

Biomedical Acupuncture- Beyond Yin and yang

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(Adapted from biomedical acupuncture for pain management)

Introduction

The practice of Acupuncture dates back nearly 5000 years, where it began in China and other Asian countries. Over the course of its development, ancient practitioners developed concepts and systems reflecting the religious, medical and cultural beliefs of their time. Archaeological relics and manuscripts give us a clue to understanding the history and development of Acupuncture. Ancient practitioners examined their patients by feeling pulsations at various points. They believed that the pulse was an indication of a vital force, which they called Qi. The difference between life, death and quality of health, was due to the presence or absence of Qi. Channels were connected between various acupoints forming a network of meridians. The theory of meridians became one of the cornerstones of traditional Chinese medicine (TCM). The most valuable discovery in acupuncture theory was the interrelation between parts of the body surface and the internal organs

As Acupuncture has evolved, many of the ancient concepts, methods and misinterpretations have remained, and are still taught in the curriculum of Acupuncture colleges. Many healthcare providers are puzzled by this ancient healing art and decide to keep away from this modality, because of the belief that it cannot be justified scientifically. Others are attracted by anecdotal evidence of its efficacy. Current technology has enabled a biomedicalization of Acupuncture. Laboratory data, functional imaging of the brain and clinical evidence has enabled us to reach a deeper understanding of acupuncture, allowing us to demystify archaic theories and replace them with mechanisms based upon anatomy, physiology and biochemistry. Clinical evidence shows that acupuncture has unique merits, differing from conventional medicine. It is effective for a variety of health problems, especially pain, and has a lot to offer in some cases where western medicine does not.

What is Acupuncture and how does it Work?

Acupuncture is the use of sterile needles to make lesions in the soft tissue. These lesions activate the body's survival mechanism that normalizes homeostasis and promotes healing. As a therapy, acupuncture does not treat any particular pathological symptom, but helps the body to reach physiological homeostasis by promoting healing in a non-specific way.

The efficacy of acupuncture depends on:

1. The severity and nature of the disease
2. The healing ability of the patient

Biomedical application of Acupuncture is based upon three main principles:

1. Simplicity- evaluation and treatment can be efficiently done in a short period of time
2. Reproducibility- procedures and results are reliable and reproducible

3. Predictability- practitioners can predict how well a patient will respond, the number of treatments needed and if or when symptoms will return

Basic Neuroanatomy of Acupoints

The efficiency of acupuncture depends on the selection of effective points. Researchers have indicated that acupoints lie on or near nerves and major blood vessels. If nerves are blocked by anesthesia, cut by surgery, bound by a band or numbed by ice, acupuncture is ineffective.

Biomedical acupuncture classifies acupoints as: trigger points, motor points and dermopoints. These points are dynamic structures that change predictably according to a patient's state of health.

Clinical research shows that stimulating acupoints affects the central, peripheral and autonomic nervous system.

The features of acupoints can provide the following:

1. Objective measurement of a patient's condition
2. Reliable information for evaluating the healing potential and homeostatic status of a patient
3. Prediction of prognosis and response to acupuncture treatment

Acupoints are able to become sensitive, tender or painful when exposed to a pathologic disorder. There are three pathophysiologic phases of an acupoint:

1. Latent- nonsensitive
2. Passive- sensitive to palpation
3. Active- painful without palpation

The physical properties of acupoints are represented on the body in terms of:

1. Sensitivity- quality
2. Specificity- size and location
3. Sequence- the sequence in which acupoints become sensitized

Active acupoints are metabolically abnormal. They maintain higher temperatures because of sustained muscle contraction and have a reduced blood supply due to low oxygen supply. Acupuncture is able to relax muscle shortening and restore normal circulation and nerve sensitivity.

Mechanisms of Acupuncture

Both central and peripheral mechanisms of acupuncture activate the four primary physiological systems: Nervous, Cardiovascular, Endocrine, and Immune.

Through functional magnetic resonance imaging (fMRI) and pharmacokinetics, Central mechanisms of acupuncture have been shown to occur reflexively as needling stimulates physiologic injuries causing the release of chemicals that modulate activity in the brain and higher centers of the central nervous system.

