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Cost effective method of arthroscopic inside out meniscus repair

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Abstract
The complex ultrastructure of the meniscus determines its vital functions for the knee, the lower extremity, and the body. The most recent concise, reliable, and valid classification system for meniscal tears is the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS) Classification, which takes into account the subsequent parameters: tear depth, tear pattern, tear length, tear location/rim width, radial location, location according to the popliteal hiatus, and quality of the meniscal tissue. It is the orthopaedic surgeon's responsibility to combine clinical information, radiological images, and clinical experience in an effort to individualize management of meniscal tears, taking into account factors related to the patient and lesion. Currently, there are three main methods of modern surgical management of meniscus tears: arthroscopic partial meniscectomy; meniscal repair with or without augmentation techniques; and meniscal reconstruction. We present you series of 10 cases of repair of bucket handle tear of meniscus with indigenous inside out technique using Urology needle instead of conventional meniscus repair set and prolene 2-0.

Keywords: knee injury, meniscus tears, inside out technique, urology needle

Introduction
Meniscal tears are one of the most frequently encountered and treated injuries in the knee joint, with a bimodal age distribution in young, active sports people and in elderly people, and with a relatively high annual cost spent on its treatment [1, 3]. Meniscal repair can be performed open or arthroscopically.
Although successful clinical results were reported with open repair, there has been increasing evolution from open to arthroscopic repair and currently the latter predominates for meniscal tears [4].
At present, there are three main techniques for arthroscopic meniscal repair: inside-out, outside-in, all-inside. Among them the strongest repair has been accepted as the inside-out technique, which was first described by Henning [5, 6].
Conventional arthroscopic meniscus repair techniques require meniscus repair set including meniscus repair needle and meniscal dart sheeth with cannula. These may cause financial burden and hence delay in surgery in some patients.
We present you series of 10 cases of repair of bucket handle tear of meniscus with indigenous inside out technique using Urology needle instead of conventional meniscus repair set and prolene 2-0.

Material and Method
We hereby present a series of 10 cases of meniscus tear treated at Dhiraj hospital, SBKS medical institute and research center, by our indigineous method. After taking consent from the patients, under spinal anaesthesia, in supine position first a diagnostic arthroscopy was performed and diagnosis of medial/lateral meniscus bucket handle tear with/without cruciate ligament injuries was confirmed. Medial/lateral meniscus tear were reduced with probe first. Then a long Urology needle (Figure 1) was inserted percutaneously in such a way that the tip of the needle engages with central part of the tear.
Then the needle with canula was pushed out through the capsule and retrived through the skin

incision posteromedially/laterally (Depending on meniscus involved). Then the needle was removed and keeping the cannula in situ, prolene 2-0 was passed through the cannula and retrived outside (Figure 2). Similarly needle with cannula was passed through the same incision and needle was passed through peripheral part of the tear, pushed further out of the capsule and retrieved through the skin incision posteriorly (Figure 3). Again needle was removed and through the cannula prolene 2-0 was passed outside and the cannula was now pulled out throught the same posterior skin incision. The final Meniscus repair configuration consisted of at least 2 to 3 prolene 2-0 sutures from posteriorly to anteriorly. All sutures were then tied outside the capsule and stability of the repair was checked arthroscopically (Figure 4).

