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Acupuncture: A Comparison Study of Sham Acupuncture, Traditional Chinese Acupuncture and Current Practice Guidelines for the Treatment of Chronic Musculoskeletal Pain in Adults

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Abstract

- **Chronic pain is one of the most difficult conditions to treat**.
  - Close monitoring of controlled medications
  - Unnecessary, expensive surgeries
- Alternatives to medication is increasingly necessary.
- Integrative medicine incorporates traditional western medicine with unconventional therapies, such as acupuncture.
  - Evaluate the treatments' efficacy for chronic neck and back pain by evaluating meta-analysis studies and randomized controlled trials.
- Physiology is a large component of understanding how and if the acupuncture works.
  - Non-invasive functional magnetic resonance imaging
  - Neurotransmitters and their response to acupuncture
- **Acupuncture therapy for improvement of chronic musculoskeletal pain**

Introduction

- Musculoskeletal pain is the top presenting problem in Emergency Departments.
- Large percentage develops into chronic pain conditions.
- **Primary care has become the epicenter for managing chronic musculoskeletal pain**.
- Limited treatment options; pain medication, physical therapy and surgery
- **Investing in integrative therapies such as acupuncture may provide additional treatment options**.

Statement of the Problem

- Chronic musculoskeletal pain is difficult to treat.
- **Current practice guideline leads to prescription medication overuse and ineffective surgeries.**
- Identify therapies that **provide patient with safe and effective improvement in their pain** is important for better patient outcomes.

Research Question

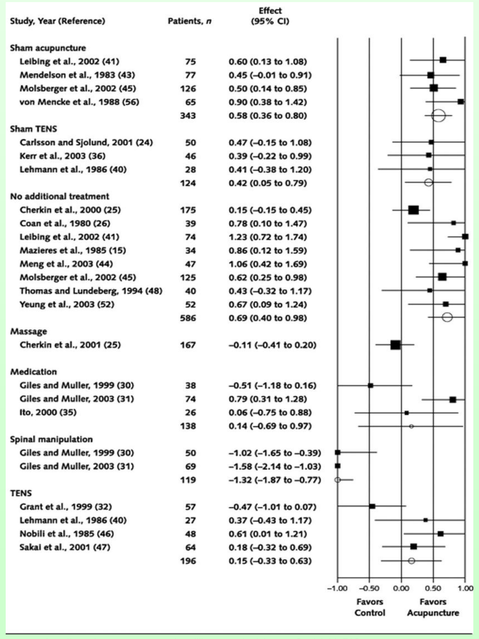
- In adult patients with chronic musculoskeletal pain, do therapies in integrative medicine such as traditional Chinese acupuncture improve pain compared to traditional western medicine?

Pathophysiology

- The gate control theory is a balance of impulses transmitted to the spinal cord via large A-delta and small C fibers.
- Excitatory neurotransmitters **glutamate and aspartate, displace magnesium ions causing sensitization and excitability in the central nervous system.**
- Release of inhibitory neurotransmitters including **GABA, glycine, norepinephrine and serotonin leads to inhibition of pain.**
- Changes in sensitivity of neurons, lead to a **lower stimulation threshold**. Regenerating peripheral nerves leads to **spontaneous impulses**. Alterations in the dorsal root ganglion in **response to peripheral nerve injury and neurotransmitters, leads to reorganization of nociceptive pain.**

Literature Review

- Cherkin, 2009, performed an eight week randomized control study of 477 adults.
  - At 8 weeks, functionality scores for individualized, standardized, and simulated acupuncture groups improved by 4.4, 4.5, and 4.4 points compared to 2.1 points for patients receiving usual care.
  - At 52 weeks, the usual care group had significantly more participants report decreasing their activity.
  - **Decreased medication use to 47% in the real and simulated acupuncture groups compared to 59% in the usual care group**
- Brinkhaus, 2006, performed a randomized, control, multicenter trial of 298 adult patients, ages 40-75 years.
  - Found no statistical significance between acupuncture and minimal acupuncture (P=0.26), did find a statistical significance between acupuncture and the control group (P=<.001)
  - Most commonly reported adverse events were **hematoma** and **bleeding.**
- Witt et al., 2006 performed a study with 11,630 subjects.
  - The **absolute risk reduction was 25.8%**, and the **number needed to treat was 4.**
- Haake, 2007, A randomized, multicenter, blinded, parallel-group trial was conducted using 1,162 adult subjects.
  - Comparing groups for pain improvement:
    - Chinese acupuncture vs. sham therapy, 3.4% (P = .39)
    - Chinese acupuncture vs. conventional therapy, 20.2% (P < .001)
    - Sham vs. conventional therapy, 16.8% (P < .001)
  - **Chinese acupuncture is not superior to sham acupuncture.**
  - **Both true and sham acupuncture is statistically significant compared to conventional therapy.**
- Manheimer, 2005, performed a systematic review of 33 studies.
  - **Acupuncture was found more effective than sham therapy.**
  - **Acupuncture more effective than no additional treatment**
  - Dose of acupuncture is important; longer treatment session doesn't prove to be more beneficial for patient outcomes. **The use of electricity can improve outcomes, along with the number of sessions.**



