

# Is Kinesiotherapy Effective in Relieving Pain and Reducing Swelling after Shoulder Arthroscopy?

Je kinezioterapie účinná pro zmírnění bolesti a ústup otoku po artroskopii ramena?

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## ABSTRACT

### PURPOSE OF THE STUDY

The purpose of this study is to investigate the acute and long term effectiveness of kinesio taping applied following shoulder arthroscopy in relieving pain and reducing swelling.

### MATERIAL AND METHODS

This study included 50 patients undergone shoulder arthroscopy between June 2016 and December 2017 in our clinic. Patients were randomly assigned into two groups. Group I consisted of patients who had kinesiotherapy; while Group II consisted of control patients whom we applied sham taping with no effect. Pre and postoperative pain and swelling status of patients were recorded and groups were compared.

### RESULTS

Comparing two groups, we found that kinesio taping significantly reduced pain levels in the early post-operative period. However, we didn't detect any significant difference in reduction of shoulder swelling between two groups.

### CONCLUSIONS

Kinesio taping could be an alternative treatment in relieving pain after shoulder arthroscopy. However, we didn't find a significant reduction in swelling in shoulder.

**Key words:** kinesio taping, arthroscopy, shoulder.

## INTRODUCTION

Arthroscopic surgery is a commonly performed orthopaedic procedure (3, 12, 13, 14). Arthroscopic techniques have been developed through the last century and arthroscopy became the cornerstone in shoulder surgery (1, 2, 11, 13, 14, 15). In the early post-operative period pain and swelling could be unbearable (5). Shoulder swelling could be the result of the extravasation caused by the high water pressure applied for a long period during shoulder arthroscopy in order to prevent intraarticular bleeding and have a better vision (5, 7, 17). However, the swelling reduces uneventfully (6, 8). Pain is witnessed by almost all patients having interventional shoulder procedure. There are invasive methods like suprascapular or scalene block, intraarticular catheter; as well as noninvasive methods such as non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol and oral analgesics to control early post-operative pain. In addition to that, almost all patients are prescribed pain killers (16, 21).

Found by Kenzo Kase in late 70s, kinesio taping provides pain relief and stimulates healing of tissues by changing the tension and blood circulation (19). Recently, it is used commonly in the treatment of sports related injuries and chronic diseases such as osteoarthritis (4, 20, 22, 25). It is also commonly used in the treatment of lymphedema following lymph node dissection due to breast cancer (18). In addition to that, it is also shown to be effective in the preoperative treatment of subacromial impingement and bursitis (9, 10). Limited information is available in the literature concerning the effectiveness of the post-operative pain control using kinesio taping.

The purpose of this study is to investigate the acute and long term effectiveness of kinesio taping in relieving pain and reducing swelling applied following shoulder arthroscopy performed for any diagnosis.

## MATERIAL AND METHODS

This prospective study includes patients undergone shoulder arthroscopy. Institutional review board approval

was obtained from Istanbul Medipol University Ethics Committee. All patients were informed about the procedure pre-operatively and enlightened consent was signed by all patients. Sealed envelope was selected as randomization method and was used in assigning patients to be applied kinesio taping.

Inclusion criteria included patients aged between 18–50 without any comorbid diseases, and no history of surgery from the involved shoulder. Exclusion criteria included patients with a history of surgery from the involved shoulder, conversion to open surgery for any reason, hypersensitivity against kinesio taping, lost during follow-ups, unwilling to continue with the follow-ups, and patients who stayed 2 days in the hospital post-operatively. Three patients were excluded from the study since they were lost during follow-ups and 5 patients were excluded since they were unwilling to continue with the follow-ups. One patient was excluded due to conversion to open surgery during arthroscopy. The study was completed with 50 patients.

Most common performed arthroscopic procedures in this study included biceps tenotomy and acromioplasty (Table 1). In order to measure the pre-operative shoulder diameter, we used two reference points, which were posterosuperior tip of acromion and coracoid process. First we measured the distance between these points over the superior border of the deltoid muscle. Second measurement was performed 1 cm lateral to the first measurement, over mid-deltoid (Fig. 1).

Pre-operative VAS scores were recorded. All patients were discharged on the first post-operative day. All patients were prescribed paracetamol 500 mg, caffeine 30 mg and codeine phosphate (Geraldin-K®-Biofarma) twice a day, unless contraindicated. VAS scores and swelling were recorded on day 2<sup>nd</sup>, 8<sup>th</sup>, 16<sup>th</sup>, 24<sup>th</sup> days and 6<sup>th</sup> week. Kinesio taping was applied until day 24 in line with lymphatic correction and pain inhibition techniques described by Kenzo Kase. Two kinesio tapes were cut as crisscross, and moderate tension was applied from anterior and posterior shoulder. During the first 8 days kinesio tape was applied over the edges of the wound dressings. After that, we applied it over deltoid region. All procedures were performed by two physiotherapists (SGG, HB). Taping was applied every three days after surgery and measurements were applied 2<sup>nd</sup>, 8<sup>th</sup>, 16<sup>th</sup>, 24<sup>th</sup> days and 6<sup>th</sup> week after surgery. Sham taping was applied and changed on same days as kinesio taping and a standard plaster was used.

