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## Research Article

# Auriculotherapy effect on pain and function following knee Arthroscopic Menisectomy: A randomized prospective study

## Abstract

**Purpose:** Knee arthroscopy is one of the most frequent procedures in orthopedic surgery. It has a large range of indications. Post-operative pain is one complication and it is managed with analgesics sometimes with weak opioids. It has been proven that auriculotherapy is efficient in decreasing post-operative pain for many orthopedic surgeries, in particular knee and hip arthroplasty. We studied the interest of auriculotherapy for post-operative pain after knee arthroscopy.

**Methods:** This randomized single blind prospective study was conducted on 40 patients who presented to Paul d'Egine Private Hospital in Paris for symptomatic, traumatic or degenerative meniscal lesions judged irreparable on knee MRI, and require knee arthroscopy for partial menisectomy. 32 patients were followed for one week post operatively. In the group of patients who received auriculotherapy, ear cartography and the pose of semi-permanent needles were done in the pre-induction period.

Evaluation was done using a questionnaire filled by the patient containing a pain score (VNS score), daily dose of analgesics, and a subjective score for the knee (Koos subjective score).

**Results:** The total mean age was 41.25 years (18-75 years). Both groups had comparable mean age (41.12 Vs. 41.37 years). The t test was used to estimate the difference between the 2 groups by calculating mean changes in each group from the start till the end of the study (VNS 0 and VNS 7). Results were statistically significant with a p value of 0.049797. Results were not statistically significant for the Koos subjective score (0.058915).

**Conclusion:** Knee arthroscopy for menisectomy is a simple and efficient procedure. Post-operative pain is usually managed with analgesics, sometimes with opioids.

We conducted this randomized prospective study and concluded that the VNS scores were significantly improved in patients treated with auriculotherapy, but functional score showed no significant improvement. Level of Evidence: II

## Introduction

Knee arthroscopy is one of the most frequent procedures in orthopedic surgery. It has a large range of indications going from simple exploration to ligamentoplasty. A new study showed that knee arthroscopy is more cost effective than a hip arthroplasty or even a coronary bypass [1].

Despite its proven advantages over open surgery, the procedure is not exempt of complications. Complication rate is 1.68% [2], and is ruled by post-operative pain that is generally managed with analgesics and sometimes, weak opioids. It is

not well described in the literature since it is transient and disappears in few weeks.

Many methods have been used to alleviate the pain. Nerve blocks, opioids infiltrations and auriculotherapy proved their efficacy. The efficacy of auriculotherapy in decreasing post-operative pain and even post-operative anxiety for many orthopedic surgeries, in particular knee and hip arthroplasty has been established.

Our study is a randomized prospective study that investigates the effect of auriculotherapy on pain and function following arthroscopic knee menisectomy.

## Materials and Methods

We conducted a randomized prospective study at Paul d'Egine Private Hospital in Paris. The study group was recruited from patients who presented to the co-author's clinic for symptomatic, traumatic or degenerative meniscal lesions that was judged irreparable on knee MRI, and required knee arthroscopy for partial meniscectomy.

An informed consent was obtained after clear explanation to the patients about the study and the procedure.

Inclusion criteria were: age between 18 and 75 years old, irreparable isolated meniscal lesion requiring resection, obtained informed consent. Exclusion criteria were misconception of the patient (intellectual deficiency, linguistic barrier...), patient refusal, a meniscal lesion other than the one described above, chronic consumption of analgesics for any disease and presence of any contraindication for auriculotherapy or general anesthesia.

In total, 34 ambulatory knee arthroscopies were performed, 32 were followed for one week post operatively, date of postop consultation by the surgeon. 2 patients were excluded from the study for losing their questionnaire.

Using a simple draw, the patients picked their groups. Finally, 2 groups of 16 patients each were randomly divided. In Group A, patients received auriculotherapy followed by general anesthesia. Group B patients had only general anesthesia.

In the group of patients who received auriculotherapy, ear cartography and the pose of semi-permanent needles were done by Dr Kayembe in the pre-induction period.

Auriculotherapy was performed using "cryogenic type" needles.

It is a liquid nitrogen spray used to treat ear points. Liquid Nitrogen, which is a very cold element, at a high jet power has the same effect of a penetrating needle on a 2 to 3mm depth through the skin depending on application time. In practice, application time is 2 seconds. The advantage of the cryogenic needle is that no foreign material is left in place. Cryogenic needles cause temporary depigmentation at the puncture site when used on colored skins. To avoid any aesthetic prejudice to these patients, steel needles F17 were used in 2 patients who had black colored skin. These needles were made by SEDATELEC firm.

