Acupuncture for Chronic Pain Management

Arianna E. Arden

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Acupuncture for Chronic Pain Management

Arianna Arden
Northern Illinois University
Abstract

Approximately 20.4% of the North American population experience chronic pain (CDC, 2016). Chronic pain has a direct impact on daily life activities, mental health, employment, and economic well-being. Many adults are treated with opioid medications which have the potential to cause addiction. Roughly 42,000 deaths were documented in 2016 due to opioid overdoses (Public Affairs, n.d.). With that number only continuing to grow, the opioid crisis is becoming an epidemic across America. Non-addictive alternative forms for managing chronic pain, such as acupuncture, should be more widely utilized in western medicine in order to prevent opioid abuse and addiction. Academic search complete was used to identify studies performed between years 2000-2020 on acupuncture (subject) use with chronic pain individuals. Key words included were management, chronic pain, acupuncture, and treatment. Results indicated patients receiving acupuncture had less pain, with scores and standard deviations lower than sham controls for back and neck pain, osteoarthritis, and chronic headache respectively. Studies also showed decreased opioid requirements by 50% within 24 hours of the first acupuncture session. Although further research is needed, results thus far support the potential role of acupuncture in addressing various forms of chronic pain and its alternative to opioid medication.
Preface

Acupuncture is a therapeutic technique, involving fine sterile needles strategically placed onto specific acupoints under the skin surface, resulting in the management of numerous health conditions including pain, nausea, headaches, allergies, constipation, insomnia, depression, and even morning sickness (Women’s Health Research Institute, 2015). For the purposes of this paper, pain management involving acupuncture will be discussed into will also help explain the history of acupuncture in ancient medicine, the science of its physiological mechanism, the role it plays in chronic pain management, and how it can help effectively combat the opioid crisis.

Traditional Chinese Medicine

Acupuncture dates back over 3,000 years in traditional Chinese medicine (TCM) and is currently received by 3 million people in western civilization today (Women’s Health Research Institute, 2015; Vickers et al., 2012). According to the TCM doctrine, in order for the body to maintain health, prevent disease, and treat preexisting illness, the body needs to maintain energy homeostasis. The body is thought to draw energy from two opposite forces called Yin and Yang. The Yin energy possesses passive forces such as cold, dark, depth, and dampness while Yang energy possesses opposite active forces such as heat, light, and dryness. A deficiency in Yang energy could be related to advanced age or illness which can cause symptoms of pain. Yin and Yang forces work together in order to keep the life force, also known as qi, balanced. Balance is important because the physical body is thought to break down and die without the spiritual energy qi provides (Anne, 2017).

Qi circulates in and out of the body through channels called meridians. There are six pairs of yin and yang meridians, twelve in total (see Appendix A). Of the twelve meridians, each one
feeds qi to a different organ system. This belief can explain reflexology, or why pressing on certain areas of the foot can have a beneficial impact on the health of specific organs, such as the kidneys or liver. Disease and illness are thought to be precipitated by a deficiency in Yang due to a blockage in the meridian system which results in an insufficient circulation of qi. To reestablish optimal circulation of qi, small needles can be used to unclog energy pathways and rebalance the body. Acupuncture needles provide passageway of qi into the meridians. When a needle is inserted into the skin many individuals report feeling a slight pinch and then a radiating tingling or sensation of heaviness in that area, known as deqi. The ancient Chinese describe this as the movement of qi throughout the body. Of the twelve meridians, there are 365 different acupoints that can be stimulated to reestablish adequate circulation of qi and improve overall health (Anne, 2017).

**Physiological Mechanism**

These ancient Chinese beliefs do not translate readily into western medicine, but aspects of acupuncture therapy, such as its effectiveness and reactions on the body, can be studied by science. Acupuncture is known to act on the nervous system by evoking the peripheral and central pain control mechanisms which trigger the release of powerful polypeptide analgesics, enkephalins and endorphins, which aid in modulating pain perception (Carroll, 2007). When a needle is placed on specific points on the body, a pain stimulus is generated on the peripheral nerve that comes into contact with the needle. The stimulated nerve sends a nociceptive signal up to the thalamus in the brain. The nociceptive signal communicates to the brain that there is possible danger. In response to possible danger, enkephalins and endorphins are released. Enkephalins are a type of neurotransmitter that have the power to inhibit pain. Once bound to correctly shaped opioid receptors, enkephalins block pain messages sent from the body...
to the brainstem. Beta-endorphins, also known as “feel-good” hormones, are induced from the pituitary and essentially do the same thing as enkephalins and bind to receptors which results in suppressed pain. Both neurotransmitters are classified as polypeptide analgesics and compare to opioid based drugs. The simultaneous release of endorphins and enkephalins generates an optimal therapeutic effect on the body (Anne, 2017; Carroll, 2007).

