

The study on mechanical and electronic performance
of Acupunctural Needle

student : Xiao-Wen Yang

Advisors : Dr. Ray-quen Hsu

Prof. Keng-Liang Ou

Institute of Mechanical Engineering
National Chiao Tung University

ABSTRACT

A poor quality acupuncture needle induces uncomfortable pains for patients in a lesser degree, more seriously, when needle point breaks while penetrating the skin might greatly endanger patient's life. The quality of acupuncture needles is thus very critical for the safety of treatment and patient feelings.

In the past, most investigations on medical needles were mainly focused on the surgical needles. Geometry, shapes of the needles or their mechanical properties have been discussed. On the other hand, the importance of traditional Chinese acupuncture though is gradually recognized by modern medical science, studies on the bio-mechanical properties of the acupuncture needles are still very few. Quality of acupuncture needles were affected by materials, dimension, needle point geometry and many other factors. For example, needle manufacture process and heat treatment also have some effects on the mechanical properties of the needles.

The purpose of this study is investigating acupuncture needle's mechanical and electrical properties, provide a quantitative criterion for selecting, design and manufacture improvements of the needles. This study measures different acupuncture needles geometries, testing their mechanical and electrical properties. It is found a better quality needles usually exhibit smaller surface roughness on the needle body, very few or none surface defects.

Needle point can not be too sharp and its slenderness should be proper. In the sense of mechanical property, we found better quality needles have smaller penetration forces and needle point geometry, surface roughness, slender ratio, manufacturing process and material all affect the penetration force in the test. For the better quality needles, although we found they possess magnetism and higher electrical resistance, their effects on the medical treatment, however, are not clear.