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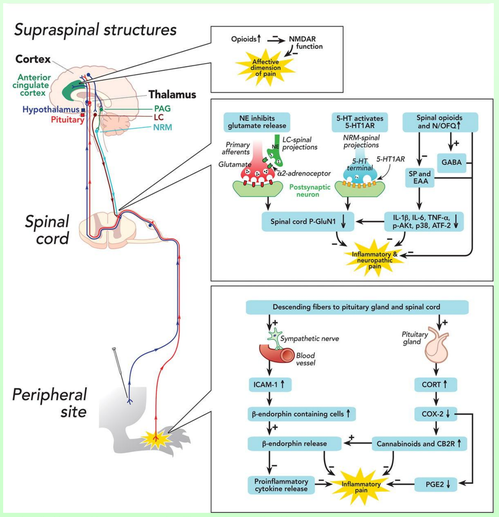
Discussion

- Comparing traditional Chinese acupuncture to traditional western therapy for chronic musculoskeletal pain
  - Cherkin et al. (638 participants) and Haake et al. (1,162 participants), found **statistical significance for improvement in function and pain**.
  - Thomas and colleagues, 2006, found only clinical significance, through a smaller sample size of 241 participants
- Comparing sham acupuncture to traditional western therapy for chronic musculoskeletal pain
  - Cherkin, 2009, and Haake, 2007, found **sham acupuncture was statistically superior to medical management.**
  - Cherkin et al. used toothpicks in a needle guidetube, while Haake et al. used superficial needling in non-acupuncture points.
- Comparing traditional acupuncture to sham acupuncuture for chronic musculoskeletal pain
  - Brinkhaus (2006), Haake and Cherkin, all Randomized Control Trials demonstrated similar findings, **traditional acupuncture to be no more effective than sham acupuncture**.
  - Vickers, 2012, and Manheimer, 2005, who discuss through Systematic Reviews that **traditional acupuncture is statistically significant for effectiveness compared to sham acupuncture** for the treatment of pain.
    - This research of comparing a sham form of acupuncture to traditional Chinese acupuncture is controversial.
      - It is not fully understood what is physiologically occurring in the body.
      - The use of functional magnetic resonance imaging to understand the process, is being done on small scales.
- Napadow, 2009, demonstrated both traditional acupuncture and simulated acupuncture activated sensory motor areas of the brain.
  - **Traditional acupuncture produced responses in the limbic regions** including the amygdala, hippocampus and several brainstem regions, **areas of the brain where large amounts of opioid receptors, enkephalins terminals, B-endorphin terminals, serotonin, dopamine and noradrenaline** are located.
  - Only traditional acupuncture produced a bimodal response of early activation and transitional to a delayed deactivation of the amygdala, hippocampus, substantia nigra.



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Applicability to Clinical Practice

- Acupuncture as a therapy that can be **an adjunct** to a variety of other therapies.
  - **Improving patients pain, by including other modalities such as chiropractic manipulation and massage**.
  - With minimal adverse effects, acupuncture is a safe addition to the treatment plan.
- By incorporating integrative medicine into a traditional western medicine practice
  - **Open up many avenues for treating an individual's pain**
- Patients who would benefit from acupuncture treatments:
  - Those who have **exhausted all treatment options** used in traditional medical settings
  - **Preventative treatment**, balancing the person and getting them to a state of deqi
- Downfalls of this treatment:
  - **Difficulty finding a practitioner** that has studied and gone through proper practical training in traditional acupuncture
  - Private practices, not associated with a medical entity
  - Acupuncture is **not covered by insurance** in many states.

