A RETROSPECTIVE STUDY TO ANALYSE THE FUNCTIONAL OUTCOME OF VARIOUS PROCEDURES TO TREAT TENDO ACHILLES INJURIES

Dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations

for the award of the degree of
MCh BRANCH – III
PLASTIC AND RECONSTRUCTIVE SURGERY

INSTITUTE FOR RESEARCH AND REHABILITATION OF HAND

AND

DEPARTMENT OF PLASTIC SURGERY

CHENNAI - 600 001

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CERTIFICATE

Dissertation on

A RETROSPECTIVE STUDY TO ANALYSE THE FUNCTIONAL OUTCOME OF VARIOUS PROCEDURES TO TREAT TENDO ACHILLES INJURIES

Certified that this dissertation is a bonafide work of **Dr.K.JAHIR HUSSAIN,** Post Graduate in M.Ch. Plastic and Reconstructive Surgery during 2010 – 2013 at the Institute for Research and Rehabilitation of Hand and Department of Plastic Surgery, Govt. Stanley Medical College. This study was done under my supervision and guidance.

Prof. Dr.S.Geethalakshmi. MD., Phd.,
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Professor and HOD,
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Stanley Medical College,
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DECLARATION

I solemnly declare that this dissertation titled

A RETROSPECTIVE STUDY TO ANALYSE THE FUNCTIONAL OUTCOME OF VARIOUS PROCEDURES TO TREAT TENDO ACHILLES INJURIES

Is a bonafide work done by me in IRRH and Dept. of Plastic Surgery, Stanley Medical College & Hospital, Chennai under the guidance and supervision of

Prof.J.Mohan, M.S.,M.Ch.,

Professor & Head of the Department, IRRH and DPS
Stanley Medical College, Chennai.

This dissertation is submitted to the Tamil Nadu Dr.MGR Medical University, Chennai in partial fulfillment of the university requirements for the award of the degree of M.Ch., Plastic and Reconstructive Surgery.

Place : Chennai
Date :

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Postgraduate Student
IRRH and DPS,
Stanley Medical College, Chennai.

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I thank my co-residents for their co-operation, support, corrections and help in execution of this effort.

I am extremely thankful to all my patients who readily consented and co-operated in the study.

CONTENT

INTRODUCTION

The achilles tendon plays a crucial role in the bipedal human beings. Injury to achilles tendon causes great difficulty in walking and running. In our people acute injuries to achilles tendon with open wounds in TA region is more common unlike the west where chronic ruptures and sport injuries are more common. This is because most Indians use Indian toilets which are a common cause of open injuries to achilles tendon[closet injuries]. Also most of us do not wear shoes hence the TA region is not protected at work place. TA region is a poorly vascularised area which may cause problems in healing.

When the patients present early the management is fairly straightforward. However if the patient is not managed well in the first chance then they may develop complications like skin necrosis over TA region and rerupture of the tendon .then patient has to undergo more extensive procedures.

Hence this study was undertaken to evaluate the cause, the course, management and functional outcome of injuries to tendo achilles.

HISTORICAL BACKGROUND

According to Greek legend, achilles was a great warrior and made invulnerable in childhood by his mother who dipped him into a magical river. At the time of dipping his heel was covered by his mother's hand and his heel was unprotected. Achilles was killed by an injury to his heel.

Ambrose pare the french surgeon, described the first closed rupture of the Achilles tendon.Anatomist phillippe verheyen (1648–1710) professor of anatomy and surgery at the university of louvain, belgium, first coined the term *tendo achillis* in place of the previous

tendo magnus of hippocrates, and the *chorda hippocratis* of later authors.

Quenu and stoianovitch in 1929 did the first comprehensive study on Achilles tendon injuries and compared the results of operative treatment with conservative treatment in two groups, each of 29 cases. Their conclusion was that operative management was better than treating conservatively.

RELEVANT ANATOMY

The achilles tendon is the strongest tendon and the thickest tendon in the human body .It is formed by the tendons of the gastrocnemius and the soleus muscle.

Contraction of the Achilles tendon plantarflexes the foot. Soleus muscle provides stability in standing position. Gastrocnemius facilitates running. Enormous forces act on the Achilles tendon while walking and running.

The gastrocnemius originates from the femoral condyles and t the soleus arises below the knee from the tibia and fibula.

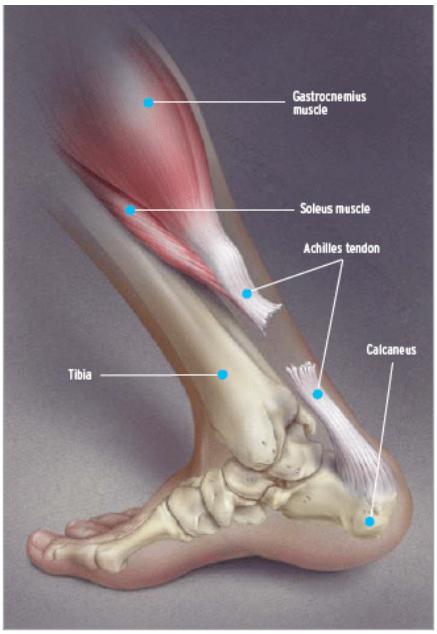


FIGURE 1. Anatomy of the tendocalcaneal joint with a ruptured Achilles tendon

RELATIONSHIPS

The sural nerve lies along the lateral border of the Achilles tendon. The plantaris tendon lies along the medial border of the Achilles tendon. These relationships are important because usually a postero medial incision is preferred to avoid damaging the sural nerve and to facilitate retrieval of plantaris tendon for possible use in repair of Achilles tendon.

BLOOD SUPPLY

The achilles tendon largely derives its vascularity from arteries running in the paratenon. Most are derived from posterior tibial artery.The middle third of the tendon is relatively poorly vascularized. When Achilles tendon is stretched this is the site where the tendon ruptures

BIOMECHANICS OF THE ACHILLES TENDON

Like all tendons, tendo achilles is not a rigid junction between muscle and bone. It is a contractile force transmitter permitting skeletal movement. The properties of tendo achilles have been studied by various in vitro and in vivo tests.

IN VITRO TESTING-

These tests are done by stretching specimens of tendons. A force elongation curve is obtained with increasing force. Based on these four different regions are described. With increasing elongation the regions also increase.

- Region I- also known as tendon toe region. It is seen in very low force causing less elongation. There is decrease of resting crimp angle of collagen fibre.

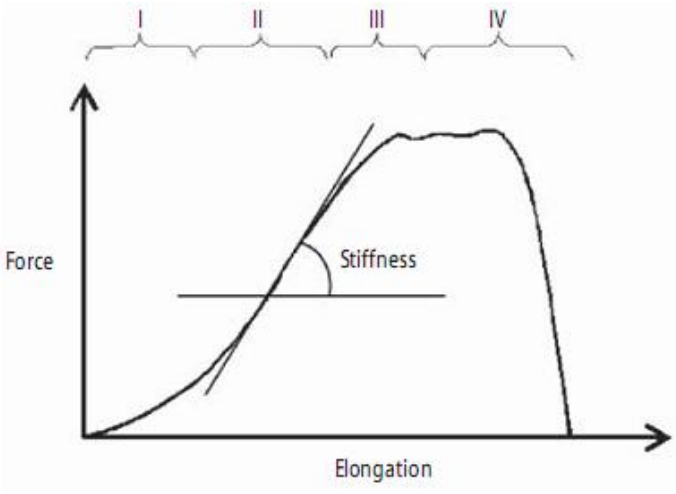
- Region II- also known as linear region. Stretching of the collagen fibers occur and the fibre is about to break.

- Region III- collagen fibers starts breaking.

- Region IV- complete break in tendon.

The force elongation curve is not uniform in shape and varies from specimen to specimen. This may be due to the differences in dimension of the specimen. This is circumvented by normalisation of tendon cross section and tendon length. Tendo Achilles is found to have an ultimate stress of 100 MPa and tendon strain of 4 to 10%. Tendo achilles is found to have properties of force relaxation, creep and mechanical hysteresis.

FORCE ELONGATION PLOT



IN VIVO TEST-

In vivo test is done with donor tendons. Ultrasound is done during isometric contraction and relaxation. Dynamometry measures muscle forces. The tendo achilles can withstand up to 110 MPa.

