WHIOCE PUBLISHING PTE. LTD.
PROVIDING
FIRST-CLASS SCIENTIFIC INFORMATION
FOR TOP SCHOLARS

2026 Volume 11, Issue 1
Advances in Precision Medicine
ISSN: 2424-9106 (Online)
ISSN: 2424-8592 (Print)

Observation on the Clinical Efficacy of High Tibial Osteotomy (HTO) Combined with Arthroscopic Surgery in the Treatment of Medial Knee Osteoarthritis

Kai Gao*
Department of Orthopedics, Lianyungang Ganyu Ruici Hospital, Lianyungang 222100, Jiangsu, China

**Author to whom correspondence should be addressed.*

Abstract: *Objective:* To explore the clinical effect of high tibial osteotomy (HTO) combined with arthroscopic surgery in clinical treatment of patients with medial knee osteoarthritis. *Methods:* 64 patients with medial knee osteoarthritis were included for data analysis. The selected patients were classified into groups using the double-blind method and named as the control group (32 cases, treated with high tibial osteotomy) and the observation group (32 cases, treated with high tibial osteotomy combined with arthroscopic surgery), and the differences between the groups were compared. *Results:* Compared with the control group, the postoperative HSS score, quality of life score, and Lysholm knee joint performance of the study group The joint scale score was significantly higher; the VAS score and postoperative complications were significantly lower; the femoral tibial angle (FTA) was smaller, and the platform posterior inclination angle was larger, $p < 0.05$. *Conclusion:* The combination of high tibial osteotomy (HTO) and arthroscopic surgery in the clinical treatment of patients with medial knee osteoarthritis has ideal results. It can not only improve the clinical efficacy, but also improve the patient's knee joint function, relieve the patient's pain, and optimize the quality of life.
Keywords: High tibial osteotomy (HTO); Arthroscopic surgery; Medial knee osteoarthritis; Clinical efficacy

Online publication: January 26, 2026

1. Introduction

Medial knee osteoarthritis is one of the most common types of knee osteoarthritis. Its initial symptoms are aggravation after activity and relief after rest. As the disease progresses, the pain may persist and even affect sleep at night [1]. At the same time, due to the damage to the medial compartment function, the range of flexion and extension of the knee joint is gradually limited, and gait stability decreases. Further development of the disease can lead to joint swelling, deformity and mobility impairment, seriously affecting the patient's quality of life, and requires timely and targeted treatment. In the past, during the treatment of patients' conditions, if the symptoms were mild, conservative methods such as weight control and drug treatment could be used. If the patient's condition was severe and conservative treatments were ineffective, surgery was required. High tibial osteotomy (HTO) is a commonly used clinical treatment method, and its effect has been

recognized. Arthroscopic treatment has good application effects. Arthroscopic treatment can effectively relieve patients' clinical symptoms, reduce pain levels, and thereby delay joint replacement time [2]. In order to further clarify the surgical plan, this study selected 64 patients with medial knee osteoarthritis for a comparative study, aiming to explore the clinical efficacy of HTO combined with arthroscopic surgery in the treatment of medial knee osteoarthritis. The details are as follows.

2. Materials and methods

2.1. Clinical data

64 patients with medial knee osteoarthritis were included for data analysis. The selected patients were classified into groups based on the double-blind method and divided into two groups, the control group and the research group, with 32 cases in each group, selected from June 2022 to December 2024.

2.1.1. Study group

There were 16 males and 16 females respectively, aged 46–61 (55.22 ± 4.11) years old; control group: 17 males and 15 females respectively, aged 43–62 (55.21 ± 4.12) years old. Two sets of data can be compared, $p > 0.05$.

2.1.2. Inclusion criteria

(1) Patients gave informed consent to participate in the study;
(2) All patients met the diagnostic criteria for medial osteoarthritis of the medial knee joint;
(3) Patients had normal cognitive function.

2.1.3. Exclusion criteria

(1) Refusal to cooperate with research
(2) Infectious diseases;
(3) Mental or cognitive impairment;
(4) Liver and kidney function impairment;
(5) Presence of blood diseases.