Acupoints have proven to exist and have precise locations found through the use of functional Magnetic Resonance Imaging (fMRI; see Appendix B). A fMRI works by measuring activity in the brain by detecting changes in blood flow. In the clinical trial Evidence from Brain Imaging with fMRI Supporting Functional Specificity of Acupoints in Humans by Zhang et al. (2004), acupoints that are from the same nerve supply and spinal segment (within close proximity of each other), were stimulated. Upon stimulation, each acupoint produced a different response in the brain, indicating acupoint specificity. The clinical trial argued if acupoints did not exist, then all acupoints on the same spinal segment would produce similar results (Zhang et al., 2004). Thus far, the effects of acupuncture on the brain and body are only beginning to be understood, and the more research that surfaces, the more accepting western culture will be of it.

**Acupuncture Procedure**

Although often known as a pseudoscience, acupuncture is actually performed by medical doctors that have obtained specialized degrees in traditional medicine and have been licensed through the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM) (NCCAOM, n.d.). During an acupuncture session, board-certified acupuncturists utilize sterile stainless-steel needles, roughly 0.20 x 30 mm in width, and manually insert them 0.25-0.50 inches into the skin in order to reach subcutaneous tissue. Depending on the effects that are trying to be reached, deqi may be stimulated. The needles are left in place for
approximately 30 minutes at a time. The size of the needles is considerably smaller than a sewing needle or sewing pin (see Appendix C). Acupuncturists insert the needles on specific acupoints depending on where the client’s pain is located. One single session is thought to have therapeutic effects lasting for approximately 3-4 days. Acupuncturists insert the needles on specific acupoints depending on where the client’s pain is located (Vickers et al., 2012).

**Literature Review on Acupuncture for Chronic Pain Management**

Since chronic pain (CP) is a continuous health problem that persists for 3 or more months, it is crucial that it is managed effectively. As of currently, studies have shown acupuncture to be an effective measure for managing CP-related conditions including neck and shoulder pain, osteoarthritis, knee and low back pain, and chronic headaches. That, which is crucial because CP has a direct impact on daily life activities, mental health, employment, and economic well-being (Chen, Bassi, & Yang, 2019). CP affects many individuals. In 2016, the Community for Disease Control (CDC) estimated 20.4% of US adults suffered with CP which equates to 50 million people (CDC, 2016). Even though an estimated 50 million people have CP in America, research shows only 3 million people currently receive acupuncture treatments (Vickers et al., 2012). Furthermore, arthritis is one of the most common chronic diseases in America which causes CP and loss of joint functioning. In 2018, the CDC estimated practically half of people aged 65 or older were diagnosed with arthritis. That percentage significantly drops to 7.1% of the population aged 18 to 44 but is still a significantly high number considering how much pain arthritis can inflict on the body, especially in young to middle aged people (CDC, 2018). The rest of this section is dedicated to clinical trial research.

In the randomized controlled trial study called Acupuncture for Pain and Dysfunction After Neck Dissection by Pfister et al. (2010), subjects were tested to see if acupuncture or usual
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care, which included physical therapy and anti-inflammatory drugs, was more effective in reducing pain across 4 weeks. Neck dissection surgery results in complaints of neck or shoulder pain in 30%-70% of patients and often leaves patients with a shoulder droop. Since pain is subjective, the outcomes were measured through the use of the Constant Murley score, which is a 100-point scale that rates the amount of pain felt during activities (see Appendix D). The lower the number, the poorer the outcome, indicating a less effective treatment. Acupuncture was performed once a week on three acupoints: LI-4, SP-6, and GV-20. An additional acupoint, LI-2, was used to test if it would reduce symptoms of xerostomia (dry mouth). The results showed the acupuncture group had a score 11.2 points higher on the Constant-Murley scale than the control group’s score. Interestingly, results further showed xerostomia inventory scores also improved.

