Feasibility study of detecting surface electromyograms in severely obese patients.

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The aims of this study were to examine if surface EMG signals can be detected from the quadriceps femoris muscle of severely obese patients and to investigate if differences exist in quadriceps force and myoelectric manifestations of fatigue between obese patients and lean controls.

Fourteen severely obese patients (body mass index, BMI, mean ± SD: 44.9 ± 6.3 kg/m^2) and fourteen healthy controls (BMI: 23.7 ± 2.5 kg/m^2) were studied. The vastus medialis and lateralis of the dominant thigh were concurrently investigated during voluntary isometric contractions (10-s long at submaximal and maximal intensities and intermittent submaximal contractions until exhaustion) and sustained (120-s long) electrically elicited contractions.

We found that the detection of surface EMG signals from the quadriceps is feasible also in severely obese subjects presenting increased thickness of the subcutaneous fat tissue. In addition, we confirmed and extended previous findings showing that the volume conductor properties determine the amplitude and spectral features of the detected surface EMG signals: the lower the subcutaneous tissue thickness, the higher the amplitude and mean frequency estimates. Further, we found no differences in the mechanical and myoelectric manifestations of fatigue during intermittent voluntary and sustained electrically elicited contractions between obese patients and lean controls.