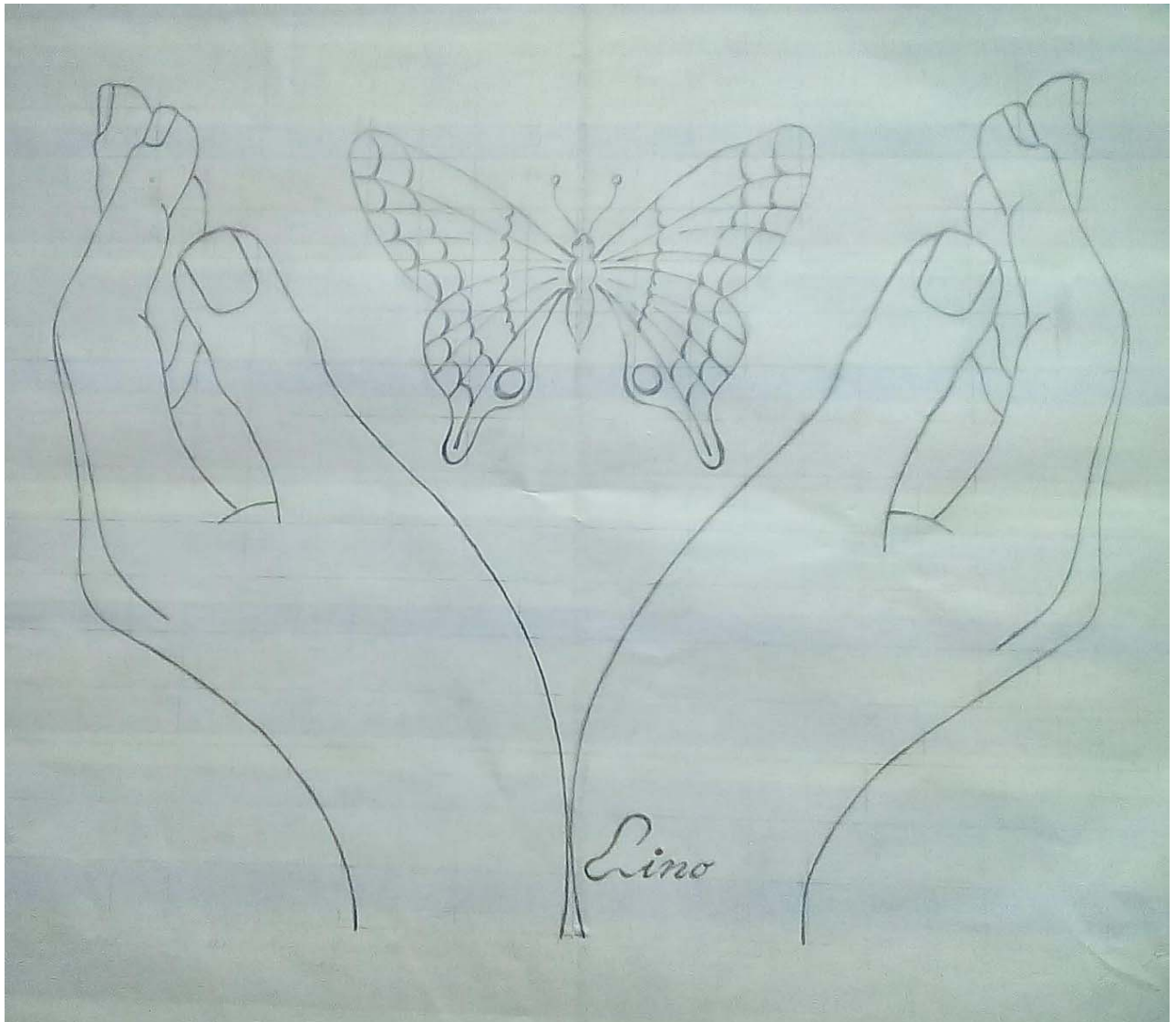


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**STUDY OF CORRELATION BETWEEN ULTRASONOGRAPHIC  
DENSITOMETRIC PARAMETERS (T-score and Z-score) AND BIO-  
IMPEDANCEMETRIC (Resistance, Reactance, FFM, FM, ECM, ICM) IN  
PATIENTS SUFFERING FROM OSTEOPOROSIS.**

