

The quadriceps femoris, also called the quadriceps extensor, quadriceps or quads) is a large muscle group that includes the four prevailing muscles on the front of the thigh.

It is the great extensor muscle of the knee, forming a large fleshy mass which covers the front and sides of the femur. The name derives from Latin four-headed muscle of the femur.

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Neuromuscular electrical stimulation (NMES) is a preventive intervention for muscle wasting in patients with aneurysms during the acute phase; however, its efficacy still remains unclear. In this case study, we report the effects of NMES on quadriceps muscle wasting for a patient with ruptured middle cerebral artery aneurysms during the acute phase.

**PRESENTATION OF CASE:** A 66-year-old woman was admitted because of a ruptured middle cerebral artery aneurysm resulting from intracerebral hematoma with subarachnoid hemorrhage. The following day, the patient started undergoing 60-120-min NMES treatment for both her quadriceps muscles, which was continued for 10 days in 2 weeks. Quadriceps muscle thickness as measured by ultrasonography was decreased in both sides (26% and 35% for the right and left sides, respectively). The compound muscle action potential (CMAP) amplitude in the peroneal nerve was also decreased in both sides (73% vs 76%).

**DISCUSSION:** The lack of efficacy of NMES in preventing muscle wasting is the decreased CMAP amplitude in this patient, which showed the possibility of existence of critical illness polyneuropathy.

**CONCLUSION:** NMES had no effect on quadriceps muscle wasting in a patient with ruptured middle cerebral artery aneurysms who had decreased CMAP amplitude in the peroneal nerve during the acute phase. NMES is not effective for patients with peripheral nerve conduction abnormalities <sup>1)</sup>.

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The purpose of a [study](#) was to investigate the relationship between the daily number of steps and physical function and quadriceps muscle thickness (QMT) in patients with sub-acute stroke during hospitalization for convalescence [rehabilitation](#). Twenty-nine patients with ischemic or hemorrhagic [stroke](#) (mean age,  $69 \pm 11$  years) hospitalized for [inpatient](#) convalescent rehabilitation were included. Physical activity (PA) was measured using a three-dimensional accelerometer that calculates the daily number of steps taken. Physical function was measured by a short physical performance battery (SPPB; 0-12 points) and the leg motor selectivity score (6 motor stages defined by Brunnstrom), and the QMT of both legs was measured using ultrasonography. PA was significantly correlated with the SPPB score ( $r = 0.63$ ,  $p = 0.0002$ ), QMT on the paretic side ( $r = 0.41$ ,  $p = 0.02$ ), and QMT on non-paretic side ( $r = 0.56$ ,  $p = 0.002$ ). There were no significant effects of the leg motor selectivity score on daily PA ( $F = 1.37$ ,  $p = 0.27$ ). In the multiple regression analysis, only the SPPB score showed significant linear regression ( $\beta = 0.44$ ,  $p = 0.02$ ). PA in male patients with sub-acute stroke during hospitalization was related to physical function and QMT and not with the severity of paresis <sup>2)</sup>.

<sup>1)</sup>

Nozoe M, Kamo A, Shimada S, Mase K. Neuromuscular electrical stimulation is ineffective for treating quadriceps muscle wasting with ruptured aneurysm: A case report. *Ann Med Surg (Lond)*. 2018 Sep 20;35:90-94. doi: 10.1016/j.amsu.2018.09.011. eCollection 2018 Nov. PubMed PMID: 30294437; PubMed Central PMCID: PMC6170208.

<sup>2)</sup>

Nozoe M, Kubo H, Furuichi A, Kanai M, Yamamoto M, Kobayashi M, Shimada S, Mase K. Physical Activity, Physical Function, and Quadriceps Muscle Thickness in Male Patients with Sub-Acute Stroke

during Hospitalization: A Pilot Study. Eur Neurol. 2018 Nov 21;80(3-4):157-162. doi: 10.1159/000494991. [Epub ahead of print] PubMed PMID: 30463057.

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