In a review of randomized controlled trials called Acupuncture versus Different Types of Control Groups for the Treatment of Chronic Pain by Chen, Bassi, & Yang (2019), acupuncture continued to be more effective in managing pain than control groups. Control groups either had no treatments or usual care prescribed by the medical doctor. Subjects tested on had a variety of different pain conditions including low back pain, headaches, neck pain, knee pain, shoulder pain, jaw pain, arm-related pain, pelvis and hip pain, hip and knee pain or back and neck pain. Acupuncture groups versus control groups with no treatment showed improved pain scores in knee osteoarthritis individuals, after 8 weeks of acupuncture treatment. Acupuncture groups versus pharmacological control groups showed improved pain outcomes after 4 weeks of treatment in individuals with carpal tunnel syndrome (vs. 10 days of ibuprofen), fibromyalgia...
ACUPUNCTURE FOR CHRONIC PAIN MANAGEMENT

(vs. 8 weeks of fluoxetine), and lower back pain (vs. 4 weeks of dibucaine); after 6 weeks of treatment in individuals with chronic shoulder pain (vs. daily diclofenac); and after 8 weeks of acupuncture in individuals with migraines (vs. 12 weeks metoprolol). Subjects in both the acupuncture group and the control group receiving medical care, further reported improved pain control than in subjects under medical care alone. Interestingly, these randomized controlled trials showed acupuncture to be more effective at treating pain than control groups receiving no pain treatment, control groups receiving pharmacological treatments, and proved to be the most effective when used in combination with medical care. These trials showed acupuncture to be especially effective in reducing pain in arthritis patients (Chen, Bassi, & Yang, 2019).

An interesting case study by Rudra, Gordin, and Xu (2020) published recently in January of 2020, showed results on how acupuncture helped rapidly reduce headache pain in a situation of medication overuse headache. Medication overuse headaches are chronic headaches caused by the overuse of analgesic and anti-headache medications. The patient presented in the case study was a 36-year-old Caucasian female on 140mg of oxycodone per day in order to help manage pain associated with her daily headaches. Before trying acupuncture, the patient rated headache intensity as a 10/10 with photophobia, phonophobia, and nausea. Upon the thirty-minute session, the patient's pain improved from a 10/10 to a 1/10 with photophobia resolution. The patient reported a better night's sleep and no headache the following day. Upon discharge, her opioid requirement decreased by 72% from her prior baseline. This case study proves acupuncture to be efficient in reducing headache pain which is prevalent since 1/6 Americans are affected by a migraine or headache in a 3-month time period. It also suggests acupuncture should be considered as a primary treatment in managing chronic headaches and migraine disorders in order to reduce medication overuse related headaches (Rudra, Gordin, & Xu, 2020).
Combatting the Opioid Crisis

Roughly 42,000 deaths in 2016 were due to opioid overdoses. Approximately 40% of deaths involved a prescription opioid and that number is only continuing to grow, making it an epidemic crisis across America (Public Affairs, n.d.). The NCCAO Advocacy works to raise awareness of the opioid crisis and is engaged on expanding access to acupuncture for opioid-use disorder patients as a primary treatment for chronic pain (National Certification Commission for Acupuncture and Oriental Medicine, n.d.). The NCCAOM and other partner associations have been effective at standing for their cause, because on January 21, 2020, for the first time ever, the Centers for Medicare and Medicaid Services (CMS) announced coverage for acupuncture in individuals with chronic low back pain that has persisted for 12 weeks or longer. CMS announced coverage for 12 visits in 90 days, with a limit of 20 covered acupuncture treatments in a year. This is the first step in supporting opioid reduction and combatting the opioid crisis (Young, 2020).

