

**Universidade do Porto**

Faculdade de Ciências do  
Desporto e de Educação Física

# Avaliação da Força Muscular

Estudo comparativo do perfil da força muscular concêntrica, de voleibolistas e indivíduos não treinados em dinamómetro isocinético.

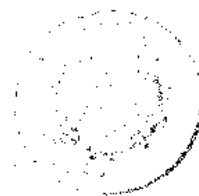
Dissertação com vista à obtenção do grau de mestre em ciências do desporto, na área de especialização de treino de alto rendimento desportivo, nos termos do decreto-lei nº 216/92 de 13 de Outubro

Orientador:

Prof. Dr. José Manuel Fernandes de Oliveira

**António Manuel Quiraz Correia**

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## Abstract

Strength is an essential biomotor ability in human performance and has an important role in carrying out certain motor and technical sport skills as well as training methods. Isokinetic dynamometry has become a preferred method for assessment of dynamic muscle function and monitoring the effects of training in both clinical research and sports environments. In team sports such as volleyball, the lower limb muscles – *quadriceps* and hamstrings - are repeatedly impelled to perform movements which demand high muscular output. The purpose of this study is to assess and compare isokinetic strength profiles of the hamstrings and quadriceps muscles in young volleyball players and untrained subjects (control group), with respect to the following indicators: peak torque, H/Q ratio and bilateral strength differences. The study subjects were 36 young male volleyball players (AGE: 15,1±1,6 YEARS; HEIGHT: 174±7,6CM; BODY WEIGHT: 64±10,8KG) who had had at least 2 years of previous competitive volleyball training, of 3 or more sessions of 90 minutes per week and 30 untrained subjects (AGE: 15±1,7 YEARS; HEIGHT: 168,1±9,2CM; BODY WEIGHT: 60,6±13,2KG), were high school students without previous training. The isokinetic peak torque was measured using the Biodex™System II dynamometer at 60 and 180°/s, with gravity correction. Volleyball players showed higher and statistically significant differences ( $p \leq 0,05$  to  $p \leq 0,01$ ) on peak torque values of quadriceps muscles, in the dominant (MEAN±S.E: 196,8±5,7 NM - 60°/s; 144,9±3,7 NM - 180°/s) and non dominant limbs (MEAN±S.E: 189,9±5,6 NM - 60°/s; 136,7±3,5 NM - 180°/s). On the other hand, the H/Q ratio reported by the volleyball players was under the functional recommended values in comparison with the untrained subjects and other studies. In the dominant limb the H/Q ratio (MEAN±S.E: 46,9±1,3 – 60°/s; 46,9±1,4 – 180°/s) was significantly lower ( $p \leq 0,01$ ) for volleyball players than to untrained subjects. The strength differences between dominant and non dominant limbs showed by Volleyball players and untrained subjects (controls) reveal a similar pattern. The Volleyball players are muscular functionally balance individuals don't show significant strength differences between limbs. These findings suggest that exposition to volleyball training along with the specific requirements of the sport could have a significant effect on the quadriceps peak torque values of the dominant and non dominant limbs, as well as, on the H/Q ratio of the dominant limb at angular velocities of 60°/s and 180°/s, although they not induce *per se* significant differences on lateral dominance.

**KEY WORDS: STRENGTH, ISOKINETIC TESTING, AGE, VOLLEYBALL,**

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