



## Healing of arthroscopic portals : A randomised trial comparing three methods of portal closure

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We carried out a single blind, randomised trial in which we examined the healing of portal wounds treated by three techniques : suturing, approximating the edges of the wound with sterile adhesive tapes (steristrips) or covering them with a simple sterile dressing.

The study included patients who underwent arthroscopy of the knee joint, either for diagnostic purposes or for small therapeutic procedures. All patients were admitted as day cases. Outcome measures adopted were level of pain at the portal site, redness, swelling and cosmesis. The power of the study was designed to detect 10% difference with 95% confidence and  $p < 0.05$ .

A total of 160 patients with an average age of 40 years were studied : 45 patients had their wounds covered with simple sterile dressing, 52 had steristrips, and 63 had sutures on the portals. The total numbers of portals were 380. No patient was lost to follow-up. There was significant difference between the three groups with regards to post operative swelling and redness : 29% patients in the suture group had swelling as compared to around 11% in the two other groups ( $p = 0.02$ ) ; 37% patients in the suture group and 23% patients in the steristrips group developed redness while only 9% patients in the simple dressing group had redness at 4 weeks ( $p = 0.004$ ). Patients in the suture group experienced more pain as measured by visual analogue scale ; however there was no statistically significant difference ( $p = 0.37$ ) in the number of patients who had pain. All patients in the steristrips and simple dressing group were satisfied cosmetically ; 8% in the suture group were not. There were no major complications.

The present study shows that suturing the portals has no additional advantage. There is little to choose between the other two methods and treating these wounds with either simple dressing or steristrips is easy and causes less discomfort to the patient.

**Keywords :** arthroscopy ; knee ; portal ; closure.

### INTRODUCTION

Arthroscopy is a common procedure carried out routinely on various joints both for diagnostic and therapeutic purposes. After the procedure the arthroscopic portal wounds are traditionally managed by either suturing them or using steristrips, or leaving them without full apposition using a simple sterile dressing. The wounds normally heal in two

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to three weeks. The success of the arthroscopic procedure depends, among other factors, upon successful and satisfactory healing of portals wounds. Very few studies have been carried out to review the results of the healing of these wounds (6). Not many complications have been reported in the past with such wounds and the overall complication rate for arthroscopy has been reported to be 0.56% (1).

We carried out a prospective, single blind, randomised trial comparing the results of healing of the arthroscopic portal wounds around the knee. The portals were either sutured or the edges approximated with sterile adhesive tape or just covered by simple sterile dressing.

### MATERIAL AND METHODS

This study was performed in a district general hospital in the United Kingdom and included patients who underwent arthroscopy of the knee joint either for diagnostic or therapeutic procedures such as debridement, removal of loose bodies and washout. All patients were admitted as day cases and were prospectively entered into our study and randomised into three groups following informed consent. Surgeons of different grades carried out the procedure. All procedures were carried out through 5-mm stab incisions. Procedures were normally undertaken using a tourniquet unless contraindicated. Normal saline was used to lavage the joints. At the end of the procedure the wound was closed either using a single nylon (3-0) suture or by using a sterile adhesive tape (steristrips) or by covering the wound with simple sterile dressing. All patients were given a support bandage around the knee after the operation, which they took off at home 48 hours after operation. The wounds were seen by a nurse practitioner at 2 weeks and at this time steristrips and sutures were removed. Any problems at this time were reported to the medical staff.

All patients were followed up until the wounds had healed. At 4 weeks from the date of operation the patients were examined clinically and record of the healing was made. Severity of pain (recorded using visual analogue score-VAS) (3) redness or localised swelling was recorded by an independent observer who was blinded to the method of wound closure. The patients were asked to point towards the area of maximum discomfort and whether the pain was around the portal or deep inside the knee joint. Cosmetic healing of the wound was noted as well. The patients were asked to qualify whether they were satisfied or not satisfied with

the cosmetic result and with overall healing of the wound.

The patients were reviewed again until the wounds were completely healed. Any problems were carefully documented.

### Statistical methods

The study had a power of 90% and was designed to detect 10% difference in the outcome measures i.e. pain at the site of portals and wound healing complications. The sample size was determined before the start of the study by carrying out a pilot study and it was calculated that each group should have at least 45 patients to detect this difference with 95% confidence and p value of less than 0.05. Chi-squared tests and ANOVA analysis were used as diagnostic statistical tests to evaluate the results.

