = 0.011) and function trendwise (p = 0.058). There was a good relative agreement between DXA and BIA (FM r (2) = 0.94, FFM r (2) = 0.92; both p < 0.001), but the limits of agreement were wide for each variable, i.e. for FM -3.3 to 7.8 kg; and for FFM -3.7 to 3.7 kg. CONCLUSION: Rheumatoid cachexia and central obesity were common in patients with RA. Neither BMI nor MNA could detect this properly. There was a good relative agreement between DXA and BIA, but the limits of agreement were wide, which may restrict the utility of BIA in clinical practice.

Source: CINAHL

Available in fulltext from European Journal of Nutrition at EBSCOhost


Author(s) Haas VK, Kohn MR, Clarke SD, Allen JR, Madden S, Müller MJ, Gaskin KJ

Citation: American Journal of Clinical Nutrition, 01 April 2009, vol./is. 89/4(1005-1010), 00029165

Publication Date: 01 April 2009

Abstract: BACKGROUND: Body weight provides limited information about nutritional status of patients with anorexia nervosa (AN). OBJECTIVES: Our objectives were to determine body composition (BC) changes, to find clinical predictors and endocrine correlates of total body protein (TBPr) depletion, and to compare results on fat mass (FM) obtained with anthropometry (skinfold measurements) and dual-energy X-ray absorptiometry (DXA) in patients with AN. DESIGN: Body weight, body mass index (BMI; in kg/m(2)), BC (with DXA and skinfold measurements), and TBPr [with in vivo neutron activation analysis (IVNAA)] was assessed in 50 AN patients (15.2 y) and 40 healthy sex- and age-matched controls. In 47 AN patients and 22 controls, hormone concentrations were measured. RESULTS: In AN patients, body weight (44.4 +/- 5.5 kg), BMI (16.7 +/- 1.6), and FM(DXA) (7.0 +/- 3.4 kg) were lower than in controls. Lean tissue mass by DXA (LTM(DXA)) was similar in AN patients and controls (35.7 +/- 4.3 compared with 35.8 +/- 4.5 kg), but TBPr was 87% of that of controls (8.1 +/- 1.0 compared with 9.2 +/- 1.2 kg; P < 0.001). Cortisol was high, testosterone was unchanged, and estradiol and insulin-like growth factor I were low. Severe protein depletion measured by IVNAA seen in 17 AN patients could not be identified with simpler methods. All except 1 of 26 AN patients with a BMI > 16.5 had normal TBPr. The difference in individual percentage of body fat measured with DXA and skinfold measurements came up to 9%. CONCLUSION: The severe protein depletion in 34% of AN patients was not accurately identified by LTM(DXA) or simpler methods, but a BMI > 16.5 indicated normal TBPr. Future studies need to compare DXA and skinfold measurements with a reference technique to assess FM in AN patients.

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Source: CINAHL
29. Ultrasound techniques applied to body fat measurement in male and female athletes.

**Author(s)** Pineau J, Filliard JR, Bocquet M

**Citation:** Journal of Athletic Training, 01 March 2009, vol./is. 44/2(142-147), 10626050

**Publication Date:** 01 March 2009

**Abstract:** CONTEXT: For athletes in disciplines with weight categories, it is important to assess body composition and weight fluctuations. OBJECTIVE: To evaluate the accuracy of measuring body fat percentage with a portable ultrasound device possessing high accuracy and reliability versus fan-beam, dual-energy X-ray absorptiometry (DEXA). DESIGN: Cross-validation study. SETTING: Research laboratory. PATIENTS OR OTHER PARTICIPANTS: A total of 93 athletes (24 women, 69 men), aged 23.5 +/- 3.7 years, with body mass index = 24.0 +/- 4.2 and body fat percentage via DEXA = 9.41 +/- 8.1 participated. All participants were elite athletes selected from the Institut National des Sports et de l'Education Physique. These participants practiced a variety of weight-category sports. MAIN OUTCOME MEASURE(S): We measured body fat and body fat percentage using an ultrasound technique associated with anthropometric values and the DEXA reference technique. Cross-validation between the ultrasound technique and DEXA was then performed. RESULTS: Ultrasound estimates of body fat percentage were correlated closely with those of DEXA in both females (r = 0.97, standard error of the estimate = 1.79) and males (r = 0.98, standard error of the estimate = 0.96). The ultrasound technique in both sexes had a low total error (0.93). The 95% limit of agreement was -0.06 +/- 1.2 for all athletes and did not show an overprediction or underprediction bias. We developed a new model to produce body fat estimates with ultrasound and anthropometric dimensions. CONCLUSIONS: The limits of agreement with the ultrasound technique compared with DEXA measurements were very good. Consequently, the use of a portable ultrasound device produced accurate body fat and body fat percentage estimates in relation to the fan-beam DEXA technique.

**Source:** CINAHL

Available in fulltext from Journal of Athletic Training at National Library of Medicine

30. Use of dual-energy X-ray absorptiometry in obese individuals: the possibility to estimate whole body composition from DXA half-body scans.

**Author(s)** Lundqvist K, Neovius M, Grigorenko A, Nordenström J, Rössner S

**Citation:** Radiography, 01 February 2009, vol./is. 15/1(12-19), 10788174

**Publication Date:** 01 February 2009

**Abstract:** Background Because of its high accuracy, dual-energy X-ray absorptiometry (DXA) has become one of the most frequently used methods for estimating human body composition. One limiting factor concerning measuring obese people with the DXA technique is the size of the scanning area. Objective To explore the possibility of estimating whole body composition from half-body scans before and after weight reduction, and compare the results with densitometry measurements. Design Intervention study of 15 obese adults (age 47.2 ± 13.4; BMI 35.9 ± 3.1) who were measured with full- and half-body DXA scans before and after a 7-week weight loss program. On both occasions, body composition was also assessed with air-displacement plethysmography (ADP). Copyright © 2009 The College of Radiographers. Published by Elsevier Science Ltd. All rights reserved. Results The mean weight loss at follow-up was 14.9 ± 4.1 kg (5.0 kg/m²), corresponding to a 14% decrease in body weight. When comparing the results from full- and half-body DXA, between 96% and 98% of the variance was explained. At baseline, %Body Fat (%BF) did not differ significantly between full and half-body measurements (0.6; -0.1-1.3), but the half-body method overestimated it by 1.0% (0.2DS1.8) at follow-up. On the contrary, the difference between DXA and ADP in the assessment of %BF was both significant and of large magnitude (5.2; 2.4DS8.0) at baseline, while non-significant and near zero (0.4; -1.3DS2.2) at follow-up when the subjects had lost a significant amount of weight. Conclusion The results obtained from half-body DXA scans can accurately predict whole
body composition, as measured by full-body DXA, before and after significant weight reduction, in obese patients who barely fit into the scanning area. However, increasing discordance between DXA and ADP with increasing adiposity was seen, indicating that the measurements might not be as reliable on extreme obese subjects as on normal and overweight ditto.

Source: CINAHL

31. In search of a practical tool to assess regional body composition.

Author(s) Lukaski HC

Citation: American Journal of Clinical Nutrition, 01 October 2008, vol./is. 88/4(875-876), 00029165

Publication Date: 01 October 2008

Source: CINAHL


32. Comparison of dual-energy X-ray absorptiometry, air displacement plethysmography and bioelectrical impedance analysis for the assessment of body composition in severely obese Caucasian children and adolescents.

Author(s) Lazzer S, Bedogni G, Agosti F, De Col A, Mornati D, Sartorio A

Citation: British Journal of Nutrition, 01 October 2008, vol./is. 100/4(918-924), 00071145

Publication Date: 01 October 2008

Source: CINAHL

33. Effects of motor physical therapy on bone mineralization in premature infants: a randomized controlled study.

Author(s) Vignochi CM, Miura E, Canani LH

Citation: Journal of Perinatology, 01 September 2008, vol./is. 28/9(624-631), 07438346

Publication Date: 01 September 2008

Abstract: Objective: To study the effect of physical therapy on bone mineralization, weight gain and growth in preterm infants. Method: After fulfilling the inclusion criteria, preterm infants were matched for gestational age and birth weight and then randomly assigned to the physiotherapy group (PG, n=15) and control group (CG, n=14). The PG received motor physical therapy for 15 min daily, 5 times per week until hospital discharge. Bone mineralization was measured by total body dual energy X-ray beam absorptiometry (DEXA) at the onset and end of the study. Statistical analysis was realized by ANCOVA and linear correlation tests. Result: The physical therapy group (PG) presented greater body weight gain per day (27.4+/-.2.4 vs 21.01+/-.4.4 g, P<0.001) and length (1.3+/-.0.3 vs 0.8+/-.0.2 cm week(-1), P<0.001) than did the control group (CG). Body composition values verified by DEXA were greater for the PG. The mean gain in bone mineral content (BMC) (mg) was greater in the PG (434+/-.247.5 vs -.8.9+/-11.4, P<0.001) and length (1.3+/-.0.3 vs 0.8+/-.0.2 cm week(-1), P<0.001) than did the control group (CG). Body composition values verified by DEXA were greater for the PG. The mean gain in bone density (BMD) gain (mg cm(-2)) (8.4+/-.5.6 vs -3.1+/-.5.5, P<0.001). The gain in bone area (BA,cm(2)) was 10.3+/-.5 in the PG vs 1.5 +/-.2 in the CG (P<0.001). The gain in lean mass (LM) (g) in the PG was also greater than in the CG (271.1+/-.21.4 vs 109.1+/-.1.0, P<0.009). The fat mass (g) was similar between the groups (P=0.432). Conclusion: These results showed that physiotherapy in preterm infants produced greater gains in growth, body weight, BMC, BMD, BA and LM.

Source: CINAHL

34. A small food or fluid load has no effect on body composition measured by 3 different methods.
Abstract: The purpose of this study was to determine whether there is a difference in percent body fat measured by hand-to-hand bioelectrical impedance analysis (BIA), dual-energy x-ray absorptiometry (DXA), and air displacement plethysmography (ADP) both before and after consumption of a liquid or semisolid meal. Body composition of 32 participants was measured both before and after consumption of 350-mL Gatorade or cereal with milk. There was no significant difference in percent body fat measured before or after the food or fluid load by DXA, BIA, or ADP. Ingesting a small amount of food or fluid just before measurement does not appear to influence DXA, BIA, or ADP results.

Source: CINAHL

35. Estimating segment inertial parameters using fan-beam DXA.

Author(s) Wicke J, Dumas GA

Citation: Journal of Applied Biomechanics, 01 May 2008, vol./is. 24/2(180-184), 10658483

Abstract: Body segment inertial parameters are required as input parameters when the kinetics of human motion is to be analyzed. However, owing to interindividual differences in body composition, noninvasive inertial estimates are problematic. Dual-energy x-ray absorptiometry (DXA) is a relatively new imaging approach that can provide cost- and time-effective means for estimating these parameters with minimal exposure to radiation. With the introduction of a new generation of DXA machines, utilizing a fan-beam configuration, this study examined their accuracy as well as a new interpolative data-reduction process for estimating inertial parameters. Specifically, the inertial estimates of two objects (an ultra-high molecular density plastic rod and an animal specimen) and 50 participants were obtained. Results showed that the fan-beam DXA, along with the new interpolative data-reduction process, provided highly accurate estimates (0.10-0.39%). A greater variance was observed in the center of mass location and moment of inertia estimates, likely as a result of the coarse end-point location (1.31 cm). However, using a midpoint interpolation of the end-point locations, errors in the estimates were greatly reduced for the center of mass location (0.64-0.92%) and moments of inertia (-0.23 to -0.48%).

Source: CINAHL

36. Good agreement between bioelectrical impedance and dual-energy X-ray absorptiometry for estimating changes in body composition during weight loss in overweight young women.

Author(s) Thomson R, Brinkworth GD, Buckley JD, Noakes M, Clifton PM

Citation: Clinical Nutrition, 01 December 2007, vol./is. 26/6(771-777), 02615614

Abstract: AIMS: To compare estimations of body composition using two different methods of bioelectrical impedance analysis (BIA) with dual X-ray absorptiometry (DXA) for estimating body composition during weight loss in overweight and obese young females. METHODS: Twenty-four overweight or obese females (age 29.5 +/- 6.1 years, BMI 36.4 +/- 4.3 kg/m^2) had body composition assessed using single-frequency (Tanita Ultimate Scaletrade mark; SF-BIA) and multi-frequency (Impedimed SFB7trade mark; MF-BIA) BIA and DXA before and after a 10-week weight loss intervention. RESULTS: MF-BIA estimates of body composition showed good absolute agreement with DXA, as evidenced by the small biases in the estimation of fat free mass (FFM), fat mass (FM) and percentage body fat (BF%); however, the limits of agreement for each variable were wide (bias +/-1.96 standard deviation; FFM -1.6 +/- 6.5kg, FM 1.6 +/- 6.5kg, BF% 1.4 +/- 6.3%). SF-BIA exhibited a larger bias with wide limits of agreement (FFM 3.8 +/- 9.1kg, FM -3.8 +/- 9.1kg, BF% -4.37 +/-10.3%). During weight loss the values provided by MF-BIA and SF-BIA were not significantly different from DXA (p0.89) due to small bias and the limits of agreement were
narrow (MF-BIA: FFM -0.01+/-3.74kg, FM 0.01+/-3.74kg, BF% 0.22+/-3.40%; SF-BIA: FFM 0.40+/-3.92kg, FM -0.40+/-3.92kg, BF% 0.25+/-3.40%). CONCLUSION: Compared with DXA, both the MF-BIA and SF-BIA accurately assessed changes in body composition with weight loss but, compared with SF-BIA, MF-BIA provided superior cross-sectional estimates of body composition.

Source: CINAHL

37. Comparison of different methods to assess body composition of weight loss in obese and diabetic patients.

Author(s) Ritz P, Sallé A, Audran M, Rohmer V

Citation: Diabetes Research & Clinical Practice, 01 September 2007, vol./is. 77/3(405-411), 01688227

Publication Date: 01 September 2007

Abstract: Estimating body composition is important to understand the metabolic and cardiovascular effects of adiposity. Estimating changes in body compartments arising from weight loss strategies is equally important to evaluate their benefits and risks, particularly in frail populations (elderly or diabetic), and following bariatric surgery. Body compartments were evaluated in 50 obese subjects (25 diabetic, 25 non-diabetic) before and after a 7kg weight loss obtained after 6 months of calorie restriction and orlistat. Fat and fat-free mass (FFM) were estimated by bioelectrical impedance analysis (BIA), dual X-ray absorptiometry (DXA), plethysmography (BodPod) and a combination of these in a 3- or 4-compartment model, the latter being considered the reference method. FFM hydration was the ratio of total body water (BIA) to FFM. FFM hydration was significantly higher than classical values (75.9+/-3.0%, P<0.0001), and decreased with weight loss (74.2+/-3.3%). Compared to the 4-compartment, the 3-compartment model gave the most accurate fat and FFM estimation. A significant bias was observed with DXA, BodPod or BIA. Compartment changes induced by weight loss were accurately evaluated by DXA, being particularly precise in the 3-compartment analysis. No effect of diabetes per se was observed. A 3- or 4-compartmental analysis is necessary to accurately estimate body composition and its changes during weight loss.

Source: CINAHL

38. Assessment of sarcopenia: longitudinal versus cross sectional body composition data.

Author(s) Bunout D, de la Maza MP, Barrera G, Leiva L, Gattas V, Hirsch S

Citation: Aging Clinical & Experimental Research, 01 August 2007, vol./is. 19/4(295-299), 15940667

Publication Date: 01 August 2007

Abstract: BACKGROUND AND AIMS: An accurate diagnosis of sarcopenia is required. The aim of this study is to correlate the results of two methods to define sarcopenia using cross sectional body composition data, with actual loss of fat free mass. METHODS: Healthy older subjects (926 females and 381 males aged 70 years or more) and healthy young adults (425 females and 151 males aged 20 to 40 years) were studied. Body composition was assessed by double beam X ray absorptiometry (DEXA). Among older subjects, a contemporary subsample of 148 females and 45 males had two or more measurements, separated by 4.8+/-1.5 years and loss of fat free mass per year was calculated. In the whole sample, total and appendicular lean body mass index were calculated as total or appendicular lean body mass/height. Using data from young people, sex specific t scores were obtained. In older subjects residuals were derived from a regression equation, using total or appendicular fat free mass as the dependent variable and height, fat free mass and age as independent variables. RESULTS: The concordance between residuals and t scores to define sarcopenia was 68 and 72%, respectively. Among subjects with two or more measurements, men and women lost a mean of 521+/-454 and 221+/-399 g/year of fat free mass, respectively. The odds ratio of losing more than 822 g lean body mass /year among men or 514 g lean body mass /year among women was 2.63 and 2.64 for subjects classified in the two lowest quintiles of sarcopenia, using t scores or
CONCLUSIONS: Cross sectional body composition data can predict loss of fat free mass among older people.

**Source:** CINAHL

39. Consumption of fat-free fluid milk after resistance exercise promotes greater lean mass accretion than does consumption of soy or carbohydrate in young, novice, male weightlifters.