Central responses occur through three primary pathways:

1. The autonomic nervous system- sympathetic and parasympathetic
2. Humoral pathways- opioids (endorphins), the endocrine system, neurochemicals
3. Endogenous opioid production from non-nervous system pathways

Peripheral mechanisms occur as a local chain of reactions in response to needling:

1. Local skin reaction and changes in tissue electrical conductivity
2. Interactions between the needle and connective tissue
3. Local muscle relaxation, improving circulation
4. Stimulation of the nervous system (local and central)
5. Stimulation of anti-inflammatory mechanisms
6. Stimulation of DNA synthesis leading to repair

Functional MRI data show that stimulating acupoints based upon their specific anatomical configurations (e.g. nerves and blood vessels), is more effective than stimulating points that are located away from these structures. In addition, research shows that Inserting a needle anywhere in the body can activate both central and peripheral pathways (which explains why needles inserted in distal points have a therapeutic effect), but one well placed needle can do what traditional acupuncture has done with 20.

Biomedical acupuncture has identified three types of acupoints:

1. Homeostatic points (**HAs**)- points appearing in predictable locations based upon anatomical landmarks. The number of tender HAs represents the degree of imbalance and the healing potential of an individual. Palpation of these points can help identify the origin of a problem as well as location of referred pain sources.
2. Symptomatic points (**SAs**)- tender points appearing in an individualized pattern in relation to an injury or segmentally (reflexively through the nervous system). These points are unpredictable and are primarily located through palpation based upon a person's history. SAs are used to treat specific symptoms
3. Paravertebral points (**PAs**)- points located on both sides of the spine. These points are particularly effective in balancing the autonomic nervous system as well as stimulating segments related to the upper and lower extremities. PAs are selected to facilitate the therapeutic efficacy of symptomatic acupoints and are chosen based upon their segmental (spinal) relationship.

The combination of the three types of acupoints forms a standardized protocol for treating pain and other symptoms, while at the same time ensuring an individualized approach. Local Homeostatic acupoints provide a guide for finding local symptomatic acupoints, which in turn act as a guide to which paravertebral acupoints should be used.

Quantitative Assessment

Quantitative evaluation can predict the efficacy of acupuncture therapy. Traditional Chinese analysis of the tongue and character of the pulse reflect qualitative features of the body's pathophysiology, but do not always provide stable information. In addition, these methods are highly empirical and difficult to master.

A comprehensive quantitative analysis includes:

1. History of condition
2. Medical examination
3. Lifestyle and diet
4. Occupation
5. Palpation for tenderness

By using quantitative methods, one can determine the self-healing potential of an individual and the severity and healable nature of a disease. As a rule, healthy people have a greater healing potential. As symptoms or diseases become more severe, the self-healing potential is impaired and the healing process is slowed. The number of sensitive homeostatic acupoints is a quantitative indicator of the degree of homeostasis in the body.

Based upon quantitative analysis of homeostatic acupoints, patients can be classified into four categories of healing potential: Excellent, Good, Average and Poor. A patient's classification, aids in predicting the frequency and number of treatments, type of pain relief, and possibility of recurrence.

Patients typically experience three types of pain relief:

1. Immediate- usually seen in young, healthy patients
2. Cumulative- some initial relief, with complete relief after several treatments
3. Delayed relief- reduction in symptom experienced days or weeks after treatment

Conclusion

Acupuncture is a unique and effective healing modality that affects the body's four principle survival systems: nervous, cardiovascular, endocrine and immune system. In addition, it affects injured tissues by creating local reactions that stimulate healing and repair. Acupuncture does not specifically target the underlying cause of a specific symptom, but activates the healing potential of the body, promoting self-healing and homeostasis. Acupuncture treatments should combine local, spinal and homeostatic points in order to fully stimulate the bodies healing potential. The efficacy of acupuncture depends upon: the healing potential of the person, severity of symptoms, the chronicity of the condition, choice of acupuncture points and psychological interactions between the patient and practitioner. The biomedicalization of traditional acupuncture maintains the essence of traditional Chinese medicine, but enhances its effectiveness by taking into consideration neuroanatomical relationships as demonstrated by functional MRI and pharmacokinetic. Biomedicalization allows treatment protocols to be individually tailored quickly and accurately. In addition, results can be predicted based upon quantitative assessment of the patient's healing potential.