We recorded VAS scores and shoulder diameter as described above.

### Statistical analysis

Descriptive statistics included mean, standard deviation, median, frequency and ratios. The distribution of variables was assessed using Kolmogorov-Smirnov test. Independent quantitative data was analyzed using Independent student's t-test and Mann-Whitney U test. Dependent quantitative data was analyzed using Wilcoxon test. Statistical analysis was performed using SPSS v22.0 (IBM, USA).

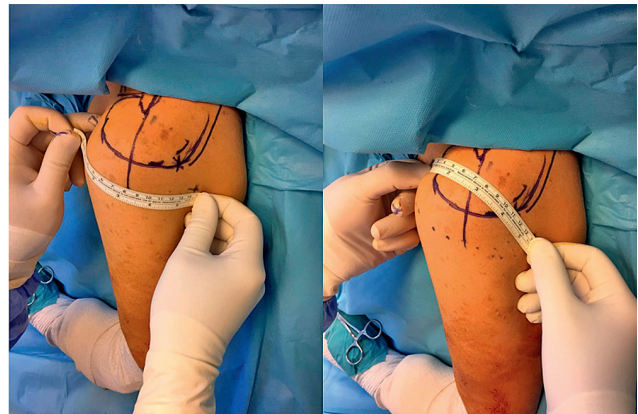


Fig. 1. Per-op measurement of shoulder diameters.

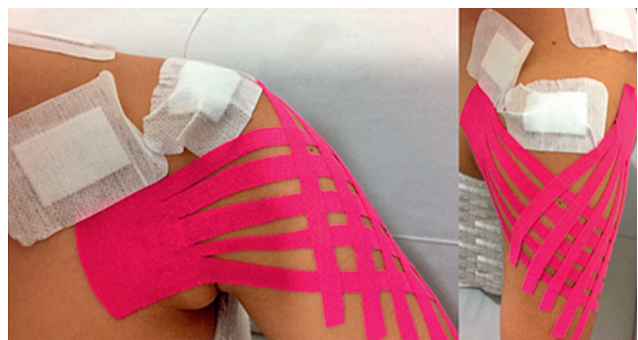


Fig. 2. Application of kinesiotaping after surgery.



Fig. 3. Application of sham taping after surgery.

## RESULTS

This study includes total of 50 patients; 24 patients in kinesio taping group and 26 patients in sham group. The mean age of patients in the kinesio taping and sham group were  $49.6 \pm 11$ , and  $44.2 \pm 13$ ; respectively. There was no significant difference in terms of age, gender, side of operation (Table 1).

VAS scores significantly decreased in the post-operative period compared to preoperative period in both groups. However, we found a significant difference between two groups on day 2 and 8, which suggests kinesio taping is more effective in reducing pain in the early post-operative period (Table 2).

Table 1. Distribution of surgeries

Procedures	
Biceps tenotomy, tenodesis	17
Rotator cuff repair	15
Subacromial release, Acromioplasty	19
Capsul release	4
Bankart repair	3
SLAP repair vs debridement	2

Table 2. Comparison of general information between groups

	Kinesio taping group	Control group	P value
Age	49.6±11.8	44.2±13.1	0.138
Sex (M/F)	10/15	11/14	0.514
BMI	27.5±2.3	26.1±1.5	0.068
Affected side (L/R)	12/13	8/17	0.263

Table 3. Comparison of VAS change between groups

VAS	Kinesio taping group	Control group	P value
Preop	6.48±2.52	6.32±1.60	0.497
2 <sup>nd</sup> day	4.61±1.64	5.40±1.35	<b>0.049*</b>
8 <sup>th</sup> day	3.09±1.59	3.84±1.06	<b>0.032*</b>
16 <sup>th</sup> day	2.65±1.11	2.52±0.96	0.678
24 <sup>th</sup> day	2.48±1.87	1.84±2.28	0.206
6 <sup>th</sup> week	1.78±2.04	1.2±0.95	0.733