IMAGING OF THE ACHILLES TENDON

X- RAY FOOT

X- ray foot sometimes helps in confirming tendo Achilles injuries. Lateral radiograph of the foot is taken. Injury to Achilles tendon is confirmed by the obliteration of the triangular space of a bounded posteriorly by the Achilles tendon, anteriorly by the tibia, and inferiorly by the calcaneum. This space is called kager's triangle.

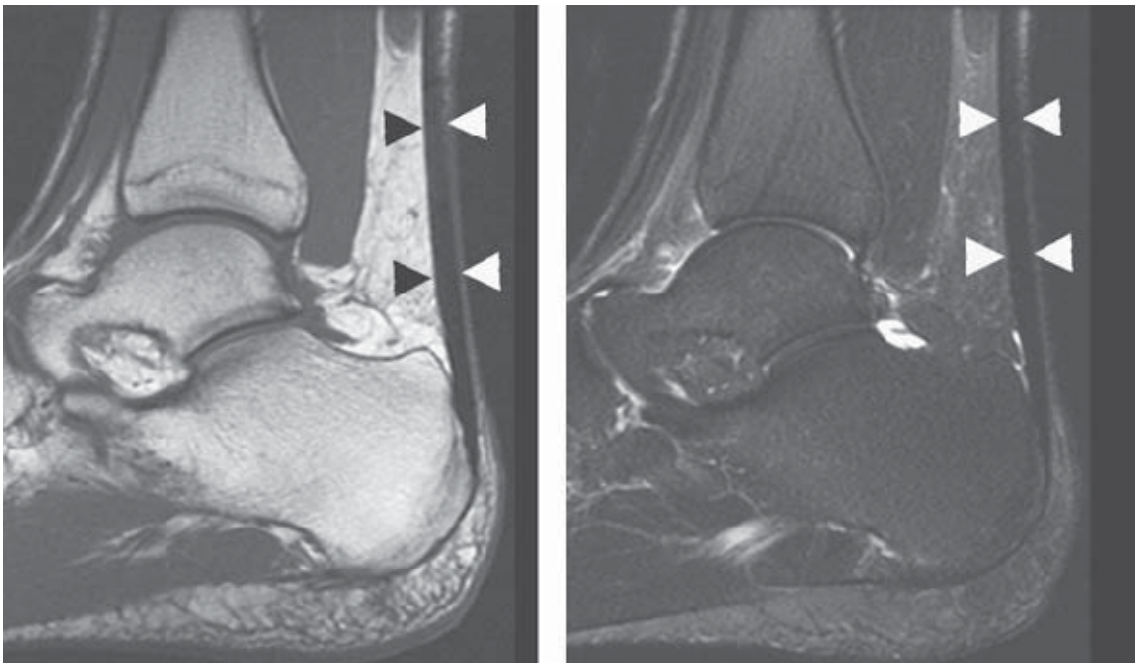
INTACT KAGER'S TRIANGLE

OBLITERRATED KAGER'S TRIANGLE

In cases where x -ray foot is not contributing for the diagnosis of tendo Achilles rupture, **ultrasound** or **MRI** can be used. The ultrasound detects tendo Achilles rupture by identifying an acoustic shadow at the site of tendon rupture.

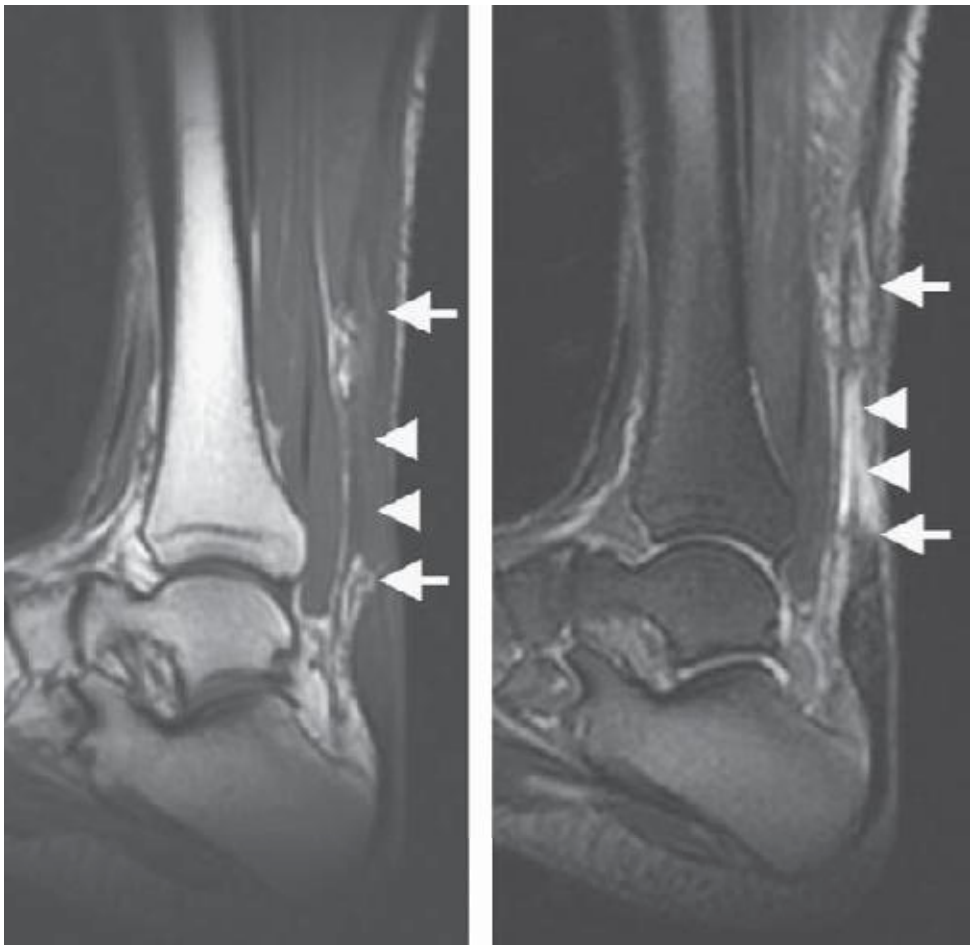
In more difficult cases MRI can be used. In MRI the rupture of the Achilles tendon is seen as total discontinuity of the tendon with high intensity signal.

INTACT TENDO ACHILLES IN MRI



Smooth parallel lines corresponding to intact Achilles tendon are seen with low intensity

CUT TENDO ACHILLES IN MRI



Disrupted anterior and posterior lines revealing cut Achilles tendon with high intensity

CLINICAL DIAGNOSIS

In acute injuries there is a history of injury in TA region associated with pain and difficulty in walking. There is usually a history of injury at Indian toilet or due to sharp object at work place. Following injury patient is not able to stand on the toes on the affected side and he's not able to walk.

In closed rupture of achilles tendon patients have pain on walking and during climbing the stairs. On examination there may be a swelling or a palpable defect along the tendon.

OPEN TENDO ACHILLES INJURY

Patient has cut Achilles tendon with open wound in TA region

LATE PRESENTATION -TENDO ACHILLES DEFECT

Patient has a defect in Achilles tendon with healed scar in TA region

THOMPSON'S OR SIMMONDS' TEST

The patient is examined in prone position. Both feet should be hanging outside the table. Both the calf muscles are squeezed and compared. The foot with intact Achilles tendon will plantar flex .If the Achilles tendon is cut the involved foot will remain neutral.

MATLES' TEST

The patient is examined in prone position and both legs are examined with knee at ninety degrees flexion. The foot with intact Achilles tendon will be plantarflexed at ankle.But the foot with cut Achilles tendon will remain neutral.

MANAGEMENT

Most of our patients sustain open injuries to Achilles tendon.Invariably most of them report to a hospital early ie within 48 hours.If these patients are managed effectively at their initial presentation almost all of them will heal with good functional outcome.**The first chance is the best chance** to treat tendo Achilles injuries effectively.

The aim of management will be to bring about good healing of the Achilles tendon injury and the skin wound .There should be **no complications** like

1] skin necrosis due to raising of skin flap without including the fascia

2] ankle stiffness due to adhesion of the tendon due to ineffective physiotherapy

3] re rupture of the Achilles tendon due to inadequate immobilization

SURGICAL TECHNIQUE IN ACUTE RUPTURES

THE SURGICAL PRINCIPLES in the management of tendo Achilles injuries should be followed rigorously.

