

**Early Functional Outcome Of Patients With Isolated Meniscal Injury Treated By
Arthroscopic Partial Meniscectomy At Muhimbili Orthopedic Institute**

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**Muhimbili University of Health and Allied Sciences
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**EARLY FUNCTIONAL OUTCOME OF PATIENTS WITH ISOLATED
MENISCAL INJURY TREATED BY ARTHROSCOPIC PARTIAL
MENISCECTOMY AT MUHIMBILI ORTHOPEDIC INSTITUTE**

By

Deogratias Gosbert Banuba

**A Dissertation Submitted in (Partial Fulfillment of the Requirements for the Degree
of Master of Medicine (Orthopedics and Traumatology) of**

**Muhimbili University of Health and Allied Sciences
October, 2018**

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled, “**Early functional outcome of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at Muhimbili Orthopedic Institute (MOI)**”, in (partial) fulfillment of the requirements for the degree of Master of Medicine (Orthopedics and Traumatology) of Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, **Deogratias Gosbert Banuba**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

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Date.....

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First and foremost, may I give my sincere thanks to Almighty God for His protection and giving me good health thought out my study period, being a Sinner I didn't deserve the blessing you delivered to me, but you didn't look at my transgressions, thank you Lord, keep molding me Lord according to your word.

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DEDICATIONS

This dissertation is dedicated to my beloved wife Pendo Salvatory Dyicha and my Children Daniel, Joyce and Doreen for their irrepressible love, courage, support and commitment.

You have always stood by me and dealt with all of my absence from many family occasions and problems with a smile.

ABSTRACT

Background

Meniscus injury is the common problem occurring due to several causes, and its treatment has evolved from open meniscectomy, arthroscopic total meniscectomy and now arthroscopic partial meniscectomy (or repair) being commonly performed. Currently at MOI, there is increase in the number of patients operated by arthroscopic partial meniscectomy compared to previous time and its outcome is not yet established.

Objectives: Early functional outcome of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at Muhimbili orthopedic institute (MOI) were determined.

Materials and Methods: A prospective hospital based descriptive study involving adult patients with meniscal injury treated by arthroscopic partial meniscectomy, was conducted at MOI for a period of twelvemonths from June 2016 to May 2017. 50 patients met inclusion criteria and were all enrolled for the study. The patients were assessed and scored using Lysholm knee functional score (LFKSS) before treatment, then 2nd, 6th and 12th weeks post treatment. Data was collected with the help of research assistant guided by structured questionnaire and tool like Goniometer was used to accomplish data collection. Outcome was assessed using Lysholm scores with eight domains at 2nd, 6th and 12th weeks. At 12th week the scores were compared with that before treatment. The data obtained were analyzed using SPSS version 20.

Results

A total of 50 patients with isolated meniscal injury were enrolled at MOI from May 2016 to December 2016 and were all followed up for 12 weeks each. 5 patients lost to follow up, only 45 patients were analyzed at 12th week. Among 45 patients, 28 (62.2%) were male and 17(37.8%) were female with male to female ratio of 2:1; more than half 29 (64.4%) were below 40years and 16 (35.6%) were above 40years. Majority 26(57.8%) were treated 3months and above, and 19(42.2%) less than 3months from injury. Activity of daily living accounted 18(40%), Sports 13(28.9%), Road traffic accidents 10 (22.2%), Falling from height 3 (6.7%) and others 1(2.2%). The median Lysholm score was 63±13.61SD before treatment and 100±

6.38SD at twelfth week post treatment (p value=0.0001), and mean flexion angle was $108.53 \pm 10.83^\circ$ and $136.55 \pm 5.88^\circ$ degrees at twelfth weeks pre and post treatment respectively (p value =0.0001). Functional outcome at twelve weeks postoperatively assessed and graded by Lysholm functional knee score (LFKS) was Excellent for 39(86.7%) and 3 (6.7%) attained good results and poor to fair results were seen only on 3(6.7%) patients. Outcome not affected by age (p=0.99), sex (p=0.235) or duration of symptoms (p=0.281) post injury at 12th week.

Conclusion

Meniscal injury is more common in males, and majority due to activity of daily living. At our set up, Arthroscopic partial meniscectomy showed excellent to good results (outcome) as most of our patients attained their pre injury state at 12th weeks with full knee function.

Recommendation

meniscal injury has excellent to good outcome despite of delay in treatment, so operation should also be considered even in delayed clinical presentation; and larger, prospective studies are needed to further explore these findings.

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ABBREVIATIONS

ACL	Anterior Cruciate Ligament
JBJS	Journal of Bone and Joint Surgery
JPMA	Journal of Pakistan medical association
LCL	Lateral Collateral Ligament
LFKSS	Lysholm Functional Knee Scoring Scale
MCL	Medial Collateral Ligament
MOI	Muhimbili Orthopedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
MVC	Motor vehicle crush
PCL	Posterior Cruciate Ligament
ROM	Range of Motion
SPSS	Statistical Program for Social Sciences

DEFINITIONS OF KEY TERMS

Disability: Defined by WHO” as any restriction or lack of the ability to perform in the manner or within the range considered normal.

Arthroscopy: Is Examination of the interior of a joint using an endoscope that is inserted into the joint through a small incision.

Early outcome: Twelve weeks’ period of follow up of clinical functional outcome.

Functional outcomes: Is measured from recovery from pain, early return to regular activities and sports, knee stability and range of knee motion following surgery.

Activity of daily living: Indoor /outdoor activity such as bathing, eating, squatting, raising from chair or walking etc.

Mechanism of injury (Others): e.g. physical assaults.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Meniscal injury is one of the common cause of functional impairment of the knee, and historically was believed to have no functional purpose and they were often excised with open total meniscectomy. [1,2]. Statistics from developed world reports the incidence is 61/100,000 [3]

The Menisci are fibrocartilagenous and wedge shaped structure in coronal plane found in a knee joint which extend the superior tibia surface improving its congruency with the femoral condyles, the medial meniscus is more crescent shaped(U-shaped) and is attached to the medial collateral ligament, which limits its mobility and the Lateral meniscus is more circular(C-shaped) and is connected to the femur via the anterior (ligament of Humphrey) and posterior (ligament of Weisberg) menisco-femoral ligaments. The major mechanical function of menisci is to distribute stress across the knee during weight bearing, provide shock absorption, serves as secondary joint stabilizers, provide articular cartilage nutrition and lubrication, facilitate joint gliding, prevent hyperextension and protect the joint margins.45% to 70% of the weight bearing load is transmitted through the menisci when the peripheral margins are intact [4, 5].

The menisci are relatively avascular excluding 3-5 mm of the peripheral rim (10-30% of the width of the medial and 10-25% of the width of the lateral meniscus) where the Para meniscal capillary plexus supplies blood to the synovial and capsular tissues. The vascularized area can be classified into the red-red zone, red-white zone, and white-white zone according to the degree of vascularity. The capillary plexus gradually decreases with age [6]

Knee arthroscopy is the most performed arthroscopic orthopedic procedure today worldwide, like all other arthroscopic procedures, it delivers a minimally invasive approach to orthopedic operations that previously necessitated open surgery. The basic principle involves the insertion of a scope and associated instruments through small portals in the skin to allow intra-articular evaluation and treatment of pathology [7]

Irreparable tears of the meniscus, either due to zone of injury or complexity of the tear, are best treated by partial meniscectomy. Practically, the vast majority of meniscal tears are managed by arthroscopic partial meniscectomy. The principle is to debride the loose non-viable edges of menisci in order to produce a stable meniscus. This aims to decrease the number of fragments of menisci that are loose and potentially causing damage to the articular cartilage. These loose fragments may also be a cause of pain [8].

