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A Comparison of Standard Height-Weight Indices and ElectroLipoGraphy (ELG) in the Clinical Diagnosis of Obesity

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Introduction: The goal of this study was to evaluate the accuracy of the currently utilized standards of height-weight tables and Body Mass Index (BMI) in comparison to electrolipography (ELG) in classifying individuals as obese or non-obese.

Methods: The Metropolitan Life Tables of 1983 (height-weight) and Body Mass Index (Wt-Kg/Ht-M²) were compared with two techniques for measuring body composition analysis (Percent Body Fat). The two techniques were the research standard hydrostatic weight (H_2O fat) and algorithmic electrolipography (ELG). The criterion for obesity was determined to be H_2O fat equal to or greater than 20% fat for males and equal to or greater than 30% fat for females. Height and weight were measured and body composition analysis utilizing both H_2O fat and ELG (ElectroLipoGraph® HealthPort, Beaverton, OR) was done on a total of 769 male and female volunteers.

Results: Of 343 males, 56 were classified as obese by H_2O fat, while 64 of the 426 females were classified as obese by hydrostatic weighing. For males, the average H_2O fat was 15.1 ± 5.63 compared to ELG average percent fat of 15.1% ± 4.79. Average male BMI was 24.3 ± 3.29. For females, average H_2O fat was 23.4 ± 6.10 and average ELG percent fat was 23.4 ± 5.27. Average BMI for females was 22.0 ± 2.82. A discriminate analysis was used to determine the accuracy of the other three methods for obesity classification compared to H_2O fat. Body composition predicted by ELG was very similar to H_2O fat values (SEE=2.8%±, R=.91). The overall accuracy of ELG for identifying obese and non-obese subjects, both males and females, was 89.3% compared to 64.2% for BMI and 53.6% for height-weight. In determining obesity in the male group, ELG differed from H_2O fat in 10.7% of the measurements while BMI differed 35.8% and

height-weight differed 46.4%. In the female group, ELG differed from H_2O fat in 7.8% of the measurements, while BMI differed 24.3% and height-weight differed in 73.4%. False negative classifications for males and females, respectively, were 9.7% and 7.2% for ELG, 26.4% and 19.6% for BMI, and 31.7% and 42.3% for height-weight.

Conclusion: Discriminate function data indicated that for both males and females, the most accurate non- H_2O fat [non-research] method for distinguishing obese from non-obese subjects was ELG. Neither the use of height-weigh measurements nor BMI is sensitive enough to accurately discriminate between obese and non-obese subjects on an individual basis. Reliance on measures of height-weight or BMI is clearly not an acceptable method to accurately diagnose obesity on an individual basis.

With an increasing awareness of the health implications of obesity, it seems apparent that accurate body composition assessments should be made. **The use of ELG offers a simple, reliable, reproducible and accurate new paradigm for the diagnosis of obesity by body composition analysis in the clinical setting.**

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