1] The incision must extend upto the fascia to prevent skin necrosis because the TA region is a relatively poorly vascularised area and if the fascia is not included the skin flap may necrose

2] The two cut ends of the tendons should be sutured without tension.

3] At time of tendon suturing the foot should be in neutral position so that the patient has no difficulty in dorsiflexing the foot when mobilisation is started.

4] The foot should be immobilised in 20 degrees plantar flexion to ease the tension on the suture line.

5] The immobilisation should be maintained for 8 weeks. Early mobilization may cause re rupture of the Achilles tendon.

6] Physiotherapy should be continued till good range of ankle movements are achieved because the site of TA repair has a tendency to form adhesions.

POSTERO MEDIAL INCISION IN TENDO ACHILLES EXPLORATION

The incision is avoided directly over the Achilles tendon because it may produce tendon adhesion and scar contracture.Instead the incision is placed on one side of the Achilles tendon usually on the posteromedial aspect.This will avoid injury to the sural nerve and facilitate retrieval of plantaris tendon for possible use in repair of the Achilles tendon.

The wound is extended till healthy portion of the two cut ends of the Achilles tendon are visible.Dissection is kept to the minimum in the

anterior aspect of the Achilles tendon because many vessels to the tendon enter through the anterior surface.

Suturing of the cut Achilles tendon is done with Bunnell's or modified Kessler's suturing technique

REHABILITATION

Effective post operative care following open repair of the achilles tendon is very important to prevent re rupture and to bring about good ankle movements.In our institute an above knee slab with the foot in twenty degree plantar flexion is maintained for 2 weeks.At the end of 2 weeks the sutures are removed and the slab is converted into a below knee cast which is maintained for another 6 weeks. At the end of 8 weeks the cast is discarded andgradual weight bearing is initiated with the patient wearing footwear with high heel and intrinsic foot exercises are started.The physiotherapy is continued till good ankle movements are achieved.

SURGICAL MANAGEMENT IN LATE PRESENTATION

Ta injuries in patients who present late are different from that of acute rupture.

Usually they have been treated ineffectively previously and they present with

A defect in Achilles tendon with or without a raw area over the TA region. Primary repair may be difficult and the achilles tendon needs to be reconstructed.with tendon graft. The reconstruction may require reinforcement or augmentation by the use of a turn down fl ap or plantaris tendon,fascia lata graft.

TURN-DOWN FLAPS

This procedure is done when the cut ends of the tendon are clean and healthy and the defect of the tendon is not large. A strip of aponeurotic flap is raised from the proximal portion of cut Achilles tendon. The raising of the flap is stopped about 2-3 cm from the cut end of the proximal portion .The flap is turned down and sutured to cut distal end of the Achilles tendon.

FASCIA LATA GRAFT

Fascia lata graft is used to reconstruct tendo Achilles defects if the cut ends are frayed, ragged and unhealthy and the defect is large. The tendon edges are freshened and the defect size is measured. A Fascia lata graft which is about 2-4 cm longer than the defect size is harvested. The graft is tubed around the cut ends of the Achilles tendon and sutured using 1-o prolene simple sutures.

PERONEUS BREVIS TRANSFER

This procedure is also done when the cut ends of the tendon are clean and healthy and the defect is not large. The tendon of the plantaris brevis is disconnected from its insertion base of the fifth metacarpal bone. It is then used to bridge the defect between the two cut ends of the Achilles tendon. There is no deficiency of eversion because the peroneus longus is intact.

AUGMENTATION WITH PLANTARIS GRAFT

Plantaris tendon is found along the medial aspect of the achilles tendon.This tendon is cut either proximally or distally and is woven across the two cut ends of achilles tendon to strengthen the repair.Also the plantaris tendon can be spread into a 2.5 cm membrane which is used to cover the repair site to prevent tendon adhesion.

POST OPERATIVE PROTOCOL

Effective post operative care following open repair of the achilles tendon is very important to prevent re rupture and to bring about good ankle movements.In our institute an above knee slab with the foot in twenty degree plantar flexion is maintained for 2 weeks.At the end of 2 weeks the sutures are removed and the slab is converted into a below knee cast which is maintained for another 6 weeks. At the end of 8 weeks the cast is discarded andgradual weight bearing is initiated with the patient wearing footwear with high heel and intrinsic foot exercises are started.The physiotherapy is continued till good ankle movements are achieved.

AIM OF THE STUDY

To study the various causes of tendo achilles injuries.

To analyse the functional outcome of various methods of repair done for tendo achilles injuries.

MATERIALS AND METHODS

This is a retrospective study of 25 patients with tendo achilles injuries who presented to our department between august 2010 to January 2013 .Patients of all age groups and both sexes were included. Patients with open wounds with Achilles tendon injuries, closed rupture of achilles tendon and patients who were treated outside and developed complications like re ruptures were all included in the study.

All the patients were subjected to x ray foot and ankle to rule out bony injury. Diagnosis of tendo Achilles was made clinically and confirmed intra operatively. Ultrasound or MRI was not required for establishing diagnosis in any of these patients.

All the patients in whom the cut ends of the Achilles tendon could be brought together underwent suturing of the cut ends of tendon. The patients with totally cut tendon were managed with Bunnell sutures. The patients with partial rupture were managed with modified Kessler sutures.

The patients in whom the two cut ends could not be brought together were managed by reconstruction of Achilles tendon using

various procedures like fascia lata graft, turn down flap, plantaris or peroneus brevis flap.

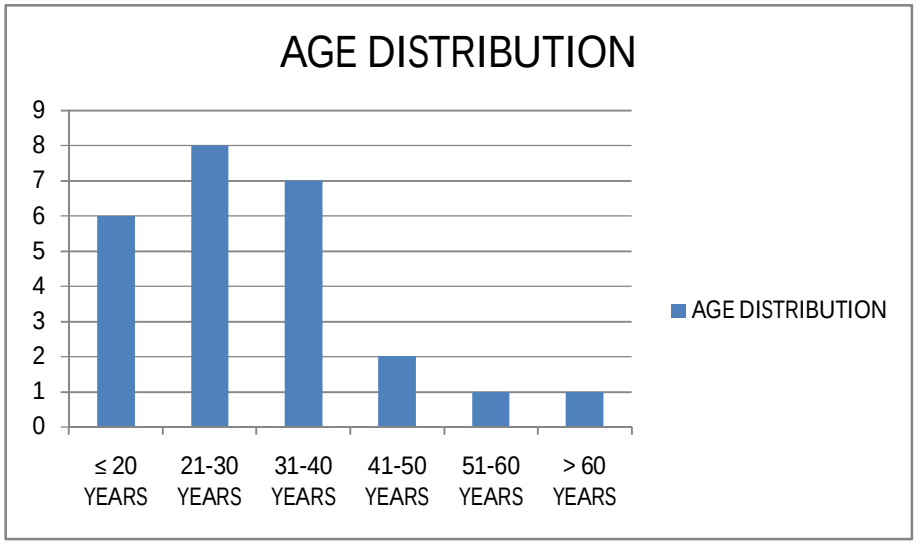
Postoperatively the limb was immobilised with the foot in plantar flexion for 8 weeks. At the end of 8 weeks the cast was discarded and gradual weight bearing and mobilisation started.

OBSERVATION AND ANALYSIS

Twenty five patients underwent surgery for tendo achilles injury from August 2010 to October 2012.

