



# CTBT

Centre for Transfer of  
Biomedical Technology

## TECHNOLOGY SUMMARY



### Technology owner

University Hospital Hradec Králové  
Mebster

### Inventor (s)

Zdeněk Zadák,  
Martin Vališ  
Oldřich Vyšata  
Michal Gloger

### IPR status

Know-how

### Stage of Development

Non-medical prototype testing

### Contact

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## Muscle Strength Measuring Device

enabling fast-twitch vs. slow-twitch muscle fiber ratio  
determination

### Background

Manual muscle-testing and the use of a dynamometer are the most common methods to measure muscle strength. Currently used methods of semi- and quantitative measurement of maximal muscle strength require subject cooperation and thus depends on engagement of tested subject.

Measuring muscle strength may be an important component of physical training or nutrition evaluation and assessment.

### Description of the Invention

The lack of quantitative data of muscle strength resulted in the development of our device. Our solution is objective dynamometry. The device works on the principle of electrical stimulation of the musculus tibialis at the motor point by a series of stimulations with increasing intensity. The maximum muscle strength and muscle fatigue are determined from the measured values using torque sensor based on tensometric measurement. This noninvasive approach enables appropriately investigating the characteristics of muscles and assess distribution of fast and slow muscle fibers. Our device is intended not only for sports medicine (effect of training and nutrition on athletes' performance) and for athletes themselves, but also for intensive medicine (sarcopenia, coma, long-term diseases). We have developed a prototype of second generation according to regulations that are required to follow for devices of such type.

### Advantages

Currently, the devices on the market are based on dynamometric principle engaging human will. Our device operates objectively independently of human will. Our device is mobile, simple and easy-to-use. Our device is a suitable tool to screen for sarcopenia and identify effective ways for preventive and therapeutic interventions and thus prevent the disastrous consequences of sarcopenia. Moreover, our solution offers technique that teaches athletes how to improve their health and physical performance.