2.2. Method

The control group was treated with high tibial osteotomy (HTO). The specific steps are: first, the patient needs to be given local anesthesia, the patient's surgical site was routinely disinfected, the skin of the patient's lesion was incised layer by layer, and the patient's muscle tissue was fully exposed to fully expose the patient's fibula. One-third of the fibula was cut off obliquely, and then the patient's stump was sealed with bone wax. After counting the surgical tools, the incision was sutured for the patient after confirmation.

The research group implemented a combined treatment of high tibial osteotomy (HTO) and arthroscopic surgery. First, arthroscopic surgery was performed, and then high tibial osteotomy (HTO) was performed. The method was the same as that of the control group. The specific operation of arthroscopic surgery was: using spinal anesthesia or epidural anesthesia, and guiding the patient to maintain In the supine position, a tourniquet was applied, a sterile pad was laid, an arthroscope was used to observe the cavity of the lesion, the medial meniscus was trimmed, the unstable articular cartilage was removed, the osteophytes that impinge within the joint were smoothed, and the loose bodies in each cavity were completely removed, and the synovial folds that impinge were completely removed. A full-thickness cartilage defect of less than 2 cm × 2 cm was observed, and the subchondral sclerotic bone was drilled with Kirschner wires. After the treatment was completed, the knee joint cavity was inspected again, and the impurities left after the operation were completely removed through lavage, focusing on cleaning the medial compartment and posterolateral compartment.

Both groups underwent the same postoperative treatment and rehabilitation training. Knee range of motion training was started on the second day after surgery. Under the guidance of the doctor, walking without weight-bearing on crutches was started as soon as possible according to the patient's recovery. Resistance straight leg raising exercises were started two weeks after the surgery. Full weight-bearing exercises were not performed within 12 weeks after the surgery.

2.3. Observation indicators

(1) Compare the knee joint function of the two groups
Use the HSS score scale to evaluate the patient's knee joint function. The higher the score, the better the knee joint function recovery.

(2) Compare the Lysholm Knee Scale scores between the two groups
Measured using the Lysholm Knee Scale.

(3) Compare the VAS scores of the two groups
Use the visual analog scale (VAS) score to measure. The scoring standard is 0–10, with 0 being no pain, < 3 points indicating mild pain, 3–6 points indicating moderate pain, and 6–10 points indicating severe pain. The higher the score, the more severe the patient's pain.

(4) Compare the quality of life between the two groups
Measured using the 36-item Brief Health Questionnaire (SF-36). The score of each index ranges from 0 to 100. The higher the score, the better the patient's quality of life.

(5) Comparing the changes in the femoral tibial angle (FTA) and platform posterior inclination angle of the two groups of patients 12 months after treatment, the femoral tibial angle decreased and the platform posterior inclination angle increased, the better the treatment effect.

(6) Compare the postoperative complications between the two groups
Including infection, secondary fracture, neurovascular injury, and joint ankylosis.

2.4. Statistics

SPSS 26.0 software: expressed as rate (%) and mean ± standard deviation ($\bar{x} \pm s$), carry out χ^2 test and t test, $p < 0.05$ indicates statistical significance.

3. Results

3.1. Comparison of HSS scores, Lysholm knee scale scores, and VAS scores between the two groups

After treatment, the VAS score of the study group was lower than that of the control group, and the HSS score and Lysholm knee scale score were higher than those of the control group, with significant differences $p < 0.05$. **Table 1**.

Table 1. Comparison of HSS scores, Lysholm knee scale scores, and VAS scores between the two groups ($\bar{x} \pm s$)

Group	n	HSS score		Lysholm knee scale score		VAS score	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Research group	32	51.65 ± 3.74	82.45 ± 5.28	52.72 ± 4.26	84.62 ± 5.33	6.81 ± 0.28	1.25 ± 0.55
Control group	32	50.33 ± 2.62	69.33 ± 4.35	53.25 ± 4.17	71.52 ± 4.26	6.75 ± 0.37	3.26 ± 0.44
t value	/	1.6352	10.8488	0.5029	10.8607	0.7315	16.1431
p value	/	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

3.2. Comparison of quality of life between the two groups

Before treatment, the difference between the groups was not significant ($p > 0.05$); after treatment, the quality of life of the patients in the study group was better than that of the control group ($p < 0.05$). **Table 2** and **3**.

