Sessione

Biologia ed Ecologia umana

poster

Linea C terminations in pathological and healthy subjects

Giovanni Floris[1]

[1] *Università degli Studi di Cagliari*

The terminations of the C line in four types have been studied in various populations. In this work the terminations of the C line in some pathologies were analyzed. The conclusion is that the pathological dermatoglyphics study may be an additional character a possible diagnosis but certainly not a significant diagnostic character.

The effect of arm position on bioimpedance measurements

Federica Frau[1], Eduardo Pizzo Junior[1], Valeria Succa[1], Tiago R Silva[2], Jonathan CK Wells[3], Analiza M Silva[4], Leigh C Ward[5], Elisabetta Marini[1]

[1] *Department of Life and Environmental Sciences, University of Cagliari, Monserrato, Italy*

[2] *Faculty of Nutrition and Food Sciences, University of Porto, Porto, Portugal*

[3] *Childhood Nutrition Research Centre, Population, Policy and Practice Research and Teaching Department, UCL Great Ormond Street Institute of Child Health, London, UK*

[4] *Exercise and Health Laboratory, Faculdade Motricidade Humana, Universidade Lisboa, Cruz Quebrada,Portugal*

[5] *School of Chemistry and Molecular Biosciences, University of Queensland, Brisbane, Australia*

Bioelectrical impedance analysis (BIA) is a widely used technique for assessing body composition. Various BIA devices and protocols are commonly applied, and their interchangeability remains a critical issue for both research and practical applications.
This study evaluates the impact of body and arm positioning, and electrode placement, on whole-body and segmental raw bioelectrical values, namely resistance (R, ohm) and reactance (Xc, ohm), measured at 50 kHz.
The study examined a sample of 50 adults (35 men and 15 women). Whole-body and arm resistance and reactance were measured with participants in seven different positions — one supine and six standing — designed to reflect the positions commonly adopted with commercial BIA devices. In the standing positions, the arms were either extended parallel to the body or abducted to 45°, 60° or 90°, or flexed at the elbow to 45° or 90°. Two different electrode placements were used for arm measurements. Differences in R and Xc values across positions were evaluated using ANOVA with Bonferroni post hoc tests.
At the whole body and arm level, R and Xc values measured in the supine position mostly corresponded to those obtained in the standing position with the arms extended parallel to the trunk, in both sexes. R values increased progressively with greater arm abduction and decreased with elbow flexion, particularly at 90°. Xc also varied, though the changes were slightly less pronounced. While most differences were statistically significant, they mostly fell within the acceptable range of device variability (±10 for R and ±5 for Xc for the whole body). However, R values in the 90° flexed position and in the maximally abducted position were outside this range for both sexes. A similar, albeit slightly more pronounced, pattern was observed for whole-body values, where both flexed positions produced R and Xc differences outside the acceptable range. Alternative electrode placements only partially mitigated the effect of arm position.
In conclusion, arm position exerts a greater influence on segmental bioimpedance measurements than body posture, reaching biological relevance when the arm is flexed. Further studies are needed to assess the systematic nature of these differences and thus support the formulation of correction factors.

Phase Angle and bioelectrical impedance vector analysis as Prognostic Indicators of Functional Recovery in Postoperative Femoral Fracture Rehabilitation

Federica Moro[1], Stefania Toselli[1], Stefania Bandini[2], Sofia Marini[3], Alessia Grigoletto[4], Mario Mauro[1]

[1] *Department of Life Quality Sciences, University of Bologna*

[2] *AUSL Imola*

[3] *Department of Medicine and Aging Sciences, University of Chieti-Pescara*

[4] *Department of Biomedical and Neuromotor Sciences, University of Bologna*

Elderly patients with femoral fractures require targeted rehabilitation after surgery to enhance self-reliance and quality of life, while also reducing mortality. Although poor body composition is associated with worse outcomes, it remains unclear whether bioelectrical impedance analysis (BIA) parameters can reflect or predict functional recovery. To explore the potential of BIA as a biomarker in rehabilitation, a case-crossover longitudinal study was conducted involving 41 elderly patients (mean age 84.6 ± 7.2 years; 75.6% female) who underwent femoral surgery. Body composition (via anthropometry and BIA) and self-reliance were assessed at three time points during follow-up, focusing on both the operated and non-operated limbs.

