

# **Medial Meniscus Tears in the ACL- Reconstructed Knees**

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**ACL Study Group**

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# Meniscal tears with ACL reconstruction

- Incidence of meniscus tears with ACL tears
- Usually incidental findings, especially with acute injury
- No correlation of joint line tenderness and meniscus tear (Shelbourne et al. AJSM 1995)

	Acute	Chronic
MMT	42%	60%
LMT	62%	49%

# Questions to be answered

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- **What to do with MMT found at the time of surgery?**
- **Can repaired MMTs heal?**
- **How large and degenerative of a tear can be repaired?**
- **What rehabilitation is needed?**
- **Do “healed” tears stay healed ?**
- **How much better are the results of healed repaired MMTs than removal?**

# Introduction

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- **Study by Shelbourne/Rask (Arthroscopy 2001)**
- **To determine the long-term clinical sequelae of salvageable, non-degenerative, peripheral vertical MMTs seen at the time of ACL reconstruction**
- **Meniscus tears – Stable > 1 cm but < 2 cm in length treated with abrasion and trephination**
- **Meniscus tears – Unstable > 2 cm in length, treated with suture repair**

# Subsequent arthroscopy

Group	N	Number Subsequent Scopes	(%)	Time post-op (years)
SITU	139	15	(10.8)	2.5
AT	233	14	(6)	2.3
Suture	176	24	(13.6)	4.3
No Tear	526	14	(2.9)	5.0

# **Results**

## **Subsequent arthroscopies**

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- **Subsequent scopes performed at a mean of 3.7 years after ACL reconstruction**
- **Of patients who had subsequent arthroscopy, 45% of the AT and SITU groups and 75% of the SUTURE group had the procedure at > 2 years after ACL reconstruction**

# Conclusions

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- **Of unstable peripheral vertical MMTs treated with suture repair, 13.6% failed, with most re-tears occurring at greater than 2 years after repair**
- **Of stable peripheral vertical MMTs treated with abrasion and trephination alone and no direct fixation, most (94%) remain asymptomatic at a mean of 3.6 years after treatment**

# **Bucket Handle Medial Meniscus Tears**

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- **Usually occurs with chronic ACL-deficient knees**
- **With the initial ACL injury, the force generated can cause a meniscus tear but it must be peripheral and posterior in nature**
- **With chronic instability, medial meniscus tear will extend anteriorly and become degenerative**

# Bucket Handle Medial Meniscus Tears

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- Study by Shelbourne/O'Shea
- Repair of locked, BH MMTs in chronic ACL-deficient knees.
- These meniscus tears are large and usually involve the avascular zone
- Low potential to heal with repair



# Purpose

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- **Assess the healing of bucket-handle meniscus repairs with second look arthroscopy at the time of ACL reconstruction**
- **Further evaluate the healing of meniscus repairs using subjective and objective criteria**

# Materials and Methods

## Subjects

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- Between 1987 and 1999, 1470 chronic ACLs performed
- Eighty-eight patients had a locked bucket-handle meniscus tear that severely limited knee extension
- The average amount of knee flexion contracture at evaluation was  $20 \pm 10$  degrees

# Results:

## 52 patients with 55 repairs

Meniscus Zone	N	Healed N (%)	Partially Healed N (%)	No Healing N (%)
White/White	43	21 (49)	17 (40)	5 (11)
White/Red	11	8 (73)	2 (18)	1 (9)
Red/Red	1	1 (100)	0	0
Total	55	30 (54.5)	19 (34.5)	6 (11)

# Results

## Long-term f/u

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- At an average follow-up of  $4.3 \pm 3.1$  years, 4 additional menisci (7%) were symptomatic and required meniscectomy
- At final follow-up, 36 of 43 (83.7%) of meniscus repairs in the white/white zone remained asymptomatic
- All repairs in the red/white and red/red zone remained asymptomatic

# Results

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- **At a mean of 60 months, the average modified Noyes score was  $89.9 \pm 8.6$  (range 67-100)**
- **No patients had difficulty regaining full range of motion**
- **In the short-term after meniscal repair, bucket-handle tears, even in the white/white zone, appear healed or partially healed.**
- **Only 1 of the 19 menisci that were partially healed at the time of ACL reconstruction became symptomatic and required removal**