### RESULTS

One hundred and sixty patients who met the above criteria were included in the study. There were 61 females (38%) and the average age of the patients was 40 years (range : 20 to 60). Table I gives the common indications for the arthroscopic procedures carried out. Mean operating time was 32 minutes. Forty five patients had their wounds covered with simple sterile dressing. Fifty two patients had steristrips put on their portals. Sixty three patients had their arthroscopic portals sutured. One hundred and three patients (64%) had two routine anterior portals and 57 patients had more than 2 portals (3 to 4 portals). The total number of portals studied was 380. No patient was lost to follow-up.

Severity of pain, assessed using VAS, was more in patients where wounds were sutured. There was, however, no statistically significant difference ( $p = 0.37$ ) in the number of patients who had pain in the three groups : 17, 9 and 8 patients in suture, steristrips and simple dressing group respectively experienced some pain.

There was statistically significant difference in the three groups with regards to post operative swelling and redness. Eighteen (29%) patients in the suture group had swelling at 4 weeks while only 5 (11%) patients developed swelling in the simple dressing group and 6 (12%) in the steristrips

Table I. — Indications for arthroscopy

S.No	Diagnosis (n = 160)	Simple sterile dressing (n = 45)	Steristrips (n = 52)	Sutures (n = 63)
1	Osteoarthritis-debridement and washout	20	30	26
2	Medial or lateral meniscus tear-resection surgery	18	10	29
3	Joint evaluation and meniscus surgery	7	12	8

group ( $p = 0.02$ ). Also, there was significant difference in the extent of post operative redness around the portals. Twenty three (37%) out of the 63 patients in the suture group developed mild to moderate redness while only 4 (9%) out of 45 patients in the simple dressing group had developed redness. Twelve (23%) patients in the steristrips group had redness ( $p = 0.004$ ).

Regarding the cosmetic result and overall satisfaction of the patients, all patients in the steristrips and simple dressing group were very satisfied, while 5 patients (8%) in the suture group were unhappy with the appearance of their wound.

There were no significant long term complications in all three groups although there was superficial infection in 2 patients in the suture group, which cleared with oral antibiotics.

## DISCUSSION

This prospective randomised trial has highlighted that there is generally good wound healing of arthroscopic portals. There is very low incidence of infection, swelling or haematoma formation in these operative wounds. In our study only two patients developed superficial infection in the portals. Both these patients had sutures to their portals. The possible explanation is that leaving the wound without suturing helps in draining the blood and prevents subcutaneous haematoma formation and subsequent infection. Grashna *et al* (5) have observed that bacteria possibly colonise the percutaneous suture tracks either superficial or deep.

There was no difference in number of patients in the three groups with regards to pain though the severity of pain measured by VAS was more in the suture group. There was significant difference in the swelling and redness. Patients who had sutures had significantly more redness around the wound

as compared to the other two groups. This could again be due to better draining from the wounds that are not sutured. Cosmetically, the results were best in the simple dressing group with high level of satisfaction followed by steristrips group and then suture group.

Although Dandy (2) advocates suturing as an ideal technique for primary wound healing, Fairclough and Moran (4) in 1987 reported good results with use of sterile adhesive tape to close the arthroscopic portals. They reported 0.4% infection rate in their study. Our results are quite similar. We have found that using a simple sterile dressing in these small wounds results in excellent healing.

Although the study is a controlled trial, there is a chance of bias occurring at the time of the examination of the patient at follow-up. We tried to minimise this by having one observer examining all the patients, who was independent and not involved in any of the operations.

Also, it is sometimes difficult for the patient to qualify the exact nature and place of origin of pain as some patients did have underlying osteoarthritis and chronic knee pain. This was a potential confounding factor and careful evaluation was done while documenting this.

## CONCLUSION

The present study shows that suturing the portals after arthroscopy has no additional advantage towards better healing. There is little to choose between the use of steristrips or simple sterile dressing. Thus treating these wounds with simple sterile dressing and bandage or steristrips and bandage is easy, economical, causes less discomfort and results in fewer problems as compared to suture removal.

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