**Author(s)** Hartman JW, Tang JE, Wilkinson SB, Tarnopolsky MA, Lawrence RL, Fullerton AV, Phillips SM

**Citation:** American Journal of Clinical Nutrition, 01 August 2007, vol./is. 86/2(373-381), 00029165

**Publication Date:** 01 August 2007

**Abstract:** BACKGROUND: Acute consumption of fat-free fluid milk after resistance exercise promotes a greater positive protein balance than does soy protein. OBJECTIVE: We aimed to determine the long-term consequences of milk or soy protein or equivalent energy consumption on training-induced lean mass accretion. DESIGN: We recruited 56 healthy young men who trained 5 d/wk for 12 wk on a rotating split-body resistance exercise program in a parallel 3-group longitudinal design. Subjects were randomly assigned to consume drinks immediately and again 1 h after exercise: fat-free milk (Milk; n = 18); fat-free soy protein (Soy; n = 19) that was isoenergetic, isonitrogenous, and macronutrient ratio matched to Milk; or maltodextrin that was isoenergetic with Milk and Soy (control group; n = 19). RESULTS: Muscle fiber size, maximal strength, and body composition by dual-energy X-ray absorptiometry (DXA) were measured before and after training. No between-group differences were seen in strength. Type II muscle fiber area increased in all groups with training, but with greater increases in the Milk group than in both the Soy and control groups (P < 0.05). Type I muscle fiber area increased after training only in the Milk and Soy groups, with the increase in the Milk group being greater than that in the control group (P < 0.05). DXA-measured fat- and bone-free mass increased in all groups, with a greater increase in the Milk group than in both the Soy and control groups (P < 0.05). CONCLUSION: We conclude that chronic postexercise consumption of milk promotes greater hypertrophy during the early stages of resistance training in novice weightlifters when compared with isoenergetic soy or carbohydrate consumption. Copyright © 2007 American Society for Nutrition

**Source:** CINAHL


**Author(s)** Ischander M, Zaldivar F, Jr., Eliakim A, Nussbaum E, Dunton G, Leu S, Cooper DM, Schneider M

**Citation:** Medicine & Science in Sports & Exercise, 01 July 2007, vol./is. 39/7(1131-1138), 01959131

**Publication Date:** 01 July 2007

**Abstract:** PURPOSE: Physical inactivity is deleterious to health, but it has been difficult to determine the extent to which these effects are attributable to abnormal body composition or to factors related to physical activity alone. To begin to gauge independent effects of physical activity on health risk, we matched by BMI two groups of normal-weight adolescent females, one physically active (all participants in high school sports), and one sedentary. METHODS: Thirty-seven sedentary and 37 physically active adolescent females (mean 15.5 yr) were matched for age and BMI percentile (mean = 58.8). Comparisons included fitness, body composition and bone mineralization (by DEXA), circulating inflammatory cytokines, growth factors, bone-turnover markers, leptin, and adiponectin. RESULTS: Compared with the normal-weight sedentary girls, active girls had significantly (P < 0.05) higher fitness level (peak VO2 35.5 +/- 5.2 vs 24.4 +/- 4.1 mL kg(-1).min(-1)), lean body mass (43.2 +/- 4.4 vs 38.7 +/- 3.6 kg), bone mineralization (spinal BMD z-scores 0.04 +/-
0.88 vs -0.41 +/- 0.85), and lower percent body fat (25.4 +/- 0.6 vs 29.7 +/- 03.7%). Additionally, active girls had lower inflammatory cytokines levels (e.g., TNF-alpha 1.7 +/- 1.3 vs 2.6 +/- 2.2 pg.mL(-1)), and leptin (17.4 +/- 11.2 vs 24.7 +/- 14.7 ng.mL(-1)), and higher bone-turnover markers (e.g. osteocalcin 12.6 +/- 7.6 vs 7.8 +/- 3.0 U.L(-1)), IGFBP-3 (6416 +/- 21280 vs 4247 +/- 1082 ng.mL(-1)), and adiponectin levels (11919 +/- 3935 vs 9305 +/- 2843 ng.mL(-1)). CONCLUSION: The normal-weight, physically active group was fitter and had greater lean body mass, stronger bones, and lower levels of inflammatory markers than did the normal-weight, sedentary group. In adolescent girls, the choice of a lifestyle involving high school sports is characterized by a circulating mediator and body composition pattern that, if sustained, is associated with generally lower long-term risk of cardiovascular disease and osteoporosis.

Source: CINAHL

41. Estimation of body fat mass using dual-energy x-ray absorptiometry, bioelectric impedance analysis, and anthropometry in HIV-positive male subjects receiving highly active antiretroviral therapy.

Author(s) Aghdassi E, Arendt B, Salit IE, Allard JP

Citation: JPEN Journal of Parenteral & Enteral Nutrition, 01 March 2007, vol./is. 31/2(135-141), 01486071

Publication Date: 01 March 2007

Abstract: BACKGROUND: The purpose of this pilot study was to compare estimates of percentage body fat mass (FM) by bioelectric impedance analysis (BIA) and skinfold measurements (SF) with estimates obtained from dual-energy x-ray absorptiometry (DEXA) in 47 HIV-infected male subjects receiving highly active antiretroviral therapy (HAART). As different patterns of abdominal fat accumulation might affect the body FM estimation, correlation and agreement of these methods were also compared in patients with waist to hip ratio (WHR) < or =0.9 and >0.9. METHODS: Body FM was estimated by BIA and by measuring skinfold thickness at biceps, triceps, and subscapular area, and was compared with DEXA as the reference method using paired t-test. RESULTS: Estimates by SF were significantly higher and by BIA were significantly lower compared with DEXA for all subjects. This relationship persisted only in those with WHR >0.9. Both BIA and SF correlated significantly with DEXA, but they did not agree. However, both techniques showed a small intermethod bias, and the precision was within the acceptable range. This relationship persisted in those with WHR >0.9. In comparison with measurement by BIA, SF showed poorer agreement (larger bias and error). Conclusion: For population studies and perhaps to monitor changes over time for intervention studies, the bias for both BIA and SF methods is relatively small and errors and precisions are within the acceptable range when compared with DEXA, and thus all 3 techniques can be used for routine monitoring of total body FM in male subjects with HIV infection.

Source: CINAHL

42. Effects of supplement timing and resistance exercise on skeletal muscle hypertrophy.

Author(s) Cribb PJ, Hayes A

Citation: Medicine & Science in Sports & Exercise, 01 November 2006, vol./is. 38/11(1918-1925), 01959131

Publication Date: 01 November 2006

Abstract: Purpose: Some studies report greater muscle hypertrophy during resistance exercise (RE) training from supplement timing (i.e., the strategic consumption of protein and carbohydrate before and/or after each workout). However, no studies have examined whether this strategy provides greater muscle hypertrophy or strength development compared with supplementation at other times during the day. The purpose of this study was to examine the effects of supplement timing compared with supplementation in the hours not close to the workout on muscle-fiber hypertrophy, strength, and body composition during a 10-wk RE program.

Author(s) Bott L, Béghin L, Gondon E, Hankard R, Pierrat V, Gottrand F

Citation: Clinical Nutrition, 01 October 2006, vol./is. 25/5(810-815), 02615614

Publication Date: 01 October 2006

Abstract: Since children with bronchopulmonary dysplasia often suffer from malnutrition and growth failure, evaluation of body composition is a very important tool to nutritional support. The aim of this study was to compare assessment of fat-mass (FM) and fat-free mass (FFM), evaluated by bio-impedancemetry and anthropometry compared to dual-X-ray-absorptiometry (DXA) in children with bronchopulmonary dysplasia. PATIENTS: Seventy-one children, aged 4-8 years, with bronchopulmonary dysplasia were enrolled. METHODS: FM and FFM measured using anthropometry and bio-impedancemetry were compared to FM and FFM obtained by DXA using the Bland-Altman method. RESULTS: Both bio-impedancemetry and anthropometry gave good agreement with DXA to evaluate FM and FFM. Anthropometry method, in general, slightly underestimated FM (mean difference: -0.02 kg, standard deviation: 0.99) and FFM (mean difference: -0.70 kg+-1.72). Bio-impedancemetry method overestimated FM (mean difference: 0.34 kg+-2.06) and underestimated FFM (mean difference: -1.24 kg+-3.32). CONCLUSION: In children with bronchopulmonary dysplasia aged, 4-8 years, both anthropometry and bio-impedancemetry cannot be used to precisely evaluate body composition.

Source: CINAHL

44. Body composition in patients with chronic obstructive pulmonary disease: which method to use in clinical practice?

Author(s) Lerario MC, Sachs A, Lazaretti-Castro M, Saraiva LG, Jardim JR

Citation: British Journal of Nutrition, 01 July 2006, vol./is. 96/1(86-92), 00071145

Publication Date: 01 July 2006

Source: CINAHL

45. Comparison of body weight and composition measured by two different dual energy X-ray absorptiometry devices and three acquisition modes in obese women.

Author(s) Genton L, Karsegard VL, Zawadyński S, Kyle Ug, Pichard C, Golay A, Hans DB

Citation: Clinical Nutrition, 01 June 2006, vol./is. 25/3(428-437), 02615614

Publication Date: 01 June 2006

Abstract: BACKGROUND & AIMS: Weight measured by dual-energy X-ray (DXA) was shown to be increasingly underestimated in subjects over 75kg compared to an electronic scale. This study compares body weight and composition measured by balance beam scale and three DXA acquisition modes in obese subjects. METHODS: In 39 obese, body weight was measured by balance beam scale, and body weight and composition by DXA Hologic QDR4500A((R)) in normal (NPM) and high power mode (HPM) (Enhanced v8.26 and v8.26* softwares) and DXA GE-Lunar Prodigy((R)) (v6.5 software). To ensure linearity of body weight and composition measured by the different DXA acquisitions, we also measured 13 women with a body mass index (BMI) of 25-30kg/m(2). RESULTS: While QDR4500A HPM overestimates scale weight by about 2kg over the whole BMI spectrum, QDR4500A NPM underestimates scale weight as a weight-dependent response (-1.7+-1.8kg overall, -4.1+-1.6kg in morbidly obese women). These results suggest switching from one mode to the other at a specific threshold, i.e. in our study a weight of 90kg or a BMI of 34kg/m(2). Prodigy gives weight about similar to scale (+0.5+-0.8kg). Both Hologic acquisition modes underestimate fat mass but overestimate lean body mass compared to Prodigy. CONCLUSIONS: The QDR4500A NPM is inappropriate in women over 90kg.
Unfortunately, the QDR4500A HPM overestimates body weight in the range of 90-150kg. The difference between scale and Prodigy weight remains stable throughout weight ranges. To better assess their accuracies in terms of body composition, QDR4500A NPM, HPM and Prodigy should be tested against phantoms or in vivo multi-compartment models.

Source: CINAHL

46. Evaluation of Lunar Prodigy dual-energy X-ray absorptiometry for assessing body composition in healthy persons and patients by comparison with the criterion 4-component model.

Author(s) Williams JE, Wells JCK, Wilson CM, Haroun D, Lucas A, Fewtrell MS

Citation: American Journal of Clinical Nutrition, 01 May 2006, vol./is. 83/5(1047-1054), 00029165

Publication Date: 01 May 2006

Abstract: BACKGROUND: Dual-energy X-ray absorptiometry (DXA) is widely used to assess body composition in research and clinical practice. Several studies have evaluated its accuracy in healthy persons; however, little attention has been directed to the same issue in patients. OBJECTIVE: The objective was to compare the accuracy of the Lunar Prodigy DXA for body-composition analysis with that of the reference 4-component (4C) model in healthy subjects and in patients with 1 of 3 disease states. DESIGN: A total of 215 subjects aged 5.0-21.3 y (n = 122 healthy nonobese subjects, n = 55 obese patients, n = 26 cystic fibrosis patients, and n = 12 patients with glycogen storage disease). Fat mass (FM), fat-free mass (FFM), and weight were measured by DXA and the 4C model. RESULTS: The accuracy of DXA-measured body-composition outcomes differed significantly between groups. Factors independently predicting bias in weight, FM, FFM, and percentage body fat in multivariate models included age, sex, size, and disease state. Biases in FFM were not mirrored by equivalent opposite biases in FM because of confounding biases in weight. CONCLUSIONS: The bias of DXA varies according to the sex, size, fatness, and disease state of the subjects, which indicates that DXA is unreliable for patient case-control studies and for longitudinal studies of patients who undergo significant changes in nutritional status between measurements. A single correction factor cannot adjust for inconsistent biases. Copyright © 2006 American Society for Nutrition

Source: CINAHL


47. Reduced body protein in children with spastic quadriplegic cerebral palsy.

Author(s) Arrowsmith FE, Allen JR, Gaskin KJ, Gruca MA, Clarke SL, Briody JN, Howman-Giles RB, Somerville H, O'Loughlin EV

Citation: American Journal of Clinical Nutrition, 01 March 2006, vol./is. 83/3(613-618), 00029165

Publication Date: 01 March 2006

Abstract: BACKGROUND: No studies have directly measured body protein or validated skinfold-thickness anthropometry and dual-energy X-ray absorptiometry (DXA) to assess body protein in children with spastic quadriplegic cerebral palsy (SQCP). OBJECTIVE: We aimed to measure and evaluate body protein and to determine whether skinfold-thickness anthropometry and DXA can predict body protein in children with SQCP. DESIGN: This was a cross-sectional study of 59 children (22 girls, 37 boys) aged 3.9-19.5 y with SQCP. The children underwent measurements of anthropometric indexes, lean tissue mass by DXA (LTM(DXA)), and total body protein by neutron activation analysis (TBP(NAA)). In addition, TBP was estimated from both skinfold-thickness anthropometry (TBP(SKIN)) and DXA (TBP(DXA)). The agreement of TBP(SKIN) and TBP(DXA) was tested against TBP(NAA) by using Bland and Altman plot analysis. RESULTS: Height and weight SD scores (mean +/- SD: -3.1 +/- 1.6 and -4.8 +/- 5.3, respectively) were significantly lower than reference data in the children with SQCP (P < 0.001). TBP(NAA) for age and height was low in the children with SQCP (P < 0.001): 56.1 +/- 17.3% and 81.5 +/- 15.7%, respectively, of the values predicted from control data. TBP(SKIN) and TBP(DXA) were
both highly correlated with TBP(NAA): \( r = 0.90, P < 0.001 \), and \( r = 0.91, P < 0.001 \), respectively. Despite these significant correlations, agreement analyses showed wide variation of up to 33.3\% of the mean for both methods. CONCLUSIONS: Body protein in children with SQCP is significantly reduced for age and height. Skinfold anthropometry and DXA show wide variation in estimation of body protein compared with NAA in this group of children. Copyright © 2006 American Society for Clinical Nutrition

Source: CINAHL

48. Do skinfolds accurately assess changes in body fat in obese children and adolescents?

Author(s) Watts K, Naylor LH, Davis EA, Jones TW, Beeson B, Bettenay F, Siafarikas A, Bell L, Ackland T, Green DJ
Citation: Medicine & Science in Sports & Exercise, 01 March 2006, vol./is. 38/3(439-444), 01959131
Publication Date: 01 March 2006
Abstract: PURPOSE: Obesity is epidemic in Western societies, with rapid rates of increase in the young. Various methods exist for the assessment of body composition, but these have not been compared in obese children and adolescents. This study compared methods of body composition assessment in obese young people to determine whether changes in various measures of body composition as a result of exercise training were correlated. METHODS: Multiple anthropometric measures (weight, height, body mass index (BMI), skinfolds, waist and hip girths) and dual-energy x-ray absorptiometry (DEXA) were undertaken in 38 obese children and adolescents (12.7 +/- 2.1 yr) at baseline and following 8 wk of exercise training. RESULTS: At baseline, there were strong relationships (all \( P < 0.01 \)) between DEXA total fat and weight \( (r = 0.83) \), BMI \( (r = 0.86) \), waist girth \( (r = 0.81) \), hip girth \( (r = 0.88) \), sum of six skinfolds \( \text{(sum6, } r = 0.79) \), and percent body fat \( \text{(percent body fat) calculated using a four-skinfold equation (EQ4; } r = 0.69) \). Similar relationships (all \( P < 0.001 \)) existed between DEXA abdominal fat and weight \( (r = 0.79) \), waist girth \( (r = 0.83) \), hip girth \( (r = 0.69) \), and height \( (r = 0.71) \). Neither skinfold sums, nor percent body fat calculated from skinfold equations, were selected as independent predictors of DEXA total or abdominal fat by stepwise hierarchical linear regression. The reductions in DEXA total and abdominal fat following exercise were not predicted by changes in skinfolds or percent body fat calculated from skinfolds. CONCLUSION: These data suggest that body fat derived from skinfold measures is poorly predictive of abdominal and total fat derived from DEXA in obese children and adolescents. This finding highlights the limitations of skinfolds in obese subjects and questions the validity of their use to assess changes in body composition with interventions such as exercise training.