The procedure aims to relieve symptoms attributed to a meniscus tear by removing torn meniscal fragments and trimming the meniscus back to a stable rim [9]. Arthroscopic partial meniscectomy is superior to traditional open meniscectomy because of low morbidity, rapid rehabilitation, high patient acceptance and early return to work and sport. Surgical repair is usually reserved for younger patients with a vertical longitudinal tear within the vascularized outer third of the meniscus for enhanced healing. This area is termed as the 'red-red zone' (denoting area of vascularity) [10]

Meniscal tears are classified according to their orientation. They can be vertical longitudinal, vertical radial, horizontal, oblique or complex [11]

Longitudinal tears are common medially; while radial tears are frequently on lateral [12].

Vertical longitudinal tears occur between the circumferential collagen fibers. Complete vertical tears can sometime twist within the joint known as "bucket handle" tears [13].

Horizontal tears split the meniscus into an upper and lower part and can exist without clinical symptoms [14].

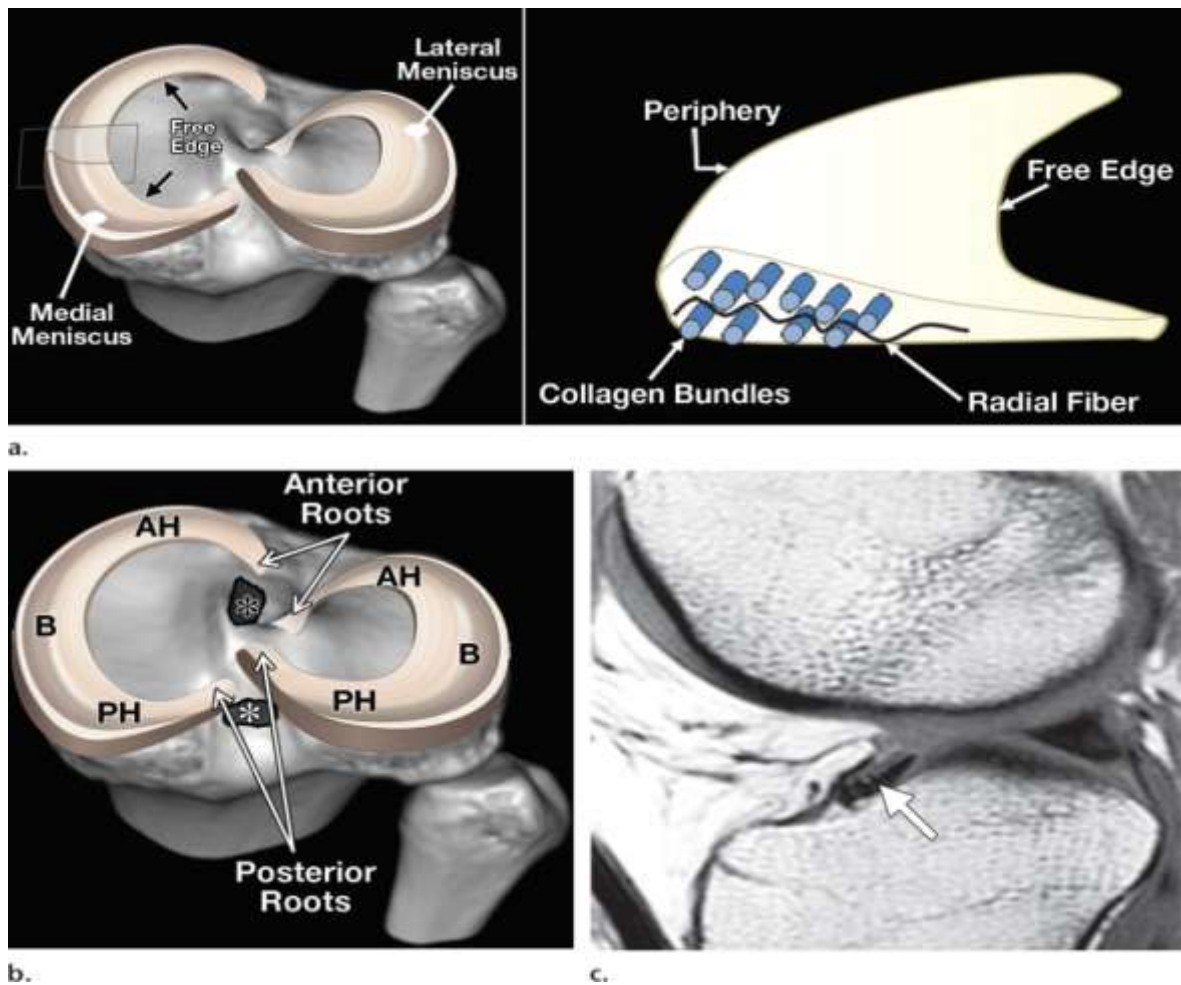


Figure1: Normal meniscal anatomy (a) Three-dimensional model (left) and cross-sectional diagram (right) of the semi-lunar meniscus showing the concavity surface, which takes the shape of femoral condyles. (b) Three-dimensional model shows the meniscus subdivided into three parts (the anterior horn [AH], body [B], and posterior horn [PH]) and attached to the tibia via the anterior and posterior root ligaments. Note the closeness of the roots to the tibia attachment sites for the anterior cruciate ligament (ACL) (black *) and posterior cruciate ligament (PCL) (white *). (c) Sagittal PD-weighted MR image shows the striated appearance of the anterior horn of the LM (arrow) due to contributing insertional fibers that comes from the ACL: Radiograph by Nguyen JC et al [15]

