

# Feasibility Analysis of the Clinical Application of Buccal Acupuncture in Osteoarthritis

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**Abstract:** As an emerging acupuncture treatment, buccal acupuncture therapy has demonstrated promising clinical efficacy in the management of knee osteoarthritis (KOA). KOA is a prevalent chronic degenerative joint disorder characterized by cartilage degeneration, joint space narrowing, and osteophyte formation, leading to pain, stiffness, and functional impairment. Current treatment approaches include pharmacological therapy, rehabilitation training, interventional procedures, and surgical interventions; however, these methods are often associated with adverse effects or high costs. In recent years, traditional Chinese acupuncture has become an important therapeutic option for KOA due to its high safety profile and minimal side effects. Buccal acupuncture therapy involves stimulating specific facial acupoints, such as Jiache (ST6) and Chengjiang (CV24), to regulate the nervous system, alleviate pain, and improve joint function. Studies indicate that buccal acupuncture, when combined with movement therapy, can significantly enhance knee joint mobility and provide rapid pain relief, achieving an overall effectiveness rate of up to 98% with minimal adverse reactions. Compared to traditional acupuncture, minimally invasive needle-knife therapy, or pharmacological treatment, buccal acupuncture offers advantages such as simplified acupoint selection and high patient compliance, making it a suitable adjunctive treatment for KOA. Further large-scale randomized controlled trials are needed to validate its long-term efficacy and underlying mechanisms.

**Keywords:** Buccal Acupuncture Therapy, Osteoarthritis, Knee Osteoarthritis (KOA), Pain Management, Functional Improvement, Acupuncture Therapy.

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## 1. Introduction

Knee osteoarthritis (KOA) is a common chronic degenerative joint disease characterized by cartilage degeneration, progressive narrowing of the joint space, and osteophyte formation, ultimately leading to pain, stiffness, and functional impairment. KOA predominantly affects middle-aged and elderly individuals and is influenced by multiple factors, including genetics, obesity, inflammatory responses, and mechanical injury. Given the slow progression of KOA and the absence of a definitive cure, the primary clinical goals of treatment are to alleviate pain, improve joint function, and slow disease progression.

Current treatment options for KOA include pharmacological therapy (such as nonsteroidal anti-inflammatory drugs [NSAIDs]), rehabilitation training (such as physical therapy and muscle strengthening exercises), interventional treatments (such as hyaluronic acid injections), and surgical interventions (such as joint replacement). However, pharmacological treatments may lead to gastrointestinal damage, cardiovascular risks, and other adverse effects, while surgical procedures involve high costs and inherent risks. As a result, in recent years, acupuncture therapy in traditional Chinese medicine (TCM) has gained attention as a promising treatment option due to its high safety profile, minimal side effects, and applicability across different stages of KOA [1].

Buccal acupuncture is an emerging acupuncture technique that involves stimulating specific facial acupoints, such as Jiache (ST6) and Chengjiang (CV24), to regulate the nervous system and alleviate joint pain and dysfunction.

Studies have shown that buccal acupuncture, when combined with movement therapy, can enhance knee joint function and provide rapid pain relief in KOA patients. This study integrates relevant literature and clinical data to explore the feasibility and clinical efficacy of buccal acupuncture in the treatment of KOA.

## 2. Methods

### 2.1 Literature Sources

This study systematically reviewed and analyzed relevant literature from the CNKI database to explore the feasibility of buccal acupuncture therapy in the treatment of knee osteoarthritis (KOA) and to compare its efficacy with other treatment modalities.

### 2.2 Study Design

The study synthesized clinical data from the selected literature and focused on the following aspects:

**Sample Size:** The total sample size from multiple studies was considered to ensure the representativeness of the results.

**Treatment Methods:** A comparative analysis was conducted on the application of buccal acupuncture therapy, minimally invasive needle-knife therapy, traditional acupuncture, and pharmacological treatment in KOA management.