# Now what?

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- **We know that stable peripheral MMTs can heal in situ without suture repair treatment**
- **We know that repairs of unstable locked MMTs can heal well**
- **Now we need to know, does the repair of large BH MMTs give better results than removal? (do they function like a normal MM)**

# **Repair vs. Meniscectomy: Assumptions**

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- **Need to “Save the mensicus” at all costs**
- **Meniscectomy dooms the knee to future degenerative changes**
- **Meniscus repair has to be better than meniscectomy**

# Purpose

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- **To determine the level of superiority meniscus repair had above partial meniscectomy for isolated, unstable, BH MMTs with regard to objective and subjective results**

# Methods

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- **Between 1982 and 1995, 155 patients met the inclusion criteria**
- **Unstable BH MMT**
- **Meniscus tear > 2 cm extending in more than half of the meniscus**
- **The meniscus, when probed, could be pulled into the intercondylar notch or was displaced in the notch**

# Methods

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- **Patients did not have any other meniscus tears, chondral damage, or other ligamentous injury**
- **56 patients underwent meniscus repair (REP group)**
  - ▶ 30 nondegenerative tears
  - ▶ 26 degenerative tears
- **99 patients had a tear that was felt to be unsalvageable (REM group) –**
  - ▶ 4 nondegenerative
  - ▶ 95 degenerative

# Results

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- **Mean age:**
  - ▶ **REM group – 23.9 years (range 13 to 48)**
  - ▶ **REP group - 21.5 years (range 15 to 37)**

# Subjective Results

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- **REM group – 87/99 patients available at 7.8 years after surgery (range 2 to 19 years)**
- **REP group – 51/55 patients available at a mean of 8.9 years after surgery (range 3 to 15)**

# Subjective Results

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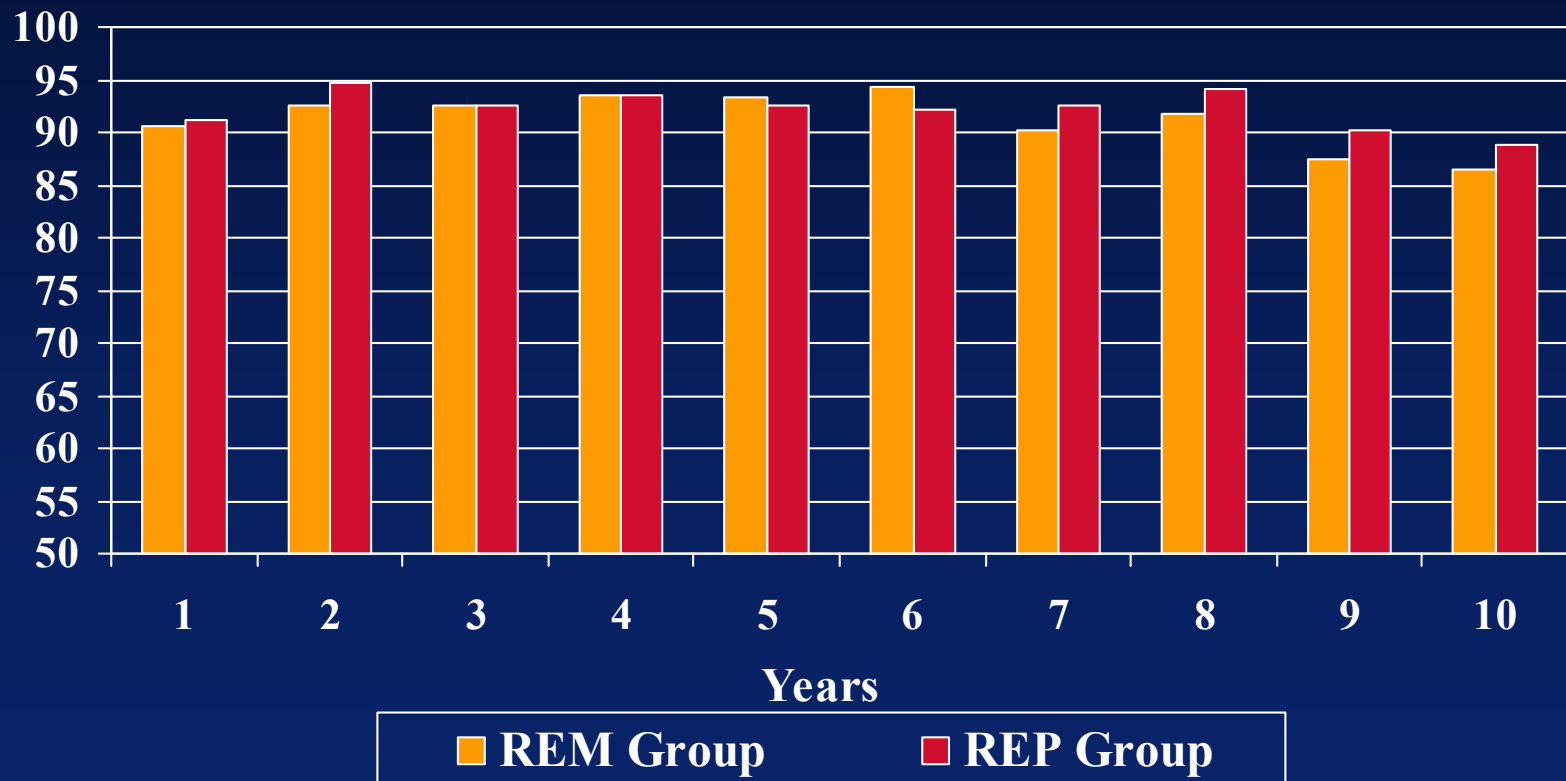
- **Total Score: Repair vs. Removal**
  - ▶ **REM group:  $90.9 \pm 16.7$  points**
  - ▶ **REP group:  $90.9 \pm 11.6$  points**