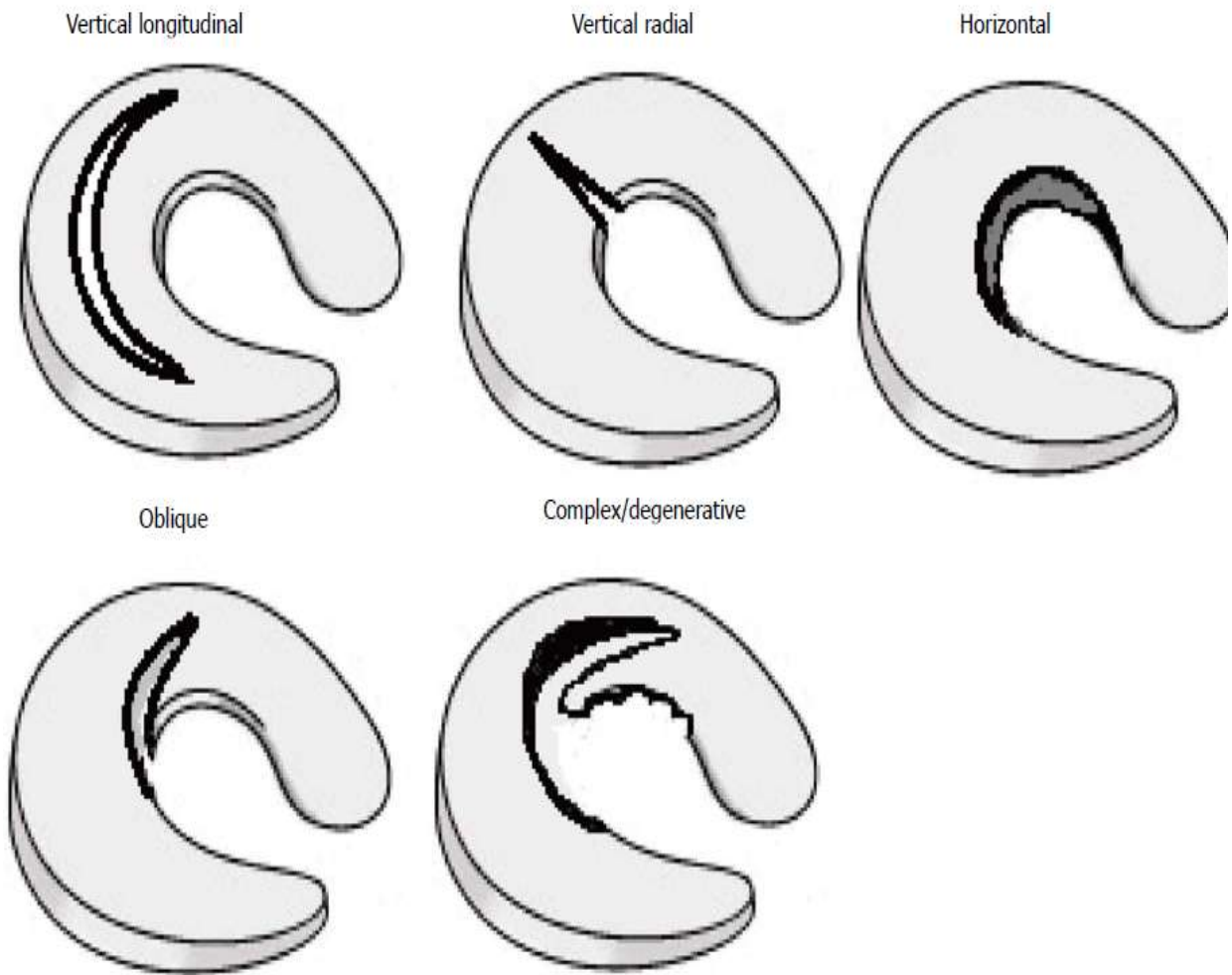


Figure 2: above: Meniscal tear patterns. [11]

1.2 Literature Review

Social Demographic features of meniscal injury

In a retrospective study by Johnson RJ et al revealed males are more affected than female in which among 99 participants, 76 (76.76%) are male and 23 (24%) are female [16]. In a study done by Drosso et al reported the ratio male to female gender was 4:1 showing much number of men is affected in meniscal injury [17]. Systematic review done on 12 studies by Snoeker et al reported that, those with more than 60 years of age and male gender are said to be at major risk for meniscal injury [18]. Study by Ramesh G et al showed in 20 participants with meniscal injury, 17 patients were male (85%), 3 patients were female (15%) in his series of meniscal injuries. Meniscal injuries are more common in males which may be reflection of male being more involved in aggressive sporting and manual activities that predispose to rotational injuries of the knee and the age ranges from 10-40 years with mean age of 27.05 years in this study of meniscal injuries [17,19]. Study done by Rao PS et al showed Patients below the age of 40 years reported good outcome, however did not address the number of patients who were below or above 40 years [20].

Duration from injury to treatment:

Delay in treatment following menisci injury is known to play important role in determining the outcome after partial meniscectomy, Poor or unsatisfactory outcome is associated with delay in surgical intervention since injury [20,22]. Rao reported best clinical outcome were observed in patients who were operated within 3 months after injury (81.25%) excellent and good results, the overall scoring showed 76.06% excellent and good results in Lysholm scoring method [20]. However, study by Scott et al reported duration of symptoms has no effect on the outcome in his study categorized in two groups, one less than 3 weeks and the other 3 weeks or more, and the mean time from injury to surgery was 1 week to 696 weeks, the rate of recovery from both groups were statistically not significant ($P=0.44$) [21]. A study by Yocum LA et al showed satisfactory results (excellent or good) among women averaged 2.3 months between documentation of injury and operation versus 43.5 months for the two women with less satisfactory results in 26 participants [22]. Study by Robert et al reported the average time of symptoms since injury to surgery was 22.3 months, 24.1 months, 39.1 months and 39.6 months for excellent, good, fair and poor results respectively. [16, 21, 43, 45].

Mechanism of meniscal injury

The causes of meniscal injuries reported to be due to accident, sports, regular activities and from other causes such as physical assaults. A study by Ramesh reported majority of injuries were due to motor vehicle crush 65 % (13 patients) followed by other causes and sports injuries.[19]. Also study done by Raza, et al in 145 patients with menisci injury reported that, sports injuries accounted to 58 (40%), and majority were injured secondary to minor accidents, and activities of daily living were 65 (45%) and very few reported to have no definite injuries encountered 22 (15%). so accident related meniscus injury is high at this particular study [23]. Study by Dross et al on 392 patients revealed sport injuries accounted 32.4% of cases and those not related to sport accounted 38.8% of meniscal tears and 71.9% of these occurred in activities of daily living and 28.8% presented with no history of trauma encountered [17].

Functional outcome of arthroscopic partial meniscectomy

Partial arthroscopic meniscectomy is now a known and documented approach in treating menisci tear as reported by Zeichen J et al, showing its efficacy post-surgery, that patient regain his pre injury state and most of symptoms are wiped out and very good to excellent clinical results can be achieved in the short and long term after arthroscopic partial meniscectomy [24]. So the traditional way of open surgery and total meniscectomy is now losing its popularity and advancement is shifting to arthroscopic partial meniscectomy and shown better outcome. Also a study by Liu JS et al assessed functional results in late middle aged adults with menisci injury, the average flexion angle was 116.01 ± 12.03 , the Lysholm score was 63.95 ± 5.45 before surgery, the results after surgery was mean flexion angle of 136.77 ± 18.56 , and the Lysholm score of 87.84 ± 5.16 and therefore arthroscopic partial meniscectomy showed good functional outcome [25]. Study done in Pakistan group I with pure meniscal lesion, who underwent partial meniscectomy, 100(53%) were sedentary workers and were able to return to work at average duration of 3 weeks, 40(21%) patients who were involved in physical demanding industrial, agriculture or outdoor work went back to their jobs in the duration of 5 weeks; 28(14%) patients who were students, were able to go to their classes in average time of 10 days and 13(9%) patients were professional or semi-professional Athletes who were permitted sport training in 3 weeks and sports participation in 6 weeks [26]. A study by Lee C et al showed there

was improvement in Lysholm score from 82.8 preoperatively to 95.4 postoperatively showing arthroscopic partial meniscectomy has a tremendous good functional outcome [27]. Barak Haviv et al reported effect of gender on the outcome of partial medial meniscectomy, 68(79%) men and 35(71%) women were satisfied with the operation with Lysholm score of 69 and 64.2 respectively for men and women before surgery to 82.1($p < 0.01$) and 73.5($p = 0.04$) respectively for men and women after surgery [28]. Study by Akkaya et al found that 68 patients (69.4%) assessed themselves and results were excellent or better than it was before surgery with an average Lysholm knee score of 73.8 ± 17.4 [29]. Study by Ramesh G et al showed functional outcome result to be excellent 70%, good 25%, and fair 5% as scored by Lysholm and majority of patients were able to return to their pre injury activity in 14.35 days [18]. Also study by Seong-II et al showed that the Lysholm scores increased after surgery by average 20.7 and no recurrence of tear or aggravation of symptoms was noted during follow up [30]. Also study by Ewa Roos et al revealed at post-operative follow up of an average of 14.4 weeks' significant improvement was seen. [31]

1.3 Problem Statement

Arthroscopic partial meniscectomy is the standard treatment for meniscal tear; At MOI 2-4 patients are treated per week with arthroscopic partial meniscectomy. The outcome of partial meniscectomy is well studied in developed World, but we have paucity of data at our environment, this study therefore gives the light on outcome of meniscal injured patient treated by arthroscopic partial meniscectomy.

