

Acupuncture and Traditional Chinese Medicine

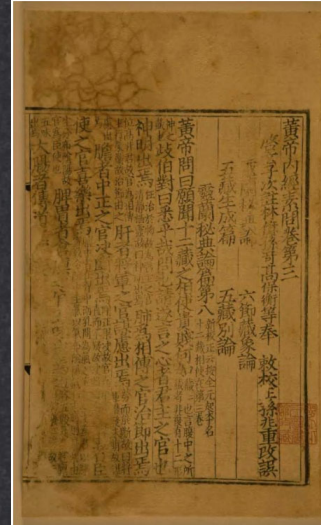
**Melissa Tornero-Bold, MD
Assistant Professor - Clinical
Department of Anesthesiology
The Ohio State University Wexner Medical Center**

Goals

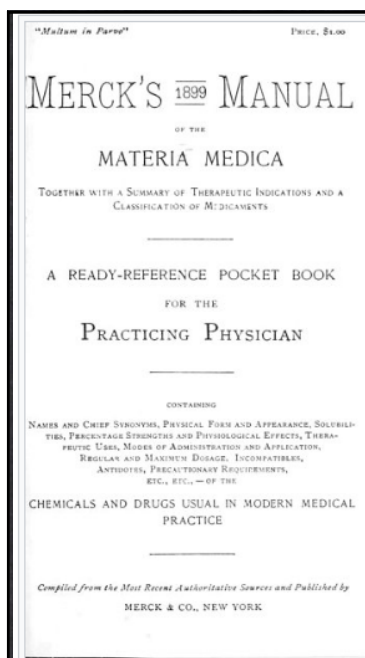
- **Integrating Modern Medicine and Traditional Chinese Medicine**
- **Literature Review**
- **Essentials of Acupuncture: Theories, Concepts, and Practice**
- **Locations and Properties of Important Acupuncture Points**

Huangdi Neijing The Yellow Emperor's Classic

- Ancient Chinese medical text that has been treated as the fundamental doctrinal source for TCM
- Dated by scholars around 400 B.C.
- The work is composed of two texts in a question-and-answer format between the mythical Yellow Emperor and one of his ministers (physicians)



Author: Unknown



$$\text{pediatric dose} = \frac{1}{\left(\frac{(\text{age})+12}{(\text{age})}\right)}$$

$$\text{e.g.: } \frac{3+12}{3} = 5$$

$$\frac{1}{5} = 0.2$$

“For example, a child three years old will require of the adult dose. Of powerful narcotics, children will require scarcely more than one-half of this proportion. Children bear opiates poorly; while they stand comparatively large doses of arsenic, belladonna, ipecac, mercurials, pilocarpine, rhubarb and some other purgatives, and squill.”

Author: Merck & Co.

- “...extraordinary claims demand extraordinary proof.” - Dr. Steven Shafer
- “You must keep an open mind, but not so open that your brains fall out”
- James Oberg, NASA engineer and science writer



Shafer SL. Did our brains fall out? Anesth Analg. 2007;104:247-8. – Source: Welcome Collections

Acupuncture Modern Day Applications

- Preventative Health
 - Stress
 - Weight management
 - Female reproductive health
- Behavioral health
 - Depression
 - Anxiety
 - Addiction
- Acute illness
- Chronic medical conditions
- Acute and Chronic pain



*Author: Christopher Michel
(CC BY 2.0)*

Effective Treatment of Animals is Usually Cited As Proof that Acupuncture is Not Merely Placebo



- Veterinary medical journals cite many examples of objective clinical success
 - ✓ Potentially lethal arthritis in horses
 - ✓ Congenital hip dysplasia in dogs

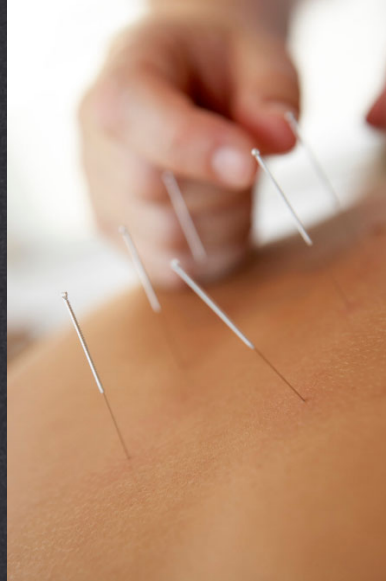
<https://www.publicdomainpictures.net/en/hledej.php?hleda=veterinary+acupuncture>

Acupuncture definition

- *Acus* = meaning a sharp point
- *Punctura* = meaning to pierce
- Technique of inserting and manipulating fine filiform needles into specific points on the body for various therapeutic purposes
- Original acupuncture technique: manipulate needle in an up-and-down and rotating movement
- Attempt to reopen the meridian so that the obstructed Qi can resume its path

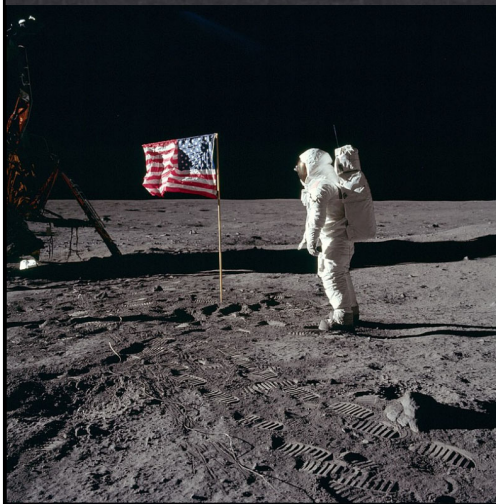
Imaginary Words to a Western Doctor

- Meridians?
- Obstructed Qi?



Source: <https://nccih.nih.gov/>

With So Many Applications, Who Do You Trust?



The Government,
of Course!

Author: NASA / Neil A. Armstrong

The NIH is “the” National Medical Research Agency

- Includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services
- The National Center for Complementary and Integrative Health (NCCIH) is the Federal Government’s lead agency for scientific research on complementary and integrative health approaches

<https://nccih.nih.gov/about/ataglance>

What is Traditional Chinese Medicine to a Modern Day Physician?

- <https://www.nih.gov/>
- <https://nccih.nih.gov/>



National Center for
Complementary and
Integrative Health

<https://nccih.nih.gov/>

NCCIH's Mission and Vision

- **Mission = Define Usefulness and Safety of complementary and integrative health interventions and their roles in improving health and health care**
- **Vision = Scientific Evidence will inform decision-making by the public, by health care professionals, and by health policymakers regarding the use and integration of complementary and integrative health approaches**

<https://nccih.nih.gov/health/integrative-health>

NCCIH Quick Facts

- **Established: by Congress 1992; later renamed 1999**
- **Funding: FY 2020: \$151.9 million; FY 1992: \$2.0 million**
- **Staff: Approximately 74 FTEs (2015)**

<https://nccih.nih.gov/about/ataglance>

<https://nccih.nih.gov/research/statistics/NHIS>

<https://nccih.nih.gov/about/budget/appropriations.htm>

Integrative Medicine

- Many definitions, but all involve bringing conventional and complementary approaches together in a coordinated way
- Researchers are currently exploring the potential benefits of integrative health in a variety of situations, including:
 - Pain management for military personnel and veterans
 - Relief of symptoms in cancer patients and survivors
 - Programs to promote healthy behaviors

<https://nccih.nih.gov/health/integrative-health#cvsa>

Complementary versus Alternative

- When describing these approaches, people often use “alternative” and “complementary” interchangeably, but the two terms refer to different concepts:
- If a non-mainstream practice is used together with *conventional medicine* = “complementary”
- If a non-mainstream practice is used in place of conventional medicine = “alternative”

