ABSTRACT

Background: Quadriceps muscle strength is fundamental to knee joint stability and lower limb function. Somatotype—an individual's body classification into ectomorphic, mesomorphic, or endomorphic categories using the Heath–Carter anthropometric method is a potential determinant of muscular strength. Limited evidence exists, particularly from Indian populations, comparing quadriceps strength across standardized somatotype categories in healthy young adults

Methodology: A cross-sectional, observational, comparative study was conducted at the Physiotherapy Laboratory, Brainware University. Ninety-six healthy young adults (aged 18–30 years) were recruited using convenience sampling and equally divided into three somatotype groups (n = 32 each) based on the Heath–Carter anthropometric classification: ectomorphic, mesomorphic, and endomorphic. Maximal isometric quadriceps strength (kg) was measured bilaterally using a handheld dynamometer in a standardised seated position (knee at 60°–90° flexion).

Results: Mean right quadriceps strength (kg) was highest in endomorphs (15.79 ± 3.66), followed by mesomorphs (14.02 ± 3.34) and ectomorphs (13.50 ± 4.55). One-way ANOVA revealed a borderline significant difference among groups for the right limb ($F = 3.064$, $p = 0.051$) and a non-significant trend for the left limb ($F = 2.066$, $p = 0.133$). Endomorphy component correlated positively with quadriceps strength ($r = 0.314$, $p = 0.002$), while ectomorphy correlated negatively ($r = -0.213$, $p = 0.037$).

Conclusion: Endomorphic young adults demonstrated the highest quadriceps strength among the three somatotype categories. A statistically meaningful, albeit borderline; group difference was observed for the dominant (right) limb. The positive correlation of endomorphy and negative correlation of ectomorphy with quadriceps strength underscore the role of body composition in muscular force production. These findings support body-type-specific exercise prescription in clinical and sports settings.

Keywords: Somatotype, Quadriceps strength, Muscle strength, Endomorph, Mesomorph, Ectomorph, Body composition, Heath-Carter method.

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