1.4 Study Rationale

This study aimed at getting baseline information to fill that gap of knowledge with regards to short term outcome of isolated meniscus injury following arthroscopic partial meniscectomy at MOI and eventually lay down a foundation in the interventional research in the management of menisci injuries.

No related published study has been done to our country which can be used as the baseline.

The study is done as a partial fulfillment for the award of the degree of Masters of Medicine in Orthopedics and Traumatology of the MUHAS.

1.5 Research Question

What are the early functional outcomes of patients with isolated meniscus injury treated by arthroscopic partial meniscectomy at MOI?

1.6 Objectives of the study

1.6.1 Broad objective

To assess early Functional outcomes of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at Muhimbili Orthopedic Institute.

1.6.2 Specific Objectives

1. To determine social demographic features of patients with isolated meniscal injury treated by Arthroscopic partial meniscectomy at MOI.
2. To determine the duration of isolated meniscus tear from injury to definitive treatment of patients treated at MOI
3. To determine mechanism of injury of isolated meniscus tear of patients treated by arthroscopic partial meniscectomy at MOI.
4. To determine early functional outcomes of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at MOI.

CHAPTER TWO

2.0 MATERIALS AND METHODOLOGY

2.1 Study design

This was a hospital based descriptive cross sectional prospective study.

2.2 Study duration

The study commenced on May 2016 and ended on April 2017.

2.3 Study area

The study was conducted at the Muhimbili Orthopedic Institute (MOI), which provides tertiary services in orthopedics, traumatology and neurosurgery. It is located in Dar es Salaam, Tanzania. It attends most of the patients referred from Dar es Salaam City but also from other regions and nearby Countries. Also it is among the Centre's used by the College of Surgeon of East, Central and Southern Africa (COSECSA) to train doctors who are doing fellowship programs in Orthopedic, Trauma and Neurosurgery. It is the training center for Residents from MUHAS. MUHAS being in collaboration with MOI as all students practice their clinical skills at MOI. MUHAS is the famous and the biggest medical university which provides various programs related to health up to PHD level. MUHAS has qualified and well experienced staff for provision of health related programs.

2.4 Study population

Patients with isolated meniscal injury admitted during study period treated by arthroscopic partial meniscectomy at MOI.

2.4.1 Inclusion criteria

- All adult patients above 18 years with meniscal injuries treated by Arthroscopic partial meniscectomy during the study period.

2.4.2 Exclusion criteria

- Infective conditions in or around the knee joint.
- Non ambulatory patients prior to injury.

- Prior limb deformity. (e.g. contractures)
- Prior contra lateral / ipsilateral major knee operation.
- Meniscal injuries with tibia plateau fractures and distal femoral fractures.

2.5 Sample size Estimation and Sampling technique.

The period of enrolling patients started on May 2016 to December 2016. Pilot study was done at MOI, where 2-4 patients are operated per week, average of 3 patients per week, for one month is 12 patients, for 4 months of sample size collection, then $12 \times 4 = 48$. During enrollment, at 4 months, 50 patients enrolled (convenient sampling), and at the end only 45 patients were available for analysis, 5 patients were lost to follow up, two of them in the 6 week and the other three at the 12th week.

2.6 Research instrument/ tool

Pre-test of data collection tool (questionnaire) was conducted by the researcher for the purpose of finding out if it provides the required information. Necessary changes were made so as to obtain the required information. Designed questionnaires (Lysholm knee functional scores included) was used as data collection tool. Goniometer was an instrument used to measure range of motion of the knee.

2.7 Patient Recruitment and Data Collection

2.7.1 Pretreatment

One research assistant was recruited, oriented on both study objectives and data collection tools.

Standard structured questionnaires were used to collect information on socio-demographic characteristic of the patients, mechanism of injury and their functional outcome.

The researcher and research assistant (Medical doctor) provided information about the study to participants and obtained consent from those who were willing to participate. The researcher or assistant interviewed the participants using a pretested structured questionnaire.

Social demographic data were collected and recorded in a questionnaire.

Range of motion (ROM) was measured preoperatively by the use of goniometer.

Lysholm knee scoring scale was used to assess the patients preoperatively to know their functional knee status and was compared with that after definitive treatment and this score is a well validated functional score, designed for knee injuries, questionnaire where each possible response to each of the 8 items has been assigned an arbitrary score on an increasing scale. The total score is the sum of each response to the 8 items. A score of 100 means no symptoms or disability.

There were 4 levels of outcome using Lysholm Functional knee scoring method as follows.

Table 1: Domains and scores for Lysholm functional knee scores

Variables/domains	Points/scores
Instability	25 points
Pain	25 points
Locking	15 points
Swelling	10 points
Stair climbing	10 points
Limp	5 points
Support	5 points
Squatting	5 points.

From table I, Total score of 95-100 was considered Excellent (level 1), 84-94 Good (level 2), 65-83 fair (level3) and those who were below 65 considered poor (level 4). This was measured before surgery and then compared with that after surgical intervention and assessed for improvement (outcome) [32].Clinical assessment of the patient was done and diagnosis made through either MRI or diagnostic knee arthroscopy or both

2.7.2 Measurement of range of knee motion

Knee extension **was** assessed with the patient in supine position with the examiner raising the patients off the coach while holding the medial malleoli together and observe the level of the knees. The goniometer was used to measure the degree of knee extension and then compared. For the knee flexion patient flexes the knee as far as possible in supine position. The Goniometer **was** placed on the lateral aspect of the flexed knee to measure the degree of knee flexion then compared [33, 34]

2.8 Treatment post treatment and patient follow up

Arthroscopic partial meniscectomy was performed to all enrolled patients who consented for the study with menisci injury, Antibiotic was given to all patients one hour prior to surgery, all underwent spinal anesthesia and tourniquet was applied to all patients and all intraoperative findings documented. Patients was requested to attend clinic on the 2nd, 6th, and 12th weeks post operatively and again required to have full weight bearing after 24hours post-surgery and analgesics was given for 3days. At home the patient was required to perform active knee physiotherapy (flexion and extension)

2.8.1 Second week visit

Using Lysholm knee scoring scale, patient was assessed for pain, Instability, locking, swelling, stair climbing, Limp, support and squatting and be graded. Wound was assessed and Stitch removed. In patients with superficial wound infection, treatment was offered accordingly by keeping them on oral antibiotics and daily wound dressing. Range of motion (ROM) with goniometer was also assessed.

2.8.2 Sixth week visit

Range of motion (ROM) was measured together with wound assessment.

Patients assessed using Lysholm functional knee scoring scale as done in the 2nd week.

2.8.3 Twelfth week visit

Last assessment was done and was the one that determined patient outcomes.

Participants were required to complete the questionnaire on Lysholm score and overall recovery from previous symptoms assessed.

Range of motion (ROM) and wound assessment if at all the wound was not healed.

Grading was classified weather is excellent (100-95), good (94-84), fair (83-65) and poor (<64).

2.8.4 Validity and reliability of investigation tools

The Lysholm score was designed to document the patient's evaluation of function and it has been proven to be valid, reliable and responsive in evaluating patient with meniscus injury [35].

The reviewed Lysholm score (1983) added Locking as one of the domain and removed objective domain of thigh muscle atrophy, therefore LFKSS has 8 domains of Instability (25), Pain (25), Locking (15), Swelling (10), Stair climbing (10), Limp (5), Support (5) and Squatting (5) which is the score used up to date Lysholm Functional knee scoring scale (LFKSS) demonstrated acceptable psychometric performance as outcome measures for patients with a meniscal injury of the knee [36].