<https://nccih.nih.gov/health/integrative-health#cvsa>

TCM Doctrine

- Diseases develop from natural effects of diet, lifestyle, emotions, environment, and age
- The universe is composed of various forces and principles, such as **Yin and Yang, Qi** and the **Five Elements** (or phases)
- Man can stay in balance or return to balance and health by understanding the laws of these natural forces

TCM encompasses many practices, including:

- Herbal medicine
- Acupuncture
- Tai chi

- Food is medicine
- Moxibustion
- Cupping
- Tui na
- Qi gong

<https://nccih.nih.gov/health/whatiscam/chinesemed.htm>

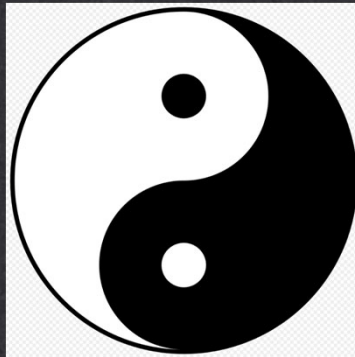
The Sign of Tai Chi

- also known as the Yin Yang symbol, which is the epitome of balanced Qi energy
- Yin and Yang are equal but opposite
- Yin and Yang are complementary to each other
- Cyclical rhythm of nature
- Yin and Yang are interdependent and cannot exist without each other
 - cannot have day without night
 - cannot have dark without light

The Sign of Tai Chi

YIN

- Negative
- Female
- Night
- Passive
- Moon
- Intuitive
- Cold
- Soft



Author: Gregory Maxwell

- Parasympathetic NS?
- Anabolism?

YANG

- Positive
- Male
- Day
- Active
- Sun
- Logical
- Hot
- Hard
- Sympathetic NS?
- Catabolism?

- **Relative levels of yin and yang are continuously changing**
- **When yin or yang are out of balance, they affect each other, and too much of one can eventually weaken (consume) the other = leading to disease state**



The Elusive “Meridian” has not Materialized Yet

- Media = nerves, blood vessels, lymphatic, connective tissues?
- In modern times, new *methods* of stimulating the acupuncture points (acupoints) have been introduced, including
 - Electroacupuncture (EA)
 - Transcutaneous Electrical Acupoint Stimulation (TEAS);
 - Injection of chemicals into the acupoints
 - Acupressure

How does Acupuncture work?

- Qi influenced and balanced by stimulating specific points on the body's surface
- Recruits endogenous neurotransmitters and neuropeptides, such as endorphins, to suppress pain
- Interrupt the vicious cycle of pain mechanisms

T.R. Deer et al. (eds.), *Treatment of chronic pain by integrative approaches: the American Academy of Pain Medicine textbook on patient management*. 2015. ISBN 978-1-4939-1820-1 ISBN 978-1-4939-1821-8 (eBook)

WHO Classification System of Meridians

- Consensus Report reached by WHO Scientific Group for standard international acupuncture nomenclature in 1989
- Naming system: alphanumeric code as well as the Han character names of meridians and acupuncture points, along with their transliterations into the Chinese phonetic alphabet (Pinyin) and their English translations
- Proposed standard nomenclature for the 14 main meridians, the 361 classical acupuncture points, the 8 extra meridians and the 48 extraordinary points, and for scalp acupuncture lines

<http://apps.who.int/medicinedocs/en/d/Jh2947e/>

https://en.wikipedia.org/wiki/List_of_acupuncture_points#Large_intestine_meridian

Meridian Labeling

- Each point has a specific function and meaning relating to its internal organ and meridian
- Names often refer to **flow** on the surface of the earth:
 - Well, Spring, Stream, River, Sea
 - Valley, Marsh, Crevice

Theory of Meridians

- Channels that transfer blood and Qi (vital energy) throughout the body
- Connected with the surface and all the internal organs of the body
- Regulate yin and yang
- According to Chinese medical theory, illness arises when the cyclical flow of Qi in the meridians is blocked or becomes unbalanced

Xu, J. (2014). *Praeger handbook of acupuncture for pain management : A guide to how the 'magic needles' work*. Retrieved from <https://ebookcentral.proquest.com>

Meridians are connected with each other in an endless cycle to nourish and adjust the energy of the body



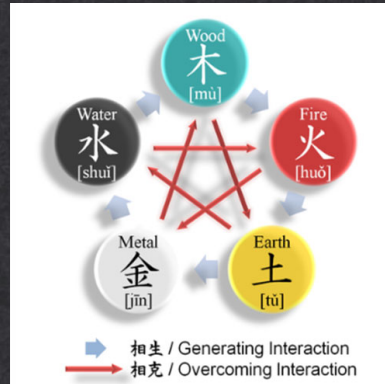
Author: Joe Haupt (CC BY-SA 2.0)

Begin with the lung meridian, connected to the large intestine → stomach → spleen → heart → small intestine → urinary bladder → kidney → pericardium → San Jiao → gallbladder → liver → finally returns to the lung again

Xu, J. (2014). *Praeger handbook of acupuncture for pain management : A guide to how the 'magic needles' work*. Retrieved from <https://ebookcentral.proquest.com>

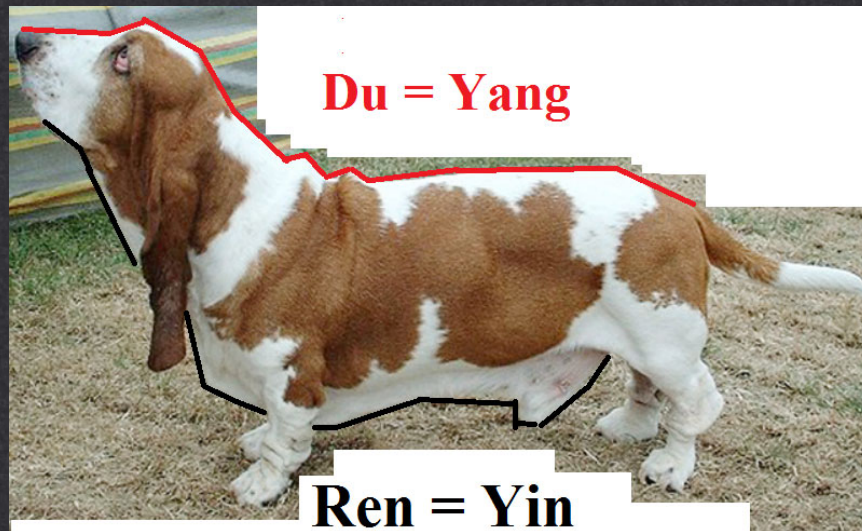
14 Common Meridians = (6 pairs + 2 unpaired)

- Relating to the Zang-Fu organ systems
- Meridians Relate to the 5 elements
 - ✓ Urinary bladder and Kidney meridians (Water)
 - ✓ Gallbladder and Liver (Wood)
 - ✓ Heart and Small intestine (Fire)
 - ✓ Stomach and Spleen (Earth)
 - ✓ Lung and Large Intestine (Metal)
 - ✓ Pericardium and San Jiao meridians
- 2 other meridians = Du (Governing Vessel) and Ren (Conception Vessel)



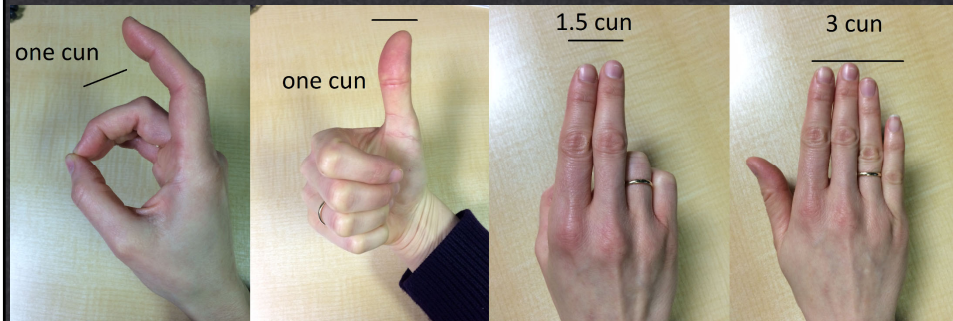
Author Parnassus (CC BY-SA 3.0)