AGE WISE DISTRIBUTION-

AGE GROUP	NUMBER OF PATIENTS
≤ 20 YRS	6
21-30 YRS	8
31-40	7
41-50	2
51-60	1
>60 YRS	1

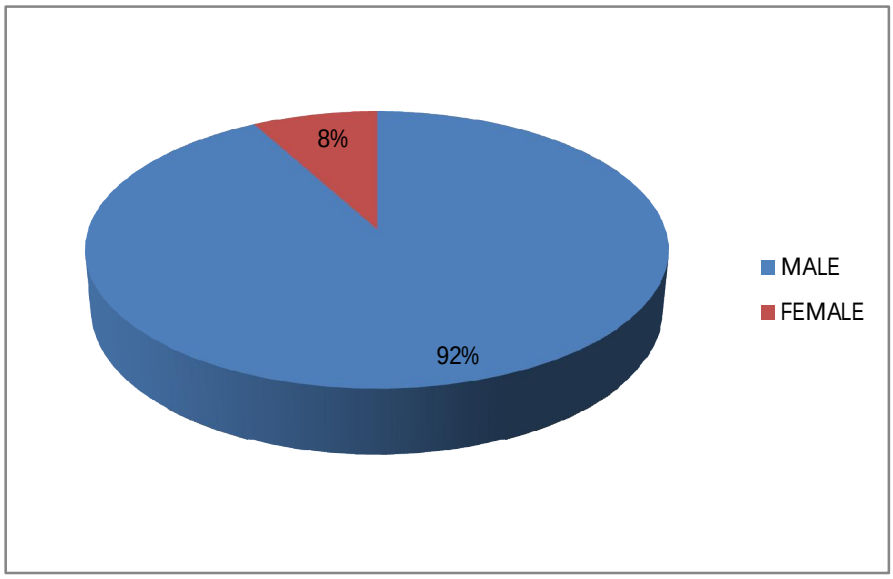


The patients between the age group of 20 to 40 years were most commonly affected.

GENDER DISTRIBUTION:

S.NO	SEX	NO OF PATIENTS
1	MALE	23
2	FEMALE	2

GENDER DISTRIBUTION

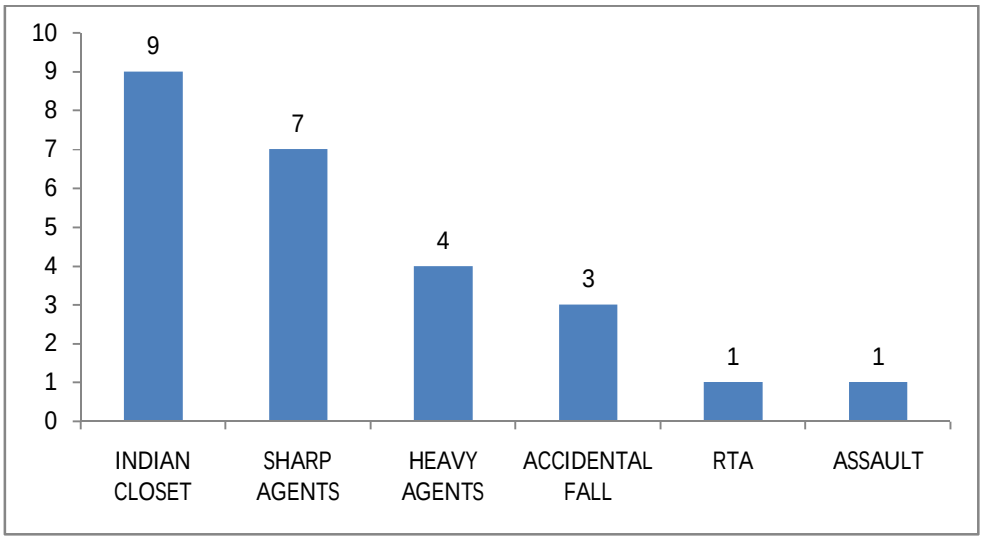


Male patients were more commonly affected

CAUSES OF TENDOACHILLES INJURY-

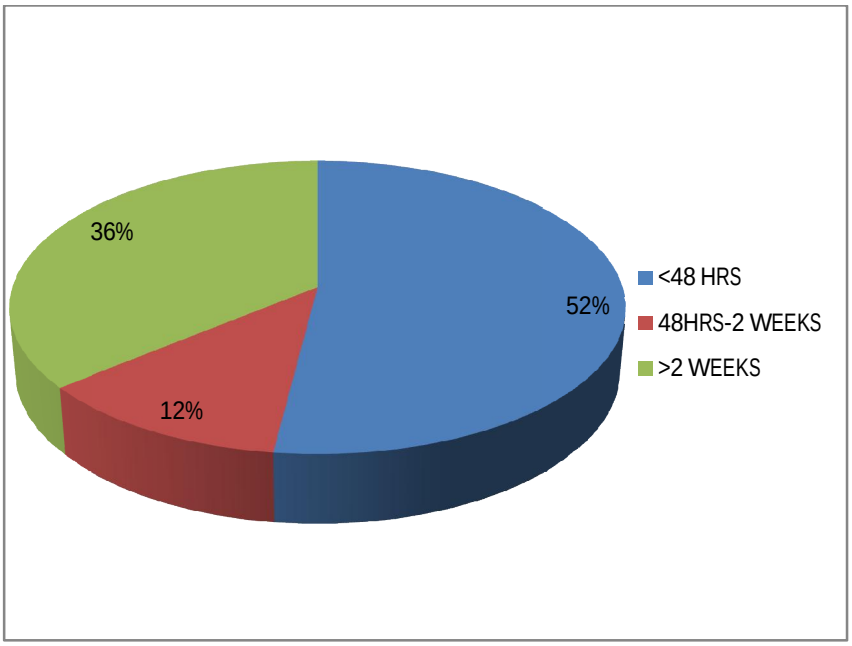
S.NO	CAUSE	NUMBER OF PATIENTS
1	INDIAN CLOSET	9
2	SHARP AGENTS AT WORK PLACE	7
3	FALL OF HEAVY AGENT	4
4	RTA	1
5	ASSAULT	1
6	ACCIDENTAL FALL	3

Accidental slipping of foot into Indian toilet closet was the most common cause of injury to Achilles tendon