2.9 Data management (Analysis)

Data entry, cleaning and analysis was done using SPSS version 20. Frequency distribution was used to describe categorical variables such as age groups, sex and standard deviations for continuous variables such as constant Lysholm scores. Analysis for demographic data was conducted using Chi-square tests. A variable was considered statistically significant if it had a P-value less than or equal to 0.05.

2.10 Ethical Clearance and Consideration

Ethical approval was obtained from the MUHAS Ethics Review Committee. Permission to carry out the study was obtained from MOI management. Informed consent was obtained from the patient. Participant anonymity, confidentiality and willingness to withdraw from the study were respected and refusal to be enrolled in the study did not affect patient treatment quality and follow-up. Registration numbers instead of names were used for confidentiality purposes.

CHAPTER THREE

3.0 RESULTS

From May 2016 to December 2016 a total of 50 patients with isolated meniscal injury treated by arthroscopic partial meniscectomy were enrolled in the study, at 12th week 45 patients were analyzed and 5 patients were lost to follow up, they were followed-up for a minimum of 12 weeks each.

Table 2: Baseline socio-demographic data (age and sex distribution)

		Frequency	Percentages
Age groups in years	≥40	16	35.6%
	<40	29	64.4%
Sex	M	28	62.2%
		17	37.8%
Total		45	100%

Majority were male accounting 28 (62.2%) with female to male ratio 17:28, Other findings are shown in table 2.

Table 3: Frequency distribution table showing duration from injury to treatment

		Frequency	Percentages
Duration from injury to treatment	≥3month	26	57.8%
	< 3month	19	42.2%
Total		45	100%

Majority of patients were treated late ≥ 3 months after injury which accounted to 26 (57.8%) of the patient. The median duration of symptoms to treatment was 3.25 ± 1.68 months.

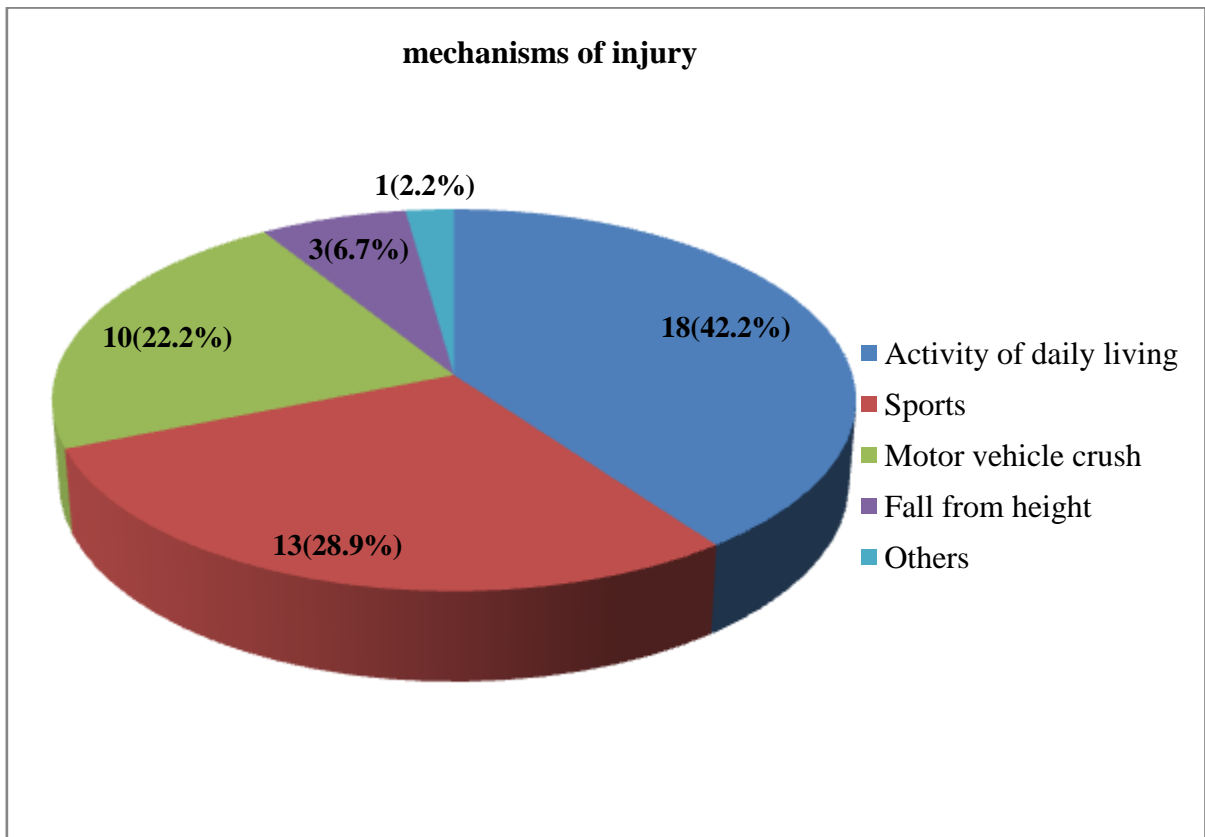


Figure 3: Distribution of mechanisms of injury expressed in percentages (%)

Activity of daily living was the leading cause of meniscal injury that accounted for 18 (40%). Other mechanisms are as shown in figure 4 above.

Table 4: Effects of age, sex and duration of symptoms on the knee functional outcome at 12th week follow up.

Parameter		Lysholm score at 12th week			P value
		Fair	Good	excellent	
Age	<40	2(6.9%)	2(6.9%)	25(86.2%)	0.99
	>40	1(6.2%)	1(6.2%)	14(87.5%)	
Sex	M	3(10.7%)	1(3.6%)	24(85.7%)	0.235
	F	0(0%)	2(11.8%)	15(88.2%)	
Duration	<3month	0(0%)	1(5.3%)	18(94.7)	0.281
	≥3month	3(11.5%)	2(7.7%)	21(94.7)	
Complication	Present	1(2.2%)	1(2.2%)	0(0%)	0.001
	Absent	2(4.4%)	2(4.4%)	39(86.7%)	

Age, sex and duration from injury to treatment appear to have no effect on the functional outcome at 12th weeks (p value >0.01). Majority of patients had no complication **43(95.7%)** and results were statistically significant (p=0.001) as shown in table 4.