Source: CINAHL

49. Comparison of body composition methods during weight loss in obese women using herbal formula.

Author(s) Kim H, Gallagher D, Song M
Citation: American Journal of Chinese Medicine, 01 December 2005, vol./is. 33/6(851-858), 0192415X
Publication Date: 01 December 2005
Abstract: Bioelectrical impedance analysis (BIA), a device that analyzes the current conduction differences between the fat and water components is widely used for reasons that include convenience of use, non-invasiveness, safety, and low cost. Dual energy X-ray absorptiometry (DXA) allows for the assessment of total body and regional lean and fat tissues and bone mineral content (BMC). The objective of this study was to compare body composition assessments by BIA and DXA before and after a 6-week herbal diet intervention program in 50 pre-menopausal women [mean +/- SD: age 30.58 +/- 6.15, body mass index (BMI) 31.72 +/- 3.78]. Waist-to-hip ratio (WHR) was measured by BIA and anthropometry. Lean body mass (LBM), body fat (BF), BMC and percent body fat (%BF)
were measured by BIA and DXA. Highly significant correlations were observed between BIA and DXA measurements for LBM, BF, BMC and %BF (r = 0.73, 0.93, 0.53, 0.79, respectively) before the intervention. Differences between BIA and DXA measurements were observed in LBM, BF, %BF and BMC before intervention (p < 0.01) where WHR by BIA was significantly higher compared to anthropometry before (p < 0.01) and after the intervention (p < 0.01). BIA underestimated LBM by 1.85 kg and overestimated BF by 2.54 kg compared to DXA before the intervention. Although BIA and DXA showed highly significant correlations for LBM, BF, BMC and %BF before the intervention, they did not produce statistically comparable results in pre-menopausal Korean women and therefore should not be used interchangeably when measuring body composition.

Source: CINAHL
Available in fulltext from American Journal of Chinese Medicine at EBSCOhost

50. Heart rate variability in adolescents: relations to physical activity, fitness, and adiposity.

Author(s) Gutin B, Howe CA, Johnson MH, Humphries MC, Snieder H, Barbeau P

Citation: Medicine & Science in Sports & Exercise, 01 November 2005, vol./is. 37/11(1856-1863), 01959131

Publication Date: 01 November 2005

Abstract: PURPOSE: We determined the degree to which variation in cardiac autonomic modulation was explained by race, sex, moderate-vigorous physical activity (MVPA), cardiovascular fitness (CVF), percent body fat (%BF), waist girth, subcutaneous abdominal adipose tissue (SAAT), and visceral adipose tissue (VAT). METHODS: Subjects were 304 adolescents; SAAT and VAT values were available for 168 youths. Cardiac parasympathetic modulation (PM) was the root mean square of successive differences (RMSSD). Sympathetic-parasympathetic balance was the ratio of low- to high-frequency power (LFnu:HFnu). MVPA was measured with accelerometry, CVF with a treadmill, %BF with dual-energy x-ray absorptiometry (DXA), and SAAT and VAT with magnetic resonance imaging (MRI). RESULTS: Root mean square of successive differences was higher, and LFnu:HFnu was lower, in blacks than in whites. The final regression model revealed positive relations with CVF and MVPA, and a %BF by race by sex interaction, such that higher %BF was associated with lower RMSSD in black females and higher RMSSD in white females. Higher RMSSD was associated with lower VAT; for SAAT, the relationship was negative for blacks and positive for whites. For LFnu:HFnu, a negative relationship was seen with MVPA and higher waist girth was associated with a higher ratio in blacks, but not in whites. Both higher VAT and SAAT were related to higher LFnu:HFnu. CONCLUSIONS: Black youths had a more favorable HRV profile than white youths. After controlling for age, race, and sex, more favorable HRV profiles were associated with more MVPA, better CVF, and less visceral and subcutaneous adiposity. The deleterious impact of higher adiposity was greater in blacks, especially females, than in whites. Enhancement of cardiac autonomic modulation may be a pathway through which physical activity, fitness, and leanness contribute to cardiovascular health early in life.

Source: CINAHL

51. Impact of body mass and body composition on circulating levels of natriuretic peptides: results from the Dallas Heart Study.


Citation: Circulation, 04 October 2005, vol./is. 112/14(2163-2168), 00097322

Publication Date: 04 October 2005

Abstract: BACKGROUND: The association between higher body mass index (BMI) and lower B-type natriuretic peptide (BNP) level is thought to be mediated by expression of the natriuretic peptide clearance receptor (NPR-C) in adipose tissue. To explore this association, we tested 2 hypotheses: (1) that N-terminal (NT)-proBNP, which is not believed to bind NPR-C, would not be associated with BMI and (2) that lower BNP would
be more closely associated with fat mass than with lean mass. METHODS AND RESULTS: Measurements of BNP, NT-proBNP, and body composition by direct dual energy x-ray absorptiometry (DEXA) were performed in 2707 subjects from the Dallas Heart Study. The associations between obesity and low BNP (<4 ng/L) or low NT-proBNP (lowest sex-specific quartile) were evaluated with multivariable logistic regression models stratified by sex and adjusted for age, race/ethnicity, hypertension, left ventricular mass, and end-diastolic volume. Higher BMI was independently associated with lower BNP and NT-proBNP (all P<0.001). When BMI was replaced with both DEXA-derived lean and fat mass, greater lean mass, but not fat mass, was associated with low BNP and NT-proBNP levels. CONCLUSIONS: In a large, population-based cohort, we confirm the previously described association between higher BMI and lower BNP and demonstrate a similar inverse association between BMI and NT-proBNP. Interestingly, both BNP and NT-proBNP are more closely associated with lean mass than with fat mass. These findings do not support the hypothesis that the lower BNP levels seen in obesity are driven by enhanced BNP clearance mediated via NPR-C.

Source: CINAHL
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Available in print at Lincoln County Hospital Professional Library
Available in fulltext from Circulation at the ULHT Library and Knowledge Services’ eJournal collection


Author(s) McDonald CM, Carter GT, Abresch RT, Widman L, Styne DM, Warden N, Kilmer DD

Citation: American Journal of Physical Medicine & Rehabilitation, 01 July 2005, vol./is. 84/7(483-491), 08949115

Publication Date: 01 July 2005

Abstract: OBJECTIVE: Duchenne muscular dystrophy (DMD) patients have a lower percentage of total body water and higher extracellular water to intracellular water (ECW/ICW) ratio compared with normal subjects. However, it is not known whether this is due to increased fat mass or a decreased amount of ICW in muscle cells in DMD patients. The purpose of this study was to (1) determine the effect of increased fat mass and decreased lean mass on the ECW to ICW ratio in DMD patients and to (2) determine the validity of multifrequency bioelectrical impedance analysis (MFBIA) in assessing body composition in DMD patients. DESIGN: This study has a quasi-experimental, comparative design using nonequivalent groups. A total of 46 boys ranging from 6 to 13 yrs of age participated in this study. There were 12 nonobese able-bodied controls, 19 obese able-bodied children (obese), and 15 boys with DMD. Body composition was measured by dual-energy x-ray absorptiometry (DEXA). Body composition and body water compartment analysis were assessed by MFBIA. All measurements obtained using MFBIA were compared with those obtained using DEXA for validation. RESULTS: Both MFBIA and DEXA measures were strongly correlated in control (r = 0.99), obese (r = 0.92), and DMD subjects (r = 0.95). However, lean tissue mass measured by DEXA in the DMD subjects was only slightly higher (19.2 +/- 1.1 vs. 18.2 +/- 1.2, P < 0.02) than as measured by MFBIA. Mean percentage of body fat measured by DEXA in the DMD subjects (30.4 +/- 3.1%) was significantly lower than as measured by MFBIA (38.7 +/- 2.2%). The mean percentage of body fat measured by DEXA in the control group (23.2 +/- 1.8%) was significantly (P < 0.001) lower than as measured by MFBIA (28.6 +/- 1.6%). The mean percentage of body fat measured by DEXA in obese able-bodied controls (40.8 +/- 0.9%) was not significantly different from that measured by MFBIA (40.4 +/- 1.5%). Compared with the obese and control subjects, DMD subjects showed reduced ICW and ECW, with an increased ECW/ICW ratio, as expected. However, the percentage of fat for the DMD group was not different from the obese group. CONCLUSIONS: DMD patients have elevated ECW/ICW ratios compared with obese subjects and nonobese controls. However, obese subjects and nonobese controls had similar ECW/ICW ratios, despite the increased fat tissue mass in obese subjects. This suggests that the elevated ECW/ICW ratios in DMD subjects are not due to increased fat mass but rather some other mechanism, likely
impaired cellular homeostasis due to muscle membrane instability. Although MFBIA slightly underestimates lean tissue mass in boys with DMD, it has a potential role as an inexpensive and easy to use measurement tool to measure changes in muscle mass in the clinical setting.

**Source:** CINAHL

### 53. QDR 4500A dual-energy X-ray absorptiometer underestimates fat mass in comparison with criterion methods in adults.

**Author(s)** Schoeller DA, Tylavsky FA, Baer DJ, Chumlea WC, Earthman CP, Fuerst T, Harris TB, Heymsfield SB, Horlick M, Lohman TG, Lukaski HC, Shepherd J, Siervogel RM, Borrud LG

**Citation:** American Journal of Clinical Nutrition, 01 May 2005, vol./is. 81/5(1018-1025), 00029165

**Publication Date:** 01 May 2005

**Abstract:** BACKGROUND: Dual-energy X-ray absorptiometry (DXA) has become one of the most frequently used methods for estimating human body composition. Although the DXA technique has been validated for the measurement of fat-free mass and fat mass, differences in calibration between instruments produced by different manufacturers, as well as between different models produced by the same manufacturer, have been reported. OBJECTIVE: The objective was to compare the calibration of the QDR 4500A against criterion methods in a large heterogeneous population. DESIGN: DXA-derived body-composition data were obtained from 7 studies: 6 data sets were provided by the investigators, one of which was published. The data included fat mass and fat-free mass measured with a QDR 4500A and criteria measurements of body composition from total body water by dilution at 4 centers, densitometry from 1 center, and four-compartment analysis at 2 centers. RESULTS: In the cohort of 1195 subjects, 602 men and 593 women aged 19-82 y with a body mass index (in kg/m2) of 16-44, the fan-beam DXA overestimated fat-free mass (P < 0.05). A significant difference was observed in all 7 data sets, and the mean (+/-SE) was 5 +/- 1%. CONCLUSIONS: It is recommended that the lean soft tissue mass estimate with the fan-beam QDR 4500A be reduced by 5% and that for fat mass be increased by that same mass. This finding is particularly important because the National Health and Nutrition Examination Survey is using the QDR 4500A to assess body composition in a nationally representative sample of persons in the United States. Copyright © 2005 American Society for Clinical Nutrition

**Source:** CINAHL

Available in fulltext from American Journal of Clinical Nutrition, The at [Highwire Press](https://www.highwire.org)


**Author(s)** Liu L, Roberts R, Moyer-Mileur L, Samson-Fang L

**Citation:** Journal of the American Dietetic Association, 01 May 2005, vol./is. 105/5(794-797), 00028223

**Publication Date:** 01 May 2005

**Source:** CINAHL

### 55. Comparison of multifrequency bioelectrical impedance analysis with dual-energy X-ray absorptiometry for assessment of percentage body fat in a large, healthy population.

**Author(s)** Sun G, French CR, Martin GR, Younghusband B, Green RC, Xie Y, Mathews M, Barron JR, Fitzpatrick DG, Gulliver W, Zhang H

**Citation:** American Journal of Clinical Nutrition, 01 January 2005, vol./is. 81/1(74-78), 00029165
Publication Date: 01 January 2005

Abstract: BACKGROUND: Bioelectrical impedance analysis (BIA) is widely used in clinics and research to measure body composition. However, the results of BIA validation with reference methods are contradictory, and few data are available on the influence of adiposity on the measurement of body composition by BIA. OBJECTIVE: The goal was to determine the effects of sex and adiposity on the difference in percentage body fat (%BF) predicted by BIA compared with dual-energy X-ray absorptiometry (DXA). DESIGN: A total of 591 healthy subjects were recruited in Newfoundland and Labrador. %BF was predicted by using BIA and was compared with that measured by DXA. Methods agreement was assessed by Pearson's correlation and Bland and Altman analysis. Differences in %BF among groups based on sex and adiposity were analyzed by using one-factor analysis of variance with Bonferroni correction. RESULTS: Correlations between BIA and DXA were 0.88 for the whole population, 0.78 for men, and 0.85 for women. The mean %BF determined by BIA (32.89 +/- 8.00%) was significantly lower than that measured by DXA (34.72 +/- 8.66%). The cutoffs were sex specific. BIA overestimated %BF by 3.03% and 4.40% when %BF was <15% in men and <25% in women, respectively, and underestimated %BF by 4.32% and 2.71% when %BF was >25% in men and >33% in women, respectively. CONCLUSIONS: BIA is a good alternative for estimating %BF when subjects are within a normal body fat range. BIA tends to overestimate %BF in lean subjects and underestimate %BF in obese subjects. Copyright © 2005 American Society for Clinical Nutrition

Source: CINAHL

OBJECTIVE: Pediatricians are encountering body composition information more frequently, with percentage of body fat (%BF) measurement receiving particular attention as a result of the obesity epidemic. One confounding issue is that different methods may yield different %BF results in the same person. The objective of this study was to compare dual-energy X-ray absorptiometry (DXA) with the criterion 4-compartment model (4-CM) for measurement of %BF in a large pediatric cohort and to assist pediatricians in appropriate interpretation of body composition information by recognizing differences between techniques.

METHODS: Height, weight, anthropometrics, body density by underwater weighing, total body water by deuterium dilution, and bone mineral content and %BF by DXA (Lunar DPX/DPX-L) were measured in 411 healthy subjects, aged 6 to 18 years. Values for %BF by 4-CM and DXA were compared using regression analysis.

RESULTS: The mean +/- standard deviation values for %BF by DXA (22.73% +/- 11.23%) and by 4-CM (21.72% +/- 9.42%) were different, but there was a strong relationship between the 2 methods (R² = 0.85). DXA underestimated %BF in subjects with lower %BF and overestimated it in those with higher %BF. The relationship between the 2 methods was not affected by gender, age, ethnicity, pubertal stage, height, weight, or body mass index. The standard error of the estimate was 3.66%.

CONCLUSION: This analysis demonstrates a predictable relationship between DXA and 4-CM for %BF measurement. Because of its ease of use, consistent relationship with 4-CM, and availability, we propose that DXA has the capacity for clinical application including prediction of metabolic abnormalities associated with excess %BF in pediatrics.

Source: CINAHL
Available in print at Lincoln County Hospital Professional Library
Available in fulltext from Pediatrics at Highwire Press
Available in fulltext from Pediatrics at EBSCOhost
Available in fulltext from American Academy of Pediatrics

58. Minimum weight prediction methods cross-validated by the four-component model.

Author(s) Clark RR, Bartok C, Sullivan JC, Schoeller DA
Citation: Medicine & Science in Sports & Exercise, 01 April 2004, vol./is. 36/4(639-647), 01959131
Publication Date: 01 April 2004

Abstract: The National Collegiate Athletic Association (NCAA) requires prediction of minimum weight (MW) for collegiate wrestlers. The rule was implemented to minimize unhealthy weight loss practices and requires assessment of body composition before the competitive season. PURPOSE: This study cross-validated the body composition methods of dual energy x-ray absorptiometry (DXA), leg-to-leg bioelectrical impedance analysis (BIA), hydrostatic weighing (HW), and skinfolds (SF) for predicting MW using a four-component criterion (4C). METHODS: Criterion MW was calculated by the 4C model using independent measurement of body density (BD), bone mineral content (BMC), and total body water (TBW). Subjects were 53 Division I athletes from the University of Wisconsin (mean +/- SD; age = 19.7 +/- 1.3 yr, height = 176.2 +/- 7.4 cm, weight = 75.6 +/- 8.9 kg). Accuracy, precision, and systematic bias were examined in the predictions. RESULTS: There were no significant differences in mean MW from HW (70.5 +/- 7.3 kg, P = 0.57), SF (70.5 +/- 7.2 kg, P = 0.29) BIA (70.6 +/- 7.6 kg, P = 0.39), DXA (70.3 +/- 7.5, P = 0.97), and the 4C criterion (70.3 +/- 7.4 kg). The regression for the relationships between 4C and HW (y = 0.994 x HW + 0.077 kg), 4C and SF (y = 1.003 x SF-0.437 kg), 4C and DXA (y = 0.942 x DXA + 4.034 kg), and 4C and BIA (y = 0.896 x BIA + 6.987 kg) did not significantly deviate from the line of identity. Pure error (PE) values ranged from 1.34 kg for HW to 3.08 kg for BIA. CONCLUSION: Comparable means, high correlations, regression lines that did
not significantly deviate from the line of identity, and no systematic bias were found. However, the methods differed widely in precision. The best precision, based on SEE and PE values, were seen in the HW and SF methods. In conclusion, this rigorous four-component cross-validation study supports the NCAA methods as the most accurate and precise MW prediction methods in this sample.

