

Materials List for:

Measurement of Vibration Detection Threshold and Tactile Spatial Acuity in Human Subjects

Rabih Moshourab^{1,2}, Henning Frenzel², Stefan Lechner³, Julia Haseleu², Valérie Bégay², Damir Omerbašić², Gary R. Lewin²

¹Department of Anesthesiology and Intensive Care Medicine, Charite Universitätsmedizin, Campus Virchow Klinikum und Campus Charite Mitte

²Department of Neuroscience, Molecular Physiology of Somatic Sensation, Max Delbrück Center for Molecular Medicine

³Institute of Pharmacology, University of Heidelberg

Correspondence to: Rabih Moshourab at rabih.moshourab@mdc-berlin.de

URL: <https://www.jove.com/video/52966>

DOI: [doi:10.3791/52966](https://doi.org/10.3791/52966)

Materials

Name	Company	Catalog Number	Comments
Piezo actuator	Physik Instrument, Germany	P-602.1L	The linear piezoelectric actuator, with integrated position sensor and motion amplifier, contains a piezoceramic material that elongates and contracts when voltage is applied. The piezoelectric actuator travels up to 100 µm. The actuator is equipped with a flexure guide that ensures straight motion without tilting or lateral offset. The displacement is linear and calibration is done and checked by the manufacturer. It is recommended that on-axis movement of the probe be checked under the microscope. According to the manufacturer, the stimulus amplitude dampens by less than 20% at oscillating frequencies of 1000 Hz. This can be checked by using a force or displacement measuring device (e.g. force transducer from Kleindiek).
Piezo Amplifier/Servo Controller	Physik Instrument, Germany	E-665	E-665 amplifier/controller drives and controls the displacement of a low-voltage piezoelectric actuator in a system with sensor position feedback (SGS sensors). The servo-controller provides the option for closed loop operation. When applying sinusoidal and oscillating stimuli the amplitude signal deviates from the set amplitude starting from 500 Hz and reaches a maximum decrease of 20% at 1000Hz.
LabChart Software	ADInstruments, USA	LabChart 7, MLU60/8	Can create, store and run macro of the psychophysical testing algorithm.
PowerLab	ADInstruments, USA	PowerLab 4/35 PL3504	Data Acquisition Hardware. Used with LabChart software.
Brass bar	Custom-made		Bar made of pure brass, weighs 15.5 kg. When the piezoelectric actuator is mounted on the brass bar it should exert a force of 30 g weight on skin surface.

Monitor	Custom-made		To mark the 1st and the 2nd interval. The monitor indicates to the subject the time intervals during which the stimulus may be presented.
Response box	Custom-made		The subject indicates the interval at which stimulus occurred.
Board	Custom-made		Upper surface should be smooth (Plastic), lower surface made of foam to prevent stray vibration of be transmitted to the stimulating probe.
Probe	Custom-made		A flat circular probe with smoothed edges (thermoplastic material) attached to a screw head. The screw should be of appropriate size to be tightened directly to the moving part of piezoelectric actuator. Size of the probe can be according to preference; in our case, diameter 8.21 mm and surface area 52.9 mm ² .
Labchart Script			Can be sent on request. See supplementary code file.
Tactile Acuity Cube	MedCore		The cube is comprised of 6 sides each containing a grating (bar and groove) whose widths are 0.75, 1.25, 1.75, 3.0, 4.5, and 6.0 mm.