2 other meridians = Du (Governing Vessel) and Ren (Conception Vessel)



https://upload.wikimedia.org/wikipedia/commons/d/d9/Collage_of_Nine_Dogs.jpg

Cun Measurements of the Body



- Since everyone's body is of a different size, use a person's inborn measurement system

**Five elements = water, wood, fire, earth, metal
= symbolically represent all phenomena**

- Includes stages of human life, and explain the functioning of the body and how it changes during disease

Based on five categories in nature:

- Water nourishes wood
- Wood provides the generative force for fire
- Fire enriches the earth
- Earth contains metal
- Metal produces water
- And so it goes

<https://nccih.nih.gov/health/whatisacupuncture/chinesemed.htm>

Xu, J. (2014). *Praeger handbook of acupuncture for pain management : A guide to how the 'magic needles' work*. Retrieved from <https://ebookcentral.proquest.com>

Five Element Theory

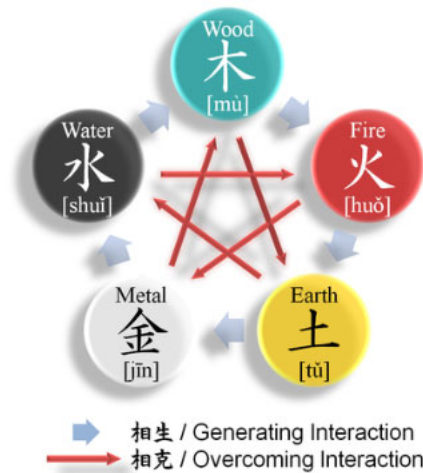



Diagram of the interactions between the wuxing. 
 The "generative" cycle is illustrated by grey arrows running clockwise on the outside of the circle, while the "destructive" or "conquering" cycle is represented by red arrows inside the circle.

Author Parnassus (CC BY-SA 3.0)

2012 National Health Interview Survey (NHIS) Provides Most Comprehensive Information on Use of Complementary Health Approaches in US

- This analysis is the first to provide data on children, on total spending across age groups, and on mean spending per user for any use of these approaches
- About 59 million Americans spend money out-of-pocket on complementary health approaches
- Total spending adds up to \$30.2 billion a year

Clarke, TC et al. Trends in the use of complementary health approaches among adults: United States, 2002-2012. Natl Health Stat Report. 2015 Feb 10;(79):1-16.

Health Care Approaches Outside of (Conventional) mainstream Western Medicine



- More than 30% of adults
- 12% of children

Source: <https://nccih.nih.gov/health/children>

2012 National Health Interview Survey (NHIS) = Data Published 2/2015

- Conducted by the National Center for Health Statistics (NCHS), part of the CDC
- Each year 35,000 and 40,000 households to ask people questions about their health
- In 2002, 2007, 2012, and 2017 the NHIS included a section, developed by NCHS and the National Center for Complementary and Integrative Health (NCCIH), on the use of complementary health approaches

National Health Statistics Reports

Number 79 • February 10, 2015

Trends in the Use of Complementary Health Approaches Among Adults: United States, 2002–2012

by Tanya C. Clarke, Ph.D., M.P.H., Lindsey L. Black, M.P.H., National Center for Health Statistics; Barbara J. Shuman, D.A., National Institutes of Health; Patricia M. Barnes, M.A., National Center for Health Statistics; and Richard L. Nahat, Ph.D., M.P.H., National Institutes of Health

Abstract

Objective. This report presents national estimates of the use of complementary health approaches among adults in the United States across three time points. Trends in the use of selected complementary health approaches are compared for 2002, 2007, and 2012, and differences by selected demographic characteristics are also examined.

Methods. Combined data from 88,062 adults aged 18 and over collected as part of the 2002, 2007, and 2012 National Health Interview Survey were analyzed for this report. Sample data were weighted to produce national estimates that are representative of the civilian noninstitutionalized U.S. adult population. Differences between percentages were evaluated using two-sided significance tests at the 0.05 level.

Results. Although the use of individual approaches varied across the three time points, nonherbals, nonvitamin, nonmineral dietary supplements remained the most popular complementary health approach used. The use of yoga, tai chi, and qi gong increased heavily across the three time points, among those three approaches, yoga accounted for approximately 80% of the prevalence. The use of any complementary health approach also differed by selected sociodemographic characteristics. The most notable observed differences in use were by age and Hispanic or Latino origin and race.

Keywords: prevalence • nonherbals, nonvitamin, nonmineral dietary supplements • yoga

Introduction

Complementary health approaches include an array of meditation and practices with a history of use or origins outside of conventional Western medicine. Previous studies have shown that individuals often use complementary health approaches to

improve health and well-being (1,2) or to relieve symptoms associated with chronic diseases or the side effects of conventional medicine (3,4). In the United States, most persons who use complementary health approaches do so in complement conventional care, rather than as a replacement (5, 6). Using data from the 2002 National Health Interview

Survey (NHIS), Nahat et al. (3) found that less than 1% of all U.S. adults used complementary health approaches but not conventional care. Previous research has also shown differences in the use of complementary health approaches by demographic characteristics such as sex and age (5,7). While knowledge of various types of complementary health approaches has increased among the U.S. population, the use of individual approaches has fluctuated across the years (1).

To better understand the patterns of use of complementary health approaches, this report describes the prevalence of adults using selected complementary health approaches and characteristics selected sociodemographic characteristics of such users. Because nonherbals, nonvitamin, nonmineral dietary supplements are the most commonly used complementary health approach among U.S. adults, other vitamins and herbs (1), individual supplements are also examined.

Methods

Data sources

Analyses in this report were based on data collected from a combined sample of 88,062 adults aged 18 and



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics



<https://nccih.nih.gov/research/statistics/NHIS/2012/about>

Acupuncture Use

Table 1. Trends in the use of selected complementary health approaches during the past 12 months, by type of approach: United States, 2002, 2007, and 2012