Table 4. Comparison of upper shoulder diameter between groups

Upper diameter of deltoid	Kinesio taping group	Control group	P value
Preop	12.48±0.96	12.84±0.80	0.175
2 <sup>nd</sup> day	14.55±1.16	14.53±0.91	0.983
8 <sup>th</sup> day	13.80±1.31	14.33±0.94	0.062
16 <sup>th</sup> day	13.43±1.29	13.88±0.98	0.120
24 <sup>th</sup> day	13.15±1.29	13.42±0.93	0.415
6 <sup>th</sup> week	13.00±1.13	13.22±0.70	0.334

Table 5. Comparison of lower shoulder diameter between groups

Lower diameter of deltoid	Kinesio taping group	Control group	P value
Preop	15.15±1.14	15.47±0.99	0.302
2 <sup>nd</sup> day	16.90±1.29	17.20±0.97	0.285
8 <sup>th</sup> day	15.65±1.41	16.78±0.84	<b>0.003*</b>
16 <sup>th</sup> day	15.53±1.43	16.25±0.87	<b>0.009*</b>
24 <sup>th</sup> day	15.37±1.43	15.96±0.93	<b>0.049*</b>
6 <sup>th</sup> week	15.24±1.26	15.71±0.92	0.083

Measurements revealed that superior deltoid diameter was larger in both groups in the post-operative period. There was no statistically significant difference between two groups in all post-operative measurements.

In the early postoperative period we detected significantly larger diameter at mid-deltoid in both groups, when compared to preoperative diameter. Also, in the late post-operative period (days 8–16–24) kinesio taping group had significantly smaller diameter compared to control group (Table 3).

## DISCUSSION

In this study we found that kinesio taping significantly reduced pain levels in the early post-operative period. However, we didn't detect a significant difference in early shoulder swelling between two groups.

There are a few published studies on the effects of kinesio taping on shoulder problems (9, 10). In a study investigating pain and range of motion, kinesio taping was shown to have positive effects on shoulder abduction in patients with subacromial impingement syndrome. However, another study suggested that its effect on pain and swelling was controversial (24).

In another study evaluating the difference between subacromial injection and kinesio taping in patients with subacromial impingement syndrome, authors investigated active flexion angles and pain after the procedure, and found a significant difference on first and third month compared to baseline preoperative values on both groups. However, they didn't detect a significant difference on pain at the late term between two groups (26). This study compared kinesio taping with an invasive technique and no control group was included. Also, no information was given about edema and swelling. Steroid injection and kinesio taping could both alleviate inflammation and reduce pain. Steroid injection is not routinely performed in shoulder arthroscopy. Thus, kinesio taping could be used as an alternative non-invasive technique.

Lymph edema and swelling on arms are common complications following breast surgery and profoundly limits quality of life. In a prospective study Tsai et al. compared standard bandage technique with kinesio taping. In the early and postoperative third month comparisons no significant difference was detected (27). In our study, we didn't add a third bandaging group since it is difficult to apply bandage to proximal humerus.

Complications following kinesio taping are rare (23). Most common complications include hyperemia, peeling and allergies (23). These skin changes could be due to improper taping. For this reason, we applied kinesio tape twice as large as original length. We believe that higher tensions could reduce tolerance of patient to tape. In our series no patient left study due to complications. However, although we detected hyperemia after removing kinesio tapes, treatment was not stopped. We don't believe that hyperemia is not a contraindication to kinesio taping.

This study is the first prospective study to use and evaluate kinesio taping after shoulder arthroscopy surgery. There is no published study in the current literature evaluating postoperative pain and swelling using kinesio taping in shoulder arthroscopy.

Disadvantage of this study is low number of patients, which could be larger in order to obtain more optimal results. Another important point is variety of surgeries. There are many different types of surgery, some of them can be more painful than others (e.g. rotator cuff reattachment surgery). Surgical distribution of patients between two groups are statistically similar but still groups were not homogenous so both pain and swelling difference may be seen between two groups.



Frequency of clinical visits of patients may be difficult for clinicians who were interested with shoulder surgery because an kinesiotherapy session may be take approximately 15–20 minutes so physiotherapist or other clinical staff who have certificate to apply kinesiotape should help to clinicians. Further studies are necessary evaluating kinesio taping with larger patient numbers and muscle strength, which we didn't evaluate.

## CONCLUSIONS

Kinesio taping could be used in the early post-operative pain control following shoulder arthroscopy. A major advantage of this method is that, this is a non-invasive method. It could be used as an alternative method in order to reduce swelling, particularly on mid-deltoid region in the early post-operative period. However, its single use for pain control has limited evidence.

**Conflict of interest:** All authors declare that they have no conflict of interest. Each author certifies that he or she has no commercial associations that might pose a conflict of interest in connection with the submitted article. This study had not been presented at any congress.

**Ethical approval:** Ethical approval was given by Istanbul Medipol University Ethical Approval Center. Our study was saved with 10840098-604.01.01-E.1697 number.

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