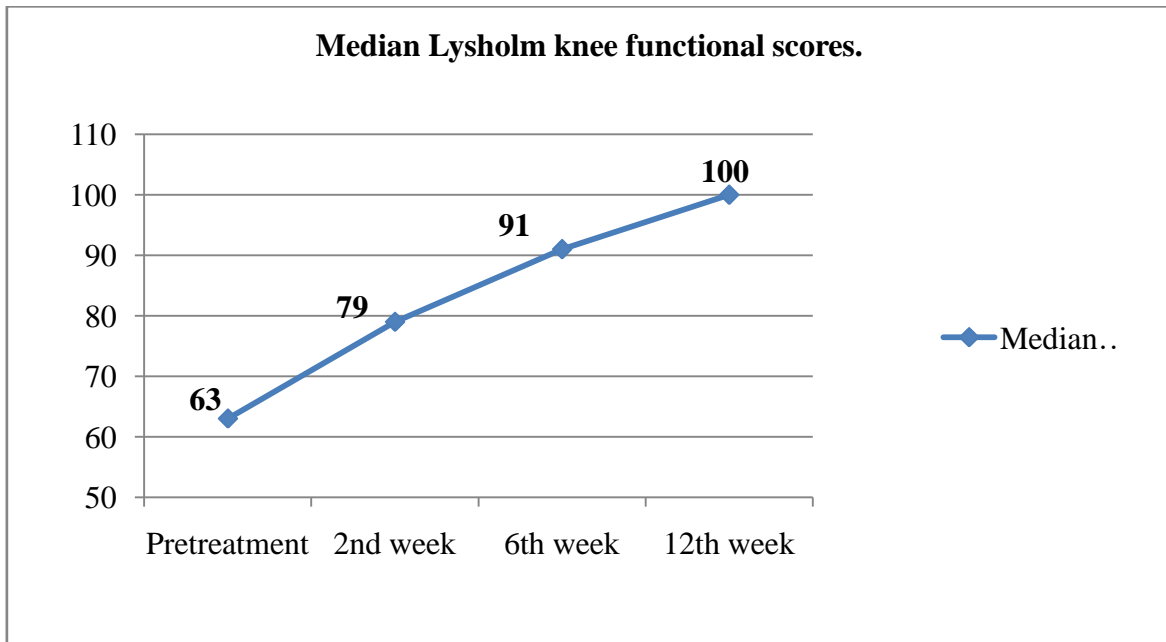


Figure 4: Median Lysholm functional knee scores at pretreatment, 2nd, 6th and 12th week

**p value= 0.0001

Majority of patients returned to their pre injury activity level at 12th weeks post operatively. Lysholm score improved significantly at 12th week post operatively (100 ± 6.38 SD) compared with that of pre-treatment Lysholm score (63 ± 13.61 SD) as shown in figure5.

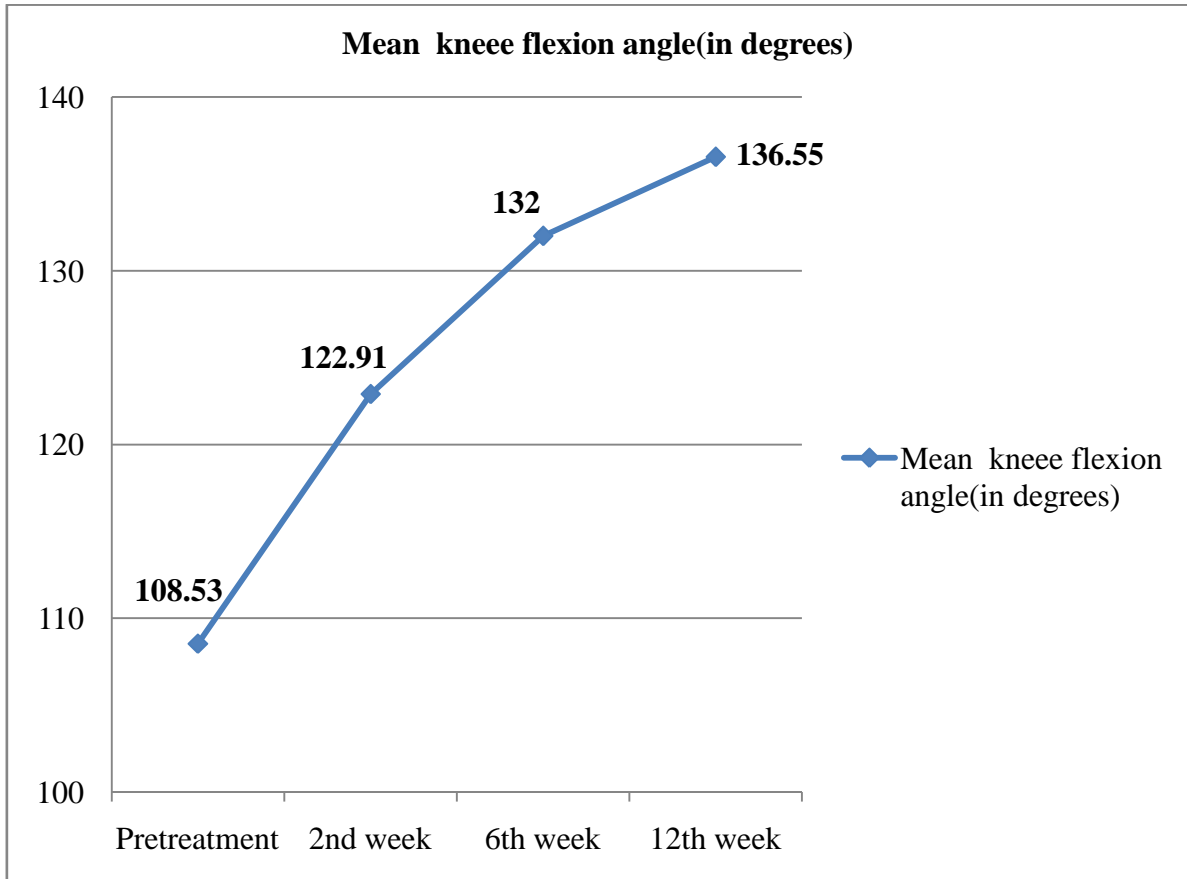


Figure 5: Mean degree of knee flexion at pretreatment, 2nd, 6th and 12th week (degrees)

*** p value= 0.0001

There is statistical significant improvement of degree of knee flexion at 12th weeks post operatively (136.55 ± 5.88 SD) compared to degree of knee flexion of 108.53 ± 10.83 SD before treatment (p value <0.01).

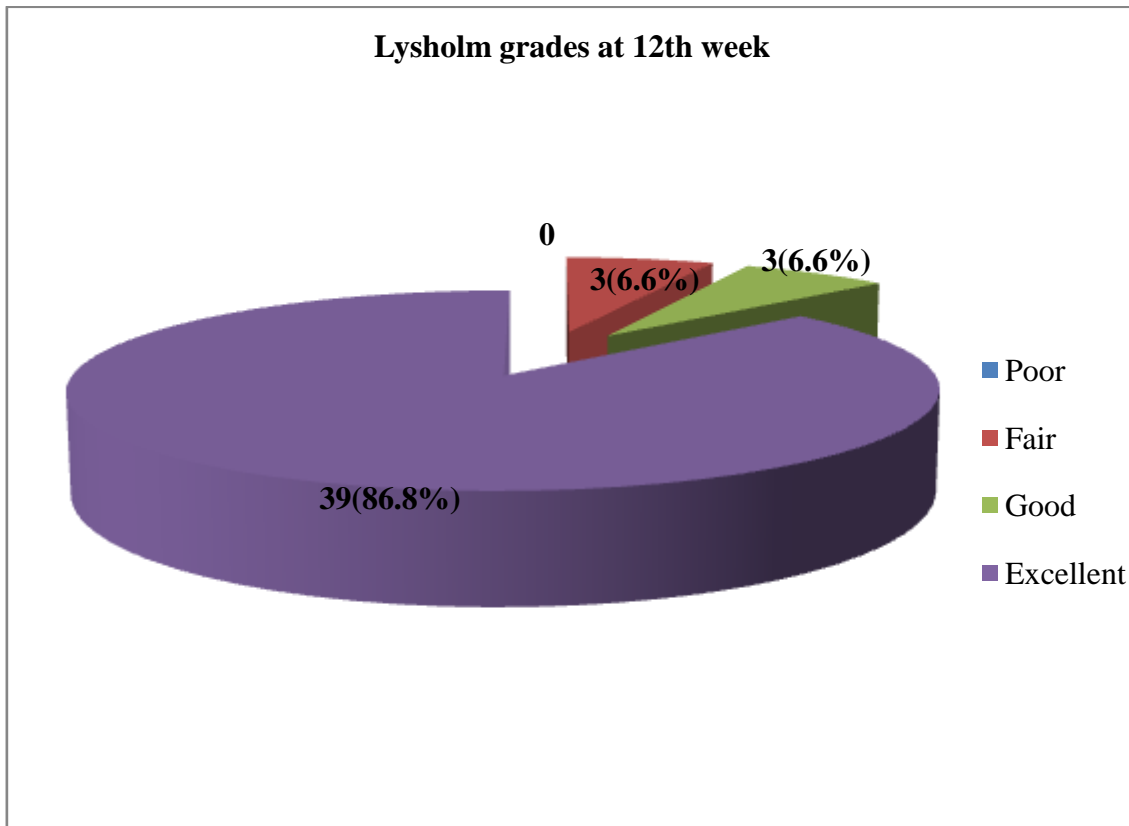


Figure 6: Lysholm knee functional outcome grades at 12th week (%)

Lysholm functional outcome score were good to excellent on 42(93.4%) of patients. Fair to poor results is as shown in the figure 7.