Complementary health approach	2002		2007		2012		Test for trend		
	Number (in thousands)	Age-adjusted percent ^a (standard error)	Number (in thousands)	Age-adjusted percent ^a (standard error)	Number (in thousands)	Age-adjusted percent ^a (standard error)	Percentage point change		
							2002–2007	2007–2012	2002–2012
Nonvitamin, nonmineral dietary supplements . . .	38,183	18.9 (0.28)	38,797	17.7 (0.37)	40,579	17.7 (0.37)	^{††}	0.0	^{††}
Deep-breathing exercises ^b	23,457	11.6 (0.24)	27,794	12.7 (0.30)	24,218	10.9 (0.26)	[§] 1.1	^{††}	^{††}
Yoga, tai chi, and qi gong	11,766	5.8 (0.17)	14,436	6.7 (0.22)	22,281	10.1 (0.25)	0.9	[§] 2.5	[§] 3.4
Chiropractic or osteopathic manipulation ^b	15,226	7.5 (0.19)	18,740	8.6 (0.27)	19,369	8.4 (0.22)	^{††}	–0.2	^{††}
Meditation ^c	15,396	7.6 (0.20)	20,541	9.4 (0.27)	17,948	8.0 (0.21)	[§] 1.8	^{††}	^{††}
Massage therapy	10,052	5.0 (0.16)	18,068	8.3 (0.23)	15,411	6.9 (0.15)	[§] 3.3	[§] 1.6	[§] 1.9
Special diets ^d	6,765	3.3 (0.12)	6,040	2.8 (0.14)	6,853	3.0 (0.13)	0.1	[§] –0.6	[§] –0.5
Homeopathic treatment ^e	3,433	1.7 (0.09)	3,909	1.8 (0.11)	5,046	2.2 (0.11)	0.1	0.4	0.5
Progressive relaxation	6,185	3.0 (0.12)	6,454	2.9 (0.15)	4,766	2.1 (0.10)	–0.1	[§] –0.8	[§] –0.9
Guided imagery	4,194	2.1 (0.10)	4,866	2.2 (0.16)	3,846	1.7 (0.10)	0.1	–0.5	–0.4
Acupuncture	2,136	1.1 (0.07)	3,141	1.4 (0.10)	3,484	1.5 (0.08)	0.3	0.1	0.4
Energy healing therapy	1,080	0.5 (0.05)	1,216	0.5 (0.06)	1,077	0.5 (0.05)	0.0	0.0	0.0
Naturopathy	498	0.2 (0.03)	729	0.3 (0.04)	957	0.4 (0.04)	0.1	0.1	0.2
Hypnosis	505	0.2 (0.03)	561	0.2 (0.04)	347	0.1 (0.03)	0.0	–0.1	–0.1
Biofeedback	278	0.1 (0.02)	362	0.2 (0.04)	281	0.1 (0.02)	0.1	–0.1	0.0
Ayurveda	154	*0.1 (0.02)	214	*0.1 (0.03)	241	0.1 (0.02)	0.0	0.0	0.0

- 2002 – 2.136 million; 1.1% population (age adjusted)
- 2007 – 3.141 million; 1.4% population
- 2012 – 3.484 million; 1.5% population

<http://www.cdc.gov/nchs/data/nhsr/nhsr079.pdf>

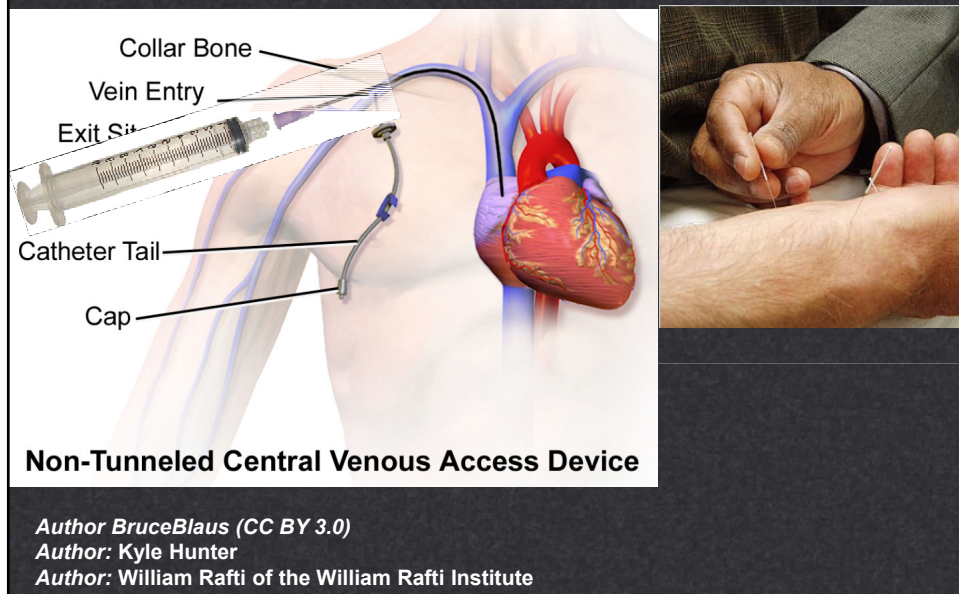
Is TCM safe?

- Improperly performed acupuncture = serious side effects
- Reports of Chinese herbal products being **contaminated** with **drugs, toxins, or heavy metals** or not containing the listed ingredients
- Some herbals can interact with drugs, have serious side effects, or be unsafe for people with certain medical conditions

<https://nccih.nih.gov/health/whatiscam/chinesemed.htm>



Risk Assessment



Chinese Herbal Medicine

- Chinese *Materia Medica* (the pharmacological reference book) describes thousands of medicinal substances =
 - primarily **plants**
 - some **minerals**
 - **animal** products
- Herbs are often combined in formulas



Author: Wikidudeman



FDA statement Cautioning against Herbals

FDA Consumer Health Information
www.fda.gov/ohrt

Use Caution With Ayurvedic Products



Ayurvedic medicine is a traditional system of healing arts that originated in India. It involves using products such as spices, herbs, vitamins, proteins, minerals, and metals (e.g., mercury, lead, iron, zinc). Some preparations combine herbs with minerals and metals. These products are commonly sold on the Internet or in stores and are represented as "Indian" or "South Asian."

"Consumers should know that Ayurvedic products are generally not reviewed or approved by the Food and Drug Administration (FDA)," says Mike Levy, Director of the Division of New Drugs and Labeling Compliance in the Office of Compliance, part of FDA's Center for Drug Evaluation and Research (CDER). "Ayurvedic products are marketed either for drug uses not approved by FDA or as dietary supplements. As such, consumers should understand that these products have not been approved by FDA before marketing."

"The bottom line," Levy says, "is that consumers need to be on guard when purchasing any product using the Internet, especially medical products." This is an area that is challenging to regulate.

Concerns About Heavy Metals
The presence of metals in some Ayurvedic products makes them potentially harmful. A study published in the August 22, 2008, issue of the *Journal of the American Medical Association (JAMA)*, demonstrated that one-fifth of U.S.-manufactured and Indian-manufactured Ayurvedic products bought on the Internet contained detectable lead, mercury, or arsenic.

Researchers found 22 Web sites selling Ayurvedic products. After identifying 377 products, they randomly selected 230 for purchase. Of those, they tested and analyzed 173 products. Nearly 21 percent were found to contain detectable levels of lead, mercury, or arsenic.

All metal-containing products exceeded one or more standards for acceptable daily metal intake. The researchers concluded that several Indian-manufactured products could result in lead and/or mercury ingestion 100 to 100,000 times greater than acceptable limits.

This study followed a previous study published in *JAMA* on December 15, 2004, which found that one out of four Ayurvedic "herbal medicine products" produced in South Asia and available in South Asian grocery stores in Boston contained

potentially harmful levels of lead, mercury, and/or arsenic.

Many of these products could pose direct or serious indirect health issues, or could contain toxic substances.

Will your health care professional detect adulterated products? Some herbs, minerals, and metals can interact with each other and with conventional medications. fda.gov

This article appears on FDA's Consumer Health Information Web page (www.fda.gov/consumer), which features the latest updates on FDA-regulated products. Sign up for free e-mail subscriptions at www.fda.gov/consumer/subscribe.html.

For More Information
FDA's Impact Alert: www.fda.gov/ohrt/impact_alert.html

Buying Medicines and Medical Products Online
www.fda.gov/ohrt/

Is It Really FDA Approved?
www.fda.gov/consumer/updates/approval/0808.html

FDA 101: Dietary Supplements
www.fda.gov/consumer/updates/supplements/0808.html

Be cautious when buying medical products on the Internet. FDA urges consumers to beware of unregulated Internet drug sales.

1/2 FDA Consumer Health Information / U.S. Food and Drug Administration OCTOBER 16, 2008

FDA Consumer Health Information
www.fda.gov/ohrt

A study ... demonstrated that one-fifth of U.S.-manufactured and Indian-manufactured Ayurvedic products bought on the Internet contained detectable lead, mercury, or arsenic.

A Priority for FDA
This issue has been and will continue to be a priority for FDA," Levy says. The agency has had an impact alert on certain Ayurvedic products in place since 2003. This impact alert allows FDA personnel to prevent these products from entering the United States.

