

## 中欧合作生物工程针灸评估 — 从计算机控制系统到电子针灸

# Bioengineering Assessment of Acupuncture - From Computer-Controlled Systems to Teleacupuncture between China and Europe

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Basic, bioengineering translational and clinical research on modernization of acupuncture has been performed at the Traditional Chinese Medicine (TCM) Research Center at the Medical University in Graz since 1997 [1-11]. The goal of this lecture is to focus on new innovative acupuncture stimulation methods such as laser acupuncture as well as on continuous electrical ear acupuncture.

In addition innovative systems of bioengineering assessment of acupuncture using high-tech methods will be presented in respect to single and double blind, controlled randomized crossover studies. Besides the investigation of peripheral effects of acupuncture using thermal imaging, laser Doppler flowmetry and laser Doppler imaging special emphasis is given to investigations of the central nervous system using multidirectional transcranial ultrasound Doppler sonography, cerebral near infrared spectroscopy, functional magnetic resonance imaging and bioelectrical methods like EEG entropy. New methods of computer-based analysis of heart rate variability complete the methodological spectrum.

Modernization of acupuncture, computer-controlled stimulation, computer-assisted recording of effects of acupuncture in the brain and also teleacupuncture are no longer future visions. In cooperation with China, research on this topic has already become reality and is proceeding with full speed at the Medical University of Graz.

### References

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Head of the Research Unit of Biomedical Engineering in Anesthesia and Intensive Care Medicine and of the TCM Research Center Graz at the Medical University of Graz, Doctor of technical and Doctor of medical sciences, several research stays and international lectures, about 550 scientific publications, partly on basic acupuncture research, author and/or editor of eleven books, currently editor-in-chief and/or member of the editorial board of 23 international scientific journals (e.g. Editor-in-chief of the Internet Journal of Alternative Medicine (IJAM), Associate Editor for Europe of Medical Acupuncture, Senior Editor of the Journal of Acupuncture and Meridian Studies (JAMS), one of the editors of Evidence-based Complementary and Alternative Medicine (eCAM)). Member and Representative of Austria of the Parliament of the European Medical Laser Association (EMLA). Prof. Litscher's special interests are computer-based Neuromonitoring and High-Tech Acupuncture Research.

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自 1997 年以来格拉茨医科大学的传统中医学 (TCM) 研究中心致力于进行针灸现代化的生物工程转型和临床基础研究 [1-11]。本次讲座的目标是重点介绍新的创新性模拟针灸方法, 如激光针灸以及连续电耳针疗。

介绍有关单盲和双盲、随机对照交叉实验的基于高科技方法的针灸生物工程评估创新系统。除介绍针灸热成像的外围效应外, 特别强调激光多普勒血流计、激光多普勒成像等研究, 用多方位的颅断层超声多普勒, 近红外光谱脑功能磁共振成像, 和生物电子方法 (如脑电图熵)。用基于计算机的心率变异性分析的新方法完善诊断方法学。

针灸现代化, 计算机控制的模拟, 电脑辅助记录大脑中的针灸影响, 电子针刺疗法已不再是未来的愿景。通过与中国合作, 这一课题的研究已经成为现实, 已经在格拉茨医科大学全速开展。

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