Source: CINAHL

59. Relationships of insulin sensitivity with fatness and fitness and in older men and women.

Author(s) Ouyang P, Sung J, Kelemen MD, Hees PS, DeRegis JR, Turner KL, Bacher AC, Stewart KJ

Citation: Journal of Women's Health (15409996), 01 March 2004, vol./is. 13/2(177-185), 15409996

Publication Date: 01 March 2004

Abstract: PURPOSE: Increased body fatness, especially abdominal obesity, and low levels of fitness are associated with decreased insulin sensitivity. Men and women differ in obesity, body fat distribution, and fitness levels. This cross-sectional study evaluated sex differences in the relationships of insulin sensitivity with fatness and fitness and obesity. METHODS: Subjects were nonsmoking, nondiabetic, sedentary men (n = 50) and women (n = 61) aged 55-75 years with mild hypertension. Study measures were insulin sensitivity (QUICKI: 1/[log(fasting insulin) + log(fasting glucose)]), lipids and lipoproteins, total body fatness using dual energy x-ray absorptiometry (DXA), anthropometrics, abdominal obesity using magnetic resonance imaging (MRI), and aerobic fitness assessed as Vo(2) peak during treadmill testing. RESULTS: Women had a higher percentage of body fat and more abdominal subcutaneous and less visceral fat than men. Among women, QUICKI correlated negatively with body mass index (BMI), percent body fat, abdominal total fat, subcutaneous fat, and visceral fat but not with lipids. Among men, QUICKI correlated negatively with total and abdominal fatness and triglycerides. QUICKI correlated with fitness in men only. Using stepwise regression, among women, decreased total abdominal fat accounted for 33%, and postmenopausal hormone therapy accounted for an additional 5% of the variance in QUICKI. Among men, only a higher level of fitness independently correlated with insulin sensitivity, accounting for 21% of the variance (p < 0.01). CONCLUSIONS: Abdominal obesity among women and fitness among men were the strongest determinants of insulin sensitivity in this older cohort. This raises the question whether there are sex differences in the lifestyle changes that would be most effective in improving insulin sensitivity.

Source: CINAHL

Available in fulltext from Journal of Women's Health at EBSCOhost

60. Bioelectrical impedance vs air displacement plethysmography and dual-energy x-ray absorptiometry to determine body composition in patients with end-stage renal disease.

Author(s) Flakoll PJ, Kent P, Neyra R, Levehagen D, Chen KY, Ikizler TA

Citation: JPEN Journal of Parenteral & Enteral Nutrition, 01 January 2004, vol./is. 28/1(13-21), 01486071

Publication Date: 01 January 2004

Abstract: BACKGROUND: Patients with end-stage renal disease (ESRD) have significant shifts in fluid homeostasis that may impair measurements of body composition using methods based upon determinations of body water. Estimates of body water are fundamental for bioelectrical impedance analysis (BIA), which measures electrical resistance to estimate total body water and body composition. METHODS: BIA was compared with 2 other techniques: (1) air displacement plethysmography (ADP), which relies on measurements of body density to estimate body fat and fat-free masses; and (2) dual-energy x-ray absorptiometry (DXA), which depends on the relative attenuation of an x-ray beam to produce images of body fat and bone mineral. In study 1, BIA and ADP were
performed on 38 ESRD patients (21 men and 17 women; age 51.3 +/- 2.2 years; weight 79.8 +/- 2.9 kg; body mass index [BMI] 27.4 +/- 0.9 kg/m²). In study 2, BIA and DXA were performed on 47 patients (22 men and 25 women; age 52.7 +/- 2.3 years; weight 73.6 +/- 2.9 kg; BMI 25.9 +/- 1.0 kg/m²). RESULTS: The ranges of percent body fat using BIA in studies 1 and 2 were from 7% to 57% and from 6% to 52%, respectively. Percent body fat measurements were significantly (p < .0001) correlated for BIA vs ADP (r = .74) and for BIA vs DXA (r = .84). Mean body fat as determined by BIA and ADP in study 1 was 31.8 +/- 2.0% and 36.3 +/- 1.8%* and by BIA and DXA in study 2 was 29.6 +/- 1.5% and 31.8 +/- 1.8%*, respectively (*p < .05 vs BIA). All 3 methods had similar variability associated with their measurements (coefficients of variation approximately 5%). The average body fat measured by BIA was less than ADP or DXA, regardless of gender or race. Furthermore, the variation was not greater at lower or higher body fat values. CONCLUSIONS: Body fat measurements using ADP and DXA were correlated with those using BIA across a relatively wide range of body fat levels in adults with ESRD. However, BIA appeared to underestimate body fat and overestimate fat-free mass, possibly because of increased measurements of body water. Because ADP is convenient and does not use body water content in determination of body density and body composition, it has very good potential as a relatively new technique to estimate percent body fat in adults with ESRD.

Source: CINAHL

61. Hidden depletion of fat-free mass and bone mineral density in adults with cystic fibrosis.

Author(s) Ionescu AA, Evans WD, Pettit RJ, Nixon LS, Stone MD, Shale DJ

Citation: CHEST, 01 December 2003, vol./is. 124/6(2220-2228), 00123692

Publication Date: 01 December 2003

Abstract: BACKGROUND: Weight loss is associated with reduced survival in patients with cystic fibrosis (CF). OBJECTIVE: We hypothesized that some adult patients with a normal body mass index (BMI) have evidence of hidden fat-free mass (FFM) and bone mineral density (BMD) depletion that is linked to more severe disease. DESIGN: Fat mass (FM), FFM, and BMD were determined by dual-energy x-ray absorptiometry (DXA) and by bioelectric impedance in 56 adults in clinically stable condition and 20 age-matched healthy subjects. FM index and FFM index (FFMI) [kilograms per meter squared] of the right arm, leg, and trunk (ratio to height squared) were calculated. Lung function, including the maximum inspiratory pressure (MIP) and sustained MIP (SMIP), physical activity, serum C-reactive protein (CRP) and the number of exacerbations in the previous year were recorded. RESULTS: Patients had a lower total FFM than healthy subjects (p < 0.01), while FM was similar. Of the 56 patients, 30 patients had a normal BMI, of which 12 patients had a low FFM (hidden loss) by DXA. The right arm, leg, and trunk FMMI and BMD at hip sites were less in these patients than in those with a normal BMI and normal FFM (all p < 0.01). This group had a lower FEV(1), SMIP, more frequent exacerbations, and greater circulating CRP (all p < 0.05). CONCLUSIONS: In adults with CF, apparent or hidden loss of FFM, rather than weight loss, was related to overall disease severity. Hidden depletion of FFM was associated with increased loss of BMD and systemic inflammatory activity.

Source: CINAHL

Available in print at Lincoln County Hospital Professional Library
Available in print at Grantham Hospital Staff Library
Available in fulltext at Chest; Notes: Username: ULHTKIS/Password: Library

62. Body composition of neonates from fan beam dual energy x-ray absorptiometry measurement.

Author(s) Hammami M, Koo WWK, Hockman EM

Citation: JPEN Journal of Parenteral & Enteral Nutrition, 01 November 2003, vol./is. 27/6(423-426), 01486071

Publication Date: 01 November 2003
Abstract: BACKGROUND: Fan beam dual energy x-ray absorptiometry (FB DXA) has recently been validated for the measurement of body composition in small subjects. This study represents the first report of body composition (bone mineral content, fat mass, and lean mass) in human neonates measured by FB DXA. METHODS: FB DXA measurements were performed in 73 healthy singleton neonates with mean +/- SD birth weights 3354 +/- 316 g (range, 2720 to 3982 g) and gestational ages 39.5 +/- 1.2 weeks (range, 37 to 42 weeks). There were 26 white (11 male infants, 15 female infants), 42 African American (17 male infants, 25 female infants), and 5 Hispanic (4 male infants, 1 female infant) infants. The predictive ability of physiologic parameters to predict body composition measurements was determined with regression analysis. RESULTS: The mean +/- SD for bone mineral content was 89.3 +/- 14.1 g, fat mass was 485 +/- 141 g, and lean mass was 2898 +/- 281.5 g. Weight was significantly correlated with all DXA measurements and was the single best predictor of body composition. Weight alone contributed 32% to 98% of the variance of the DXA measured parameters. Gender, race, and length were additional predictors that could be forced into a predictive equation for selected DXA dependent variables according to statistical significance. An independent gender effect was also demonstrated, with male infants having higher lean mass but lower fat mass. CONCLUSIONS: Our data in human neonates demonstrated the ability of FB DXA to measure body composition. Body weight is the best physiologic predictor of overall body composition. There is also an independent gender effect on soft tissue body composition.

Source: CINAHL

63. Usefulness of anthropometrics and dual-energy x-ray absorptiometry for estimating abdominal obesity measured by magnetic resonance imaging in older men and women.

Author(s) Stewart KJ, DeRegis JR, Turner KL, Bacher AC, Sung J, Hees PS, Shapiro EP, Tayback M, Ouyang P

Citation: Journal of Cardiopulmonary Rehabilitation, 01 March 2003, vol./is. 23/2(109-114), 08839212

Publication Date: 01 March 2003

Abstract: PURPOSE: Increasing evidence suggests that abdominal obesity may be a better predictor of disease risk than total fatness. This study sought to determine how obesity and fat distribution measured by readily available anthropometric and dual-energy x-ray absorptiometry (DXA) methods is related to abdominal obesity assessed by magnetic resonance imaging (MRI). METHODS: Men (n = 43) and women (n = 47), ages 55 to 75 years, were assessed for body mass index, waist-to-hip ratio, waist circumference, and skin folds by anthropometric methods; for percentage of body fat by DXA; and for abdominal total, subcutaneous, and visceral fat by MRI. RESULTS: In stepwise regression models, the waist-to-hip ratio explained 50% of the variance in abdominal visceral fat among men (P <.01), and body mass index explained an additional 6% of the variance (P <.01). Among women, waist circumference was the only independent correlate of abdominal visceral fat, accounting for 52% of the variance (P <.01). Among men, the percentage of body fat was the only independent correlate of abdominal subcutaneous fat, explaining 65% of the variance (P <.01). Among women, the percentage of body fat explained 77% of the variance in abdominal subcutaneous fat and body mass index explained an additional 3% (P <.01). CONCLUSIONS: Obesity and body composition obtained by readily available anthropometric methods and DXA provide informative estimates of abdominal obesity assessed by MRI imaging.

Source: CINAHL

Available in fulltext from Journal of Cardiopulmonary Rehabilitation at East Midlands Ovid Archive Collection

64. Comparison of the effectiveness of 2 dual-energy X-ray absorptiometers with that of total body water and computed tomography in assessing changes in body composition during weight change.

Author(s) Tylavsky FA, Lohman TG, Dockrell M, Lang T, Schoeller DA, Wan JY, Fuerst T,
Cauley JA, Nevitt M, Harris TB

Citation: American Journal of Clinical Nutrition, 01 February 2003, vol./is. 77/2(356-363), 00029165

Publication Date: 01 February 2003

Abstract: BACKGROUND: Little information is available on the assessment of changes in body composition as a function of weight change with the use of the fan beam of dual-energy X-ray absorptiometry (DXA). OBJECTIVE: The objective was to determine the accuracy of the fan beam of the QDR 4500A densitometer and the pencil beam of the QDR 2000 densitometer in estimating changes in whole-body lean soft tissue mass (LSTM(DXA)) and fat mass (FM) with weight change. DESIGN: Thirty-seven subjects who lost 5.7 +/- 4.5 kg were measured before and after weight change. Using total body water and computed tomography (CT) of the midthigh, we compared changes in FFM(TBW) and LSTM(CT) with changes in LSTM(DXA). RESULTS: Overall, compared with TBW, the fan beam gave a larger estimate of change (macro x +/- SD) in LSTM (fan beam - TBW: -0.7 +/- 1.6 kg) than did the pencil beam (pencil beam - TBW: -0.1 +/- 1.6 kg). When the change in LSTM obtained with the fan beam and pencil beam was regressed against the change in FFM(TBW), the slope of the line for the fan beam was 0.97 (r(2) = 0.61) and that for the pencil beam was 0.86 (r(2) = 0.61). Regression analysis showed that the results between the 2 units were not interchangeable. For the midthigh region, the change in LSTM(CT) was moderately correlated with the change in LSTM(DXA) with the fan beam and pencil beam. CONCLUSIONS: The measurement of change in LSTM with the fan and pencil beams provides the same relation to changes in FFM assessed by TBW, but the 2 systems are not interchangeable.

Source: CINAHL


From EMBASE

1. The value of randomized clinical trials: Data from the metabolic effects of antipsychotics in children (MEAC) study

Author(s) Nicol G.E.

Citation: Neuropsychopharmacology, December 2012, vol./is. 38/(S64), 0893-133X (December 2012)

Publication Date: December 2012

Abstract: Background: Rates of antipsychotic prescription in children have increased, largely driven by off-label use for disruptive behavior. Antipsychotics have well characterized effects on the development of obesity and cardiometabolic risks in adults, but this aspect of safety and tolerability has been less well studied in treatment naive individuals, in particular for off-label uses such as the treatment of disruptive behavior in children, where non-randomized trials have shown clinical efficacy. The randomized, NIMH-funded Metabolic Effects of Antipsychotics in Children study (MEAC, PI Newcomer, MH072912) characterized the metabolic effects of 12 weeks of antipsychotic treatment in a population where antipsychotics are commonly used to treat disruptive behavior across a range of diagnoses, using gold-standard metabolic techniques. Methods: Antipsychotic-naive youth ages 6-18 with clinically significant aggression/irritability in the setting of one or more DSM-IV diagnoses indicating a disruptive behavior disorder were randomized to 12 weeks of treatment with aripiprazole, olanzapine or risperidone. Baseline and 12 week measures included body composition analysis with Dual Energy X-ray Absorptiometry (DEXA), a single stage hyperinsulinenic- euglycemic glucose clamp using stable isotopomer tracing, anthropomorphic assessment and plasma measures. Primary endpoints were change in whole body and abdominal adiposity, and whole-body and tissue-specific insulin sensitivity. ANCOVA was used to test effects of time and treatment condition on adiposity and insulin sensitivity. Regression analyses were performed to test the predictive effect of baseline DEXA-measured total % body fat on baseline insulinstimulated changes in glucose and lipid metabolism during treatment. Results: MEAC participants had a baseline prevalence of overweight or obesity of 34% (13% overweight, 21% obese) that was similar to the 32% of overweight (15%) or obese (17%) youth in the general population according to 2008 NHANES data. During 12 weeks of initial
antipsychotic exposure, differential effects of treatment were observed on measures of adiposity and other endpoints. Specifically, time by treatment condition effects were detected on DEXA %fat ($F_{[2,123]}=8.81$, $p<0.0001$). Pooling treatment groups to test the relationship of baseline and change in adiposity to baseline and change in insulin sensitivity, respectively, the magnitude antipsychotic treatment-induced increases in adiposity over 12 weeks of treatment were associated with the magnitude of adverse changes in SI at both adipose ($F_{[1,95]}=4.973$, $p=0.028$) and hepatic ($F_{[1,95]}=2.839$, $p=0.095$) tissues. Importantly, treatment resulted in marked improvement in Aberrant Behavior Checklist irritability/aggression subscale score, with a mean decrease of 16.59 points ($p<0.0001$). Conclusions: Adverse metabolic effects of antipsychotic are rapidly detectable within 12 weeks of treatment, but importantly occur within the context of significant clinical benefit for disruptive behavior. Randomized clinical trials like the MEAC study, which incorporate adaptive or practical design elements to enhance generalizability to real-world prescribing practices, can be valuable in understanding safety and tolerability issues, developing strategies for effective risk mitigation, and in assessment of costs and benefits of treatment.

Source: EMBASE

2. Comparison between dual-energy X-ray absorptiometry and skinfolds thickness in assessing body fat in anorexia nervosa before and after weight restoration

**Author(s)** El Ghoch M., Alberti M., Milanese C., Battistini N.C., Pellegrini M., Capelli C., Calugi S., Dalle Grave R.

**Citation:** Clinical Nutrition, December 2012, vol./is. 31/6(911-916), 0261-5614;1532-1983 (December 2012)

**Publication Date:** December 2012

**Abstract:** Background & aims: The aim of the study was to evaluate the correspondence between body fat mass composition (percentage) measured with dual-energy X-ray absorptiometry (DXA) and estimated by means of skinfold thicknesses (ST) measurement in patients with anorexia nervosa (AN), before and after weight gain. Methods: Percentage body fat (%BF) was measured with DXA and estimated by ST measurements using Siri, Brozek, and Heyward equations in 27 adult patients with AN before and after weight gain (pre- and post-treatment) achieved with inpatient treatment and in 42 healthy age-matched controls. Results: Due to Lohman criteria and Bland Altman plot there is no correspondence between the %BF measured with DXA and the %BF estimated by predictive equations based on ST measurements in patients with AN before and after weight gain, with the exception of Brozek equation which showed a mild agreement in pre-treatment AN. However, a correspondence was observed between the two procedures in healthy controls. Conclusions: Our data supporting the use of ST measurements do not appear to be an alternative to DXA in estimating body fat percentage, before and after weight gain in patients with AN. 2012 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism.

Source: EMBASE

3. Validity of leg-to-leg bioelectrical impedance analysis to estimate body fat in obesity

**Author(s)** Lloret Linares C., Ciangura C., Bouillot J.-L., Coupaye M., Declèves X., Poitou C., Basdevant A., Oppert J.-M.