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**KEY-WORDS:** T-score, Z-score, BIA, Osteoporosis

**ABSTRACT**

**Aim:** the purpose of our study project is to screen subjects aged 50 years and older with the Hologic Sahara calcaneal ultrasound densitometer for detecting possible osteopenia or osteoporosis. Our research was carried out by correlating the densitometric data (T-score and Z-score) with the anthropometric data and skin conductivity obtained by bioimpedancemetry (Akern) body with 4 electrodes (FFM, FM, ECM, ICM, Resistance, Reactance) in order to identify possible screening bioimpedancemetry values between conditions of normality, osteopenia or osteoporosis. **Materials and Methods:** all subjects enrolled in our study were over 50 years of age (12 women and 8 men) and voluntarily agreed to undergo screening for osteopenia or osteoporosis using a non-invasive method based on calcaneal ultrasound evaluation. All patients were asked for informed consent in order to carry out the screening procedure and to process personal data. Following the calcaneal ultrasound evaluation, the patients enrolled in the study underwent bioimpedance evaluation with a 4-electrode detection system (Akern) for the detection of anthropometric and skin conductivity parameters (FFM, FM, ECM, ICM, Resistance, Reactance). **Results:** the data analysis did not reveal a statistically significant correlation between the T score value and the bioimpedance parameters examined. A similar result was observed for the correlation between the Z score and the bioimpedance parameters mentioned above. Finally, a correlation study was carried out between Bone Mass Density (BMD) and bioimpedance parameters which did not show, once again, any

statistically significant correlation. From the analysis of all the measured variables, a statistically significant positive correlation emerged between the sex of the enrolled patients and the coefficients of the T score (Pearson = 0.458; P = 0.037\*), Z score (Pearson = 0.459; P = 0.036\*) and BMD (Pearson = 0.464; P = 0.034\*). A negative correlation emerged, even if not statistically significant, between the sex of the enrolled patients and the bioimpedance values measured Resistance (Pearson = -0.063; P = 0.783), Reactance (Pearson = 0.313; P = 0.167) and FM (Pearson = -0.397; P = 0.074), FFM (Pearson = 0.162; P = 0.483), BCM (Pearson = 0.253; P = 0.268), and ECM (Pearson = -0.168; P = 0.468). Positive correlations emerged, although not statistically significant, between the age of the enrolled patients and the parameters describing bone density T score (Pearson = 0.060; P = 0.794), Z score (Pearson = 0.253; P = 0.269) and BMD (Pearson = 0.060; P = 0.792). Finally, for the sake of completeness, we report the presence of a negative correlation, even if not statistically significant, between the age of the enrolled patients and the bioimpedance parameters Resistance (Pearson = -0.117; P = 0.614), Reactance (Pearson = 0.431; P = 0.050\*) and FM (Pearson = -0.406; P = 0.067), FFM (Pearson = 0.093; P = 0.686), BCM (Pearson = 0.344; P = 0.126), and ECM (Pearson = 0.411; P = 0.064). **Discussion:** From the data in the previous tables it emerges that there is a positive correlation between the parameters derived from bone densitometry performed with ultrasound methodology and the sex of the enrolled patients. No positive or negative correlations were found such as to reach statistical significance for the data concerning the age of the patients enrolled in the study and the parameters relating to bone densitometry and bioimpedancemetry. The only correlation at the limits of statistical significance was found between the age of the enrolled patients and the value of the reactance measured with the bioimpedancemeter Age vs Reactance (Pearson = 0.431; P = 0.050). The data of our study allow us to affirm that the values of the indices calculated by bioimpedancemetry do not correlate significantly with the parameters calculated by ultrasound calcaneal bone densitometry. **Conclusions:** Our research study allowed us to exclude the possibility of identifying—with certainty—a strong correlation between a bioimpedance parameter and bone densitometry data, hence hypothesizing a cut-off value to be used as a screening between normality-osteopenia-osteoporosis. The expansion of the study sample and a stratification by age group could allow the identification of statistically significant positive or negative correlation values in adulthood or

geriatric age. Currently, the size of the sample under examination is not sufficient to carry out a reliable evaluation by dividing the patients into subgroups.

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