CHAPTER FOUR

4.0 DISCUSSION

Majority of patients in this study were male 28 (62.2%) compared to 17(37.8%) female with female to male ratio of 1:2. These results concur to what reported by Johnson RJ et al and G Ramesh et al, that male preponderance, majority reporting the male to female ratio of 4:1 [16,17,18,19], the reason for male preponderance was due to more involvement of male in aggressive sporting and manual activities [19], which may also account for similar larger number of male compared to females being involved in aggressive and manual activities. Majority of patients in this study were below 40 years 29(64.4%), These results correspond to findings reported by Ramesh G et al where nearly half of the patients were in the third decade hence majority were below 40years, this may be due to the fact that, young age is frequently involved in high risk activities, manual and energetic works. [19]

More than half of our patients in this study were treated at 3month and above since injury, this is similar to findings reported by Rao et al, also categorized the duration from injury to treatment in more than 3months and less than 3months, however the number of those treated at three months and above was not addressed in his study and only functional outcome was reported. [20].This differs from other studies where several authors have analyzed duration of symptoms in different groups, Scott et al, grouped patients in less than 3weeks and more than 3weeks, Yocum et al reported outcome of patients with duration of symptoms for 2.3month and 43.5 months, and Johnson et al grouped his patients between an average of 23 months and 39 months for outcome evaluation [21, 22, 16].

On mechanism of injury majority of meniscal injury in this study were due to activity of daily living by 40% followed by sports injuries 28.9%, these results concur to results reported by Dross et al and Raza et al, found that activity of daily living, followed by sport injuries were the leading causes, and motor vehicle accidents were the least. [17, 23], However these findings are contrary from what reported by Ramesh et al, in which motor vehicle accidents was the leading cause of meniscal injury (65%) [19]. The reason for this difference may be attributed by much involvement in sports activity in the setting where

the study was conducted, and in this study sports activity accounted less than activity of daily.

On the functional outcome in this study, the median Lysholm improved from pretreatment to 12th week post operatively from 63 to 100 respectively, and the mean knee flexion angle improved from 108.53° to 136.55° pretreatment to post treatment respectively at 12th week, These results were similar to findings reported by Liu JSet al, Akkaya et al, and Ghislain et al where the average knee flexion was 116°, and Lysholm score of 63.95 before treatment, and knee flexion and Lysholm improved to 136.77 and 87.84 after arthroscopic partial meniscectomy.[25, 29,44];Excellent to good results were observed in the majority of patients 42(93.4%) which concurs with other several studies reported by Rao et al, Umar et al, Lee et al, Simpson et al, Schimmer et al, Burks et al and Jaureguito et al; their findings where excellent to good outcome ranging from of 80.56% to95.4% Lysholm knee functional scores [20,26,27,37,38,39,45].

Age of patient has shown to have no effect on the outcome as most of our patients attained good to excellent outcome at 12th week follow up regardless of age difference. Our study also found no difference in the outcome in patients treated less than 3months and those treated at 3month and above. (p-value =0.99), which is similar to what was reported by Burks et al; where age at the time of meniscectomy was not found to have effect on the functional outcome [39].These results are similar to what reported by Raoet al, where there was no significant difference between the two age groups (p = 0.7), also for Lysholm scores, there was no statistical significance while comparing patients below and above the age of 40 years (p value=0.052), However there was significant difference in the long-term group (p value = 0.02) which was also reported by Balano et al also at long term [20, 42]

Sex in this study had no effect on functional outcome at12th week (p-value=0.235) though majority were male but functional outcome at 12th week were similar, excellent results were 85.7% and 88.2% for male and female respectively, our findings are similar to what reported by Haviv et al, Higuchi et al and Fabricant et al where sex at the time of operation showed no significant association on the functional outcome following partial meniscectomy [28, 40, 41]

Duration of symptoms since injury to treatment did not affect functional outcome in this study, (p-value=0.281). Both groups had no difference in the outcome. This is similar to the Study reported by Scott et al and Bolano et al which showed symptoms of less than three weeks and those more than three weeks were statistically not significant (p-value=0.44), and also symptoms less than 12-month duration had no effect on the functional outcome, though this was a long-term follow up study [21, 42], However our findings are opposite from studies reported by Yocum et al and Johnson et al where they reported that delay in treatment, from injury to surgery was associated with less satisfactory results[16, 22], this is opposite to findings reported by Tapper EM et al, where those with delayed treatment had better outcome; the longer one waits, the more frequency of locking the patient will encounter, the more specific the diagnosis and the more accurate the surgery[44], Good results occurring after delay in treatment in the study by Tapper EM et al may be explained by better diagnosis, though in this study were no difference in functional outcome among those treated below three month, and those treated three month and above since the onset of symptoms, though duration of follow up may also account for these differences. Again the differences may be explained such that, the duration of symptoms was generalized, some might had delayed more than 2year and others less than 6months, Amount of meniscal tissue resected (severity of injury), also Activity level post-surgery and also duration of follow up; All these factors might have accounted in the difference in outcome post partial meniscectomy.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Meniscal injury occurs more in young age and most affected individuals are male.

Meniscal injury due to activity of daily living was a leading cause, followed by sports and accidents.

Arthroscopic partial meniscectomy provided excellent results following meniscal injury

5.2 Study Limitation

1. The study done at one hospital center, therefore the results cannot be generalized to the community
2. Lost to follow up.
3. Follow-up duration was short.

5.3 Recommendation

1. Arthroscopic partial meniscectomy has to be promoted and practiced to other centers also, as our findings revealed good to excellent outcome.
2. meniscal injury has excellent to good outcome despite of delay in treatment,so operation should also be considered even in delayed clinical presentation.
3. Larger, prospective studies are needed to further explore our findings.

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APPENDICES

Appendix I: Research Questionnaire-English Version

TITLE: EARLY FUNCTIONAL OUTCOME OF PATIENTS WITH ISOLATED MENISCUS INJURY TREATED BY ARTHROSCOPIC PARTIAL MENISCECTOMY AT MUHIMBILI ORTHOPEDIC INSTITUTE (MOI).

(MAY 2016 TO APRIL 2017)

TITLE: EARLY FUNCTIONAL OUTCOME OF PATIENTS WITH ISOLATED MENISCUS INJURY TREATED BY ARTHROSCOPIC PARTIAL MENISCECTOMY AT MUHIMBILI ORTHOPEDIC INSTITUTE (MOI).

