

Research Report Poster Display

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### **KNEE MUSCLE STRENGTH, BALANCE AND FUNCTIONAL INDEPENDENCE IN PERSONS WITH STROKE**

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**Purpose:** To investigate the relationship between knee muscle strength, balance and functional independence within the first month after stroke.

**Relevance:** Cerebral vascular disease is one of the main causes of morbidity, disability and mortality in developed countries. Problems with movement control are frequent after stroke. Lower limb weakness and impaired balance are common problems that are related with the risk of falls and are likely to interfere with the ability to perform daily life activities. Physiotherapy intervention usually starts early after stroke and addresses impairments related to movement and posture in order to improve motor recovery and restore function.

**Participants:** Subjects were recruited at Physiotherapy Department of Hospital Fernando Fonseca within the first month after stroke. We studied 8 patients, all males, mean age 62,5±6,2y, with unilateral stroke (7 ischemic, 1 hemorrhagic), in the middle cerebral artery territory, who were admitted to physiotherapy department. All subjects have no cognitive impairment according to Mini Mental State, no history of lower limb orthopedic problems and no other disease that could interfere with physiotherapy treatments. All subjects gave their informed consent to participate in this investigation.

**Methods:** A test protocol was set up. Knee muscle strength (extensors and flexors) was measured on an isokinetic dynamometer. Balance and functional independence were assessed using the Berg Balance Scale (BBS) and the Modified Barthel Index (MBI) respectively.

**Analysis:** The results were analyzed in an SPSS program version 17.0. Descriptive statistics were used to characterize the participants. A correlation analysis was performed using knee muscle strength, BBS and MBI. The significance level was set at  $p < 0,05$ .

**Results:** Knee extensors from the affected lower limb show a deficit of 26,6% regarding knee extensors from the opposite knee. For knee flexors the deficit is 34,5%. Mean score for BBS is 29,63 ± 14,81 in a 56 point scale which indicates risk of fall. MBI mean score of 65,63 ± 17,33 indicates functional dependence. The correlation analysis demonstrates a positive correlation between BBS and MBI (Spearman correlation coefficient is 0,898 with  $p$  value = 0,002 < 0,01. These results indicate that function increase with balance.

**Conclusions:** After stroke knee strength from the affected lower limb is impaired. It appears to be important to improve knee muscle strength from the affected lower limb to reduce weakness. In addition persons with stroke have higher risk of falls and are functionally dependent. There is evidence that balance is an important feature for functional independence in persons with stroke. Further research is needed to investigate the effect of knee muscle strength training on balance and function.

**Implications:** These results indicate that early physiotherapy is needed after stroke. Intervention must focus on strength and balance training in order to improve stability and help persons with stroke to become functionally independent .

**Key-words:** 1. Stroke 2. Balance 3. Functional independence

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**Ethics approval:** Approved by the ethics committee of Fernando Fonseca Hospital, Amadora, Portugal.

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