According to literature, not only could acupuncture be used as a primary treatment for chronic pain management, but if worked effectively, acupuncture could also alleviate symptoms from the heroin withdrawal process which would reduce the chances of relapse in addicts during drug abstinence (Wu, Leung, & Yew, 2016). Acupuncture could have the potential of breaking the opioid abuse cycle in this way. Research from experiments conducted in China in the Acupuncture for Detoxification in Treatment of Opioid Addiction journal, psychological symptoms, such as cravings, anxiety, depression, and sleep disturbance to be some of the strongest factors contributing to the relapse from heroin. Results showed acupuncture to decrease symptoms of anxiety, depression and sleep disturbance, but not in cravings. Electrical acupuncture was found to accelerate endorphin and encephalin production in the body.
accelerated production of these neurotransmitters had a positive linkage on allaying opioid-associated depression and anxiety since those neurotransmitters act as natural pain killers and mood boosters. Transcutaneous electrical acupoint stimulation showed to exert an immediate sleep-inducing effect in a third of heroin addicts, which decreases a chance of sleep disturbance, which are common in the heroin withdrawal process. Acupoint Neiguan, (PC-6), which is located 3 finger breadths below the wrist on the inner forearm, was the most effective point for management of psychological symptoms in heroin addiction treatment [see Appendix E]. Further research needs to be done, but acupuncture shows good potential in breaking the heroin abuse cycle by alleviating common withdrawal symptoms (Wu, Leung, & Yew, 2016).

Discussion

Before doing research on acupuncture, I had many misconceptions about it. I had heard that it is nothing more than a placebo, only works on the mind, and that it is only popular among Asian cultures. After doing extensive research, I have come to realize that acupuncture is quite effective in managing many health conditions, especially ones involving pain, and is not the quackery and placebo it has been made out to be. Since endorphins and enkephalins are released due to the stimulus produced from the insertion of the needle, I learned there is quite a bit of science involved and that acupuncture is not just mind trickery. The fact that acupuncturists have to strategically place needles on the body and know the exact locations in order to alleviate pain symptoms, showed me how complex of a science acupuncture really was. What surprised me the most, is that research supports acupuncture to have positive impacts on alleviating pain, and yet opioids and narcotics are still the primary treatment, even with the opioid crisis claiming more and more deaths every year. Not only do I find acupuncture to be a positive referral for chronic pain individuals, but I also feel that acupuncture could potentially be the solution for...
ACUPUNCTURE FOR CHRONIC PAIN MANAGEMENT

preventing opioid abuse from occurring and stopping opioid abusers from using. Acupuncture looks promising as it does not have the life-threatening adverse effects that opioid medications do and because it is beginning to be recognized by our government as a potential referral. The fact that, as of this year, acupuncture is getting covered by the CMS shows that it is gaining popularity in Western culture and is not just used in Asian cultures. Hopefully further studies on acupuncture will take place in order for it to integrate more into American medicine.

Closing Statement

Even though looked down upon as a pseudoscience or just a holistic care approach, acupuncture has a lot more to do with the physical body than its rep leads on. It is more than mindless placing of needles on the body to help spiritual energy. Evidence from literature portrays how effective it is at treating different types of pain and should be reasonably considered as a referral option, especially in a time when opioid narcotic medications are creating more harm than good in America. As a soon to be a practicing nurse, I look forward to advocating for chronic pain patients and educating others about acupuncture.
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<table>
<thead>
<tr>
<th>Location</th>
<th>Energy</th>
<th>Internal Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm</td>
<td>Yin</td>
<td>1. Heart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Lung</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Pericardium</td>
</tr>
<tr>
<td></td>
<td>Yang</td>
<td>1. Small intestine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Large intestine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. San Jiao (triple burner)</td>
</tr>
<tr>
<td>Leg</td>
<td>Yin</td>
<td>1. Liver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Kidney</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Spleen</td>
</tr>
<tr>
<td></td>
<td>Yang</td>
<td>1. Urinary bladder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Gall bladder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Stomach</td>
</tr>
</tbody>
</table>
## Appendix B - Most Common Acupoints

<table>
<thead>
<tr>
<th>Accupoint</th>
<th>Channel/Meridian</th>
<th>Location</th>
<th>Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST36</td>
<td>Stomach</td>
<td>Front of the leg and below the knee</td>
<td>Digestive disorders, immune deficiency, fatigue and a variety of other illnesses.</td>
</tr>
<tr>
<td>SP6</td>
<td>Spleen</td>
<td>Inner side of the leg above the ankle</td>
<td>Hormonal disorders like irregular menstruation, digestion and immune disorders</td>
</tr>
<tr>
<td>LV3</td>
<td>Liver</td>
<td>Top of the foot and between the second and first toes</td>
<td>Point treats headaches, is used to balance emotional energy, regulate menstruation and reduce high blood pressure</td>
</tr>
<tr>
<td>GV20</td>
<td>Governing Vessel</td>
<td>Top of the head</td>
<td>This point treats vertigo, ear and nasal disorders and various mental disorders.</td>
</tr>
<tr>
<td>CV12</td>
<td>Conception Vessel</td>
<td>Midway between the breastbone and the navel</td>
<td>Digestive disorders and harmonizes the intestines</td>
</tr>
<tr>
<td>CV6</td>
<td>Conception Vessel</td>
<td>Approximately 1.5 inches below the navel</td>
<td>Treats exhaustion</td>
</tr>
<tr>
<td>LI14</td>
<td>Large Intestine</td>
<td>Back side of the hand between the thumb and first finger</td>
<td>Activates the immune system and helps pain, especially in the face</td>
</tr>
<tr>
<td>KI3</td>
<td>Kidney</td>
<td>Behind the inner ankle</td>
<td>Treats asthma, insomnia, sore throat and lower back pain</td>
</tr>
</tbody>
</table>

