

# Acupuncture Beats Drug For Knee Arthritis Relief

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Acupuncture combined with moxibustion is more effective for the treatment of knee osteoarthritis than meloxicam (a nonsteroidal anti-inflammatory drug). Researchers from Shanghai University of Traditional Chinese Medicine quantified the curative effect of warm needle acupuncture using micro-CT (computed tomography). [1] In the study, acupuncture combined with moxibustion successfully improves the condition of the osteoarthritic knee bone structure. In addition, knee cartilage scores document that

acupuncture with moxibustion reduces inflammation and accelerates knee cartilage repair.

Knee osteoarthritis is characterized by degeneration of articular cartilage, intra-articular inflammation with synovitis, and remodeling of periarticular and sub-chondral bone. [2] It is a major cause of pain and disability and is also one of the most common musculoskeletal disorders. [3] In addition, the increased prevalence of the disease is proportional to increases in the obesity epidemic. [4]

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used drugs for the treatment of knee osteoarthritis (KOA). While effective for pain management, the downside is that NSAIDs can lead to heartburn, indigestion, stomach ulcers, hypogonadism, and skin rashes. [5] In China, warm needle acupuncture is widely used for treating KOA. In this study, the researchers note that “In the early stages of KOA, warm needle acupuncture not only relieves pain, but also accelerates bone tissue repair.” The researchers conclude that “Warm needle acupuncture is safe and effective for the treatment of KOA.”

In this randomized study, 40 experimental rats were divided into 4 groups: a control group (n=10), a KOA model group (n=10), a medication group (n=10), and a warm needle acupuncture group (n=10). With the exception of the control group, the other three groups underwent surgery to create a KOA model. The medication group received intragastric administration of meloxicam, once per day, for 20 consecutive days. Meloxicam is an NSAID used to treat pain and inflammation caused by osteoarthritis. The warm needle acupuncture group was treated with acupuncture and moxibustion at bilateral Xiyan (ST35 Dubi and Neixiyan), once per day, for 20 consecutive days. The KOA model group did not receive any treatment.

## Micro-CT Imaging

High-resolution micro-computed tomography (micro-CT) imaging has been established as the gold standard for assessing the morphology of calcified tissue. [6] Micro-CT has many advantages, including providing direct visualization of the whole joint as well as quantification of parameters such as articular cartilage volume and surface area. [7] The disadvantage of micro-CT is that it doesn't effectively image uncalcified soft tissue such as cartilage. [8]

In this study, the researchers used the imaging technology to quantify the two dimensional and three dimensional changes of the knee bone. After validating the rat KOA model using established technology, Zhang et al. scanned the knee joints in situ and analyzed the samples in two different ways. First, the researchers observed the samples in 2-D views for morphological changes. In this first phase, the Region of Interest (ROI) involves the tibial intercondylar eminence, femoro-patellar joint space, and the lateral aspect of the patella. In medical imaging, ROI is a selected area of the whole image identified for a particular purpose. Second, they reconstructed the knee joint in 3-D views. In the second phase, ROI includes the femoral condyle and tibial plateau.

After 2-D scanning of the knee joint, the control group showed a smooth intercondylar eminence, normal joint space, and a healthy lateral aspect of the patella. The KOA model group displayed an edgy intercondylar eminence, narrowed joint space, and thickened lateral aspect of the patella. For the medication group, the imaging results were like that of the KOA model group. For the warm needle acupuncture group, the imaging results were closer to that of the control group. After comparing different groups, the researchers concluded that warm needle acupuncture outperformed meloxicam for knee bone repair.

In a 3-D presentation, the control group displayed a smooth joint surface and no bone loss. The KOA model group showed obvious bone loss. The reconstruction results of the medication group were closer to that of the KOA model group. For the warm needle acupuncture group, the results were closer to that of the control group, indicating that warm needle acupuncture provides a significant bone healing effect.

### **Macroscopic Grading of Cartilage Changes**

The cartilage area of the femoral condyle and tibial plateau was measured and graded based on a 0 – 4 scaling assessment: 0 = surface appears normal, 1 = minimal fibrillation or a slight yellowish discoloration of the surface, 2 = erosion extending into superficial or middle layers, 3 = erosion extending into the deep layers, 4 = erosion extending to the subchondral bone. [9]

For scoring of cartilage changes, the KOA model group, medication group, and acupuncture group were more impacted than the control group ( $P < 0.01$ ). However, the medication group and the acupuncture group were less impacted than the KOA model group ( $P < 0.05$ ). Importantly, the acupuncture group was significantly less impacted than the medication group ( $P < 0.05$ ). The researchers concluded that warm needle acupuncture has a superior effect for knee cartilage repair when compared with meloxicam.

### **Acupuncture Procedure**

The acupoint pair used in this study is Xiyan. Treatment commenced with the knee at a 45 degree angle. Upon disinfection, needles were inserted to a depth of 5 mm. Once a deqi sensation was obtained, the needles were retained and moxibustion was applied.

Moxa cigar cuttings were attached to each needle handle and kept 2 – 3 cm above the skin. It is noted that moxa is best ignited from the bottom to ensure an optimal warming effect and then left in place to self-extinguish. [10] A total of two moxa cigar cuttings were used during the treatment session.

### **Traditional Chinese Medicine**

The researchers cited the ancient historical roots behind the protocol used in the study. In TCM (Traditional Chinese Medicine), KOA is in the scope of Gu Bi (translated as bone impediment). According to the *Huangdi Neijing (Yellow Emperor's Classic of Medicine)*, Gu Bi is caused by the congestion of wind, cold, and dampness. The root cause of the disease is liver and kidney deficiency. The treatment principle is to tonify the liver and kidneys, and to alleviate the congestion of the exogenous pathological factors.

Warm needle acupuncture is a combination of acupuncture and moxibustion. This needling technique invigorates blood circulation, transforms stasis, warms the meridians, and relieves pain. Previous studies demonstrate that warm needle acupuncture is beneficial to patients for the treatment of KOA. [11] In the *Jing Yue Quan Shu (Jing-Yue's Complete Compendium)*, it is written that “Impediments are worsened by cold, but relieved by heat.” In the *Qian Jin Yao Fang (A Thousand Gold Pieces Formulary)*, a special moxibustion technique called Zhong Zhi (translated as heavy moxibustion) is mentioned. This technique requires the use of large amounts of moxa cigar cuttings during one single treatment session and provides a significant curative action. In this study, two moxa cigar cuttings were used on the laboratory animals. The researchers note that “the effectiveness equals using 28 moxa cigars on human patients, which is an example of Zhong Zhi.”

The research team cited previous research to explain the anti-inflammatory actions of acupuncture. [12] They note that warm needle acupuncture influences the expression of transforming growth factor beta 1 (TGF- $\beta$ 1), osteoprotegerin (OPG, osteoclastogenesis inhibitory factor), basic fibroblast growth factor (bFGF), and insulin-like growth factor 1 (IGF-1). Healthy regulation of these protein levels plays an important role in promoting cartilage repair and chondrocyte proliferation.

The researchers conclude that acupuncture with moxibustion is effective for the alleviation of KOA. In addition, warm needle acupuncture outperforms meloxicam. Patients interested in learning more are encouraged to contact local licensed acupuncturists.

## References

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