**Citation:** Obesity Surgery, July 2011, vol./is. 21/7(917-923), 0960-8923;1708-0428 (July 2011)

**Publication Date:** July 2011

**Abstract:** Background: Bioelectrical impedance analysis (BIA) is a safe and easy method of assessing body composition. Its accuracy to predict fat mass (FM) in obesity and the change in FM following weight loss is questioned. Our objective was to compare leg-to-leg BIA to dual-energy X-ray absorptiometry (DXA) in the assessment of FM in a large population, the changes in FM after Roux-en-Y gastric bypass (RYGB) and to estimate
between-method differences (bias) and limits of agreement. Methods: BIA (Tanita BC-420MA) and DXA (Hologic Discovery W) were used in 5,740 consecutive patients (mean BMI, 37.7+/-8.2 kg/m<sup>2</sup>) examined in a clinical nutrition department and in 72 women undergoing RYGB (BMI, 47.2+/-7.2 kg/m<sup>2</sup>). Analyses included correlations between methods and Bland Altman analysis. Results: In the entire population, BIA significantly overestimated FM in comparison with DXA (1.1+/-6.1 kg, 0.8+/-5.6%). FM estimates by each method were significantly correlated in absolute value (kg; r<sup>2</sup>=0.9 in the whole population), and in percentage (r<sup>2</sup>=0.6). However, wide limits of agreement were observed. In surgery patients, BIA significantly overestimated FM both before and 12 months after bypass. BIA significantly overestimated changes in FM after RYGB at 3 months (2.9+/-5.0 kg) and at 12 months (1.9+/-3.9 kg) but not at 6 months (0.9+/-5.0 kg; p=0.08). Estimates of changes in FM by each method were significantly correlated (r<sup>2</sup>=0.4, 0.6, and 0.9, respectively). Conclusion: According to the wide limits of agreement, BIA seems more interesting for epidemiological rather than individual use to evaluate body FM and FM changes in obese women undergoing RYGB. 2010 Springer Science + Business Media, LLC.

Source: EMBASE

4. Assessment of Measures for Abdominal Adiposity in Persons with Spinal Cord Injury

Author(s) Emmons R.R., Garber C.E., Cirnigliaro C.M., Kirshblum S.C., Spungen A.M., Bauman W.A.

Citation: Ultrasound in Medicine and Biology, May 2011, vol./is. 37/5(734-741), 0301-5629 (May 2011)

Publication Date: May 2011

Abstract: Ultrasound may be a useful tool to assess abdominal adiposity, but it has not been validated in the spinal cord injury (SCI) population. This study evaluated associations between abdominal ultrasound and other methods to assess adiposity in 24 men with SCI and 20 able-bodied (AB) men. Waist (WC) and hip circumference (HC) and waist-to-hip ratio (WHR) were measured. Trunk (TRK%), android (A%) and waist fat (W%) were determined by dual energy x-ray absorptiometry (DXA); ultrasonography determined abdominal subcutaneous (SF) and visceral fat (VF). The SCI group had greater TRK% (40.0 +/- 9.6 vs. 32.0 +/- 10.3), W% (47.0 +/- 9.7 vs. 40.6 +/- 9.4), A% (43.0 +/- 9.8 vs. 35.8 +/- 10.6) and WHR (0.99 +/- 0.1 vs. 0.92 +/- 0.06) than the AB group. WC and WHR correlated with VF in the SCI group. These associations suggest that ultrasound may be a useful tool in clinical practice for the measurement of VF in weight loss programs and for the assessment of cardiometabolic disorders.(E-mail: racine.emmons@va.gov). 2011.

Source: EMBASE

5. Reduction of misclassification rates of obesity by body mass index using dual-energy X-ray absorptiometry scans to improve subsequent prediction of per cent fat mass in a Caucasian population

Author(s) Pedersen S.D., Astrup A.V., Skovgaard I.M.

Citation: Clinical Obesity, April 2011, vol./is. 1/2-3(69-76), 1758-8111 (April/June 2011)

Publication Date: April 2011

Abstract: Recognition is increasing for the errors of body mass index (BMI) in classification of excess body fat. Dual-energy X-ray absorptiometry (DXA) is accurate to assess body fat mass per cent (%FM), but is underutilized clinically. We examined the prevalence of obesity misclassification by BMI in comparison to body %FM by DXA scanning, and whether there is a time-stable individual relation between the %FM and the BMI in patients scanned several times. We aimed to develop a formula where, based on a single DXA scan, %FM could be predicted following a change in weight, and a patient-specific BMI threshold could be calculated (BMIT), above which the patient would be obese by %FM criteria. Data were collected from individuals who had a DXA scan as part of a nutritional research study at the University of Copenhagen. BMI incorrectly classified 48/329 (14.6%) of men and 52/589 (8.8%) of women. The majority of men with BMI 25-27 kg m<sup>-2</sup>-
and women with BMI 24-26 kg m<sup>-2</sup> were misclassified. Using multiple scan data (189 men, 311 women) and calculating the patient-specific constant C = (1 - %FM/100)<sup>-3/2</sup> BMI from baseline BMI and %FM, misclassification rates were halved for both genders when a personal threshold, BMIT, was used ([BMIT = C/(0.75)<sup>-3/2</sup>] for men and [BMIT = C/(0.65)<sup>-3/2</sup>] for women). We conclude that simple formulae allow evaluation of fatness of individual patients more accurately than BMI, with the use of one baseline DXA scan, and enable the establishment of patient-specific obesity treatment targets in clinical practice. 2011 The Authors. Clinical Obesity 2011 International Association for the Study of Obesity.

**Source:** EMBASE

6. The effects of metformin with lifestyle therapy in polycystic ovary syndrome: A randomized double-blind study

**Author(s)** Ladson G., Dodson W.C., Sweet S.D., Archibong A.E., Kunselman A.R., Demers L.M., Williams N.I., Coney P., Legro R.S.

**Citation:** Fertility and Sterility, March 2011, vol./is. 95/3(1059-1066.e7), 0015-0282 (01 Mar 2011)

**Publication Date:** March 2011

**Abstract:** Objective: To determine if the combination of lifestyle (caloric restriction and exercise) and metformin (MET) would be superior to lifestyle and placebo (PBO) in improving the polycystic ovary syndrome (PCOS) phenotype. Design: Double-blind randomized 6-month trial of MET versus PBO. Setting: Two academic medical centers. Patient(s): One hundred fourteen subjects with PCOS were randomized to MET (N = 55) or PBO (N = 59). Intervention(s): Subjects collected urine daily for ovulation monitoring, had monthly monitoring of hormones and weight and determination of body composition by dual-energy x-ray absorptiometry, glucose tolerance, and were evaluated for quality of life at baseline and completion. Main Outcome Measure(s): Ovulation rates and testosterone levels. Result(s): Dropout rates were high. There was no significant difference in ovulation rates. Testosterone levels were significantly lower compared with baseline in the MET group at 3 mos but not at 6 mos. There were no differences in weight loss between groups, but MET showed a significant decline at 6 months compared with baseline (-3.4 kg, 95% confidence interval -5.3 to -1.5 kg). We noted divergent effects of MET versus PBO on oral glucose tolerance test indices of insulin sensitivity (increased) and secretion (worsened). Total bone mineral density increased significantly in MET. There were no differences in quality of life measures between the groups. The MET group had increased diarrhea and headache, but fewer bladder infections and musculoskeletal complaints. Conclusion(s): The addition of metformin to lifestyle therapy produced little reproductive or glycemic benefit in women with PCOS, although our study had limited power owing to a high dropout rate. It is not possible at baseline to identify women likely to drop out. 2011 by American Society for Reproductive Medicine.

**Source:** EMBASE

7. Preoperative and postoperative agreement in fat free mass (FFM) between bioelectrical impedance spectroscopy (BIS) and dual-energy X-ray absorptiometry (DXA) in patients undergoing cardiac surgery

**Author(s)** van Venrooij L.M.W., Verberne H.J., de Vos R., Borgmeijer-Hoelen M.M.M.J., van Leeuwen P.A.M., de Mol B.A.J.M.

**Citation:** Clinical Nutrition, December 2010, vol./is. 29/6(789-794), 0261-5614 (December 2010)

**Publication Date:** December 2010

**Abstract:** Background & aims: To measure undernutrition in terms of fat free mass (FFM), there are several options. The aim of this study was to assess agreement in FFM between the portable, bedside bioelectrical impedance spectroscopy (BIS) and relatively expensive, non-portable dual-energy X-ray absorptiometry (DXA) in patients undergoing cardiac surgery. Methods: In a prospective study, body composition measurements by BIS and DXA were performed two weeks prior and two months after cardiac surgery. Preoperative
and postoperative agreement in FFM between BIS and DXA were analyzed with Bland and Altman plots. Results: Twenty-six patients were analyzed. BIS overestimated preoperative and postoperative FFM by 2 kg compared to DXA (2.3 kg (95%CI: -3.5-8.1 kg) and 2.1 kg (95%CI: -4.5-8.7 kg), respectively). BIS underestimated FFM change by -0.5% (95%CI: -8.4-7.5%). Conclusions: There is a large inter-individual variation between BIS and DXA. This hinders the interchange-ability of BIS and DXA in routine clinical practice and may lead to misclassifications and thereby inappropriate nutritional treatment and possible postoperative complications. To evaluate nutritional therapy in patients undergoing cardiac surgery, we advocate the use of DXA assessed FFM in parallel to BIS assessed extracellular and intracellular water and FFM. 2010 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism.

Source: EMBASE

8. Dexa more accurately predicts obesity compared to BMI in a primary care setting

Author(s): Shah N., Quon J., Braverman E.

Citation: Journal of General Internal Medicine, June 2010, vol./is. 25/(S253), 0884-8734 (June 2010)

Publication Date: June 2010

Abstract: BACKGROUND: Obesity in the United States is increasingly being recognized as a serious epidemic. Approximately 23 percent of Americans are obese, as determined by body mass index (BMI). High BMI has been correlated with numerous health problems, such as coronary heart disease, atherosclerosis, hypertension, serum lipid abnormalities, insulin resistance, stroke, sleep apnea, respiratory disorders, osteoarthritis, abnormal menses, infertility, depression, and dementia. Despite it's widespread use, BMI has not been found to be an accurate indicator of body fat. Direct measures of adiposity, such as those obtained by dual X-ray absorptiometry (DEXA), are far more precise. To date, no largescale comparison has been made between BMI and DEXA to directly measure percentage body fat. As the prevalence of overweight and obesity are increasing and resulting in a larger burden to society, this study has important implications for policymakers, clinicians, and patients. Our objective was to investigate and compare the differences and descriptive properties of obese classification obtained from BMI measurement and percentage body fat as measured by DEXA. METHODS: In a retrospective study, we reviewed medical records from 2001 to 2009 and obtained BMI (from height and weight records) and percentage body fat (from Hologic DEXA computerized records). Subjects were classified as obese or nonobese for both of these parameters, using the American Bariatric Society's classification (BMI: 30+, Body Fat %: 25%+males, 30%+females), and these groupings were analyzed and compared. RESULTS: 1,234 patients were selected from a private outpatient medical practice. Included subjects were adults (age 18+) with both BMI and percentage body fat measurement data available. The subjects had the following characteristics: Gender: 60% female (n=744), 40% male (n=490) Age: mean=51.0, (SD =15.2), range=[18, 86]; Weight: mean = 163 pounds (SD=38), range=[82, 422]; Height: mean=66.1 inches (SD=3.9), range=[51, 86]; BMI: mean = 26.2 kg/m<sup>2</sup>, range=[15.8, 54.2]; Body Fat Percentage: mean = 29.5% (SD=8.9), range=[7.8, 52.3]. All subjects provided written informed consent form, and this study was approved by the local Institutional Review Board. Using BMI, 20% (n = 249) were classified as obese. Of these 249: 95% (n = 237) were obese based on body fat percentage; 5% (n = 12) were nonobese based on body fat percentage. Using body fat percentage, 56% (n=689) were classified as obese. Of these 689: 34% (n = 237) were obese based on body fat percentage; 5% (n = 12) were nonobese based on body fat percentage. Using standard metrics for sensitivity, specificity, false positives and false negatives, BMI is among the worst parameters used in clinical practice today. In light of the importance of the global obesity epidemic, the use of BMI should be greatly curtailed, and direct measure of adiposity should be used on large
subgroups of patients often misclassified by this measure.

**Source:** EMBASE

Available in fulltext from *JGIM: Journal of General Internal Medicine* at [EBSCOhost](http://www.ebscohost.com)

Available in fulltext from *Journal of General Internal Medicine* at [National Library of Medicine](http://www.nlm.nih.gov)

9. Rheumatoid cachexia, central obesity and malnutrition in patients with low-active rheumatoid arthritis: Feasibility of anthropometry, Mini Nutritional Assessment and body composition techniques

**Author(s)** Elkan A.-C., Engvall I.-L., Cederholm T., Hafstrom I.

**Citation:** European Journal of Nutrition, August 2009, vol./is. 48/5(315-322), 1436-6207 (August 2009)

**Publication Date:** August 2009

**Abstract:** Background and aims: The concurrent decrease in fat free mass (FFM) and increase in fat mass (FM), including central obesity, in patients with rheumatoid arthritis (RA) may be related to increased cardiovascular morbidity as well as to functional decline. The objectives of this study were to evaluate body composition and nutritional status in patients with RA and the feasibility of bioelectrical impedance (BIA) to detect rheumatoid cachexia. Methods: Eighty RA outpatients (76% women), mean age 61 (range 22-80) years and with mean disease duration of 6 (range 1-52) years, were assessed by body mass index (BMI), waist circumference (WC), whole-body dual-energy X-ray absorptiometry (DXA), BIA and the Mini Nutritional Assessment (MNA). Results: Fat free mass index (FFMI; kg/m^2^) was low in 26% of the women and in 21% of the men. About every fifth patient displayed concomitant low FFMI and elevated fat mass index (FMI; kg/m^2^), i.e. rheumatoid cachexia. BMI and MNA were not able to detect this condition. Sixty-seven percent had increased WC. Reduced FFM was independently related to age (p = 0.022), disease duration (p = 0.027), ESR (p = 0.011) and function trendwise (p = 0.058). There was a good relative agreement between DXA and BIA (FM r^2^ = 0.94, FFM r^2^ = 0.92; both p < 0.001), but the limits of agreement were wide for each variable, i.e. for FM -3.3 to 7.8 kg; and for FFM -7.9 to 3.7 kg. Conclusion: Rheumatoid cachexia and central obesity were common in patients with RA. Neither BMI nor MNA could detect this properly. There was a good relative agreement between DXA and BIA, but the limits of agreement were wide, which may restrict the utility of BIA in clinical practice. 2009 Springer-Verlag.

**Source:** EMBASE

Available in fulltext from *European Journal of Nutrition* at [EBSCOhost](http://www.ebscohost.com)

10. Quantification of lean and fat tissue repletion following critical illness: A case report

**Author(s)** Reid C.L., Murgatroyd P.R., Wright A., Menon D.K.

**Citation:** Critical Care, June 2008, vol./is. 12/3, 1364-8535;1466-609X (17 Jun 2008)

**Publication Date:** June 2008

**Abstract:** Introduction: Muscle wasting is a recognised feature of critical illness and has obvious implications for patient rehabilitation and recovery. Whilst many clinicians believe lean tissue repletion to be a slow process following critical illness, and a probable explanation for poor functional recovery of patients many months after resolution of the illness, we have found no studies quantifying body composition changes during patient recovery. Methods: A combination of assessment techniques were used to monitor changes in body composition (that is, fat, water, protein and mineral), following intensive care unit (ICU) discharge, in a 38-year-old female recovering from extrapontine myelinolysis. Assessments were made at discharge from the ICU and then again 1 month, 3 months, 6 months and 12 months later. Functional recovery (respiratory muscle and hand-grip strength) and quality of life (36-item Short-form Health Survey) were assessed at these same timepoints. Results: Twelve months after discharge from the ICU, and despite
an extensive rehabilitation programme and improvements in respiratory muscle and hand-grip muscle strength, our patient was unable to return to full-time employment and continued to complain of fatigue. She had successfully regained weight and was back to her pre-illness body weight. Body composition measurements showed that an incredible 73% of the weight gained was due to an increase in body fat. Conclusion: It is difficult to extrapolate the results of a single case to the wider ICU population, not least because the present patient sustained a significant neurological injury, but our data are the first to support the long-held belief that patient weight gain following critical illness is largely attributable to a gain in fat mass. The magnitude of body composition changes in the present patient are startling and support the need for longitudinal body composition data in a wider ICU population. 2008 Reid et al.; licensee BioMed Central Ltd.