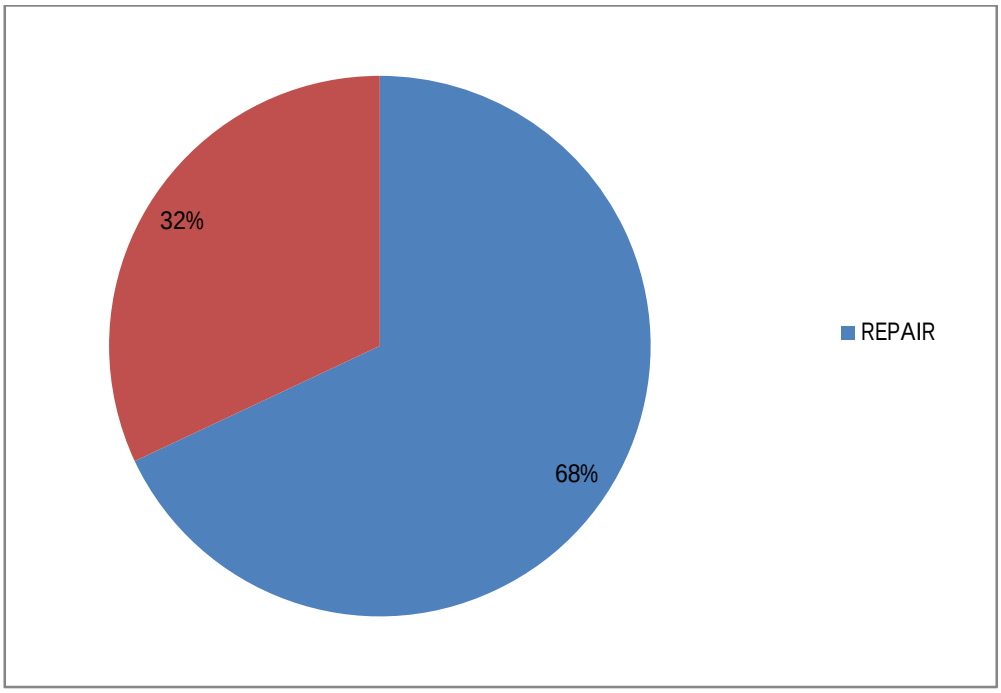
TIME BETWEEN INJURY AND SURGERY-

S.NO	TIME	NUMBER OF PATIENTS
1	<48 HRS	13
2	48HRS-2 WKS	3
3	>2 WKS	9



NATURE OF SURGERY

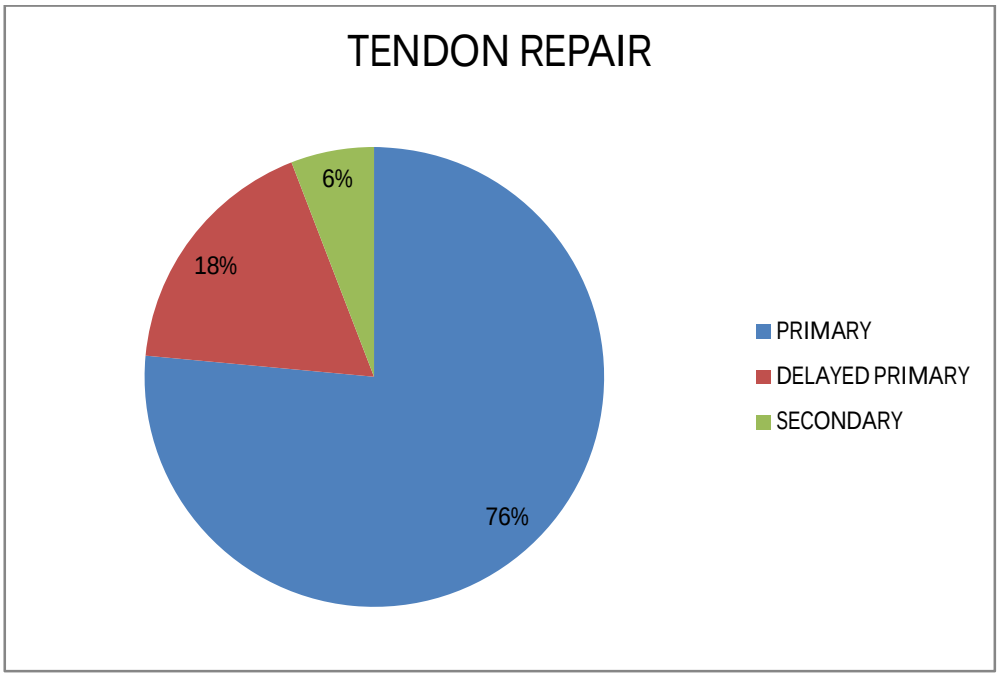
S.NO	SURGERY	NO OF PATIENTS
1	TENDON REPAIR	17
2	TENDON RECONSTRUCTION	8



BREAK UP OF TENDON REPAIR

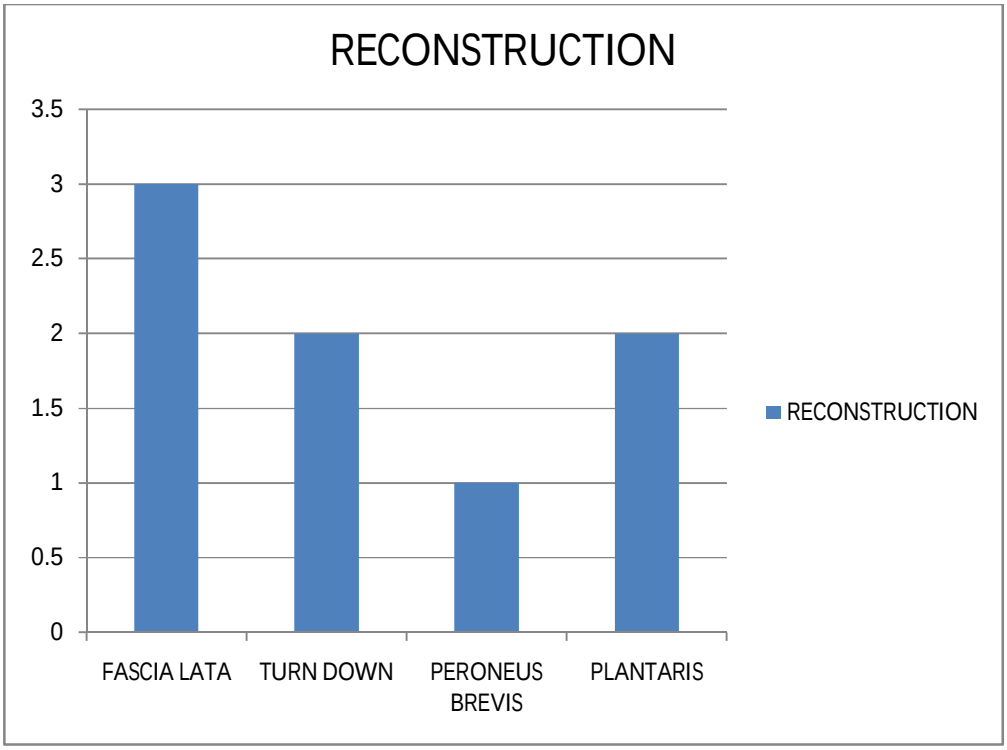
S.NO	SURGERY	NO OF PATIENTS
1	PRIMARY REPAIR	13
2	DELAYED PRIMARY REPAIR	3
3	SECONDARY REPAIR	1

Most of the patients presented to hospital within 48 hours after injury to tendo Achilles.



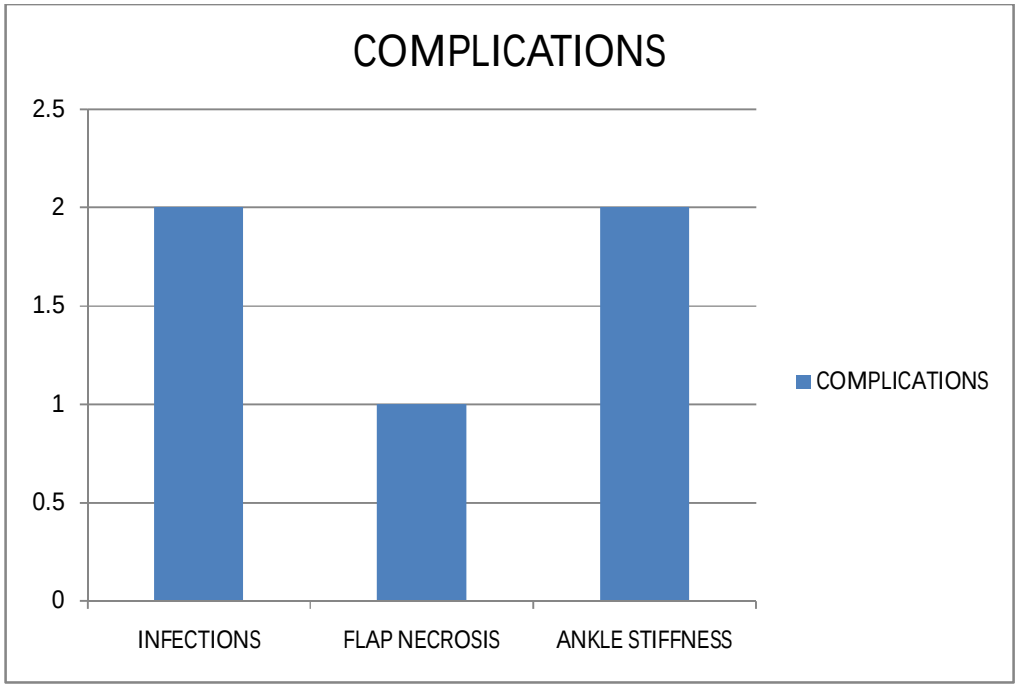
BREAK UP OF TENDON RECONSTRUCTION

S.NO	SURGERY	NO OF PATIENTS
1	FASCIA LATA GRAFT	3
2	TURN DOWN FLAP	2
3	PERONEUS BREVIS FLAP	1
4	AUGMENTATION WITH PLANTARIS	2



COMPLICATIONS

S.NO	COMPLICATION	NO OF PATIENTS
1	INFECTION	2
2	FLAP NECROSIS	1
3	ANKLE STIFFNESS	2



DISCUSSION

AGE

TA injuries occur in all age groups. In this study the most common age group involved is 20 to 40 years. Out of 25 patients about 15 patients belonged to this age group

CAUSE

In this study the various causes of TA injuries are Indian closet, injury due to sharp objects at work place ,accidental fall, road traffic accident etc. Among these the most common cause was accidental injury in Indian closet.

Most of the TA injuries presented with open wounds unlike the west, this is because most of us don’t wear the shoes which offers protection at work place.

In this study about 7 patients sustained due to accidental contact with steel sheet, sickle, etc, at working place.

About 9 patients sustained open TA injuries due to accidental slipping in Indian closet.

