

Relationship between age and handgrip strength: Proposal of reference values from infancy to senescence

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Abstract

Introduction: Measurement of hand grip strength (HGS) has been proposed as a key component of frailty and has also been suggested as a central biomarker of healthy aging and a powerful predictor of future morbidity and mortality. **Objectives:** (a) To determine whether a nonlinear relationship model could improve the prediction of handgrip strength (HGS) compared to the linear model and (b) to propose percentiles to evaluate HGS according to age and sex for a regional population of Chile from infancy to senescence. **Methods:** A cross-sectional descriptive study was developed in a representative sample of the Maule region (Chile). The volunteers amounted to 5,376 participants (2,840 men and 2,536 women), with an age range from 6 to 80 years old. Weight, height, HGS (right and left hand) according to age and sex were evaluated. Percentiles were calculated using the LMS method [(L (Lambda; asymmetry), M (Mu; median), and S (Sigma; coefficient of variation)]. **Results and discussion:** There were no differences in HGS from 6 to 11 years of age in both sexes; however, from 12 years of age onwards, males presented higher HGS values in both hands ($p < 0.05$). The linear regression between age with HGS showed values of $R^2 = 0.07$ in males and $R^2 = 0.02$ in females. While in the non-linear model (cubic), the values were: $R^2 = 0.50$ to 0.51 in men and $R^2 = 0.26$ in women. The percentiles constructed by age and sex were: P5, P15, P50, P85, and P95 by age range and sex. This study demonstrated that there is a nonlinear relationship between chronological age with HGS from infancy to senescence. Furthermore, the proposed percentiles can serve as a guide to assess and monitor upper extremity muscle strength levels at all stages of life. Copyright © 2023 Gómez-Campos, Vidal Espinoza, de Arruda, Ronque, Urra-Albornoz, Minango, Alvear-Vasquez, la Torre Choque, Castelli Correia de Campos, Sulla Torres and Cossio-Bolaños.

Author keywords

dynamometer; hand grip strength; infancy; percentiles; senescence