A two-way repeated-measures ANOVA, adjusted for sex, age, and leg dominance, revealed significant improvements in activities of daily living. Thigh circumference decreased over time regardless of surgical intervention. In terms of BIA parameters, resistance (R) decreased more prominently in the operated leg, while reactance (Xc) showed similar trends in both limbs. Phase angle (PhA) presented differential changes between treated and untreated limbs, and between right and left legs, with a maximum recovery-related reduction of up to 16.8% (95% CI: 3.4–28.4). These findings highlight the need for personalized attention in geriatric rehabilitation. BIA presents a promising, non-invasive tool for monitoring recovery and may help optimize healthcare resource allocation.

Body composition in patients with epilepsy

Eduardo Pizzo Junior[1], Federica Frau[1], Valerio Basile[2], Santina Caliri[3], Mariangela Serra[4], Angelina Laganà[5], Federica Maria Sacco[2], Patrizia Pollicino[3], Vincenzo Arcoraci[2], Elisabetta Marini[6]

[1] *Dipartimento di Scienze della Vita e dell'Ambiente, Università degli studi di Cagliari*

[2] *Department of Clinical and Experimental Medicine, University of Messina, Italy*

[3] *IRCCS Institute of Neurological "Bonino Pulejo" – P.O. Piemonte (UOC Neurorehabilitation) of Messina, Italy*

[4] *Department of Life and Environmental Sciences, University of Cagliari, Italy*

[5] *Neurophysiopathology and Movement Disorders Clinic, University of Messina, Messina, Italy; Regional Epilepsy Center, University of Messina, Italy*

[6] *Università degli Studi di Cagliari*

Epilepsy is among the most common neurological disorders, affecting over 70 million people worldwide. Variability in body composition (BC) may result from treatment effects and, in turn, influence pharmacokinetics and therapeutic efficacy.
This study analyses BC in 110 Italian adults with epilepsy (46 men, 64 women). Anthropometric data (weight, height, mid-upper arm, waist, and calf circumferences) and bioelectrical measurements (resistance and reactance at 50 kHz) were collected. BC was assessed using conventional bioimpedance analysis, phase angle (PhA) analysis, and both classic and specific bioelectrical impedance vector analysis (BIVA). Participants also completed questionnaires on adherence to the Mediterranean diet (MEDILITE) and physical activity (IPAQ).
Men and women were of similar age (men: 46.5± 20.6 years; women: 46.6 ± 16.2 years; p = 0.991). Adherence to the Mediterranean diet was generally good across both sexes. Nearly half of the participants were physically inactive (men: 46.3%; women: 56.1%). The mean BMI (men: 28.5 ± 5.4kg/m^2; women: 26.9 ± 5.7kg/m^2) and fat mass percentage (FM%; men: 28.7 ± 9.8%; women: 37.3 ± 7.4%) indicated overweight in both sexes, based on the thresholds proposed in the literature.
When plotted on classic and specific BIVA tolerance ellipses, over 80% of the vectors were on the right side, with low PhA values indicating reduced muscle mass and low intracellular/extracellular water ratio. Specific BIVA revealed a tendency towards elongated vectors in men and women aged 18-65 years, indicating high FM%. Classic BIVA showed longer vectors in both sexes and in the same age group, indicating a tendency towards dehydration.

In conclusion, despite adhering well to the Mediterranean diet, the sample exhibited excess body weight and fat mass percentage, as well as reduced muscularity. This may be due to physical inactivity, which is a feature of nearly half of cases.