PART A: EVALUATION:

- 1) Form number:
- 2) Registration NO
- 3) Phone no:
- 4) Place of residency:
- 5) Age:
- 6) Sex..... a) Male b) Female
- 7) Date of injury:
- 8) Date of treatment.....
- 9) MECHANISM OF MENISCAL INJURY:
 - a) Road Traffic Injury b) Falling from height
 - c) Sports related injury d) Activity of daily living e) others, specify

PART B: DOMAINS FOR LYSHOLM FUNCTIONAL KNEE SCORES

10) LIMPING

- a) I have no limp when I walk. (5)
- b) I have a slight or periodical limp when I walk. (3)
- c) I have a severe and constant limp when I walk. (0)

11) SUPPORT

- a) I do not use a cane or crutches. (5)
- b) I use a cane or crutches with some weight-bearing. (2)
- c) Putting weight on my hurt leg is impossible. (0)

12). PAIN

- a) I have no pain in my knee. (25)
- b) I have intermittent or slight pain in my knee during vigorous activities. (20)
- c) I have marked pain in my knee during vigorous activities. (15)
- d) I have marked pain in my knee during or after walking more than 1 mile. (10)
- e) I have marked pain in my knee during or after walking less than 1 mile. (5)
- f) I have constant pain in my knee. (0)

13). INSTABILITY

- a) My knee never gives way. (25)
- b) My knee rarely gives way, only during athletics or other vigorous activities. (20)
- c) My knee frequently gives way during athletics or other vigorous activities
- d) In turn I am unable to participate in these activities. (15)
- e) My knee occasionally gives way during daily activities. (10)
- f) My knee often gives way during daily activities. (5)
- g) My knee gives way every step I take. (5)
- h) My knee gives way every step I take (0)

14). LOCKING

- a) I have no locking and no catching sensations in my knee. (15)
- b) I have catching sensation but no locking sensation in my knee. (10)
- c) My knee locks occasionally. (6)
- d) My knee locks frequently. (2)
- e) My knee feels locked at this moment. (0)

15). SWELLING

- a) I have no swelling in my knee. (10)
- b) I have swelling in my knee only after vigorous activities. (6)
- c) I have swelling in my knee after ordinary activities. (2)
- d) I have swelling constantly in my knee. (0)

16). SQUATING

- a) I have no problems squatting. (5)
- b) I have slight problems squatting. (4)
- c) I cannot squat beyond 90-degree bend in my knee. (2)
- d) Squatting is impossible because of my knee. (0)

17). CLIMBING STAIRS:

- a) I have no problems climbing stairs. (10)
- b) I have slight problems climbing stairs. (6)
- c) I can climb stairs only one at a time. (2)
- d) Climbing stairs is impossible for me. (0)

PART C: COMPLICATION

18). Complications

- a) Present
- b) Absent

If present specify (infection, delayed wound healing, effusion etc.)

Appendix II: Informed Consent Form- English Version

Consent to participate in the study titled “Early functional outcomes of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at MOI”

Greetings:

I am Dr. Banuba Deogratias, a resident in Orthopedics and Traumatology expecting to do a study on “Early functional outcomes of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at MOI”

Purpose of the study: To assess early functional outcomes of patients with isolated meniscal injury treated by arthroscopic partial meniscectomy at MOI.

What participation involves: If you agree to participate in this study, you will be asked questions and examined.

Confidentiality: All the information obtained will be kept confidential and it will be entered into computer with only an identification number; your name will not be included.

Risk: We ensure that there is no harm in engaging into the study.

Rights to withdraw: Taking part in this study is completely voluntary and refusal to participate or withdrawal will not involve penalty or loss of any benefits to which you are entitled. You will be treated and followed up as per the usual treatment protocol of the Institute for all patients with meniscal injury treated by arthroscopic partial meniscectomy.

Benefits: If you agree to participate in this study, you will be assessed on the progress of your condition by the investigating doctor. We hope that the obtained information from this study will benefit others.

Who to contact: If you have any other questions regarding this study, feel free to contact me, the investigator, Dr. Banuba Deogratias, Muhimbili Orthopedics Institute, P.O. Box 65474, Dar es Salaam, Tel No 0752973310. If you have any questions concerning your rights as a participant, you may contact Prof. Mainen Mushi, Chairman of the college research and publication committee, P.O. Box 65001, Dar es Salaam. Telephone: 2150302/6.

Signature

Do you agree to participate?

Participant does not agree.....

I, have read the consent form and my questions have been answered and I agree to participate in this study.

Signature of Participant.....

Signature of Investigator.....

Date of signed consent.....

Appendix III: Informed Consent Form - Swahili Version

Ruhusa ya Kushiriki Utafiti Kuhusu kuangalia matokeo ya muda mfupi ya matibabu ya wagonjwa wenye matatizo ya meniscus kwa kuondoa sehemu ya meniscus iliyoumia kwa kutumia video maalum Taasisi ya Mifupa na ubongo Muhimbili May 2016

Salaam,

Mimi naitwa Dr. Banuba Deogratias ni mwanafunzi wa udhamili chuo kikuu cha tiba Muhimbili, nachunguza matokeo ya muda mfupi ya matibabu ya wagonjwa wenye matatizo ya meniscus kwa kuondoa sehemu ya meniscus kwa kutumia video maalum MOI 2016.

Dhumuni la utafiti huu: Kupata taarifa muhimu ya matokeo ya matibabu ya meniscus pasipo kutumia upasuaji na kutoa mapendekezo ya uboreshaji.

Ushiriki: Kama unakubali kushiriki kwenye utafiti huu utaulizwa maswali, utachunguzwa kwa kina na utafuatiliwa hata baada ya upasuaji katika kliniki yetu

Usiri: Taarifa zote za uchunguzi zitaingizwa kwenye kompyuta na nambari ya utambulisho; jina halitanukuliwa.

Madhara: Tunategemea kwamba hakuna madhara yoyote yatokanayo na utafiti huu.

Haki ya kujitoa kwenye utafiti: Kushiriki katika utafiti huu ni hiari, na kutokubali kushiriki au kujitoa hautaadhibiwa au kupoteza haki yako ya matibabu. Utatibiwa kama taratibu za hospitali zinavyoelekeza kwa mtu aliye na matatizo ya meniscus.

Kutokea kwa madhara: Tunategemea kwamba hakuna madhara yoyote yatokanayo na utafiti huu. Hata hivyo kama madhara ya mwili yatatokea kutokana na utafiti huu, utatibiwa kulingana na kanuni na taratibu za matibabu ya Tanzania.

Faida ya kushiriki kwenye utafiti: Kama utakubali kushiriki kwenye utafiti huu, Faida utakazopata ni pamoja na kuonwa kwa ukaribu na daktari anayefanya utafiti. Tunatumaini kwamba taarifa zitakazopatikana zitawanufaisha wengine pia

Kwa mawasiliano zaidi: Kama una maswali au maelezo kuhusu utafiti huu, uwe tayari kuwasiliana na mtafiti, Dr. Banuba Deogratias, Taasisi ya upasuaji mifupa na ubongo Hospitali ya Taifa Muhimbili, P.O. Box 65474, DSM. simu: 0752973310.

Kama una maswali kuhusu haki yako kama mshiriki waweza pia kuwasiliana na Prof Menein Mushi ambaye ni Mwenyekiti wa kamati ya utafiti wa chuo cha Muhimbili, P.O. Box 65001, DSM. Simu 2150302/6.

Saini.

Je umekubali kushiriki?

Mshiriki hajakubali kushiriki.....

Mimi..... nimesoma maelezo na

kuyaelewa vizuri, na nimekubali kushiriki kwenye utafiti huu.

Sahihi ya Mshiriki.....

Sahihi ya Mtafiti.....

Tarehe