PRESENTATION TIME AFTER INJURY

In this study about 13 patients presented within 48 hours of injury. About 3 patients presented between 48 hours to 1 weeks.9 patients presented after 2 weeks of injury out of whom 3 presented after 60 days from the date of injury. The reason for late presentation was that after injury they had been treated outside and developed complications like skin necrosis, rerupture of the tendo Achilles and had been referred to our institute. Many of these patients had a healed scar over the TA regions with rupture of the tendo Achilles.

NATURE OF SURGERY

From the point of management the patients with TA injuries can be broadly classified into 4 groups

1) Patients with TA injuries without skin loss or tendon defect.
2) Patients with TA injuries without skin loss but with tendon defect.
3) Patients with TA injuries with skin loss but without tendon defect
4) Patients with TA injuries with skinless and with tendon defect.

PATIENTS WITH TA INJURIES WITHOUT SKIN LOSS OR TENDON DEFECT.

These are the patients with TA injuries who present early. Usually there is wound in the TA region without skin loss and there is no tendon defect. The management is fairly straight forward and the outcome is good if properly managed .The first chance is the best chance.

THE SURGICAL PRINCIPLES in the management of tendo Achilles injuries should be followed rigorously.

1] The incision must extend upto the fascia to prevent skin necrosis because the TA region is a relatively poorly vascularised area.

2] The two cut ends of the tendons should be sutured without tension.

3] At time of tendon suturing the foot should be in neutral position so that the patient has no difficulty in dorsiflexing the foot when mobilisation is started.

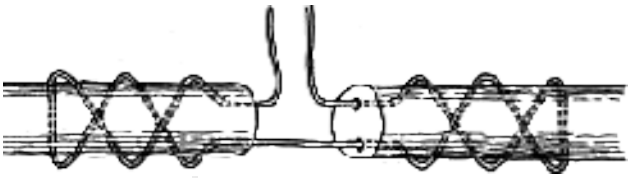
4] The foot should be immobilised in 20 degrees plantar flexion to ease the tension on the suture line.

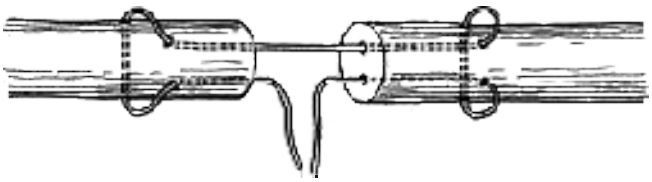
5] The immobilisation should be maintained for 8 weeks. Early mobilization may cause re rupture of the Achilles tendon.

6] Physiotherapy should be continued till good range of ankle movements are achieved because the site of TA repair has a tendency to form adhesions.

The tendon repair is done by suturing the cut ends together using Bunnell's or Modified Kessler's sutures. Few peripheral sutures are applied. In this study 17 patients with TA injuries were managed by suturing the cut ends together. Of these 13 patients underwent primary repair .The 3 patients underwent delayed repair.1 patient underwent secondary repair.

BUNNELL'S SUTURE



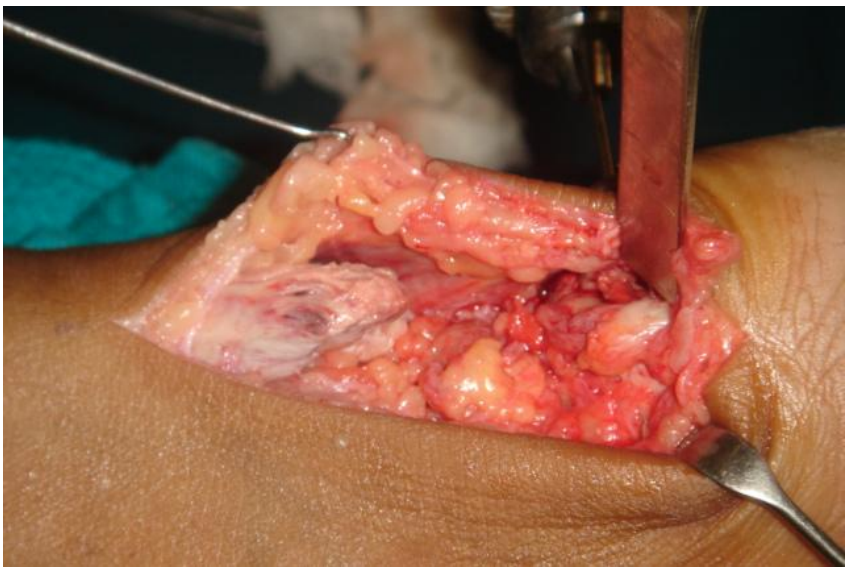


MODIFIED KESSLER'S SUTURE

OPEN TENDO ACHILLES INJURY WITH OUT SKIN LOSS

There is a open wound with out skinloss and cut Achilles tendon

CUT TENDO ACHILLES



Both the cut ends of the Achilles tendon are visible

END TO END SUTURING OF CUT ACHILLES TENDON DONE

PATIENTS WITH TA INJURIES WITHOUT SKINLOSS BUT WITH TENDON DEFECT.

These are the patients who present late and who have been treated outside usually the wound over the TA region has healed. But the TA injury has not healed and cut ends retracted and there is a defect in the tendo Achilles. It is not possible to bring the two cut ends of the tendon together and suture it. These patients will need reconstruction of the tendo Achilles

DEFECT IN ACHILLES TENDON WITH HEALED SKIN WOUND

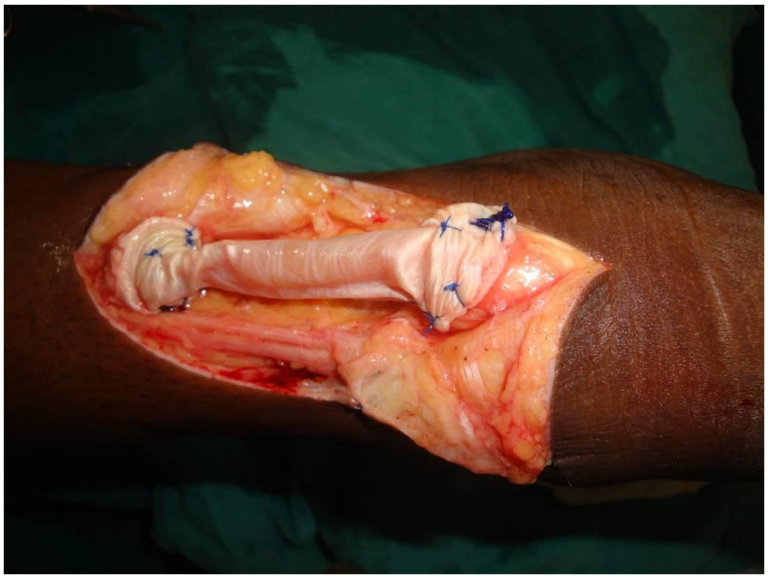
In this study 7 patients presented with tendon defect and without skin loss. Of these 2 patients underwent fasciala TA graft for reconstruction of tendo Achilles.2 patients underwent reconstruction with turn down flap.2 patients underwent augmentation of the TA repair using the plantaris tendon. 1 patient underwent reconstruction using peroneus brevis flap.

FASCIA LATA GRAFT

Fascia lata graft is used to reconstruct tendo Achilles defects if the cut ends are frayed, ragged and unhealthy and the defect is large. The tendon edges are freshened and the defect size is measured. A Fascia lata graft which is about 2-4 cm longer than the defect size is harvested. The graft is tubed around the cut ends of the Achilles tendon and sutured using 1-o prolene simple sutures.

DEFECT IN ACHILLES TENDON IS MEASURED

FASCIA LATA GRAFT USED TO BRIDGE THE DEFECT



In this study there were three patients with large defects of achilles tendon greater than 5 cm and the fascia lata graft was used to reconstruct the Achilles tendon.

TURNED DOWN FLAP

This procedure is done when the cut ends of the tendon are clean and healthy and the defect of the tendon is not large. A strip of aponeurotic flap is raised from the proximal portion of cut Achilles tendon. The raising of the flap is stopped about 2-3 cm from the cut end of the proximal portion .The flap is turned down and sutured to cut distal end of the Achilles tendon.

