MYOTON®
MUSCLE DIAGNOSTICS

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Multifidius at L4

Trapezius upper part

Myoton®PRO Digital Palpation Device is a non-invasive, unique and reliable* research tool for the assessment of muscle health and physical condition. Moreover, it enables easily to measure also tendons, ligaments, skin and other soft biological tissues.

* Interrater reliability of muscle tone, stiffness and elasticity measurements of rectus femoris and biceps brachii in healthy young and older males; S.Agyapong-Badu, L.Aird, L.Bailey, K.Mooney, J.Mullix, M.Warner, D.Samuel, M.Stokes. Working Papers in Health Sciences 2013; Summer 1(4):1-11 ISSN 2051-6266 / 20130021

* Testing muscle tone and mechanical properties of rectus femoris and biceps femoris using a novel hand held MyotonPRO device: relative ratios and Reliability; J. Mullix, M. Warner, M.Stokes. Working Papers in Health Sciences 2012; Autumn 1(1):1-8. ISSN 2051-6266 / 20120006

* Stiffness of resting lumbar myofascia in healthy young subjects quantified using a handheld myotonometer and concurrently with surface electromyography monitoring; K. Nair, A. Masi, B. Andonian, J. Alexander, B. Coates, J. Dougherty, E. Schaefer, J. Henderson, J. Kelly. Mechanical Engineering, Bradley University, Peoria, IL, USA, Bodywork and Movement Therapies (December 2015) (DOI:10.1016/j.jbmt.2015.12.005)

Applications

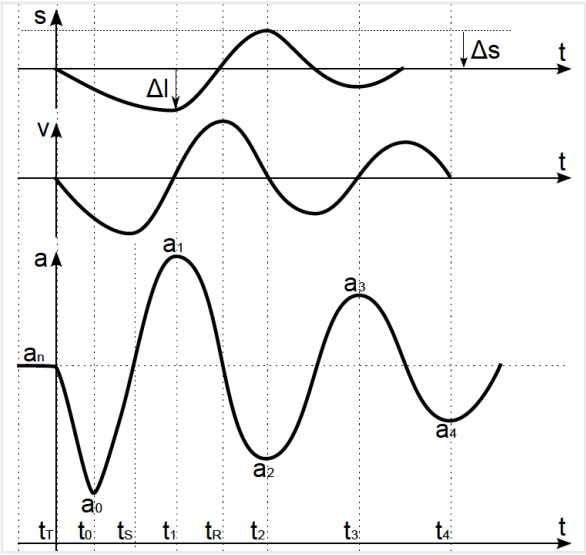
The use of Myoton technology provides invaluable information on the condition of muscles in several fields of medicine and sports. The measurable parameters allow objectively to assess the efficacy of different interventions, sports exercise, symmetry, injuries or aging.

Potentially major clinical benefit of MyotonPRO is its use in physiotherapy and in neurological disorders, e.g. Parkinson's and Stroke. Myoton could potentially enable medical practitioners to better determine and manage drug efficacies, dosage, frequencies and routinely monitor effects of physiotherapy.

Measurable parameters

Parameter	Characterizes	Parameter type	Unit	Formula
Natural Oscillation Frequency	Tone or Sate of Tension	State of Tension	[Hz]	$F = f_{max}$ from signal spectrum (FFT)
Dynamic Stiffness	Dynamic Stiffness	Bio-mechanical property	[N/m]	$S = a_1 \cdot m_{probe} / \Delta l$ a_1 = max deformation m_{probe} = probe mass
Oscillation Logarithmic Decrement	Elasticity	Bio-mechanical property	-	$D = \ln (a_1 / a_3)$
Relaxation time	Mechanical stress relaxation time	Visco-elastic property	[ms]	$R = t_R - t_1$
Ratio of Deformation and Relaxation time	Creep	Visco-elastic property	-	$C = R / (t_1 - t_T)$

Method



The method of myometry consists of four main stages:

1) application of pre-compression to subcutaneous adipose tissues
2) exertion of a light mechanical impulse to the muscle
3) recording the muscle's response in the form of an acceleration signal
4) subsequent computing of parameters

Δs – pre-compression of the subcutaneous adipose tissues
Δl – maximum displacement
Acceleration (a), Velocity (v), Displacement (s), produced in the process of damped natural oscillation

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