**Key Outcome Measures:** The effectiveness of each therapy was quantitatively assessed using the following indicators:

**Visual Analog Scale (VAS) Score:** To evaluate pain relief.

**Hospital for Special Surgery (HSS) Knee Score:** To assess knee joint function.

**Range of Motion (ROM) Improvement:** To measure knee joint mobility.

**Adverse Reaction Rate:** To determine the safety profile of each treatment.

### 2.3 Comparison of Buccal Acupuncture Therapy with Other Treatment Methods

#### 2.3.1 Clinical Efficacy Analysis of Buccal Acupuncture Therapy

**Table 1:** Comparison of the Clinical Efficacy of Buccal Acupuncture Therapy and Traditional Acupuncture Therapy for Knee Osteoarthritis (KOA)

Group	Sample Size (n)	Cure Rate (%)	Total Effectiveness Rate (%)	VAS Score Reduction	HSS Score Increase	ROM Improvement (°)	Adverse Reaction Rate (%)
Buccal Acupuncture Group	60	40.0	98.3	3.5 ± 1.2	14.4 ± 3.2	26.5 ± 4.1	1.7
Traditional Acupuncture Group	60	30.0	85.0	2.8 ± 1.4	10.5 ± 3.7	20.2 ± 3.8	5.0

As presented in Table 1, the data suggest that buccal acupuncture therapy is more effective than traditional acupuncture in improving cure rates, reducing pain, enhancing knee joint function, and increasing joint mobility, while also demonstrating a lower rate of adverse reactions.

#### 2.3.2 Comparison Between Minimally Invasive Needle-Knife Therapy and Buccal Acupuncture Therapy

**Table 2:** Comparison of Clinical Efficacy Between Minimally Invasive Needle Knife Therapy and Combination Therapy for Knee Osteoarthritis

Group	Sample Size (n)	Total Effectiveness Rate (%)	VAS Score Reduction	HSS Score Increase	ROM Improvement (°)	Adverse Reaction Rate (%)
Minimally Invasive Needle Knife + Acupotomy + Herbal Decoction	40	95	3.8 ± 1.1	15.2 ± 3.4	28.3 ± 3.9	5.0
Minimally Invasive Needle Knife	40	80	3.0 ± 1.3	12.0 ± 3.1	22.6 ± 3.5	10.0

As presented in Table 2, this table presents the clinical outcomes of a study comparing the efficacy of buccal acupuncture therapy combined with movement training versus traditional acupuncture therapy in the treatment of knee osteoarthritis (KOA). The study measured key indicators such as cure rate, total effectiveness rate, pain relief (VAS score reduction), knee function improvement (HSS score increase), range of motion (ROM) improvement, and adverse reaction rate. The results indicate that buccal acupuncture therapy demonstrates superior efficacy in improving knee function, alleviating pain, and increasing joint mobility, with a lower incidence of adverse effects.

### 2.3.3 Comparison Between Acupuncture Therapy and Pharmacological Treatment

**Table 3:** Comparison of Clinical Efficacy Between Acupuncture Therapy and Medication Therapy for Rheumatoid Arthritis

Group	Sample Size (n)	Total Effectiveness Rate (%)	VAS Score Reduction	CRP Reduction (mg/L)	HAQ Score Reduction	Adverse Reaction Rate (%)
Acupuncture Therapy	402	90	2.5 ± 1.2	8.1 ± 2.5	0.20 ± 0.05	3
Medication Therapy	394	75	2.0 ± 1.3	5.0 ± 2.1	0.10 ± 0.03	12

As presented in Table 3, this table compares the clinical outcomes of acupuncture therapy and medication therapy for rheumatoid arthritis. Key evaluation indicators include:

Total Effectiveness Rate (%) – The proportion of patients who showed improvement.

VAS Score Reduction – The decrease in pain levels as measured by the Visual Analog Scale (VAS).

CRP Reduction (mg/L) – The decrease in C-reactive protein (CRP), indicating reduced inflammation.

HAQ Score Reduction – The improvement in the Health Assessment Questionnaire (HAQ), which measures physical function.

Adverse Reaction Rate (%) – The percentage of patients experiencing side effects.

The results show that acupuncture therapy is superior to medication therapy in terms of pain relief, inflammation reduction, and functional improvement, while also having a significantly lower adverse reaction rate [3].

## 2.4 Summary of Key Evaluation Indicators

### Summary of Key Evaluation Indicators

Based on data from the CNKI database, this study employs the following key indicators to evaluate the clinical efficacy of buccal acupuncture therapy:

**Pain Score (VAS):** This measures the severity of pain experienced by patients. A lower score indicates greater pain relief.

**Knee Joint Function Score (HSS):** This assesses knee function, including pain levels, mobility, and muscle strength. The total score is 100, with higher scores indicating better joint function [4].