(Won Institute of Graduate Studies, 2018)
Appendix C - Needle Size

Matchstick - 4.2mm

Medical Syringe - 2.9mm

Sewing Needle - 1mm

Acupuncture Needle - 0.25mm

(Natural Health Improvement Center, 2020)
Appendix D- Constant Murley Score Inventory

### Constant Murley Score - Patient Completed Portion

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
   - The range of motion is measured from the scapula to the spinous process.
   - The scores are as follows:
     - 0-20: 3 points
     - 21-40: 2 points
     - 41-60: 1 point
     - 61-80: 0 points

B. Activities of daily living (max 20 points)
   - 1. Sleep: Points are given in parenthesis
     - 0 points
     - 1 point
     - 2 points
   - 2. Normal daily living: The score is given by measuring the distance (in cm) from the site of the injury to the spinous process.
     - 0 cm: 4 points
     - 5 cm: 3 points
     - 10 cm: 2 points
     - 15 cm: 1 point
     - 20 cm: 0 points

C. Movement (max 40 points)
   - 1. Forward and lateral elevation: Points are given in parenthesis
     - 0 points
     - 1 point
     - 2 points
   - 2. External rotation: Points are given in parenthesis
     - 0 points
     - 1 point
     - 2 points
   - 3. Internal rotation: Points are given in parenthesis
     - 0 points
     - 1 point
     - 2 points

D. Strength (max 25 points)
   - 1. Strength is measured by the dynamometer.
   - 2. The scores are as follows:
     - 0-20: 3 points
     - 21-40: 2 points
     - 41-60: 1 point
     - 61-80: 0 points

### Constant Murley Score - Physiotherapist Completed Portion

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
   - The range of motion is measured from the scapula to the spinous process.
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     - 2 points
   - 3. Internal rotation: Points are given in parenthesis
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     - 2 points

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   - 2. The scores are as follows:
     - 0-20: 3 points
     - 21-40: 2 points
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     - 61-80: 0 points

### Constant Murley Score Completed by Physiotherapist

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
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     - 2 points
   - 3. Internal rotation: Points are given in parenthesis
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     - 2 points

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     - 21-40: 2 points
     - 41-60: 1 point
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### Constant Murley Score Completed by Physiotherapist

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
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   - The scores are as follows:
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     - 21-40: 2 points
     - 41-60: 1 point
     - 61-80: 0 points

### Constant Murley Score Completed by Physiotherapist

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
   - The range of motion is measured from the scapula to the spinous process.
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   - 2. The scores are as follows:
     - 0-20: 3 points
     - 21-40: 2 points
     - 41-60: 1 point
     - 61-80: 0 points

### Constant Murley Score Completed by Physiotherapist

**Scoring Instructions:**

A. Pain (max 13 points)
   - Points are calculated by the equation: \( P = 3 \times (K - 5) \times \text{Range of motion (in degrees)} \)
   - The range of motion is measured from the scapula to the spinous process.
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     - 0-20: 3 points
     - 21-40: 2 points
     - 41-60: 1 point
     - 61-80: 0 points

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   - 1. Sleep: Points are given in parenthesis
     - 0 points
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     - 41-60: 1 point
     - 61-80: 0 points
Appendix E – Acupoint Neiguan (PC-6)

(Revett, 2017)
Acupuncture for Chronic Pain Management

A Capstone Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Honors

Department Of

Nursing

By

Arianna Arden

DeKalb, Illinois

Spring 2020
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