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Locating zones of motor points (MPs) using needle invasive stimulation method (NISM)

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The MP is a junction of an efferent nerve and a muscle. 3 sequential steps in our experiment with a purpose of most precise MP localization were made: 1) Localization of the MP on a cadaver model; 2) Intraoperative localization of human neuromuscular apparatus section during surgical efferent nerve grafting, and electric stimulation of the efferent nerve and the muscle and; 3) MP searching using NISM based on ultrasonography data and minimum current intensity (MCI), sufficient for muscular contraction. The results were then integrated. Cadaver model of 10 bodies was analysed. For experiment we chose musculus flexor digitorum superficialis (MDS) and musculus flexor digitorum profundus (MFDP). We measured distances from bone markers to MPs. Statistical average data was calculated. We localized efferent nerves and muscles on 3 patients during surgeries. We directly stimulated the nerve and the muscle at the point they are jointed (Z1), and area of that muscle 4 cm away from the nerve (Z2). Values of MCI, which caused visible muscle contraction, were protocolled. For stimulation of Z1 sufficient MCI value was 1 mA, Z2 – 6-10 mA. Also we measured distances from nerve-muscle connections to bone markers. We examined 37 healthy patients and two methods were used such as: NISM and ultrasonography (for muscles visualization). Muscle examination includes MDS and MFDP. Z1 and Z2 were stimulated with a monopolar needle electrode. MP zone was mapped using data gained during our experiments, information from anatomical charts of MPs and ultrasonography. To start visible muscle contraction of Z1 sufficient MCI value was 1-3 mA, Z2 – 8-15 mA. Data of anatomical model, functional open stimulation and NISM of the selected muscles are congruent. This method is very promising. Data accumulation process is still on going.

Biography

Albert Karimov has completed his PhD from State Medical University of Samara Department and Post-doctoral studies at State Medical University of Samara Department. He is the Head and Director of Medical Rehabilitation in the company Infomed-Neuro. He has published more than 10 papers in reputed journals and is a Doctor who is involved in clinical research.

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