"Through this impact alert, the agency is able to stop commercial importation of these products," Levy says, "but individual Internet purchases are harder to monitor."

In light of recent reports, FDA is re-evaluating its existing impact alert and considering possible enforcement actions related to Ayurvedic products manufactured in the United States.

Advice for Consumers
Be aware that Ayurvedic products do not undergo FDA review. In accordance with current law, FDA does not evaluate these products before they are marketed. This means their safety, quality, and effectiveness cannot be assured by FDA. Certain populations, including children, are particularly at risk for the toxic effects of heavy metals.

Be cautious when buying medical products on the Internet. FDA urges consumers to beware of unregulated Internet drug sales.

1/2 FDA Consumer Health Information / U.S. Food and Drug Administration OCTOBER 16, 2008

Source: Food and Drug Administration

Cupping



<https://www.publicdomainpictures.net/>

Author: Iwansw (CC BY-SA 3.0)

Cupping



Source: Wellcome Collection gallery
(2018-03-28) - (CC BY 4.0)

Author: Alanna Ralph (CC BY 2.0)

Moxibustion



https://en.wikipedia.org/wiki/Acupuncture#/media/File:A_Dose_of_Moxa.jpg

The Status of TCM Research

- In spite of the widespread use of TCM in China and its use in the West, rigorous scientific evidence of its effectiveness is limited
- TCM can be difficult for researchers to study because its treatments are often complex and are based on ideas very different from those of modern *Western medicine*
- Most research studies on TCM have focused on specific techniques, primarily acupuncture and Chinese herbal remedies, and there have been many systematic reviews of studies of TCM approaches for various conditions

<https://nccih.nih.gov/health/whatiscam/chinesemed.htm>

NIH Review Finds Nondrug Approaches Effective for Pain

NIH National Center for Complementary and Integrative Health & Mayo Clinic Proceedings

A review of **105 randomized controlled trials**, which included more than **16,000 participants**, shows that a variety of complementary health approaches may help manage pain.

- Acupuncture
- Massage therapy
- Relaxation techniques
- Tai chi
- Yoga

nccih.nih.gov/pain_review

Citation: Nahin RL, Borneau R, Khalsa PS, Shapiro ML, Winter WJ. Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States. Mayo Clinic Proceedings. 2016;91:1292-306.

https://nccih.nih.gov/news/press/pain_review

Nahin, Richard L et al. "Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States." *Mayo Clinic proceedings* vol. 91,9 (2016): 1292-306. doi:10.1016/j.mayocp.2016.06.007

NIH Review Trial Evidence on Complementary Approaches for Five Painful Conditions

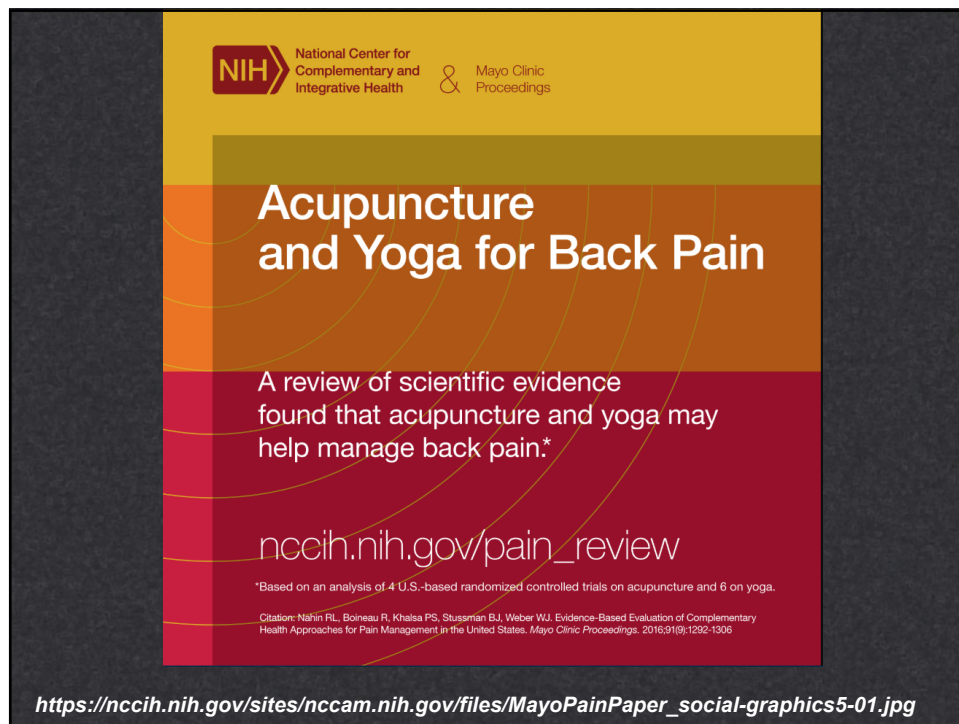
- Painful conditions are the most common reasons why American adults use complementary health approaches
- About 40 million American adults experience severe pain in any given year
- 5 conditions = low back pain, osteoarthritis, neck pain, severe headaches and migraine, and fibromyalgia

<https://nccih.nih.gov/research/results/spotlight/five-painful-conditions>

NCCIH Review Article Continued

- Review conducted by a group of scientists from the National Center for Complementary and Integrative Health (NCCIH) at the National Institutes of Health
- To identify RCTs for each complementary approach, published from January 1, 1966, through March 31, 2016
- Limited to RCTs in United States
- Found RCT-evidence for treating pain:
 - Acupuncture and yoga for back pain
 - Acupuncture and tai chi for osteoarthritis of the knee

Nahin, Richard L et al. "Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States." Mayo Clinic proceedings vol. 91,9 (2016): 1292-306. doi:10.1016/j.mayocp.2016.06.007



NIH Review Article: Low Back Pain

- 4 RCTs (total participants, 1092)
- Age range, 28-60 years
 - used primary study outcomes of self-report of pain intensity (numeric rating scale or visual analog scale [VAS]) and/or functional disability (Roland-Morris Disability Questionnaire, Oswestry Disability Index [ODI], or Disability Rating Index)
- Cherkin et al reported modest improvement in pain intensity and function compared with usual care
- In pregnant women using auricular acupuncture, Wang et al found a significant reduction in pain intensity and improved functional status

Nahin, Richard L et al. "Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States." *Mayo Clinic proceedings* vol. 91,9 (2016): 1292-306. doi:10.1016/j.mayocp.2016.06.007



NIH Review article: Knee OA

- 4 RCTs; Predominantly female, had mean ages 60–65 years, and had knee pain for an average of 9 to 11 years
- All used Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) total score or the WOMAC pain subscore
- In 2 of the RCTs no difference was seen between verum acupuncture and sham acupuncture for either the primary or secondary outcome measure
- The third trial, which used a sham control, found significantly better improvement in both the WOMAC pain subscale and function subscale after 14 weeks of treatment.