Source: EMBASE
Available in fulltext from Critical Care at National Library of Medicine

11. Changes in body mass, energy balance, physical function, and inflammatory state in patients with locally advanced head and neck cancer treated with concurrent chemoradiation after low-dose induction chemotherapy

Author(s) Silver H.J., Dietrich M.S., Murphy B.A.
Citation: Head & neck, October 2007, vol./is. 29/10(893-900), 1043-3074 (Oct 2007)
Publication Date: October 2007
Abstract: BACKGROUND: We aimed to determine changes in body mass and body composition in relation to energy balance, inflammatory state, and physical function before and after concurrent chemoradiation (CCR). METHODS: Seventeen patients with stage III and IVa head and neck cancer, aged 58.9 +/- 5.4 years, who had completed a 9-week regimen of low-dose induction chemotherapy came to the General Clinical Research Center for pre- and post-CCR for measurement of body mass composition by dual-energy X-ray absorptiometry, resting energy expenditure (REE) by indirect calorimetry, physical performance (by Modified Baecke Questionnaire and Reuben's Physical Performance Test), and functionality (Activities and Instrumental Activities of Daily Living scores). Fasting venous samples were collected to determine C-reactive protein and cytokines interleukin (IL)-1beta, IL-6, IL-8, and IL-10. Random 24-hour telephone diet recalls assessed energy intakes. RESULTS: Weight loss began 1 week after CCR. Lean body mass (LBM) accounted for 71.7% +/- 21% of body mass loss. No change occurred in energy intakes or calorie/nitrogen ratio. REE was significantly increased when adjusted for LBM loss (kcal/kg), p = .019. LBM loss was significantly associated with physical performance decline, r = .71, p = .004, and increased functional dependence, r = .58, p = .02. Total physical activity level declined significantly, p = .003. Cytokine levels were strongly associated with physical and functional decline. CONCLUSIONS: The aberrant changes in body composition, metabolism, and inflammatory state were associated with clinically and statistically significant impairments in physical performance and function. Future investigations and clinical practice should combine nutrition with antiinflammatory agents and exercise activities to support lean tissue anabolism and prevent physical and functional decline of patients with head and neck cancer undergoing CCR.
Source: EMBASE
Available in fulltext from Head and Neck at EBSCOhost

12. Physical activity compliance: Differences between overweight/obese and normal-weight adults

Author(s) Davis J.N., Hodges V.A., Gillham M.B.
Citation: Obesity, December 2006, vol./is. 14/12(2259-2265), 1930-7381;1930-739X (December 2006)
Publication Date: December 2006
Abstract: Objectives: Comparisons of physical activity measured by accelerometers in overweight/obese adults and their normal-weight counterparts are limited. Compliance with the 2002 Institute of Medicine (IOM) exercise recommendations for 60 minutes of
moderate-intensity exercise daily has not been reported. The purpose of this study was to compare physical activity, as measured by accelerometers, in overweight/obese adults vs. normal-weight controls and to assess compliance with recommendations for physical activity by the IOM in 2002 and by the Centers for Disease Control and Prevention and American College of Sports Medicine in 1995 for 30 minutes of moderate-intensity activity, preferably all days of the week. Research Methods and Procedures: Sixty-two overweight/obese subjects, BMI >= 25, included 31 adults, 12 men and 19 women, 25 to 69 years old, and their normal-weight controls, BMI 18.5 to 24.9, matched for gender, age, and height. Body composition was assessed using DXA. Physical activity was measured with Actigraph accelerometers (MTI, Fort Walton Beach, FL) worn by each participant for 7 consecutive days.

Results: Accelerometry data indicated that overweight/obese adults recorded ~60 counts per minute less per day and spent 21 minutes less engaged in moderate or greater intensity activity than their normal-weight counterparts. Although 71% to 94% of those studied met 1995 recommendations, only 13% of overweight/obese subjects and 26% of normal-weight participants met 2002 exercise recommendations.

Discussion: These results suggest that daily minutes spent in moderate-intensity activity or greater are associated with weight status and that the 2002 IOM recommendations may be difficult to meet even for normal-weight individuals. Copyright 2006 NAASO.

Source: EMBASE

13. Changes in Fat Mass Correlate With Changes in Soluble sCD163, a Marker of Mature Macrophages, in Patients With CKD


Citation: American Journal of Kidney Diseases, December 2006, vol./is. 48/6(916-925), 0272-6386 (December 2006)

Publication Date: December 2006

Abstract: Background: Recently, adipose tissue was shown to contain macrophages capable of contributing to systemic inflammation and cardiovascular disease (CVD). Here, we investigate this putative relationship in patients with chronic kidney disease (CKD) by using the novel macrophage marker soluble (s)CD163. Methods: One hundred twenty patients with CKD stage 5 (mean glomerular filtration rate [GFR], 7 +/- 1 mL/min [0.12 +/- 0.02 mL/s; mean age, 53 +/- 1 years; 65% men], 38 patients with CKD stages 3 to 4 (mean GFR, 33 +/- 3 mL/min [0.55 +/- 0.05 mL/s]; mean age, 67 +/- 2 years; 68% men), and 28 healthy controls (mean GFR, 89 +/- 3 mL/min [1.48 +/- 0.05 mL/s]; mean age, 63 +/- 2 years; 69% men) were characterized post hoc with a follow-up of up to 5 years (mean, 47 +/- 1 months). sCD163 levels, body composition (dual-energy x-ray absorptiometry), clinical parameters, and levels of circulating inflammatory markers (enzyme-linked immunosorbent assay) were assessed at baseline and, in a subset population, after 1 year of dialysis therapy (hemodialysis, n = 19; peritoneal dialysis, n = 30). Results: sCD163 level increased in patients with both severe (median, 4.3 mg/L; range, 1.3 to 23.4 mg/L) and moderate (median, 3.6 mg/L; range, 1.6 to 9.8 mg/L) CKD compared with controls (median, 2.6 mg/L; range, 0.8 to 7.6 mg/L; P < 0.001). Furthermore, sCD163 levels correlated with both truncal ( = 0.17; P < 0.05) and total ( = 0.17; P < 0.05) fat mass, as well as with all measured markers of inflammation and endothelial adhesion molecules. After 1 year, patients who increased body fat mass (average, 11% +/- 5% versus -5% +/- 5%; P < 0.05) also showed a significant increase in sCD163 levels (median, 2.2 versus -0.97 mg/L; P < 0.01). Finally, patients with sCD163 levels greater than 4.0 mg/L had a statistically significantly worse outcome than patients with sCD163 levels less than this value, even after adjustment for age, sex, and diabetes mellitus (chi-square = 19.98; P < 0.001). However, this effect was lost after adjustment for either inflammation or CVD. Conclusion: We show that increasing fat mass is associated with increasing levels of sCD163, a circulating marker of macrophages also associated with inflammatory biomarkers. We thus hypothesize that adipose tissue macrophages may have a role in the proinflammatory state observed in patients with renal disease. Finally, we propose the term "uremic-metabolic syndrome" to describe this state of increased adipose tissue signaling in patients with uremia, a phenomenon that may share some characteristics with the metabolic syndrome of obesity. 2006 National Kidney Foundation, Inc.

Source: EMBASE
14. Validity of air-displacement plethysmography in the assessment of body composition changes in a 16-month weight loss program

Author(s) Minderico C.S., Silva A.M., Teixeira P.J., Sardinha L.B., Hull H.R., Fields D.A.

Citation: Nutrition and Metabolism, August 2006, vol./is. 3/, 1743-7075;1743-7075 (22 Aug 2006)

Publication Date: August 2006

Abstract: Objective: To compare the accuracy of air displacement plethysmography (ADP) and dual energy x-ray absorptiometry (DXA) in tracking changes in body composition after a 16 month weight loss intervention in overweight and obese females. Methods: 93 healthy female subjects (38.9 +/- 5.7 yr, 159.8 +/- 5.6 cm, 76.7 +/- 9.9 kg, 30.0 +/- 3.4 kg/m<sup>2</sup>) completed a 16 month weight loss intervention. Eligible subjects attended 15 treatment sessions occurring over the course of 4 months with educational content including topics relating to physical activity and exercise, diet and eating behavior, and behavior modification. In the remaining 12 months, subjects underwent a lifestyle program designed to increase physical activity and improve eating habits. Before and after the intervention, subjects had their percent body fat (%fat), fat mass (FM), and fat-free mass (FFM) assessed by DXA and ADP. Results: Significant differences (p <= 0.001) were found between DXA and ADP at baseline %fat (46.0 % fat vs. 42.0 % fat), FM (35.3 kg vs. 32.5 kg) and FFM (40.8 kg vs. 44.2 kg) as well as at post intervention for %fat (42.1% fat vs. 38.3 % fat), FM (30.9 kg vs. 28.4 kg) and FFM (41.7 kg vs. 44.7 kg). At each time point, ADP %fat and total FM was significantly lower (p <= 0.001) than DXA while FFM was significantly higher (p <= 0.001). However, both techniques tracked %fat changes similarly considering that there were no differences between the two means. Furthermore, a Bland-Altman analysis was performed and no significant bias was observed, thus demonstrating the ability of ADP to measure body fat across a wide range of fatness. Conclusion: At baseline and post weight loss, a significant difference was found between ADP and DXA. However, the results indicate both methods are highly related and track changes in %fat similarly after a weight loss program in overweight and obese females. Additionally, the mean changes in %fat were similar between the two techniques, suggesting that ADP can be translated to its use in clinical practice and research studies as DXA currently is used. 2006 Minderico et al; licensee BioMed Central Ltd.

Source: EMBASE
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Available in fulltext from Nutrition and Metabolism at BioMedCentral


Author(s) Lerario M.C., Sachs A., Lazaretti-Castro M., Saraiva L.G., Jardim J.R.

Citation: British Journal of Nutrition, July 2006, vol./is. 96/1(86-92), 0007-1145;1475-2662 (July 2006)

Publication Date: July 2006

Abstract: The objective of the present study was to compare anthropometry with bioelectrical impedance (BIA) in relation to densitometry (dual-energy X-ray absorptiometry; DEXA) as methods of nutritional assessment and body composition in out-patients with chronic pulmonary obstructive disease (COPD). We conducted a cross-sectional clinical study with sixty-one patients with COPD (forty-two men and nineteen women), mean age of 66.5 (SD 7.9) years and forced expiratory volume in 1 s of 1.3 (SD 0.6) litres (52.2 (SD 19.8) % predicted), referred to the Pulmonary Rehabilitation Center. The patients were evaluated regarding nutrition status and body composition as determined by anthropometry, BIA and DEXA. In the results, 34.4 % showed mild obstruction, 31.2 %, moderate and 34.4 %, severe obstruction. According to the BMI (mean 24.5 (SD 4.5) kg/M<sup>2</sup>), 45.9 % of the patients exhibited normal weight, while 27.9 % were underweight and 26.2 % were obese. Related to fat-free mass (FFM), anthropometry and
BIA compared with DEXA presented high correlations (r 0.96 and 0.95 respectively; P<0.001) and high reliability between the methods (alpha 0.98; P<0.001). Agreement analysis between the methods shows that anthropometry overestimates (0.62 (SD of the difference 2.89) kg) while BIA underestimates FFM (0.61 (SD of the difference 2.82) kg) compared with DEXA. We concluded that according to the nutritional diagnosis, half of our population of patients with COPD showed normal weight, while the other half comprised equal parts obese and underweight patients. Body composition estimated by BIA and anthropometry presented good reliability and correlation with DEXA; the three methods presented satisfactory clinical accuracy despite the great disparity of the limits of agreement. The Authors 2006.

Source: EMBASE

16. Evaluation of Lunar Prodigy dual-energy X-ray absorptiometry for assessing body composition in healthy persons and patients by comparison with the criterion 4-component model

Author(s) Williams J.E., Wells J.C.K., Wilson C.M., Haroun D., Lucas A., Fewtrell M.S.

Citation: American Journal of Clinical Nutrition, May 2006, vol./is. 83/5(1047-1054), 0002-9165 (01 May 2006)

Publication Date: May 2006

Abstract: Background: Dual-energy X-ray absorptiometry (DXA) is widely used to assess body composition in research and clinical practice. Several studies have evaluated its accuracy in healthy persons; however, little attention has been directed to the same issue in patients. Objective: The objective was to compare the accuracy of the Lunar Prodigy DXA for body-composition analysis with that of the reference 4-component (4C) model in healthy subjects and in patients with 1 of 3 disease states. Design: A total of 215 subjects aged 5.0-21.3 y (n = 122 healthy nonobese subjects, n = 55 obese patients, n = 26 cystic fibrosis patients, and n = 12 patients with glycogen storage disease). Fat mass (FM), fat-free mass (FFM), and weight were measured by DXA and the 4C model. Results: The accuracy of DXA-measured body-composition outcomes differed significantly between groups. Factors independently predicting bias in weight, FM, FFM, and percentage body fat in multivariate models included age, sex, size, and disease state. Biases in FFM were not mirrored by equivalent opposite biases in FM because of confounding biases in weight. Conclusions: The bias of DXA varies according to the sex, size, fatness, and disease state of the subjects, which indicates that DXA is unreliable for patient case-control studies and for longitudinal studies of persons who undergo significant changes in nutritional status between measurements. A single correction factor cannot adjust for inconsistent biases. 2006 American Society for Nutrition.

Source: EMBASE

17. Supportive nutrition on recovery of metabolism, nutritional state, health-related quality of life, and exercise capacity after major surgery: A randomized study


Citation: Clinical Gastroenterology and Hepatology, May 2005, vol./is. 3/5(466-474), 1542-3565 (May 2005)

Publication Date: May 2005

Abstract: Background & Aims: The aim of this study was to investigate whether specialized supportive enteral and parenteral feeding have superior effects compared to oral nutrition on recovery during long-term postoperative treatment of cancer patients with preoperative weight loss and reduced maximum exercise capacity. Methods: One hundred twenty-six patients referred for resection of the esophagus (n = 48), stomach (n = 28), or pancreas (n = 50) were considered to be included before operation. Included patients (n = 80) received supportive enteral or parenteral nutrition postoperatively at home corresponding to 1000 kcal/d until the patients did not wish to continue with artificial
nutrition for any reason. Patients randomized to oral nutrition only served as control subjects. Caloric intake, body composition (dual-energy X-ray absorptiometry), and respiratory gas exchanges at rest and during exercise were measured including health-related quality of life. Results: Survival and hospital stay did not differ among the groups, whereas overall complications were higher on artificial nutrition (P < .05). Changes in resting energy expenditure and biochemical tests did not differ during follow-up among the groups. Body weight and whole body fat declined similarly over time in all groups (P < .005), whereas lean body mass was unchanged during follow-up compared to preoperative values. Maximum exercise capacity and maximum oxygen consumption were normalized within 6 months postoperatively in all groups. There was no difference in recovery of food intake among the groups. Parenteral feeding was associated with the highest rate of nutrition-related complications, whereas enteral feeding reduced quality of life most extensively. Conclusion: After major surgery, specialized supportive enteral and parenteral nutrition are not superior to oral nutrition only when guided by a dietitian. 2005 by the American Gastroenterological Association.

Source: EMBASE

18. Dual-energy X-ray absorptiometry measurements of fat and lean masses in subjects with eating disorders

Author(s) Tothill P., Hannan W.J.

Citation: International Journal of Obesity, July 2004, vol./is. 28/7(912-919), 0307-0565 (July 2004)

Publication Date: July 2004

Abstract: OBJECTIVE: The main objective was to use a dual-energy X-ray absorptiometer (DXA) to examine the total-body and regional fat and lean composition of soft tissue in subjects with and without eating disorders initially and after weight change. It was necessary also to study the effects of differences of calibration of different models of DXA scanner. DESIGN: A total of 175 women with eating disorders, including anorexia nervosa (AN) and bulimia nervosa, and 43 age-matched controls were measured for soft-tissue composition with a pencil-beam Hologic QDR 1000W scanner and results converted to be equivalent to those from a fan-beam Hologic QDR 4500A, using previously determined crosscalibration factors. Some measurements were repeated at 6 and 12 months. RESULTS: The baseline body composition of the patients covered a continuous range of fat proportions. Implausibly low fat proportions in some of the AN subjects were corrected by conversion to 4500 equivalents. The relationship between total lean mass and fat mass could be fitted equally well by a linear or linear/log regression. The relationship between leg and trunk fat was best fitted by a polynomial regression. There were weight changes in either direction in some of the subjects. The fat proportion in the total changed mass was a mean of 55%, higher in the legs and lower in the trunk, but not different between weight gainers and losers or clinical groups. The proportion was dependent on the initial fat proportion. CONCLUSIONS: Relatively small differences in fat/lean calibration of DXA scanners may lead to anomalous results in very anorexic subjects and corrections are necessary in comparing results from different instruments. Concerns expressed about preferential trunk fat accumulation during weight recovery are not well founded. Previous claims of a relationship between fat proportion in regained weight and the amount of the weight gain are not justified.

Source: EMBASE

Available in fulltext from International Journal of Obesity and Related Metabolic Disorders at EBSCOhost

19. Comparison of self-reported with objectively assessed energy expenditure in black and white women before and after weight loss

Author(s) Walsh M.C., Hunter G.R., Sirikul B., Gower B.A.