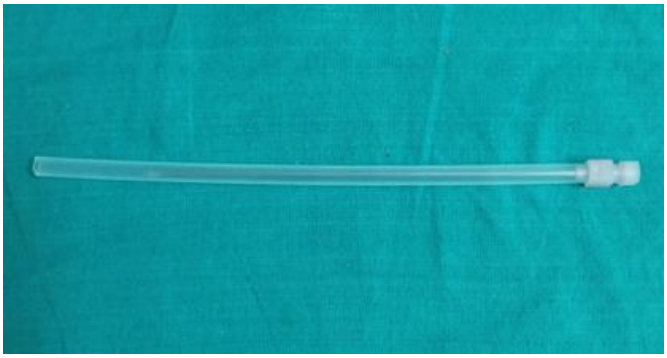

Fig 1: Urology needle with cannula

Fig 2: Retrieving prolene 2-0 through cannula

Fig 3: Retrieving prolene posteriorly

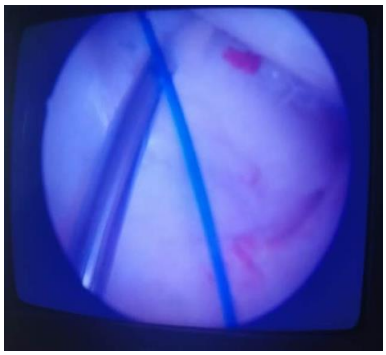

Fig 4: Arthroscopy image showing lateral meniscus repair using inside out technique

Post operatively passive knee range of motion exercises were started from first day with non-weight bearing. After 1 month, active knee range of motion with partial weight bearing with brace was started and after 6 weeks full weight bearing was permitted. After 3 months, patients were allowed to perform all his routine/occupational activities.

Patients were regularly followed up at 1 month, 2 month and 3 months and evaluated using Knee society score.

Results

In our study of 10 cases, 50% cases had history of sports injury, 20% had road traffic accident and remaining 20% due to trivial trauma. 80% patients were male. In 70% cases, medial meniscus was injured and remaining 30% had lateral meniscus injury. In 70% cases, Anterior cruciate ligament was injured along with meniscus including posterior cruciate ligament injury in one patient. Cruciate injuries were treated accordingly. As per knee society score, we have achieved 80% excellent and 20% good results. We did not encounter in form of complication in our study.

Table 1: Knee society score at final follow-up

Patient	Menisci	Gender	Mode of injury	Associated injury	Knee society score at final follow-up
1	Medial	Male	Sports injury	None	87
2	Medial	Male	Sports injury	ACL	92
3	Lateral	Male	Road traffic accident	ACL	76
4	Medial	Female	Road traffic accident	None	90
5	Lateral	Male	Sports injury	ACL+PCL	82
6	Medial	Female	Trivial trauma	None	89
7	Medial	Male	Road traffic accident	ACL	74
8	Lateral	Male	Sports injury	ACL	84
9	Medial	Male	Sports injury	ACL	90
10	Medial	Male	Trivial trauma	ACL	89

Discussion

There are two menisci, which are medial (U-shaped) and lateral (S-shaped) semilunar shaped, hydrated, biphasic fibrocartilaginous soft-tissue structures in the medial and

lateral tibiofemoral compartments of the knee joint, respectively. The morphology of this load-bearing complex structure determines its vital functions: load bearing, joint stability, joint congruity, increasing joint contact area, decreasing joint contact stresses, protection of articular cartilage, shock absorption, lubrication, limitation of extreme movement and proprioception [7, 9]. Meniscal injury of knee results in marked disability due to symptoms like pain, clicking and locking of knee. Patient can develop early osteoarthritis of knee if meniscal injuries are not treated properly. For these reasons in today's era meniscus repair surgeries are of prime importance. Among mesical repair techniques, arthroscopic inside out repair technique for meniscus is considered to be the best.

Michael E. Hantes *et al*. [10] did a comparative study between three different techniques of meniscus reapir. In his study, 30% patients underwent outside in repair, 35% had inside out and 35% had all inside repair. Study suggested that inside-out technique is the most preffered one since it provides a high rate of meniscus healing without prolonged operation time.

Conventional arthroscopic meniscus repair would costs around $700-800 for each surgery at our set-up, whereas technique of arthroscopic meniscus repair using long urology needle costs approximately $30.

Conclusion

Arthroscopic inside out method of meniscus repair is the most promising among all and achieving it using a long Urology needle is suitable and cost effective alternative for commercially available meniscus repair needle and cannula set.

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