**Range of Motion (°):** This measures the maximum flexion and extension angles of the knee joint. An increase in this value signifies improved joint function and reduced stiffness.

**Adverse Reaction Rate (%):** This records any discomfort or side effects during treatment, such as swelling or itching. A lower percentage represents a higher level of safety.

Comparative analysis of different treatment methods demonstrates that buccal acupuncture therapy is highly effective in alleviating pain, improving knee joint function, and enhancing range of motion, while maintaining a low incidence of adverse reactions. Given its promising clinical value, further large-scale clinical studies are needed to validate its long-term efficacy and optimize treatment protocols.

### 3. Results and Discussion

#### Effect of Buccal Acupuncture Therapy on Knee Pain

As an emerging acupuncture treatment, buccal acupuncture therapy has been proven to be highly effective in alleviating knee pain associated with knee osteoarthritis (KOA). According to the study *Clinical Observation of Buccal Acupuncture and Exercise Therapy in the Treatment of 60 Cases of Knee Osteoarthritis*, a total of 60 KOA patients underwent buccal acupuncture therapy combined with exercise training. The results showed a total effectiveness rate of 98%, with 40% of patients achieving complete clinical recovery, defined as the complete disappearance of pain and restoration of joint mobility [5].

In terms of pain relief, the study measured changes in Visual Analog Scale (VAS) scores, revealing a significant reduction in pain levels after treatment. The buccal acupuncture group exhibited a VAS score reduction of  $3.5 \pm 1.2$ , which was notably superior to the traditional acupuncture group ( $2.8 \pm 1.4$ ). This suggests that buccal acupuncture therapy provides more effective pain relief compared to conventional acupuncture techniques.

The mechanism behind this pain reduction is believed to be related to the stimulation of specific facial acupoints, such as Jiache (ST6) and Chengjiang (CV24), which influence the nervous system's pain transmission pathways and reduce the release of inflammatory mediators. This results in a faster onset of pain relief compared to traditional acupuncture methods. The study further observed that buccal acupuncture therapy typically produced noticeable pain relief within 1–3 sessions, whereas traditional acupuncture often required a longer treatment duration before achieving similar effects.

#### Improvement of Knee Joint Function with Buccal Acupuncture Therapy

In addition to its advantages in pain relief, buccal acupuncture therapy has been shown to effectively improve knee joint function and enhance range of motion. Based on the Hospital for Special Surgery (HSS) knee score, patients in the buccal acupuncture group exhibited a significant post-treatment increase of  $14.4 \pm 3.2$ , which was notably higher than that of the traditional acupuncture group ( $10.5 \pm 3.7$ ). This result indicates that buccal acupuncture not only alleviates pain but also aids in restoring knee mobility, thereby enhancing patients' overall quality of life.

Furthermore, range of motion (ROM) is a critical indicator of KOA treatment efficacy. The study demonstrated that after treatment, knee joint ROM increased by  $26.5 \pm 4.1^\circ$  in the buccal acupuncture group, significantly outperforming the traditional acupuncture group ( $20.2 \pm 3.8^\circ$ ). This improvement may be attributed to buccal acupuncture's influence on the neuro-muscular system, as it stimulates facial acupoints that may regulate central nervous system motor control mechanisms, thereby promoting joint mobility recovery [6].

#### Comparison of Buccal Acupuncture Therapy with Other Treatments

In clinical practice, multiple treatment approaches are available for KOA, including traditional acupuncture, minimally invasive needle-knife therapy, and pharmacological treatments. To assess the relative advantages of buccal acupuncture therapy, this study compared its efficacy with other commonly used treatment methods.

#### Buccal Acupuncture Therapy vs. Traditional Acupuncture

**Acupoint Selection:** Traditional acupuncture typically targets knee-related or distal acupoints (e.g., Zusanli (ST36), Yanglingquan (GB34)), whereas buccal acupuncture selects facial acupoints, such as Jiache (ST6) and Chengjiang

(CV24). This method avoids direct stimulation of the affected knee, reducing potential discomfort.

**Efficacy Comparison:** Buccal acupuncture provides faster pain relief, with a greater reduction in VAS scores, and more significant improvements in knee joint function than traditional acupuncture.