Anthropometric study of body proportions: a citizen science event during a Leonardo da Vinci celebrative exibition

Francesco Sguaizer[1], Marco Moietta[1]; Alessandra Fenoglio[2], Melchiorre Masali[2], Margherita Micheletti Cremasco[1,2]

[1] *Department of Life Sciences and Systems Biology, University of Torino, Italy*

[2] ICxT Centro Interdipartimentale di Ricerca ICT e Innovazione per la Società e il Territorio University of Torino, Italy

The study of body proportions originates from the aesthetic needs of artistic representations of the human body, dating back to ancient Egyptians, Greeks and Romans times. From the 15th century onward, the main reference for such proportions has been Leonardo da Vinci's drawing known as the Vitruvian Man, which visually represents the descriptions provided by Vitruvius Pollione (c. 80–20 BCE) in De Architectura, and had already been roughly sketched by Francesco di Giorgio Martini a few years before Leonardo. According to this ideal reference, height and arm span should therefore be equal in length for a body to be considered proportionate.
In anthropometric studies, arm span (or wingspan) is generally of limited interest, mostly restricted to areas such as sports as basketball and football, where a wide wingspan can offer advantages in specific phases of the game, contributing to a better performance.
To assess whether the equivalence of these two body measurements is truly common or rare, and to determine which one tends to prevail over the other, a survey was carried out on a sample of the general adult population. The opportunity arose to combine a scientific survey based on anthropometric standards with a Kinect-based 3D body scannering a "playful" setting, as part of a citizen science project conducted in Turin (2019/2020) titled Delle misure universali de' corpi. The event was curated by A. Dino, A. De Bortoli and M. Flores (Unito), scientific project by M. Micheletti Cremasco and A. Giustetto and illustrated by A. Fenoglio (DBIOS UniTo); installation by auroraMeccanica s.c.a r.l. Turin.
Through an interactive exhibit set up at the Galleria Sabauda of the Royal Museums, visitors could compare their own physical proportions with the ideal ones of Leonardo's Vitruvian Man. From the measurements of 2.747 adult subjects (1.435 males and 1.312 females) collected using the Kinect scanner (with 326 subjects also measured using anthropometric instruments, including 173 females and 153 males), it was found that in over 90% of cases, height exceeds wingspan. Only in 6% of female subjects and 10% of male subjects wingspan was greater than height. Virtually no one matched Leonardo's ideal proportions. Comparisons between Kinect measurements and traditional anthropometric ones are reported to help inform future research on the scientific reliability of such applications within citizen science initiatives, as part of the university's third mission activities.

Associations Between Vegetarian Diet and Bioelectrical Impedance Parameters: Insights into Body Composition and Cellular Health in Young Adult Women

Simona Sulis[1], Darina Falbová[1], Petra Švábová[1], Lenka Vorobeľová[1]

[1] *Comenius University Bratislava, Slovakia*

Vegetarian diets are becoming increasingly popular among young adults. The aim of this study is to investigate the impact of such a diet on body composition. Methods: A sample of 202 female young adults, mainly university students from Slovakia, consisting of 73 vegetarians (22.03 ± 2.84 years old) and 129 omnivores (21.26 ± 2.34 years old) was analysed. Body composition was measured using a bioelectrical impedance analyser, the InBody 770. Information on participants' diet was collected using a modified version of the WHO STEPS 2014 questionnaire. Results: Linear regression analysis showed that a vegetarian diet and eating after 18:00 were independent predictors of the body composition parameter reactance (Xc; p = 0.017), while a vegetarian diet also influenced phase angle (PhA; p ¡ 0.001), total body extracellular water ratio (ECW; p = 0.004), left arm ECW ratio (p = 0.004), trunk ECW ratio (p = 0.004) and left leg ECW ratio (p = 0.007) were also significantly affected after adjusting for smoking, allergies, vitamin D and physical activity. Conclusions: Vegetarians had lower values of Xc, PhA, and a higher ECW ratio in all body segments studied, indicating a potentially less favourable state of cellular health and fluid distribution compared to omnivores. These results suggest that a vegetarian diet may have a negative effect on bioelectrical impedance parameters related to body composition in young adult women. Further research is needed to investigate the long-term health effects of these differences.