DEFECT IN ACHILLES TENDON WITH INTACT PLANTARIS

TURN DOWN FLAP RAISED AND WEAVING OF PLANTARIS TENDON BETWEEN THE TWO CUT ENDS OF ACHILLES TENDON

TURN DOWN FLAP SUTURED TO THE DISTAL CUT END

In this study 2 patients underwent turn down flap to reconstruct the defect of Achilles tendon.

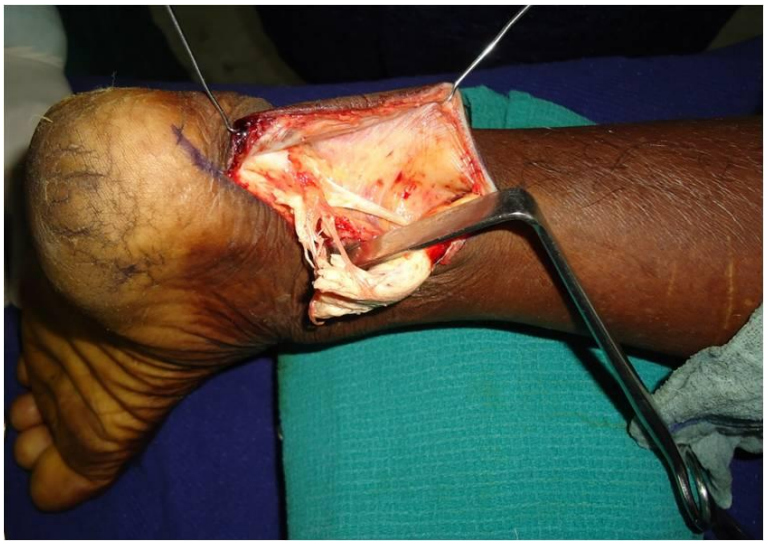
PERONEUS BREVIS FLAP

This procedure is also done when the cut ends of the tendon are clean and healthy and the defect is not large. The tendon of the plantaris brevis is disconnected from its insertion base of the fifth metacarpal bone. It is then used to bridge the defect between the two cut ends of the Achilles tendon. There is no deficiency of eversion because the peroneus longus is intact.

AUGMENTATION WITH PLANTARIS

Plantaris tendon is used to augmeny the repair of Achilles tendon when the defect is not large and the cut ends are clean and healthy so that the ends need to be only minimally debrided. This tendon is cut either proximally or distally and is woven across the two cut ends of achilles tendon to strengthen the repair. Also the plantaris tendon can be spread into a 2.5 cm membrane which is used to cover the repair site to prevent tendon adhesion.

CUT ACHILLES TENDON WITH INTACT PLANTARIS TENDON



PLANTARIS TENDON CUT PROXIMALLY AND USED TO AUGMENT THE TA REPAIR

END TO END SUTURING OF ACHILLES TENDON AUGMENTED BY WEAVING THE PLANTARIS BETWEEN THE CUT ENDS

FINAL APPEARANCE OF THE AUGMENTED REPAIR

In this study 2 patients underwent augmentation of the TA repair using plantaris tendon.

PATIENTS WITH TA INJURIES WITH SKINLOSS BUT WITHOUT TENDON DEFECT

In this study 2 patients had TA injury associated with skin loss. It was possible to suture the two cut ends. The raw area in the TA region was covered with a rotation flap. Of the two patients one patient developed partial flap necrosis for which split skin grafting was done. Later this patient had ankle stiffness though he was able to walk.

Another patient shown in the picture below healed well and had a satisfactory outcome.

CUT ACHILLES TENDON WITH RAW AREA OVER TA REGION

TA REPAIR DONE AND ROTATION FLAP COVER GIVEN

This is the follow up picture at the end of 3 months. The wound has healed well. Patient had a good functional outcome.

PATIENTS WITH TA INJURIES WITH SKINLOSS AND WITH TENDON DEFECT

In this study one patient presented with raw area in the TA region and Achilles tendon injury with loss. We planned to reconstruct both the skin loss and the Achilles tendon defect in a single stage.

In this picture fascia lata graft has been harvested and sutured to the proximal portion of the cut Achilles tendon

The fascia lata graft has been sutured to both the cut ends of the Achilles tendon. Planned for free antero lateral thigh flap to cover the raw area over the TA region.

Free antero lateral thigh flap cover has been given to cover the raw area over the TA region after reconstructing the defect in Achilles tendon with fascia lata graft.

Follow up at end of 8 weeks shows excellent healing. This patient had a good Functional outcome with no complications.

REHABILITATION

Effective post operative care following open repair of the achilles tendon is very important to prevent re rupture and to bring about good ankle movements. In our institute an above knee slab with the foot in twenty degree plantar flexion is maintained for 2 weeks. At the end of 2 weeks the sutures are removed and the slab is converted into a below knee cast which is maintained for another 6 weeks. At the end of 8 weeks the cast is discarded andgradual weight bearing is initiated with the patient wearing footwear with high heel and intrinsic foot exercises are started. The physiotherapy is continued till good ankle movements are achieved.

EVALUATION OF FUNCTIONAL OUTCOME

The functional outcome is evaluated by

1] Ability to both plantar flex as well as dorsi flex the ankle joint

2] Patient's ability to walk and to stand on toes is tested.

3] Healing of the skin wound over the Taregion

4] Patient's return to work, school etc

5] Patient's satisfaction

In this study of the 25 patients ,

All the 17 patients who had undergone tendon repair had a good functional outcome of the 8 patients who had undergone TA reconstruction ,

1] Two patients had skin problems and later ankle stiffness

2] One patient abscess in the TA region which was managed by incision and drainage. subsequently the wound healed

CONCLUSION

The following conclusions are derived from this study

1] Tendo acilles injuries are more common in males possibly because more of them get injured at work place

2] Open injuries to Achilles tendon is the usual presentation unlike the west because of our habit of using Indian toilet and our habit of not wearing shoes

3] First chance is the best chance to treat tendo Achilles injuries. Primary surgical management if done well produces the best functional outcome

4] If patient develops complications due to mismanagement in the first instance, further management needs more extensive procedures and the complication rates are also higher

5] In complex defects in TA region single stage reconstruction with free flap and tendon graft gives good functional outcome.

5] Rehabilitation following surgery with adequate immobilisation and effective physiotherapy is very important for good functional outcome.

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PROFORMA

1. NAME-
2. AGE/SEX-
3. PS NO-
4. ADDRESS
5. MOBILE NO-
6. OCCUPATION-
7. SOCIOECONOMIC STATUS-
8. DATE OF INJURY
9. CAUSE OF INJURY
10. NATURE OF INJURY
11. ASSOCIATED INJURIES
12] OTHER CO MORBID CONDITIONS
12. DATE OF SURGERY
13. TYPE OF SURGERY FOR INJURIES TO ACHILLES TENDON,

A]WITHOUT DEFECT-REPAIR[PRIMARY,DELAYED PRIMARY,SECONDARY]

B]WITH DEFECT- FASCIA LATA GRAFT,TURN DOWN FLAP,AUGMENTATION WITH PLANTARIS TENDON

C] WITH SKIN DEFECT-VARIOUS FLAPS

14.TIME BETWEEN INJURY AND SURGERY

15.PREOP XRAYS,MRI

16.TIME AT WHICH MOBILISATION STARTED

17.WHETHER PATIENT ATTENDED PHYSIOTHERAPY OR NOT

18.ASSESSMENT-

- RANGE OF MOVEMENTS AT ANKLE JOINT
- POST OP SKIN PROBLEM AT TA REGION
- PATIENT'S RETURN TO WORK
- PATIENT'S ABILITY TO WALK AND SATISFICATION