All of our patients were operated by the same orthopedic surgeon under general anesthesia done by the same anesthesiologist with the same protocol to decrease bias to a minimum.

Anesthesia protocol was the following:

- 1 - No pre-medication
- 2 - Induction: IV Midazolam 1mg + Propofol 2.5mg/Kg + Sufentanil 0.2 to 0.33µg/kg + Dexamethasone 4mg

3 - Laryngeal mask

4 - Anesthesia maintenance with Sevoflurane in an equimolar mixed O<sub>2</sub>/N<sub>2</sub>O gas

Post-operative analgesia was initiated in the per-operative period with IV Paracetamol (1000mg) + IV Ketoprofene (100mg) and Nefopam (20mg).

A questionnaire to be filled by the patient was given. It contained a pain score (VNS score), quantity of daily dose of analgesics, and a subjective score for the knee (Annex 1). An explanatory note was attached to the questionnaire (Annex 2).

Every day, the patient should note his pain level on the pain scale, and fill the daily dose of analgesics used (Paracetamol 500mg, Ketoprofene 100mg).

At day 8 post-operatively, before the follow-up visit, the patient filled the rest of questionnaire (Koo's subjective score).

## Results

The mean age was 41.25 years (18-75 years). Both groups had comparable mean age (41.12 Vs. 41.37 years). 24 patients had right knee arthroscopy, and 8 had left knee arthroscopy. Gender repartition was equal.

The t test was used to estimate the difference between the 2 groups by calculating mean changes of VNS score in each group from the start till the end of the study (VNS 0 and VNS 7).

Results were statistically significant with a t value of 2.04421 (p=0.049797).

T test was also used to compare Koos subjective knee score between the two groups. Results showed better scores but were not statistically significant. T was 1.96351 with p value= 0.058915.

## Discussion

Knee arthroscopy is an efficient procedure with low rate of complications. Its indications and frequency are rising. The most frequent complications are hemarthrosis and post-operative pain that are usually controlled with analgesics and sometimes even with narcotics.

Auriculotherapy showed its efficacy as an adjuvant to treatment in many knee and hip procedures [3-7]. The procedure consist on inserting extemporaneous, semi-permanent or cryogenic needles in order to block the pain and decrease the analgesic dose needed and theoretically improve functional scores.

In 2007, Usichenko et al., published a randomized study on the efficacy of auriculotherapy on post-operative pain in knee arthroscopy. They compared 10 patients treated by auriculotherapy to 8 patients who received "Sham" (needles are inserted in non-therapeutic sites of the ear). They concluded that the needs for analgesics are less in the auriculotherapy group (p=0.043).

Until this day, it is the only randomized study found in the literature evaluating the efficacy of auriculotherapy in knee arthroscopy. However, many weak points should be noted: the small study group (10 vs. 8), the multitude of indications for arthroscopy (meniscectomy, synovectomy, debridement), and the very short –term follow-up (1 day). In addition, the use of the “Sham” procedure which proved some antalgic effect increased the Placebo effect, thereafter increasing bias.

In our study, the group was larger (16 vs. 16), therefore more representative. Follow-up was done 1 week after the procedure which allows better post-op pain evaluation. Only one indication – partial meniscectomy – was included in the study.

Our results are comparable to those in the literature, showing an improvement in VNS score in patients treated with auriculotherapy compared to those who did not receive it for knee arthroscopic meniscectomy.

There are no studies in the literature that compared knee function following scores. Our study is the first to evaluate post-operative functional score. Amelioration of functional score in patients who received auriculotherapy was found in our study but the difference was not statistically significant.

This study had two major weaknesses. The sample size remains low and the study was not double blinded. Both the physician and the patient knew about the procedure. A double blinded study would show more significant results with less bias.

Future studies might benefit from a larger sample size (>30 patients per group) that would be more representative and significant.

## Conclusion

Knee arthroscopy for meniscectomy is a simple and efficient procedure. Post-operative pain is usually managed with analgesics, sometimes with opioids.

We referred to Usichenko study to conduct this randomized prospective study comparing patients treated with adjuvant auriculotherapy to a control group treated with conventional drugs (Paracetamol and Ketoprofen).

We concluded that the VNS scores were significantly improved in patients treated with auriculotherapy. Functional score showed improvement but it was not statistically significant.

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