References

- Brinkhaus, B., Witt, C. M., Jena, S., Linde, K., Streng, A., Wagenpfeil, S., . . . Willich, S. N. (2006). Acupuncture in patients with chronic low back pain: A randomized controlled trial. *Archives of Internal Medicine, 166*(4), 450-457. doi:166/4/450 +AFs-pii+AF0-
- Chae, Y., Chang, D. S., Lee, S. H., Jung, W. M., Lee, I. S., Jackson, S., . . . Wallraven, C. (2013). Inserting needles into the body: A meta-analysis of brain activity associated with acupuncture needle stimulation. *The Journal of Pain : Official Journal of the American Pain Society, 14*(3), 215-222. doi:10.1016/j.jpain.2012.11.011 [doi]
- Cherkin, D. C., Sherman, K. J., Avins, A. L., Erro, J. H., Ichikawa, L., Barlow, W. E., . . . Deyo, R. A. (2009). A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. *Archives of Internal Medicine, 169*(9), 858-866. doi:10.1001/archinternmed.2009.65 [doi]
- Furlan, A. D., van Tulder, M., Cherkin, D., Tsukayama, H., Lao, L., Koes, B., & Berman, B. (2005). Acupuncture and dry-needling for low back pain: An updated systematic review within the framework of the cochrane collaboration. *Spine, 30*(8), 944-963. doi:00007632-200504150-00018 [pii]
- Haake, M., Muller, H. H., Schade-Brittinger, C., Basler, H. D., Schafer, H., Maier, C., . . . Molsberger, A. (2007). German acupuncture trials (GERAC) for chronic low back pain: Randomized, multicenter, blinded, parallel-group trial with 3 groups. *Archives of Internal Medicine, 167*(17), 1892-1898. doi:167/17/1892 +AFs-pii+AF0-
- Huang, W., Pach, D., Napadow, V., Park, K., Long, X., Neumann, J., . . . Witt, C. M. (2012). Characterizing acupuncture stimuli using brain imaging with FMRI--a systematic review and meta-analysis of the literature. *PloS One, 7*(4), e32960. doi:10.1371/journal.pone.0032960 [doi]
- Hui, K. K., Marina, O., Liu, J., Rosen, B. R., & Kwong, K. K. (2010). Acupuncture, the limbic system, and the anticorrelated networks of the brain. *Autonomic Neuroscience : Basic & Clinical, 157*(1-2), 81-90. doi:10.1016/j.autneu.2010.03.022 [doi]
- Kelly, R. B. (2009). Acupuncture for pain. *American Family Physician, 80*(5), 481-484.
- MacPherson, H., Maschino, A. C., Lewith, G., Foster, N. E., Witt, C. M., Vickers, A. J., & Acupuncture Trialists' Collaboration. (2013). Characteristics of acupuncture treatment associated with outcome: An individual patient meta-analysis of 17,922 patients with chronic pain in randomised controlled trials. *PloS One, 8*(10), e77438. doi:10.1371/journal.pone.0077438 [doi]
- Manheimer, E., White, A., Berman, B., Forys, K., & Ernst, E. (2005). Meta-analysis: Acupuncture for low back pain. *Annals of Internal Medicine, 142*(8), 651-663. doi:142/8/651 [pii]
- Mao, J. J., & Kapur, R. (2010). Acupuncture in primary care. *Primary Care, 37*(1), 105-117. doi:10.1016/j.pop.2009.09.010 [doi]
- Napadow, V., Dhond, R., Park, K., Kim, J., Makris, N., Kwong, K. K., . . . Hui, K. K. (2009). Time-variant fMRI activity in the brainstem and higher structures in response to acupuncture. *Neuroimage, 47*(1), 289-301. doi:10.1016/j.neuroimage.2009.03.060 [doi]
- Thomas, K. J., MacPherson, H., Thorpe, L., Brazier, J., Fitter, M., Campbell, M. J., . . . Nicholl, J. (2006). Randomised controlled trial of a short course of traditional acupuncture compared with usual care for persistent non-specific low back pain. *BMJ (Clinical Research Ed.), 333*(7569), 623. doi:bmj.38878.907361.7C [pii]
- Vickers, A. J., Cronin, A. M., Maschino, A. C., Lewith, G., MacPherson, H., Foster, N. E., . . . Acupuncture Trialists' Collaboration. (2012). Acupuncture for chronic pain: Individual patient data meta-analysis. *Archives of Internal Medicine, 172*(19), 1444-1453. doi:10.1001/archinternmed.2012.3654 [doi]
- Witt, C. M., Jena, S., Selim, D., Brinkhaus, B., Reinhold, T., Wruck, K., . . . Willich, S. N. (2006). Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic low back pain. *American Journal of Epidemiology, 164*(5), 487-496. doi:kwj224 [pii]
- Zhang, R., Lao, L., Ren, K., & Berman, B. M. (2014). Mechanisms of acupuncture-electroacupuncture on persistent pain. *Anesthesiology, 120*(2), 482-503. doi:10.1097/ALN.0000000000000101 [doi]

Thank You

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