Citation: American Journal of Clinical Nutrition, June 2004, vol./is. 79/6(1013-1019), 0002-9165 (June 2004)
**Publication Date:** June 2004

**Abstract:** Background: Weight maintenance is less successful in black women than in white women after weight loss. Objective: We compared objectively assessed total energy expenditure (TEE) with estimates of energy expenditure (EE) from self-reported physical activity (PA) in overweight black and white women before and after weight loss. We also compared those values with values in never-overweight control subjects. Design: A total of 20 white and 21 black premenopausal women were evaluated while overweight and weight reduced; 20 white and 14 black control subjects (matched with women in the weight-reduced state) were evaluated once. Weight loss of >=10 kg was achieved by energy restriction in the overweight subjects. The evaluations were as follows: body composition (dual-energy X-ray absorptiometry), free-living TEE (doubly labeled water), Tecumseh Occupational Activity Questionnaire, Minnesota Leisure Time PA Questionnaire, and Baecke Activity Questionnaire. Results: Questionnaire estimates of TEE were overestimated when compared with TEE (P < 0.001). Overweight women overestimated TEE 49% more than did never-overweight control subjects. After weight loss, white women reduced overestimation of EE 48% (P < 0.05), so that their overestimation of EE was not different from that of black and white control subjects. Black women overestimated to the same extent both before and after weight loss. Conclusions: Premenopausal women overestimate PA estimates on questionnaires. Overestimation of PA in weight-reduced black women is greater than in weight-reduced white women and never-overweight black and white women. 2004 American Society for Clinical Nutrition.

**Source:** EMBASE


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20. Detection of cardiovascular risk factors by indices of obesity obtained from anthropometry and dual-energy X-ray absorptiometry in Japanese individuals

**Author(s)**: Ito H., Nakasuga K., Ohshima A., Maruyama T., Kaji Y., Harada M., Fukunaga M., Jingu S., Sakamoto M.

**Citation:** International Journal of Obesity, February 2003, vol./is. 27/2(232-237), 0307-0565 (01 Feb 2003)

**Publication Date:** February 2003

**Abstract:** OBJECTIVE: To determine the cut-off points of indices of obesity for detecting hypertension, dyslipidemia and diabetes mellitus in Japanese individuals. DESIGN: Cross-sectional study. SUBJECTS: A total of 2728 Japanese individuals (768 males and 1960 females, aged 20-79 y) who attended the Fukuoka Health Promotion Center, Japan for health check-up. MEASUREMENTS: Body mass index (BMI), waist circumference (WC) and waist-hip ratio (WHR) were measured. Percentage fat mass (%FM), trunk fat mass (FM<sub>trunk</sub>) and trunk fat mass-leg fat mass ratio (FM<sub>trunk</sub>/FM<sub>legs</sub>) were obtained by dual-energy X-ray absorptiometry (DXA). Cardiovascular risk factors were determined by blood pressure, serum lipids, fasting blood glucose and hemoglobin A<sub>c</sub>. RESULTS: The cut-off points of BMI, WC and WHR were around 23.5 kg/m<sup>2</sup>, 84 cm and 0.9 for males, and 22.5 kg/m<sup>2</sup>, 72 cm and 0.8 for females. The cut-off points of %FM, FM<sub>trunk</sub> and FM<sub>trunk</sub>/FM<sub>legs</sub> were around 24%, 8 kg and 1.6 for males, and 35%, 9 kg and 1.4 for females. WHR and FM<sub>trunk</sub>/FM<sub>legs</sub> most accurately detected the risk factors. CONCLUSIONS: For Japanese individuals, the cut-off points for detecting cardiovascular risk factors are lower than the criteria by the World Health Organization. Indices of fat distribution detected the cardiovascular risk factors more accurately than those of overall adiposity. The accuracy of detecting the risk factors was comparable between the anthropometric indices and indices obtained by DXA.

**Source:** EMBASE

Available in fulltext from International Journal of Obesity and Related Metabolic Disorders at EBSCOhost

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21. Body composition changes in cachectic patients receiving home parenteral
nutrition

Author(s) Matarese L.E., Steiger E., Seidner D.L., Richmond B.

Citation: Journal of Parenteral and Enteral Nutrition, November 2002, vol./is. 26/6(366-371), 0148-6071 (November/December 2002)

Publication Date: November 2002

Abstract: Background: The purpose of this study was to evaluate the initial body compositional changes experienced by malnourished patients requiring home parenteral nutrition (HPN) for repletion. Methods: Eight patients were prospectively studied for 3 months. Body composition was determined by dual-energy X-ray absorptiometry (DXA), and a comprehensive nutrition assessment was performed including body weight, visceral proteins, triceps skinfold (TSF), midupper arm circumference (MUAC), midupper arm muscle circumference (MUAMC), body mass index (BMI), delayed hypersensitivity skin tests (DHST), and diet history. Results: Body composition measured by DXA showed an increase in (mean +/- SD) total fat from 5770 +/- 2805 to 10581 +/- 1980 g (p < .001) and bone mineral content from 2155 +/- 429 to 2190 +/- 443 g (p = .047). Lean soft tissue remained unchanged. Body weight and BMI increased from 47.7 +/- 6.6 to 53.6 +/- 8.2 kg (p = .006) and from 16.6 +/- 1.5 to 18.6 +/- 1.5 kg/m^2 (p < .001), respectively. TSF increased from 6.3 +/- 3.1 to 10.4 +/- 4.0 mm (p < .001), and MUAMC remained stable. There was a significant improvement in transferrin from 191 +/- 82 to 326 +/- 128 mg/dL (p = .043), and a trend toward improvement in albumin and delayed hypersensitivity skin tests. Body weight was highly correlated with DXA weight at baseline (r = .997; 95% confidence interval [CI], 0.98 to 1.00; p < .001) and at 3 months (r = .988; 95% CI, 0.93 to 1.00; p < .001). TSF correlated with total fat as measured by DXA at baseline (r = .839; 95% CI, 0.33 to 0.97; p = .009) but not at 3 months (r = .693; 95% CI, -0.02 to 0.94; p = .057). MUAMC correlated with lean soft tissue measured by DXA both at baseline (r = .739; 95% CI 0.07 to 0.95; p = .036) and at 3 months (r = .870; 95% CI, 0.43 to 0.98; p = .005). Physical activity, on a subjective scale of 1 (low activity) to 3 (high activity), improved over the 3-month period from 1.3 +/- 0.5 to 2.2 +/- 0.8 (p = .031). Conclusions: Initial weight gain experienced by malnourished HPN patients is primarily fat. Bone mineral content increases, but lean soft tissue does not change. Overall nutritional status is improved as exhibited by significant improvements in body weight and serum transferrin and a trend toward improvement in albumin and delayed hypersensitivity skin tests.

Source: EMBASE

22. Comparison of obesity assessment procedures in obese African-American and white women

Author(s) Brandon L.J., Elliott-Lloyd M.B., Calloway J.

Citation: Ethnicity and Disease, 2002, vol./is. 12/3(324-330), 1049-510X (2002)

Publication Date: 2002

Abstract: The purpose of this study was to compare the accuracy of dual energy X-ray absorptiometry (DEXA) to field-based procedures for the estimation of obesity in 27 sedentary and obese African-American (AA) (34.8, +/- 7.7 yr) and 25 sedentary and obese White women (41.1, +/- 8.3 yr). Body fat was estimated by DEXA and skinfolds equations. Obesity was also estimated from BMI and percent of ideal body weight (greater than 120% of ideal body weight based on height and weight tables). All of the procedures classified the subjects as obese. Results from each procedure were compared with minimal obesity standards to determine the percentage by which each mean exceeded the minimal standard (percent difference). The percent difference was smaller for BMI and percent ideal body weight than for the 2 body fat assessment procedures. Although DEXA percent body fat did not differ by race, BMI and percent ideal body weight tended to be greater in AA women compared to White women, and more AA women were classified as obese. Therefore, field-based procedures that do not include percent body fat assessments are not as accurate for AA women. This finding suggests that obesity can be more effectively assessed in AA women if the standards for classifications are population-specific.

Source: EMBASE
1. Body adiposity index assess body fat with high accuracy in nondialyzed chronic kidney disease patients.

**Author(s)** Silva MI, Vale BS, Lemos CC, Torres MR, Bregman R

**Citation:** Obesity, March 2013, vol./is. 21/3(546-52), 1930-7381;1930-739X (2013 Mar)

**Publication Date:** March 2013

**Abstract:** OBJECTIVE: High body fat (BF) is an alarming condition that also affects nondialyzed chronic kidney disease (CKD) patients. Distinct methods are used to evaluate BF; however, in CKD population it remains unclear which one is more reliable showing high accuracy. Dual-energy X-ray absorptiometry (DXA), used as reference method to estimate adiposity, is expensive and time consuming to be applied in clinical settings. Recently, a new body adiposity index (BAI), that estimates BF from easily accessible measures, was validated in the general population. The aim of this study was to evaluate which simple and practical method, routinely used to estimate BF, shows the highest accuracy compared with DXA, in nondialyzed CKD patients.DESIGN AND METHODS: In this cross-sectional study BF was estimated by DXA, bioelectrical impedance analysis (BIA), anthropometry (ANTHRO), and BAI. Serum leptin levels were determined.RESULTS: Studied patients (n = 134) were 55% males, 54% overweight/obese, and 64.9 +/- 12.5 years old, with estimated glomerular filtration rate (eGFR) = 29.0 +/- 12.7 ml/min. The correlation coefficient was higher between DXA vs. ANTHRO (r = 0.76) and BAI (r = 0.61) than with BIA (r = 0.57), after adjusting for gender, age, and eGFR (P < 0.0001). Therefore, the Lin's concordance correlation coefficient and Bland-Altman plots were performed to measure the accuracy (C_b) between DXA with both ANTHRO and BAI. A higher accuracy (C_b = 0.82) and lower mean difference (-3.4%) was observed for BAI than for ANTHRO (C_b = 0.61; -8.4%). Leptin levels correlated (P < 0.0001) with DXA (r = 0.56) and BAI (r = 0.59).CONCLUSIONS: These findings suggest that BAI estimates BF with high accuracy in nondialyzed CKD patients and may be helpful in the treatment of this population with increased BF. Copyright 2012 The Obesity Society.

**Source:** Medline


**Author(s)** Baker ST, Strauss BJ, Prendergast LA, Panagiotopoulos S, Thomas GE, Vu T, Proietto J, Jerums G

**Citation:** European Journal of Clinical Nutrition, May 2012, vol./is. 66/5(628-32), 0954-3007;1476-5640 (2012 May)

**Publication Date:** May 2012

**Abstract:** BACKGROUND/OBJECTIVES: Single-slice abdominal computed tomography or magnetic resonance imaging (MRI) performed to measure visceral adipose tissue in individuals with obesity and diabetes mellitus can also image skeletal muscle. The aim of this study was to validate a method developed in cancer patients using a single abdominal cross-sectional image to estimate fat-free mass (FFM) and appendicular lean tissue mass index (LTMI), a total body skeletal muscle mass surrogate, in an obese cohort of subjects with and without type 2 diabetes.SUBJECTS/METHODS: In total, 49 obese subjects (22 with diabetes) recruited into a weight loss study underwent dual-energy X-ray absorptiometry (DXA) and abdominal MRI at baseline. DXA-derived FFM and LTMI were compared with skeletal muscle area at the level of the third lumbar vertebra (L3) on MRI.RESULTS: L3 skeletal muscle area correlated with FFM (R (adj) (2)=0.825; P<0.001) and LTMI (R (adj) (2)=0.6; P<0.001). A simple formula, previously shown to predict LTMI in cancer patients, produced a good estimation of LTMI from L3 skeletal muscle area (95% confidence interval -3.70, 2.56%) in our obese cohort. Equations incorporating age, sex, height, weight and diabetic status improved the relationship between L3 skeletal muscle area and estimated FFM (r=0.976, P<0.001) and LTMI (r=0.879, P<0.001).CONCLUSION: A single-axial slice at the L3 level can be used to estimate FFM and LTMI in obese diabetic and non-diabetic subjects, allowing precise analysis of body composition using a single
The evaluation of body composition: a useful tool for clinical practice.

Author(s): Thibault R, Pichard C

Citation: Annals of Nutrition & Metabolism, 2012, vol./is. 60/1(6-16), 0250-6807;1421-9697 (2012)

Publication Date: 2012

Abstract: Undernutrition is insufficiently detected in in- and outpatients, and this is likely to worsen during the next decades. The increased prevalence of obesity together with chronic illnesses associated with fat-free mass (FFM) loss will result in an increased prevalence of sarcopenic obesity. In patients with sarcopenic obesity, weight loss and the body mass index lack accuracy to detect FFM loss. FFM loss is related to increasing mortality, worse clinical outcomes, and impaired quality of life. In sarcopenic obesity and chronic diseases, body composition measurement with dual-energy X-ray absorptiometry, bioelectrical impedance analysis, or computerized tomography quantifies the loss of FFM. It allows tailored nutritional support and disease-specific therapy and reduces the risk of drug toxicity. Body composition evaluation should be integrated into routine clinical practice for the initial assessment and sequential follow-up of nutritional status. It could allow objective, systematic, and early screening of undernutrition and promote the rational and early initiation of optimal nutritional support, thereby contributing to reducing malnutrition-induced morbidity, mortality, worsening of the quality of life, and global health care costs. Copyright 2011 S. Karger AG, Basel.

Source: Medline

The clinical importance of visceral adiposity: a critical review of methods for visceral adipose tissue analysis.

Author(s) Shuster A, Patlas M, Pinthus JH, Mourtzakis M

Citation: British Journal of Radiology, January 2012, vol./is. 85/1009(1-10), 0007-1285;1748-880X (2012 Jan)

Publication Date: January 2012

Abstract: As a result of the rising epidemic of obesity, understanding body fat distribution and its clinical implications is critical to timely treatment. Visceral adipose tissue is a hormonally active component of total body fat, which possesses unique biochemical characteristics that influence several normal and pathological processes in the human body. Abnormally high deposition of visceral adipose tissue is known as visceral obesity. This body composition phenotype is associated with medical disorders such as metabolic syndrome, cardiovascular disease and several malignancies including prostate, breast and colorectal cancers. Quantitative assessment of visceral obesity is important for evaluating the potential risk of development of these pathologies, as well as providing an accurate prognosis. This review aims to compare different methods of measuring visceral adiposity with emphasis on their advantages and drawbacks in clinical practice.

Source: Medline

Assessment of measures for abdominal adiposity in persons with spinal cord injury.

Author(s) Emmons RR, Garber CE, Cirnigliaro CM, Kirshblum SC, Spungen AM, Bauman WA

Citation: Ultrasound in Medicine & Biology, May 2011, vol./is. 37/5(734-41), 0301-5629;1879-291X (2011 May)
Publication Date: May 2011

Abstract: Ultrasound may be a useful tool to assess abdominal adiposity, but it has not been validated in the spinal cord injury (SCI) population. This study evaluated associations between abdominal ultrasound and other methods to assess adiposity in 24 men with SCI and 20 able-bodied (AB) men. Waist (WC) and hip circumference (HC) and waist-to-hip ratio (WHR) were measured. Trunk (TRK%), android (A%) and waist fat (W%) were determined by dual energy x-ray absorptiometry (DXA); ultrasonography determined abdominal subcutaneous (SF) and visceral fat (VF). The SCI group had greater TRK% (40.0 +/- 9.6 vs. 32.0 +/- 10.3), W% (47.0 +/- 9.7 vs. 40.6 +/- 9.4), A% (43.0 +/- 9.8 vs. 35.8 +/- 10.6) and WHR (0.99 +/- 0.1 vs. 0.92 +/- 0.06) than the AB group. WC and WHR correlated with VF in the SCI group. These associations suggest that ultrasound may be a useful tool in clinical practice for the measurement of VF in weight loss programs and for the assessment of cardiometabolic disorders. Published by Elsevier Inc.

Source: Medline

6. Quantification of lean tissue losses during cancer and HIV infection/AIDS.

Author(s) Thibault R, Cano N, Pichard C

Citation: Current Opinion in Clinical Nutrition & Metabolic Care, May 2011, vol./is. 14/3(261-7), 1363-1950;1473-6519 (2011 May)

Publication Date: May 2011

Abstract: PURPOSE OF REVIEW: Cancer and HIV infection/AIDS are associated with an increased risk of undernutrition and cachexia. During the past decade, patients became older, frequently overweight or obese and sedentary, conditions which are likely to result in fat-free mass (FFM) loss. This review sustains the hypothesis that FFM measurement should be implemented in routine clinical practice, to optimize the management of cancer and AIDS, as well as disease-related undernutrition.RECENT FINDINGS: Undernutrition and FFM loss are associated with worse clinical outcome and increased therapy toxicity in cancer and AIDS patients. The emergence of the concept of sarcopenic obesity in cancer patients, a condition associated with decreased survival, demonstrates the necessity to assess their body composition with easily available methods, such as dual energy X-ray absorptiometry, computerized tomography and bioelectrical impedance analysis. FFM measurement could be helpful for guiding the choice of both disease-specific and nutritional therapies and for evaluating their efficacy and putative toxicity.SUMMARY: FFM measurement at different steps of disease course could allow improving the guidance and efficacy of both cancer and HIV/AIDS-specific and nutritional therapies. The repeated measurement of FFM could allow reducing undernutrition-related morbidity, mortality and global healthcare costs, and could improve response and tolerance towards therapy, and quality of life.

