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Ultrasonographic Muscle Thickness Measurement Verified NMES Decrease Muscle Atrophy After TKR

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This study is designed to find the change of reduction in thickness of quadriceps femoris muscle, especially in vastus medialis, which is reflect the muscle atrophy, by conducting the electrical stimulation therapy and voluntary isometric contraction exercise, as a way of management method for muscular weakness associated with arthrogenic muscle inhibition and quadriceps muscular atrophy from a short term period after surgery. Total of 63 patients, 70 cases treated with total replacement of the knee were included in the study initially, and 43 patients, 58 cases (36 patients, 48 cases in the study group and 7 patients, 10 cases in the control group) finally participated in this study. Both study and control groups started the therapy program at 5th post operation day and experimental group received both voluntary isometric contraction exercise and neuromuscular electrical stimulation therapy (2 times per day, each 30 minutes) while control group received only voluntary isometric contraction exercise. Ultrasonographic muscle thickness measurements was done on the day before the operation (PRE), the 5th day after operation (POD5), the 9th day after operation (POD9) and the 13th day after operation (POD13). There was no statistical difference between study and control groups in demographics on the independent two sample t-test. There was statistical difference in vastus medialis thickness between PRE and POD13 of control group, while it shows no statistical difference in study group. This results shows the prevention effect for the atrophic change of vastus medialis muscle during first 2 weeks after total knee replacement by combining the muscle contraction by electrical stimulation and voluntary isometric contraction. This study verified this effect via measuring the thickness of the vastus medialis muscle by ultrasonographic scanning. This study suggest a muscle contraction by electrical stimulatino therapy as auseful treatment method for maintaining the muscular strength of quadriceps femoris muscle that usually hard to exercise due to pain and edema after early phase after surgery. This study is particulary important because if affiremed muscle thickness change and effect of muscle contraction by electrical stimulation during ultrashort period (within 2 weeks) after total knee arthroplasty.

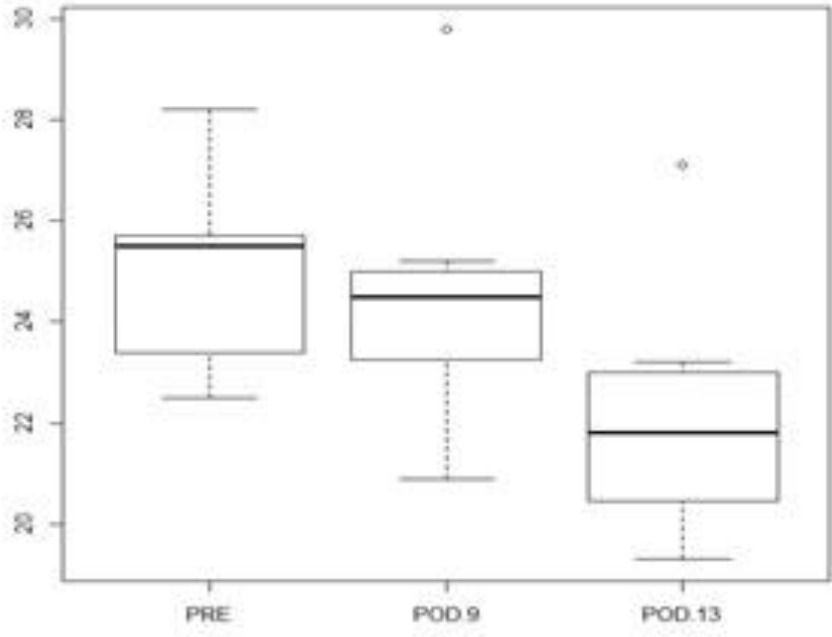


Fig 1. Box plot of control group shows statistical differences between PRE and POD13.

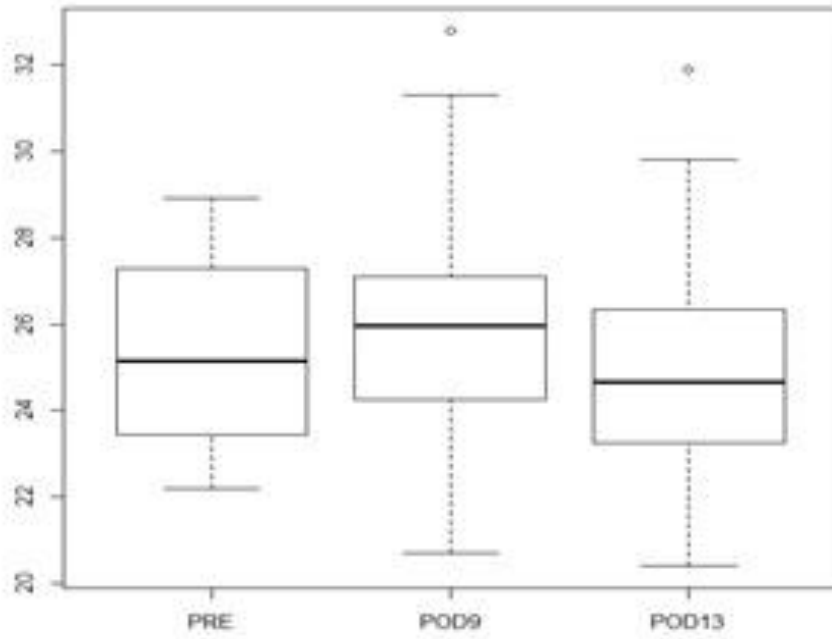


Fig 2. Box plot of study group shows no statistical differences between PRE and POD13