MASTER CHART

SNO	NAME	AGE	SEX	PSNO	DOI	DOS	ETIOLOGY	NATURE OF INJURY	PROCEDURE	OUTCOME	COMPLICATIONS
1	ashok	21	m	66057	12/5/2012	14-5-12	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant
2	ganesh	10	mch	65690	13-3-12	14-3-12	gate	openTA injury	primary TA repair	satisfactory	Nil Significant
3	gokul	10	mch	65672	10/3/2012	12/3/2012	fall from hight	openTA injury	primary TA repair	satisfactory	Nil Significant
4	anandhan	28	m	65624	4/3/2012	5/3/2012	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant
5	arumugam	57	m	65286	1/1/2012	6/1/2012	twisting injury	closed TA rupture	Plantaris augmentatio	satisfactory	Nil Significant
6	selva raj	16	m	65121	23-10-12	13-12-12	knief	TA defect	fascio lata graft	satisfactory	Nil Significant
7	kuralamma	22	f	66955	16-10-12	17-10-12	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant
8	jegadesan	28	m	66888	5/10/2012	8/10/2012	steel sheet	openTA injury	primary TA repair	satisfactory	Nil Significant
9	bineth kumar	19	m	65060	19-11-11	28-11-11	fall of heavy objec	TA defect	peroneus brevis	satisfactory	Nil Significant
10	sekar	43	m	64926	26-10-11	28-10-11	fall of heavy objec	openTA injury	primary TA repair	satisfactory	Nil Significant
11	velmurugan	35	m	64757	28-9-11	13-10-11	knife	TA injury with skin loss	rotational flap	not satisfactory	flap loss/ SSG done
12	navendhra kumar	25	m	63208	25-1-11	25-3-11	fall of heavy objec	TA defect	turn down flap	satisfactory	Nil Significant
13	dharma raj	62	m	62799	29-12-10	30-12-10	steel plate	openTA injury	primary TA repair	satisfactory	Nil Significant
14	jayaraman	38	m	64233	1/6/2011	20-7-11	steel plate	TA defect	fascio lata graft	satisfactory	Nil Significant
15	mohan	11	mch	64335	21-7-11	22-7-11	due to fall	openTA injury	primary TA repair	satisfactory	Nil Significant
16	malkondaiah	40	m	65639	10/4/2012	20-4-12	RTA	TA defect/ skin loss	free ALTF with fascio l	satisfactory	Nil Significant
17	saroja	40	f	67353	16-11-12	16-2-13	sickle	TA defect	turn down flap	not satisfactory	wound infection & ankle stiffness
18	munusamy	18	m	62955	20-12-10	27-1-11	steel plate	TA injury with skin loss	TA repair and rotation	satisfactory	Nil Significant
19	manimaran	27	m	65509	21-12-10	27-1-11	indian closet	TA defect	turn down flap	satisfactory	Nil Significant
20	thanga vel	25	m	64387	10/1/2011	24-2-11	indian closet	TA defect	Plantaris augmentatio	satisfactory	Nil Significant
21	udhayakumar	34	m	66780	17/9/12	18/9/2012	steel sheet	openTA injury	primary TA repair	satisfactory	Nil Significant
22	yavaraj	31	m	66726	7/9/2012	11/9/2012	indian closet	openTA injury	delayed primary TA re	satisfactory	Nil Significant
23	narashiama	50	m	64287	13/7/11	15-7-11	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant
24	velu	30	m	64387	18/8/11	19-8-11	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant
25	ayyanpillai	38	m	60941	14/10/12	15-10-12	indian closet	openTA injury	primary TA repair	satisfactory	Nil Significant

INSTITUTIONAL ETHICAL COMMITTEE,
STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work: **A RETROSPECTIVE STUDY TO ANALYSE THE FUNCTIONAL OUTCOME OF VARIOUS PROCEDURES TO TREAT TENDO ACHILLES INJURIES**

Principal Investigator : Dr.K.JAHIR HUSSAIN
Designation : PG in M.Ch(Plastic Surgery)
Department : Department of Plastic Surgery
Government Stanley Medical College,
Chennai-1

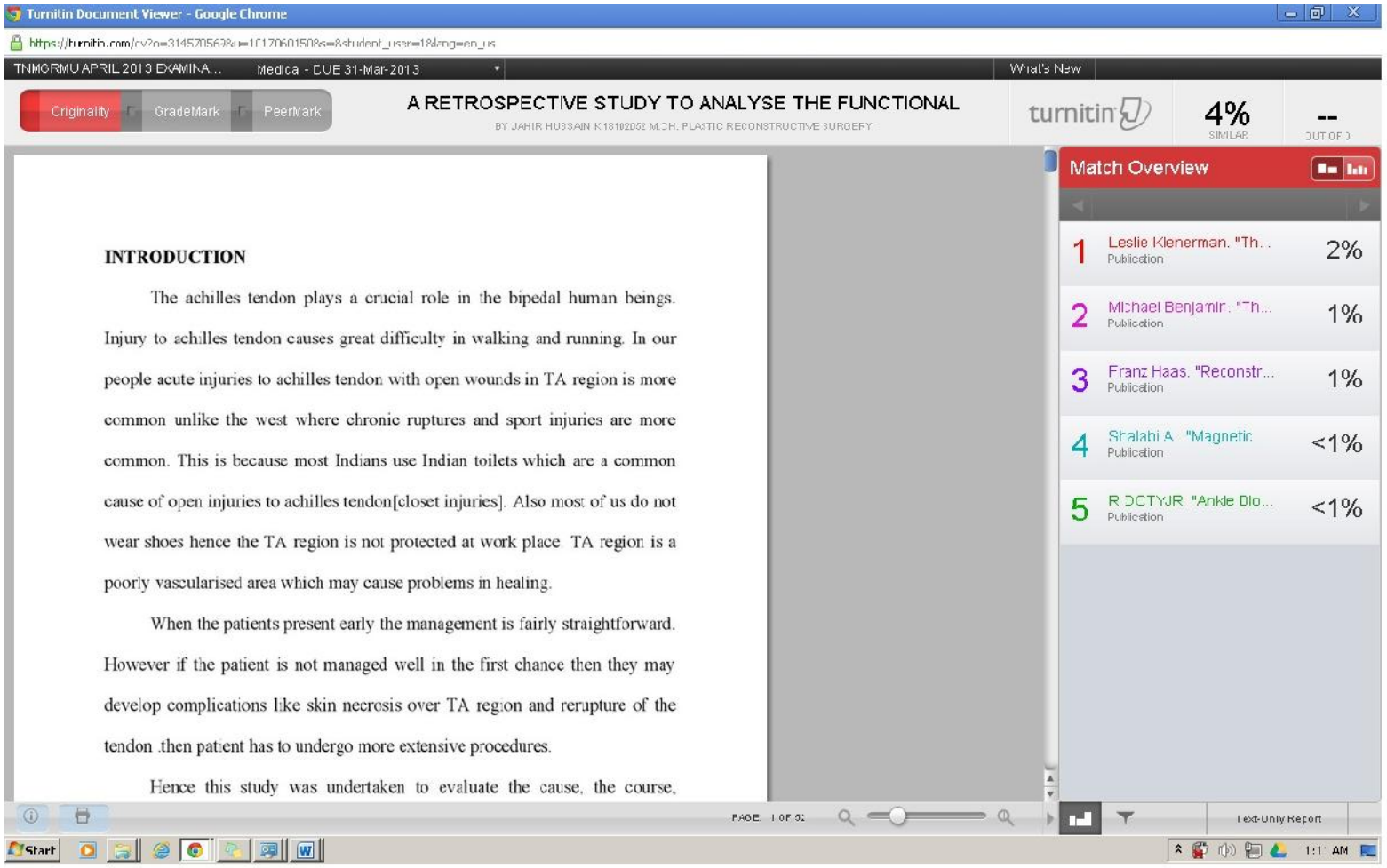
The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 07/02/13at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate form the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and it any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

MEMBER SECRETARY,
IEC, SMC CHENNAI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OUT OF
INTRODUCTION
The achilles tendon plays a crucial role in the bipedal human beings. Injury to achilles tendon causes great difficulty in walking and running. In our people acute injuries to achilles tendon with open wounds in TA region is more common unlike the west where chronic ruptures and sport injuries are more common. This is because most Indians use Indian toilets which are a common cause of open injuries to achilles tendon[closet injuries]. Also most of us do not wear shoes hence the TA region is not protected at work place TA region is a poorly vascularised area which may cause problems in healing.
When the patients present early the management is fairly straightforward. However if the patient is not managed well in the first chance then they may develop complications like skin necrosis over TA region and rerupture of the tendon .then patient has to undergo more extensive procedures.
Hence this study was undertaken to evaluate the cause, the course,
Match Overview
1 Leslie Klenerman. "Th... Publication 2%
2 Michael Benjamin. "Th... Publication 1%
3 Franz Haas. "Reconstr... Publication 1%
4 Shalabi A. "Magnetic Publication <1%
5 R DCTYJR "Ankle Dio... Publication <1%
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