Nahin, Richard L et al. "Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States." *Mayo Clinic proceedings* vol. 91,9 (2016): 1292-306. doi:10.1016/j.mayocp.2016.06.007

NCCIH tips for finding a Provider

- If you need names of practitioners in your area, first check with your doctor or other health care provide
- Unfortunately, the National Center for Complementary and Integrative Health (NCCIH) cannot refer you to practitioners
- NCCIH is not involved in the clinical training, credentialing, or licensing of complementary health practitioners
- Find out as much as you can about any potential practitioner, including education, training, licensing, and certifications
- The credentials required for complementary health practitioners vary tremendously from state to state and from discipline to discipline

<https://nccih.nih.gov/health/tips/selecting>

National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM):

- National organization that validates entry-level competency in the practice of acupuncture and Oriental medicine through professional certification
- Provides patient-level information about these practices and a provider-finder link

<https://www.nccaom.org/>

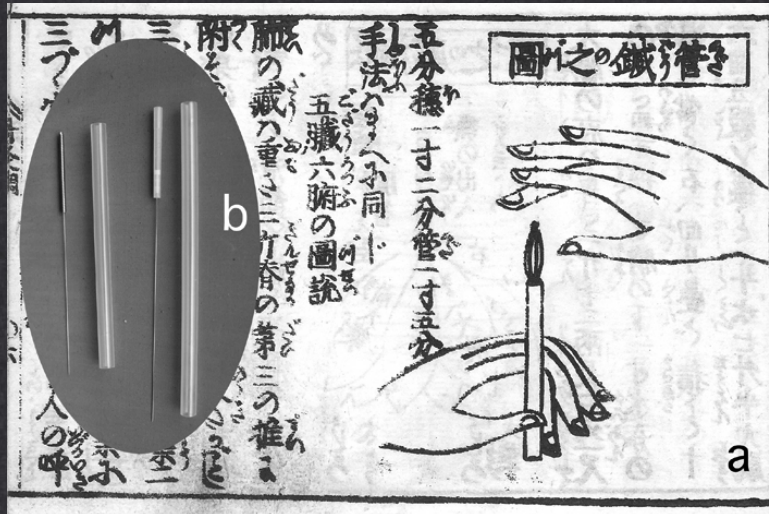
Acupuncture subsets

- Body
- Scalp
- Ear
- Hand



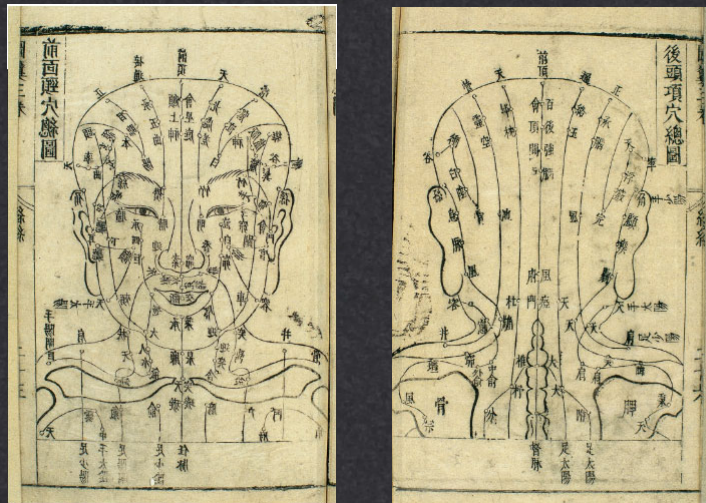
https://upload.wikimedia.org/wikipedia/commons/a/a2/Archie_McPhee_acupuncture.jpg

Demonstration of Acupuncture



https://upload.wikimedia.org/wikipedia/commons/7/7f/Japanese_kudabari.jpg

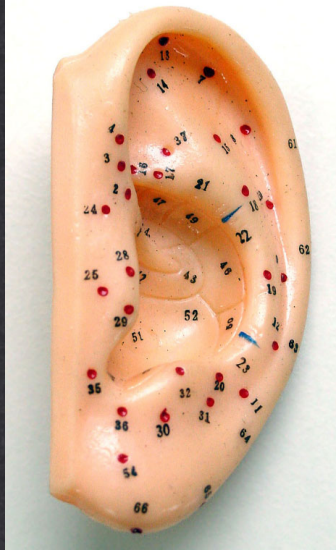
Scalp Acupuncture



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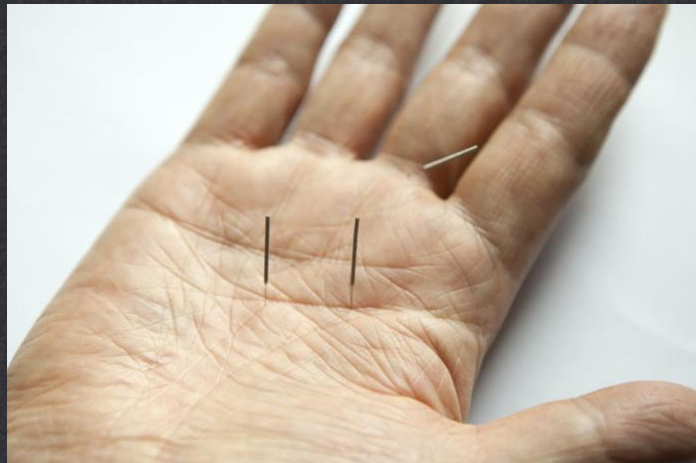
<https://wellcomecollection.org/works/hvvtvy4k>

Ear Acupuncture



Author: Wouterhagens at Dutch Wikipedia (CC BY-SA 3.0)

Hand Acupuncture



Author: National Institute of Korean Language (CC BY-SA 2.5)

History of Acupuncture Research

Acupuncture Anesthesia During Surgery

- In the late 1950s up to 1970s, there was a large-scale clinical practice in China of using acupuncture in lieu of anesthetics for surgical procedures
- In fact, in most hospitals, acupuncture was used in combination with anesthetics to form “acupuncture-assisted anesthesia (AAA)”
- Almost all reports stressed the benefits
 - less anesthetic requirements
 - earlier recovery
 - less postoperative pain and other complications
 - shortened hospitalization

T.R. Deer et al. (eds.), Treatment of chronic pain by integrative approaches: the American Academy of Pain Medicine textbook on patient management. 2015. ISBN 978-1-4939-1820-1 ISBN 978-1-4939-1821-8 (eBook)

Acupuncture Raises Pain Threshold in Humans and Suggests Neurochemical Mechanisms

- Study to ascertain whether acupuncture stimulation would indeed lower pain sensitivity
- Skin potassium iontophoresis method was used, whereby the minimal intensity of an anode (5 mm diameter) current needed to produce a clear pain sensation was recorded, usually by 1 mA
- Following the continuous manipulation of the needle (at Hegu point) for 50 min, a gradual increase of the pain threshold was observed over 30 min to increase from 1 to around 2 mA, and leveled off thereafter

Research Group of Acupuncture Analgesia, Beijing Medical College. The effect of acupuncture on pain threshold of the skin on human volunteers. Chin Med J. 1973;3:151–7.

Pain Threshold Increases After Acupuncture at LI-4

- Eight representative skin points were identified for the measurement of pain threshold
- Slow rise of pain threshold during the stimulation period and the slow decay after the removal of the needle suggest the involvement of neurochemical mechanisms

T.R. Deer et al. (eds.), Treatment of chronic pain by integrative approaches: the American Academy of Pain Medicine textbook on patient management. 2015. ISBN 978-1-4939-1820-1 ISBN 978-1-4939-1821-8 (eBook)

LI-4 = Hegu = translated as Conjoining Valley

- **Location:** On the dorsum of the hand, between the 1st and 2nd metacarpal bones, in the middle of the 2nd metacarpal bone on the radial side.



https://upload.wikimedia.org/wikipedia/commons/0/05/Acupuncture_point_Hegu_%28LI_4%29.jpg

Cerebrospinal Fluid Cross-perfusion Study Determines that Chemical Mediators produced in Brain are Responsible for Analgesia (BL-60)

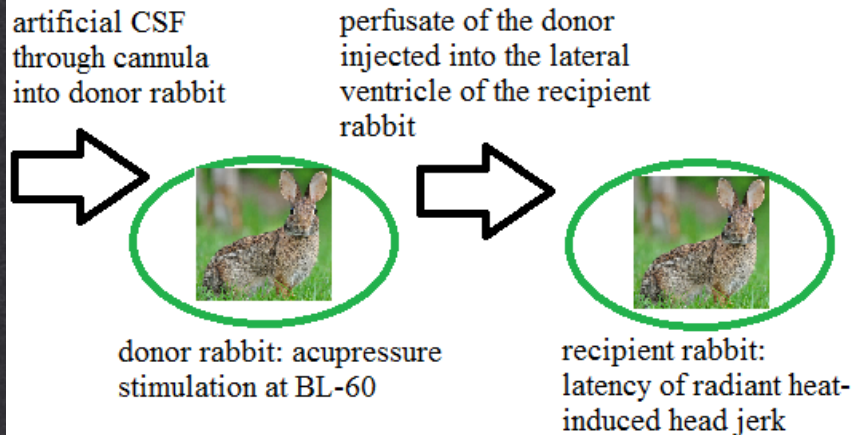
BL-60 = translated as
“Kunlun Mountains”

Location: On the foot, behind the external malleolus, in the depression between the tip of the external malleolus and calcaneal (Achilles) tendon



Research Group of Acupuncture Anesthesia. Beijing Medical College: the role of some neurotransmitters of brain in acupuncture analgesia. *Sci Sin.* 1974;17:112–30.