**Patient Compliance:** Due to its minimally invasive nature and lower pain intensity, buccal acupuncture is generally better tolerated, leading to higher patient adherence to treatment.

#### Buccal Acupuncture Therapy vs. Minimally Invasive Needle-Knife Therapy

The study "*Clinical Application of Knee Pain-Relief Decoction Combined with Small Needle-Knife and Acupotomy in the Treatment of KOA*" evaluated the effectiveness of small needle-knife therapy combined with acupotomy compared to standalone small needle-knife therapy. The results were as follows:

Total effectiveness rate: 95% (combined therapy)

VAS score reduction:  $3.8 \pm 1.1$

HSS knee score improvement:  $15.2 \pm 3.4$

ROM improvement:  $28.3 \pm 3.9^\circ$

Although small needle-knife therapy demonstrated superior efficacy compared to traditional acupuncture, it requires a high level of technical expertise and is associated with certain post-treatment discomforts, including localized swelling and soreness.

In contrast, buccal acupuncture therapy minimizes trauma, avoiding the soft tissue damage that may occur with needle-knife treatment. This makes it particularly suitable for patients who are hesitant about minimally invasive procedures. Additionally, the total effectiveness rate of buccal acupuncture is comparable to that of needle-knife therapy, but buccal acupuncture has a lower incidence of adverse reactions (1.7% vs. 5–10%), indicating better safety and patient tolerance.

#### Buccal Acupuncture Therapy vs. Pharmacological Treatment

The meta-analysis "*Clinical Acupuncture Treatment for Rheumatoid Arthritis*" demonstrated that acupuncture therapy is significantly more effective than pharmacological treatment in pain relief and inflammation reduction. The study reported an overall effectiveness rate of 90% for acupuncture, which was notably higher than the 75% observed in the pharmacological treatment group. Additionally, acupuncture led to a greater reduction in Visual Analog Scale (VAS) scores ( $2.5 \pm 1.2$ ) compared to pharmacological treatment ( $2.0 \pm 1.3$ ).

Furthermore, acupuncture therapy effectively decreased C-reactive protein (CRP) levels, an inflammatory biomarker, by  $8.1 \pm 2.5$  mg/L, which was significantly better than the reduction observed in the pharmacological treatment group ( $5.0 \pm 2.1$  mg/L).

While pharmacological treatment provides rapid symptom relief, long-term use is associated with gastrointestinal damage, liver and kidney toxicity, and other adverse effects. The incidence of adverse reactions in the acupuncture group was 3.0%, substantially lower than the 12.0% observed in the pharmacological group. In comparison, buccal acupuncture therapy not only offers similar pain relief but also reduces drug dependence and minimizes long-term medication-related side effects.

#### Preliminary Discussion on the Mechanisms of Buccal Acupuncture Therapy

The remarkable efficacy of buccal acupuncture therapy in KOA treatment is likely linked to several underlying mechanisms:

**Central Nervous System Modulation** – Buccal acupuncture stimulates specific facial acupoints, which may influence the motor and sensory centers of the cerebral cortex, modulating nerve conduction and alleviating joint pain.

**Regulation of Inflammatory Mediators** – Studies indicate that acupuncture therapy can reduce levels of inflammatory cytokines, such as CRP and IL-6, thereby alleviating synovial inflammation, reducing pain, and

minimizing joint swelling.

Improvement of Blood Circulation – Buccal acupuncture stimulation may promote local blood flow, enhancing nutrient supply to joint tissues, facilitating cartilage repair, and improving overall joint function [7].

Muscle Relaxation and Functional Recovery – By influencing the neuro-muscular system, buccal acupuncture helps alleviate muscle spasms and enhances knee joint mobility.

#### 4. Conclusion

This study comprehensively analyzed multiple clinical studies and found that buccal acupuncture therapy exhibits high clinical value in the treatment of KOA. It provides significant pain relief, enhances knee joint function, and maintains a high safety profile. Compared to traditional acupuncture, minimally invasive needle-knife therapy, and pharmacological treatments, buccal acupuncture demonstrates superior efficacy in reducing pain and improving knee function, with a lower incidence of adverse reactions.

Given these findings, buccal acupuncture therapy is a promising adjunctive treatment for KOA patients. Future large-scale randomized controlled trials should be conducted to further optimize treatment protocols and explore the specific physiological mechanisms underlying its therapeutic effects.

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