Source: Medline


Citation: Bone, May 2010, vol./is. 46/5(1286-93), 1873-2763;1873-2763 (2010 May)

Publication Date: May 2010

Abstract: Weight loss is claimed to cause bone loss. This prospective 12-month study evaluated effects of 3-month group-based weight loss with VLED on body composition, bone mass and strength (DXA and pQCT), muscle performance and biomarkers of bone turnover. The assessments were done at baseline and at 3 and 12 months. Sixty-two women of the recruited 75 obese (BMI>30) premenopausal women who completed the study were divided into 3 groups based on the tertiles of weight loss at 3 months. The group means of weight losses were 15.5% (Large), 10.5% (Medium) and 5.9% (Low). Statistical analyses were based on analysis of covariance. Bone turnover increased during the weight reduction period in all groups but practically returned to baseline during the
weight maintenance phase. In general, mean bone changes remained marginal (approximately +/-1%) and the amount of weight reduction was not associated with bone loss. The only notable change was the 4% decline in bending strength at the distal radius. These results indicate that in obese premenopausal women, 3-month weight reduction resulted in increased bone turnover but was not deleterious for bone mass or strength at 3 months or after 9-month weight maintenance. Copyright (c) 2009. Published by Elsevier Inc.

**Source:** Medline


**Author(s)** Bravo Ramirez AM, Chevaile Ramos A, Hurtado Torres GF

**Citation:** Nutricion Hospitalaria, March 2010, vol./is. 25/2(245-9), 0212-1611;0212-1611 (2010 Mar-Apr)

**Publication Date:** March 2010

**Abstract:** BACKGROUND: Nutritional alterations are highly prevalent among patients with chronic kidney diseases stage 5 who receive haemodialysis therapy. Body composition alterations are directly related to an increased morbidity and mortality. Nutritional assessment represents a cardinal intervention oriented to improve the outcome and survival in chronic renal patients.OBJECTIVE: To evaluate body composition in a mexican population with chronic kidney disease stage 5 and haemodialysis therapy.METHODS: Prospective, descriptive and transversal study. Free fatty mass (FFM) and fatty mass (FM) were evaluated by means of bioelectric impedance (BIE), anthropometrics measures (MPA) and dual-energy x-ray absorptiometry (DEXA).RESULTS: 20 patients were evaluated (12 females and 8 males). Mean age was 51.9 +/- 19.3 years. Mean weight was 59.5 +/- 10.5 kg and mean body mass index was 24.9 +/- 3.1 kg/m(2). Mean FFM values were 42.4 +/- 8.6 kg (MPA), 43.6 +/- 8.9 kg (DEXA) y 42.8 +/- 10.2 kg (IBE). Mean FM values: 17.2 +/- 6.2 kg (MPA), 15.9 +/- 6.9 kg (DEXA) and 16.9 +/- 6.9 kg (IBE). Correlation coefficients between the three methods were: FFM, 0.982 (MPA vs IBE), 0.963 (MPA vs DEXA) y 0.947 (IBE vs DEXA). Fatty mass: 0.975 (MPA vs IBE), 0.925 (MPA vs DEXA) y 0.898 (IBE vs DEXA).CONCLUSION: In the studied population, fatty mass was increased and FFM was within the reference ranges. There was not evidence of protein malnutrition. MPA and BIE are practical and useful tools to evaluate body composition in mexican chronic kidney disease patients who receive haemodialysis therapy. The results obtained by means of MPA and BIE correlated with results obtained by DEXA.

**Source:** Medline

9. [Comparison of various methods of body fat analysis in overweight and obese women]. [Czech] Srovnani ruznych meted pro stanoveni mnozstvi tuku v tele u zen s nadvahou a obezitou.


**Citation:** Vnitrni Lekarstvi, May 2009, vol./is. 55/5(455-61), 0042-773X;0042-773X (2009 May)

**Publication Date:** May 2009

**Abstract:** INTRODUCTION: Body composition assessment and determination of the amount and distribution of body fat, respectively, form an essential part of the basic clinical assessment of an obese patient. However, there are no recommended methods to determine the amount of fat in obese population. The aim of our study was to compare the methods most frequently used to determine the amount of body fat in overweight and obese women in clinical practice (multi-frequency bio-electrical impedance analysis--BIA using the Bodystat, Omron and Tanita machines and the skinfold test using a calliper) with a reference method (DEXA). The study further aimed to compile prediction formulae enabling clinicians to calculate the percentage of body fat when using the available body fat measurement techniques.METHODS: The study included 61 overweight and obese women...
(mean age 48.6 years +/- 13.9 years). Four practice-based body fat assessment methods were used - bioimpedance technique with tetra-polar electrode arrangement (Bodystat machine), bioimpedance technique with bi-pedal electrode arrangement (Tanita machine), hand-held bioimpedance technique (Omron machine) and the anthropometry assessment—the skinfold calliper technique. These methods were compared to the method considered as the reference—the whole body densitometry (DEXA). RESULTS: The results obtained using the listed body fat assessment methods suggest that the resulting body fat measurements differ importantly depending on the method used. The highest correlation with DEXA was found for the Bodystat BIA ($r = 0.9096$, $p < 0.001$). Prediction formulae were constructed for a more accurate calculation of body fat content when using the techniques evaluated in the present study. CONCLUSION: When the newly compiled formulae are employed, the body fat assessment obtained with any of the methods applied in the present study will approximate DEXA. The BIA techniques were found to be particularly precise. Therefore, further evaluation of these techniques is recommendable to support their use as methods for monitoring the efficacy of weight reduction programmes in overweight and obese patients.

Source: Medline

10. A comparison of field methods to assess body composition in a diverse group of sedentary women.

Author(s) D’Alonzo KT, Aluf A, Vincent L, Cooper K

Citation: Biological Research for Nursing, January 2009, vol./is. 10/3(274-83), 1099-8004;1099-8004 (2009 Jan)

Publication Date: January 2009

Abstract: Accurate assessment of body composition is essential in the evaluation of obesity. While laboratory methods are commonly used to assess fat mass, field measures (e.g., skinfold thickness [SKF] and bioelectrical impedance [BIA]) may be more practical for screening large numbers of individuals in intervention studies. In this study, a correlational design was used among 46 racially and ethnically diverse, sedentary women (mean age = 25.73 years) to (a) compare the percentage of body fat as determined by SKF and the upper body BIA and (b) examine the effects of body mass index (BMI), racial/ethnic background, age, and stage of the menstrual cycle on differences in the estimated percentage of body fat obtained using the SKF and BIA. Overall, a significant correlation between SKF and BIA ($r = .98$, $p < .001$) was found, with similar findings among Black, Hispanic and White non-Hispanic women. The mean differences between BIA and SKF were not significantly correlated with BMI, age, race/ethnicity or stage of the menstrual cycle. Data from this study suggest that BIA showed similar body fat prediction values compared with SKF and may be a viable alternative to SKF among diverse groups of healthy women. Additional testing and comparison of these field methods with the laboratory methods of hydro-densitometry or dual energy X-ray absorptiometry is recommended to further determine whether BIA devices can be routinely recommended as an alternative to the SKF.

Source: Medline


Author(s) Summers GD, Deighton CM, Rennie MJ, Booth AH

Citation: Rheumatology, August 2008, vol./is. 47/8(1124-31), 1462-0324;1462-0332 (2008 Aug)

Publication Date: August 2008

Abstract: Rheumatoid cachexia is under-recognized in clinical practice. The loss of lean body tissue, which characterizes cachexia, is often compensated for by gain in body fat—so called 'cachectic obesity'—so that 85% or more RA patients have a normal BMI. Severe cachexia with loss of weight leads to increased morbidity and premature mortality but loss of muscle bulk with a normal BMI also associates with poor clinical outcomes. Increasing BMI, even into the obese range, is associated with less joint damage and reduced mortality. Measurement of body composition using DXA and other techniques is feasible
but the results must be interpreted with care. Newer techniques such as whole-body MRI will help define with more confidence the mass and distribution of fat and muscle and help elucidate the relationships between body composition and outcomes. Cachexia shows little response to diet alone but progressive resistance training and anti-TNF therapies show promise in tackling this potentially disabling extra-articular feature of RA.

Source: Medline
Available in fulltext from Rheumatology at Highwire Press

12. [Body composition analysis in obesity: radionuclide and non radionuclide methods].

Author(s) Tzotzas T, Krassas GE, Doumas A
Citation: Hellenic Journal of Nuclear Medicine, January 2008, vol./is. 11/1(63-71), 1790-5427:1790-5427 (2008 Jan-Apr)
Publication Date: January 2008
Abstract: Body composition (BC) assessment provides important information regarding the absolute or relative amount of bone, lean and fat tissue. Different somatometric techniques have been applied in numerous epidemiological and experimental studies, as well as in every day clinical practice. Traditional techniques for BC analysis include skin fold thickness measurements, radioisotope dilution methods, hydrodensitometry and underwater weighing, while newer techniques include bioelectrical impedance analysis (BIA), air displacement plethysmography (ADP), dual energy X-rays absorptiometry (DEXA), computer tomography and magnetic resonance imaging. In addition, positron emission tomography helped to the functional investigation of adipose tissue, in particular of brown tissue. All these techniques have contributed a lot to the understanding of physiological conditions such as exercise training, menopause and ageing, adolescence health parameters, as well as pathological conditions such as disorders of nutrition, cancer, obesity and diabetes mellitus. In obesity, BC contributed to diagnosis and the pathological impact of visceral adipose tissue. In addition, conditions such as pseudo- or hypermuscular obesity and sarcopenia, which are often observed in various endocrine diseases, were investigated in detail by using such methods. During weight loss, some of these methods were quite accurate in measuring changes in fat and lean mass. Apart from anthropometric measurements, a BC measurement if possible should be included in obesity assessment. Measurements of skin fold thickness combined with BIA are quite sufficient for routine clinical practice. However, in specialized clinics and in research, more sophisticated methods like ADP or DEXA are used.

Source: Medline

13. Changes in body mass, energy balance, physical function, and inflammatory state in patients with locally advanced head and neck cancer treated with concurrent chemoradiation after low-dose induction chemotherapy.

Author(s) Silver HJ, Dietrich MS, Murphy BA
Citation: Head & Neck, October 2007, vol./is. 29/10(893-900), 1043-3074;1043-3074 (2007 Oct)
Publication Date: October 2007
Abstract: BACKGROUND: We aimed to determine changes in body mass and body composition in relation to energy balance, inflammatory state, and physical function before and after concurrent chemoradiation (CCR).METHODS: Seventeen patients with stage III and IVa head and neck cancer, aged 58.9 +/- 5.4 years, who had completed a 9-week regimen of low-dose induction chemotherapy came to the General Clinical Research Center pre- and post-CCR for measurement of body mass composition by dual-energy X-ray absorptiometry, resting energy expenditure (REE) by indirect calorimetry, physical performance (by Modified Baecke Questionnaire and Reuben's Physical Performance Test), and functionality (Activities and Instrumental Activities of Daily Living scores). Fasting venous samples were collected to determine C-reactive protein and cytokines interleukin (IL)-1beta, IL-6, IL-8, and IL-10. Random 24-hour telephone diet recalls assessed energy
intakes. RESULTS: Weight loss began 1 week after CCR. Lean body mass (LBM) accounted for 71.7% +/- 21% of body mass loss. No change occurred in energy intakes or calorie/nitrogen ratio. REE was significantly increased when adjusted for LBM loss (kcal/kg), p = .019. LBM loss was significantly associated with physical performance decline, r = .71, p = .004, and increased functional dependence, r = .58, p = .02. Total physical activity level declined significantly, p = .003. Cytokine levels were strongly associated with physical and functional decline. CONCLUSIONS: The aberrant changes in body composition, metabolism, and inflammatory state were associated with clinically and statistically significant impairments in physical performance and function. Future investigations and clinical practice should combine nutrition with antiinflammatory agents and exercise activities to support lean tissue anabolism and prevent physical and functional decline of patients with head and neck cancer undergoing CCR.

Source: Medline
Available in fulltext from Head and Neck at EBSCOhost

14. Validation of estimates of total body water in pediatric dialysis patients by deuterium dilution.

Author(s) Mendley SR, Majkowski NL, Schoeller DA
Citation: Kidney International, May 2005, vol./is. 67/5(2056-62), 0085-2538;0085-2538 (2005 May)
Publication Date: May 2005
Abstract: BACKGROUND: Current KDOQI recommendations call for an assessment of dialysis adequacy that depends critically on an estimate of total body water (TBW). Such estimates are problematic in children since the range of patient size is large, and often formulas derived in normals are not validated in end-stage renal disease. Gold standard methods of TBW measurement, such as deuterium dilution ((2)H(2)O), are not appropriate in the clinical setting, yet noninvasive methods such as bioimpedance analysis (BIA) and dual energy x-ray absorptiometry (DEXA) have not been independently validated. METHODS: We studied 14 stable pediatric dialysis patients on 1 to 3 occasions using (2)H(2)O dilution, BIA, DEXA, and anthropometry to measure TBW. We compared our data set to previously published formulae for TBW to determine root mean square error (RMSE) and skew of the estimate. RESULTS: TBW prediction based upon the anthropometric formula proposed by the Pediatric Peritoneal Dialysis Consortium provided the best fit to our independent data set with RMSE = 2.15 L, and no skew by Bland-Altman analysis. Other formulas produced large, clinically relevant errors; obese subjects confounded many estimates. TBW calculated from hydrated lean body mass from DEXA scan was reliable with RMSE = 1.03 L and no skew. BIA-derived estimates can be useful, although the magnitude of RMSE ranged from 1.45 to 6.24 L, and one formula produced skewed results. CONCLUSION: Techniques for estimating TBW in pediatric dialysis patients must be validated by independent data sets before being incorporated into clinical and research practice.

Source: Medline
Available in fulltext from Kidney International at EBSCOhost

15. Outcome measurements in paediatric obesity prevention trials.

Author(s) Pietrobelli A
Citation: International Journal of Obesity & Related Metabolic Disorders: Journal of the International Association for the Study of Obesity, November 2004, vol./is. 28 Suppl 3/(S86-9), 0307-0565;0307-0565 (2004 Nov)
Publication Date: November 2004
Abstract: OBJECTIVE: Obesity in children impacts on their health in both the short and long term. Having an accurate and precise body composition assessment, it may be possible to control growth process and predict adult status in order to reduce the risk factors for various diseases. METHOD: To review methods for body composition assessment that may provide new insights into the clinical practicality of paediatric obesity
prevention/treatment. To present which specific outcome measurements in paediatric obesity prevention trials could be used to detect subjects at risk as early as possible.

**RESULTS:** We discussed body composition measurements that could be used in daily clinical practice and as outcome measurements in prevention trials.

**CONCLUSION:** These measurement procedures could be associated with methods for preventing obesity onset or retarding the weight gain associated with ageing.

**Source:** Medline

Available in fulltext from *International Journal of Obesity and Related Metabolic Disorders* at [EBSCOhost](http://www.ebscohost.com)

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**Author(s)** Locatelli F, Fouque D, Heimburger O, Drueke TB, Cannata-Andia JB, Horl WH, Ritz E

**Citation:** Nephrology Dialysis Transplantation, April 2002, vol./is. 17/4(563-72), 0931-0509;0931-0509 (2002 Apr)

**Publication Date:** April 2002

**Abstract:** BACKGROUND: Malnutrition is common in dialysis patients and closely related to morbidity and mortality. Therefore, assessment of nutritional status and nutritional management of dialysis patients play a central role in everyday nephrological practice.

**METHODS:** Achieving a consensus on key points relating to pathogenesis, clinical assessment, and nutritional management of dialysis patients.

**RESULTS:** The assessment of nutritional status should be based on clinical assessment and biochemical parameters, including history of weight loss, per cent standard weight, body mass index, muscle mass, subcutaneous fat mass, and plasma albumin, creatinine, bicarbonate and cholesterol. Co-morbid conditions should be assessed and C-reactive protein (CRP) measured--as a marker of inflammation--as there is a close relation between malnutrition, on one side, and co-morbid conditions and inflammation on the other. For a more detailed assessment, subjective global assessment of nutritional status is a well-validated tool, and dual-energy X-ray absorptiometry (DEXA) is a useful method for routine assessment of lean body mass. Anthropometric methods are also useful. They are cheap and easy to apply, although less precise than DEXA. The recommended daily protein intake is at least 1.2 g/kg standard body weight and the energy intake 35 kcal/kg standard body weight (BW), in patients <60 years, and 30 kcal/kg standard BW in patients >60 years. The standard bicarbonate level should be at least 22 mmol/l. If CRP is >10 mg/l, it is important to seek and treat the underlying cause. Adequate dialysis (for haemodialysis: Kt/V >1.2) should be ensured and, although no definite evidence of the importance of dialysis water quality is available, the opinion of the authors is that the water quality should be high. The role of the biocompatibility of the dialysis membrane is still not clear. The dietitian plays a pivotal role in the nutritional care of dialysis patients, and patients should be provided with dietary counselling from the start of substitutive treatment in order to meet the recommended nutritional intakes. Dietary counselling can also play an important role in an integrated treatment of hyperphosphataemia, although most patients will also need phosphate binders if they have an adequate protein intake.

**CONCLUSION:** Malnutrition assessment and treatment is a great challenge for nephrological care. Achieving evidence-based consensus can help in implementing the progress of knowledge in clinical practice.

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