Table 2. Comparison of the quality of life (general health, mental health, social function, physiological function) between the two groups ($\bar{x} \pm s$)

Group	n	General health		Mental health		Social function		Physiological function	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Research group	32	51.66 ± 6.82	70.77 ± 6.71	59.72 ± 5.12	80.78 ± 7.38	63.32 ± 8.45	82.41 ± 9.11	52.62 ± 7.16	76.68 ± 5.22
Control group	32	50.62 ± 7.14	61.67 ± 7.25	58.11 ± 6.47	69.00 ± 6.36	62.02 ± 7.32	71.36 ± 6.24	53.26 ± 8.48	66.33 ± 7.15
t value	/	0.5958	5.2110	1.1038	6.8400	0.6578	5.6609	0.3262	6.6136
p value	/	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

Table 3. Comparison of the quality of life (vitality, somatic pain, emotional function, physiology) between the two groups ($\bar{x} \pm s$)

Group	n	Vitality		Somatic pain		Emotional function		Physiology	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Research group	32	58.68 ± 6.82	81.47 ± 6.16	57.95 ± 7.62	81.52 ± 8.41	56.14 ± 6.96	79.14 ± 7.45	60.44 ± 7.56	80.27 ± 8.35
Control group	32	57.55 ± 8.05	70.52 ± 8.41	58.71 ± 6.16	70.88 ± 7.07	57.45 ± 6.36	73.22 ± 6.66	59.92 ± 5.56	68.61 ± 8.12
t value	/	0.6059	5.9419	0.4388	5.4782	0.7860	3.3512	0.3135	5.6631
p value	/	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

3.3. Changes in femoral-tibial angle and platform posterior inclination angle in the two groups

After treatment, the femoral tibial angle (FTA) of the study group was significantly smaller than that of the control group, and the platform posterior inclination angle was significantly larger than that of the control group, with significant differences $p < 0.05$. **Table 4.**

Table 4. Comparison of changes in femoral-tibial angle and platform posterior inclination angle between the two groups ($\bar{x} \pm s$)

Group	n	Femoro-tibial angle	Platform back inclination angle
Research group	32	172.52 ± 1.32	11.08 ± 1.07
Control group	32	176.25 ± 1.44	10.34 ± 1.12
t value	/	10.8014	2.7025
p value	/	< 0.05	< 0.05

3.4. Comparison of postoperative complications between the two groups

The incidence rate of complications was 31.25% (10/32) in the control group and 9.37% (3/32) in the study group, with significant difference $p < 0.05$. **Table 5**.

Table 5. Comparison of postoperative complications between the two groups (n/%)

Group	n	Infection	Secondary fracture	Neurovascular injury	Ankylosis	Total
Research group	32	1	0	1	1	3 (9.37)
Control group	32	3	1	3	3	10 (31.25)
χ^2 value	/	/	/	/	/	4.7300
p value	/	/	/	/	/	< 0.05

4. Discussion

Medial osteoarthritis of the knee joint is a common clinical disease. There are many main causes of the disease, and its incidence rate has been on the rise in recent years. This disease will cause patients to suffer from various problems such as knee joint deformity, pain, and limited movement, and will have a great adverse impact on the patient's physical and mental health [3]. Therefore, effective treatment measures should be provided to patients based on the actual situation. HTO is a kind of knee-preserving surgery. It is a minimally invasive surgery. When performed on the patient, it can well reduce the patient's pain problem and greatly improve the patient's knee joint dynamic function. At the same time, it can also promote the return of the patient's lateral articular surface and medial articular surface cartilage function to normal. However, it cannot effectively correct the patient's tibiofemoral angle [4]. Knee arthroscopy has the advantages of less trauma and faster recovery. It can be used to clean up diseased tissue in the joint and reduce inflammatory reactions [5]. Arthroscopy combined with high tibial osteotomy treatment can correct the patient's osteotomy positive force line, redistribute the joint load, and transfer it to the normal lateral platform, thereby prolonging the patient's knee joint life [6]. At the same time, combined arthroscopic surgery will enable the two to complement each other, maximize the effects of both, and more effectively control the patient's clinical symptoms. Moreover, treating patients through arthroscopic surgery can reduce the patient's postoperative pain and enhance the therapeutic effect on the patient, so that the patient can better recover from health.