Neurochemical Mechanisms of Acupuncture



Author: Gareth Rasberry (CC BY-SA 3.0)

Research Group of Acupuncture Anesthesia. Beijing Medical College: the role of some neurotransmitters of brain in acupuncture analgesia. *Sci Sin.* 1974;17:112-30.

Acupuncture Analgesia found to be Modulated through Opioidergic Pathways

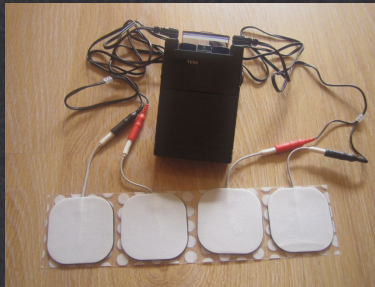
- The analgesic effect of acupuncture for dental pain can be prevented by the subcutaneous injection of naloxone
- Suggests the involvement of endogenous opioid substances



<https://wellcomecollection.org/works/xy86ag9c/items?canvas=1&langCode=fre>
 Mayer DJ, Price DD, Raffi A. Antagonism of acupuncture analgesia in man by narcotic antagonist naloxone. *Brain Res.* 1977;121:368-72. Author: James Heilman, MD (CC BY-SA 4.0)

Standard TEAS Device for Research Studies

- Clinical trials demonstrated efficacy in treating pain and addictions, autism, infertility, insomnia, depression, and urinary incontinence
- Gentle electrical stimulation at certain frequencies mobilizes the body's own natural healing processes to restore biological balance



<https://upload.wikimedia.org/wikipedia/commons/6/6b/Tens.jpg>

Acupuncture is Modulated by Ascending and Descending Pathways in the Brain and Spinal Cord

- From neurophysiological point of view, acupuncture analgesia can be taken as a reflex action
 - Afferent = (mostly A β fibers) innervating the acupoint
 - Efferent = descending pathway modulating the sensitivity of the dorsal horn neurons not only in the same segment but also in heterogeneous segments
- Rat studies revealed that 100-Hz stimulation of the acupoint would trigger the release of dynorphin in the spinal cord
- After destruction of the parabrachial nucleus of the brainstem, high-frequency EA would no longer produce an analgesic effect

Han JS, Wang Q. Mobilization of specific neuropeptides by peripheral stimulation of identified frequencies. News Physiol Sci. 1992;7:176–80.

Different Electroacupuncture Frequencies Recruit Different Opioid Receptors

- Used a specific antagonist for the three types of opioid receptors
- 2-Hz stimulation releases endorphins and enkephalins; mediated by *mu* and *delta* receptor
- 100-Hz stimulation releases dynorphins; mediated by *kappa* receptors

Han JS. Acupuncture: neuropeptide release produced by electrical stimulation of different frequencies. Trends Neurosci. 2003;26:17–22.

Neuromodulation (continued)

- Conversely, 2-Hz EA induces the release of β -endorphin in the brain and enkephalin in the whole central nervous system
- After the destruction of the arcuate nucleus of the hypothalamus (where β -endorphin neurons aggregated), 2-Hz EA would no longer elicit analgesia
- Neither low- nor high-frequency EA would work if a lesion is placed at the periaqueductal gray (PAG) of the midbrain

Han JS, Wang Q. Mobilization of specific neuropeptides by peripheral stimulation of identified frequencies. News Physiol Sci. 1992;7:176–80.

Functional Magnetic Resonance Imaging (fMRI) shows EA-induced Analgesia by 2- or 100-Hz EA stim

- Magnitude of acupuncture-induced BOLD signal change observed in identified brain area with the magnitude of the analgesic effect
- The results showed that the analgesic effect induced by low and high frequencies seems to be mediated by different, though partially overlapping brain networks

Zhang WT, Jin Z, Cui GH, et al. Relations between brain network activation and analgesic effect induced by low versus high frequency electrical acupoint stimulation in different subjects: a functional magnetic resonance imaging study. Brain Res. 2003; 982:168–78.

Serotonin in the CNS Plays Important Role in Acupuncture Analgesia

- The role played by central 5-hydroxytryptamine (5-HT) has been studied in rats with the tail-flick response
- Increase of availability of 5-HT in brain or spinal cord potentiated acupuncture analgesia
- Whereas blockade of 5-HT synthesis or receptor activation resulted in a significant decrease of the analgesic effect

Han JS, Chou PH, Lu CH, et al. The role of central 5-HT in acupuncture analgesia. Sci Sin. 1979;22:91–104.

Acupuncture is shown by Evidence-Based Medicine to be Cost Effective

- Postoperative pain
- Nausea and vomiting
- Anxiolysis
- Lack of clinical toxicity

White PF. Use of alternative medical therapies in the perioperative period: is it time to get on board? *Anesth Analg* 2007;104:251–4.

TEAS Device Decreases Postoperative Pain

- Transcutaneous Electrical Acupoint Stimulation (TEAS) to assess if it can reduce the postoperative PCA requirement for hydromorphone (HM)
- Dr. Paul White's group = single-blind controlled study, first of many using specific device
- Compared to the blank control of "PCA only" group:
 - The HM used in the sham TEAS group showed a 22% reduction
 - For the real TEAS group, they used two levels of intensity, the threshold level (4–5 mA) and double threshold level (9–12 mA),
 - resulting in a 34% ($P < 0.05$) and 65% ($P < 0.001$) reduction, respectively
- Postoperative side effects significantly reduced

Wang BG, Tang J, White PF, et al. Effect of the intensity of transcutaneous acupoint electrical stimulation on the postoperative analgesic requirement. *Anesth Analg*. 1997;85:406–13.

PC-6 Neiguan = translated as Inner Gate

- Location: On the palmar aspect of the forearm, 2 cun above the transverse crease of the wrist, between the tendons of m. palmaris longus and m. flexor carpi radialis



Postoperative Nausea and Vomiting

- For 3,347 postoperative subjects in 26 trials, acupuncture point PC-6 was found to be very effective in reducing nausea and vomiting postoperatively
- Manipulating the needles, either manually or by electronic stimulation, can enhance the effects

Lee, A, Done, ML. "Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting." Cochrane Database System Review. 17. CD003281, 2004. Update in: Cochrane Database System Review. (2): CD003281, 2009.

