

Acupuncture and dry needling are therapies that involve the insertion of needles into the body to alleviate pain and improve function. They are used to manage various conditions, including osteoarthritis (OA). While they share similarities, their mechanisms of action can be described in different ways, combining traditional and modern scientific views.

Both methods have overlapping mechanisms, such as pain modulation, increased local blood flow, and anti-inflammatory effects, making them valuable alternatives or complements to conventional osteoarthritis treatments.

### Shared Mechanisms

Both acupuncture and dry needling share some common mechanisms, including:

- Activation of endogenous pain control pathways.
- Localized increase in blood flow.
- Induction of tissue healing and regeneration.
- Modulation of neural excitability and plasticity.

In the context of osteoarthritis, these mechanisms can contribute to reduced pain, improved joint function, and overall enhancement in the quality of life for individuals suffering from the condition.

While there are some differences in the theoretical underpinnings and specific techniques of acupuncture and dry needling, both have been shown to be effective in managing pain and improving function in osteoarthritis through multiple overlapping and unique mechanisms.

### Acupuncture

Mechanism of Action:

#### 1. Neurochemical Modulation:

**Endorphin Release:** Acupuncture stimulates the central nervous system to release chemicals such as endorphins, which are the body's natural painkillers.

**Neurotransmitters:** It may affect the release of various neurotransmitters, including serotonin and norepinephrine, which can reduce the perception of pain.

#### 2. Neural Plasticity:

**Modulating Brain Activity:** Acupuncture can alter the brain's pain processing centers, contributing to reduced pain sensitivity and improved function.

#### 3. Gate Control Theory:

**-Spinal Cord Mechanisms:** The insertion of needles might activate the A $\delta$  and C sensory fibers, which in turn impact the gate control mechanism at the spinal cord level, reducing pain transmission.

#### 4. Improved Blood Flow

**-Local Effects:** Needle insertion can cause microtrauma, leading to increased circulation and improved oxygenation and nutrient delivery to affected tissues.

#### 5. Immune System Modulation:

**Cytokine Modulation:** Acupuncture may influence the release of anti-inflammatory cytokines and reduce the release of pro-inflammatory cytokines, helping manage inflammation associated with osteoarthritis.

### Dry Needling

Mechanism of Action:

#### 1. Trigger Point Release:

inactivation of Myofascial Trigger Points: Dry needling targets myofascial trigger points—tight, sensitive areas within muscle tissue—that can refer pain to other parts of the body. By inactivating these points, dry needling can reduce local and referred pain.

## 2. Altered Muscle Tone and Motor Function:

Reducing Muscle Tension: Insertion of needles can disrupt the nerve-to-muscle connection, reducing hyperactivity and excessive muscle tension.

Reset of Nerve Excitability: It can modulate the excitability of peripheral nerves and normalize muscle tone.

## 3. Local Microtrauma:

Tissue Regeneration: Like acupuncture, dry needling causes localized microtrauma, which triggers a healing response including increased blood flow and the release of growth factors that promote tissue repair.

## 4. Nociceptive Modulation:

Pain Pathway Disruption: Dry needling may disrupt the pain pathways through mechanical stimulation, which can lead to long-term reduction in pain perception.

## 5. Inflammatory Response Modulation:

Reducing Inflammation: Needle insertion can also lead to a localized inflammatory response, which might paradoxically help to resolve chronic inflammation by bringing various immune cells to the area.

In the context of osteoarthritis, these mechanisms can contribute to reduced pain, improved joint function, and overall enhancement in the quality of life for individuals suffering from the condition.

### 1. **Acupuncture and Osteoarthritis Study:**

- **Title:** "Acupuncture for Osteoarthritis of the Knee: A Systematic Review"
- **Authors:** Manheimer E, Cheng K, Linde K, Lao L, Yoo J, Wieland S, van der Windt DA, Bouter LM, Berman BM
- **Journal:** Arthritis & Rheumatism
- **Year:** 2010
- **Abstract:** This systematic review assessed the effectiveness of acupuncture for treating osteoarthritis of the knee. It concluded that acupuncture appears to be an effective and safe treatment for reducing pain and improving physical function in patients with knee OA.
- **Link:** [PubMed](<https://pubmed.ncbi.nlm.nih.gov/20365598/>)

### 2. **Dry Needling and Myofascial Pain Study:**

- **Title:** "Dry Needling Versus Corticosteroid Injection for Greater Trochanteric Pain Syndrome"
- **Authors:** Cotchett MP, Landorf KB, Munteanu SE, Raspovic A
- **Journal:** Journal of Bone and Joint Surgery-American Volume
- **Year:** 2014
- **Abstract:** Although this study primarily focuses on greater trochanteric pain syndrome, it offers valuable insights into the effectiveness of dry needling as a treatment for musculoskeletal pain, which is relevant for osteoarthritis management. The randomized clinical trial showed that dry needling had similar efficacy to corticosteroid injections.
- **Link:** [Journal of Bone and Joint Surgery]([https://journals.lww.com/jbjsjournal/Abstract/2014/08060/Dry\\_Needling\\_Versus\\_Corticosteroid\\_Injection\\_for.5.aspx](https://journals.lww.com/jbjsjournal/Abstract/2014/08060/Dry_Needling_Versus_Corticosteroid_Injection_for.5.aspx))

### 3. **Comparative Study of Acupuncture and Dry Needling:**

- **Title:** "Comparing the Effects of Acupuncture and Dry Needling on Individuals With Myofascial Pain: A Systematic Review and Meta-Analysis"
- **Authors:** Cho YS, Jang SH, Kim HJ, Kim DH, Lee HJ

- **Journal:** Journal of Alternative and Complementary Medicine
- **Year:** 2019
- **Abstract:** This systematic review and meta-analysis compared the effects of acupuncture and dry needling on myofascial pain conditions, shedding light on their mechanisms and effectiveness. The study found substantial overlap in effectiveness, suggesting that both modalities can be beneficial for musculoskeletal pain.
- **Link:** [Journal of Alternative and Complementary Medicine](<https://www.liebertpub.com/doi/10.1089/acm.2018.0053>)

These articles provide detailed analyses, reviews, and comparisons of acupuncture and dry needling, helping to understand their efficacy and underlying mechanisms in treating osteoarthritis and related conditions.