The results of this study show that after surgery, the HSS score, quality of life, and Lysholm Knee Scale score in the study group were significantly higher, and the VAS score and postoperative complications were significantly lower, $p < 0.05$. After treatment, the femoral tibial angle (FTA) of the study group was significantly smaller than that of the control group, and the platform posterior inclination angle was significantly greater than that of the control group, $p < 0.05$. This shows that the combination of HTO and arthroscopy is much more effective because:

(1) Under arthroscopy, minimally invasive surgery can be performed on the synovium and cartilage lesions in the joint, and all loose bodies and wear debris in the joint can be removed. At the same time, a large amount of normal saline can be used to flush the joint cavity multiple times, which can improve the microenvironment in the joint, eliminate inflammatory mediators, and relieve joint pain [7].

(2) Arthroscopy causes less damage to the joints and has less impact on the joints. This is a surgical procedure that meets the physiological requirements of the knee joint. The damage to the knee joint can be seen more clearly under the mirror [8]. In short, this method is easy to operate, has mild postoperative pain, allows early functional training, and is conducive to rapid recovery.

In summary, the clinical treatment of patients with medial knee osteoarthritis using a combination of high tibial

osteotomy (HTO) and arthroscopic surgery has ideal results. It can effectively improve knee joint function, relieve pain, optimize quality of life, correct alignment, and reduce the incidence of complications, and is worthy of clinical promotion.

Disclosure statement

The author declares no conflict of interest.

References

[1] Huang W, Liang D, Ma S, et al., 2025, Effect of Arthroscopic Debridement Combined with Proximal Fibula Osteotomy in the Treatment of Medial Knee Osteoarthritis. Chinese Medical Innovation, 22(3): 1–4.

[2] Duan X, Zhang K, Cai C, et al., 2024, Effect of Arthroscopy Combined with High Tibial Osteotomy in the Treatment of Medial Compartment Osteoarthritis of the Knee. Chinese Community Physicians, 40(2): 43–45.

[3] Zhang Z, Zhang N, Ji Z, et al., 2023, Clinical Efficacy of Arthroscopy Combined with High Tibial Osteotomy and Unicondylar Replacement in the Treatment of Medial Compartment Osteoarthritis of the Knee. Hebei Medicine, 29(11): 1847–1852.

[4] Yi X, Zhang S, Wang K, et al., 2022, Comparison of OWHTO Combined with Arthroscopic Debridement and UKA in the Treatment of Medial Compartment Osteoarthritis of the Knee. Chinese Medical Innovation, 19(20): 1–5.

[5] Jia Y, Cui L, Wang J, et al., 2022, Mid-Term Efficacy of High Tibial Osteotomy Combined with Arthroscopic Debridement Microfracture and Unicondylar Replacement in the Treatment of Medial Compartment Osteoarthritis of the Knee. Chinese Journal of Modern Surgery, 26(3): 190–196.

[6] Chen T, Zhang J, Pan F, et al., 2022, Arthroscopic Surgery Combined with High Tibial Osteotomy in the Treatment of Medial Knee Osteoarthritis. Progress in Modern Biomedicine, 22(2): 364–368.

[7] Xiao H, Chen L, Guo X, et al., 2024, Efficacy of Arthroscopy Combined with High Tibial Osteotomy Versus Unicondylar Replacement in the Treatment of Medial Compartment Osteoarthritis of the Knee. Clinical Medicine, 44(11): 20–22.

[8] Liu M, Hao J, Li S, et al., 2023, Early Efficacy of HTO Combined with Knee Arthroscopy in the Treatment of Knee Osteoarthritis. Journal of Practical Orthopedics, 29(10): 912–915.