Evidence Supports Ear Acupuncture Effectiveness

Ameliorating
Withdrawal and
Craving
Symptoms



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https://en.wikipedia.org/wiki/Fast_food#/media/File:Fast_food_meal.jpg

https://en.wikipedia.org/wiki/Cocaine#/media/File:Smoking_Crack.jpg

https://upload.wikimedia.org/wikipedia/commons/3/34/Opioid_Pills.svg

https://en.wikipedia.org/wiki/Alcoholic_drink#/media/File:Common_alcoholic_beverages.jpg

SAMHSA Publishes TIP 45 Manual Recommending Ear Acupuncture

Detoxification and
Substance Abuse Treatment

A Treatment
Improvement
Protocol
**TIP
45**



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Center for Substance Abuse Treatment
www.samhsa.gov



SAMHSA, of the U.S.
Department of Health and
Human Services
Publication Date: 10/2015

<http://store.samhsa.gov/product/TIP-45-Detoxification-and-Substance-Abuse-Treatment/SMA15-4131>

National Acupuncture Detoxification Association Protocol Summary (Lincoln Hospital, NY)



Sympathetic
Shen Men
Kidney
Liver
Lung

- (1) Clinicians use three to five ear acupuncture points
- (2) Treatment is provided in a group setting for 40–45 min
- (3) Acupuncture treatment is integrated with conventional elements of psychosocial rehabilitation

Author: Genusfotografen (Tomas Gunnarsson) /
Wikimedia Sverige (CC BY-SA 4.0)

Johnson, B. A. (Ed.). (2011). *Addiction Medicine*. doi:10.1007/978-1-4419-0338-9



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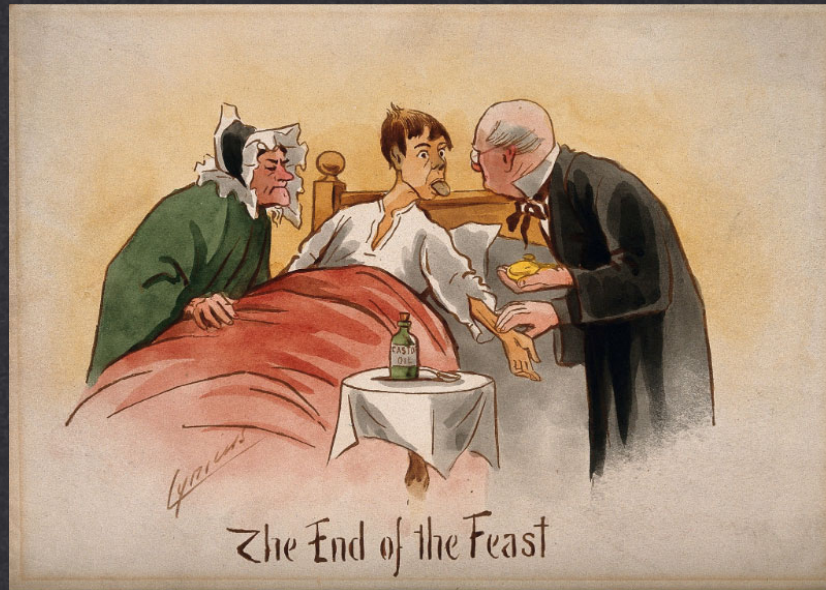
How to Decide which Acupoints?

- History and Physical
 - Tongue Diagnosis
 - Pulse Diagnosis
- Different combinations of points and meridians can treat different diseases
- Acupuncture points are the locations along each of the specific meridians used for needle insertion

Categories of TCM Diagnosis

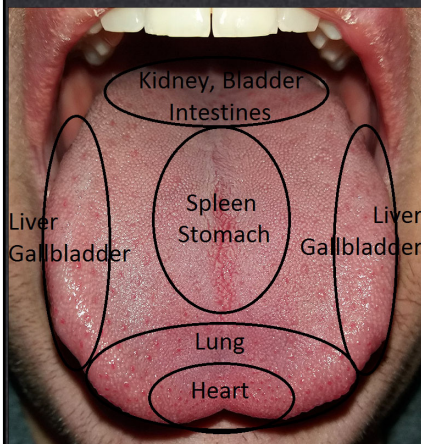
- Yin and Yang
- Hot and Cold
- Exterior and Interior
- Deficiency and Congestion

Comprehensive Training Course on Acupuncture for Physicians – Academy of Pain Research



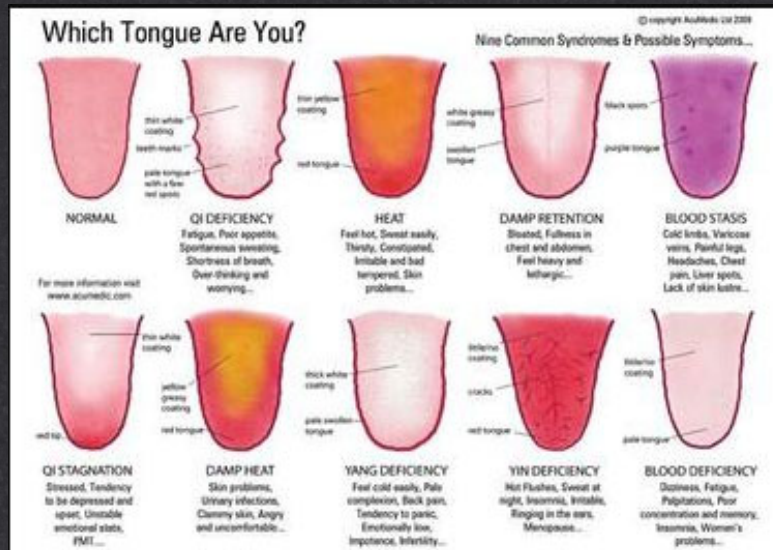
Source: <https://wellcomecollection.org>

Tongue Areas



- Tongue related to both meridians and the internal organs
- Important during inspection for confirming TCM diagnosis
- Can present strong visual indicators of a person's overall health

Author: Mahdiabbasin (CC BY-SA 4.0)



Author: AcuMedix Ltd 2003 Fair Use

Pulse Diagnosis (~28 types) on the Lateral Wrist Detects the Energy and Blood of an Internal Organ

- Middle finger at eminent head of radius and other 2 fingers are adjacent
- Separation of fingers depends on size of the patient (greater if taller), along the artery



Author: a Delhi painter. (Life time: Unknown)

Pulse Quality

- Choppy
- Deep
- Fast
- Full
- Hurried
- Intermittent
- Knotted
- Short
- Slippery
- Slow
- Superficial
- Thin
- Tight
- Weak
- Wiry

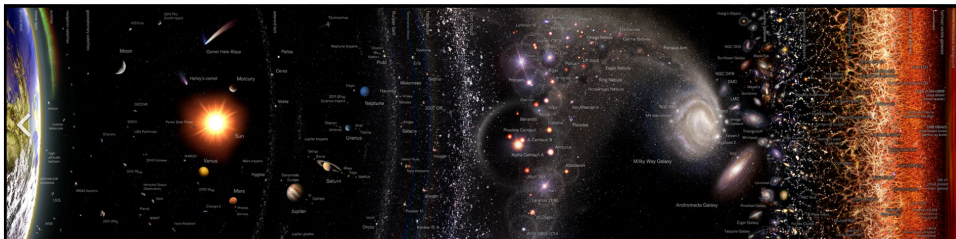
http://www.tcmstudent.com/study_tools/Pulse%20Quality.html

Limitations to Proving the Efficacy of Acupuncture

- Strict study protocol that cannot be varied from patient to patient
- Multiple cofounding medical problems
- Highly complex art
- Sham acupuncture that is effective
- Ineffective techniques

Why is Acupuncture Able to Treat Different Disorders? = Acupuncture Restores Homeostasis

- Sophisticated regulatory mechanisms keep the body in a biological balance in an ever-changing environment
- Severe or prolonged deviation of the system beyond the set points may lead the body into pathology
- Although the manifestations of diseases are different, they often share similar pathological pathways



Author: Pablo Carlos Budassi (CC BY-SA 4.0)



Source: Needpix.com

Melissa.Tornero-
Bold@osumc.edu

Thank You