# Subjective Results

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- Further evaluation for the REP group based on whether the tear was degenerative or nondegenerative
- Not enough numbers in the REM group – almost all degenerative
- REP group
  - ▶ Deg tear:  $87.1 \pm 12.9$  points
  - ▶ Non-deg tear:  $93.9 \pm 9.8$  points ( $P=0.0123$ )

# Total Scores Through Time



# **IKDC Results: Overall Grade**

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- **Available for**
  - ▶ REP group – 25 patients at 7.1 years p.o.
  - ▶ REM group – 56 patients at 6.0 years p.o.
- **Graded as**
  - ▶ Normal
  - ▶ Nearly normal
  - ▶ Abnormal
  - ▶ Severely abnormal

# IKDC overall grade: Removal vs. Repair

	REM		REP	
GRADE	#	(%)	#	(%)
Normal	26	(46)	13	(52)
Nearly Normal	25	(45)	9	(36)
Abnormal	5	(9)	3	(12)
Severely Abnormal	0		0	

**P = 0.7467**

# **IKDC Overall Grade – Repair Group Nondegenerative vs. Degenerative**

<b>Grade</b>	<b>Degenerative</b>	<b>Nondegenerative</b>
<b>Normal</b>	<b>8</b>	<b>5</b>
<b>Nearly Normal</b>	<b>4</b>	<b>5</b>
<b>Abnormal</b>	<b>1</b>	<b>2</b>
<b>Severely Abnormal</b>	<b>0</b>	<b>0</b>

*P=0.5774*

# Radiographic Grade: Repair vs. Removal

GRADE	REM		REP	
	#	(%)	#	(%)
Normal	41	(79)	20	(83)
Nearly Normal	8	(15)	3	(13)
Abnormal	3	(6)	1	(4)
Severely Abnormal	0		0	

**P = 0.8977**

(One patient refused x-rays)

# Radiographic Grade Repair Group: Degenerative vs. Nondegenerative

Grade	Degenerative	Nondegenerative
Normal	9	11
Nearly Normal	2	1
Abnormal	1	0
Severely Abnormal	0	0

$P=0.4646$

(One patient refused x-rays)

# Results

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- All but one of the 15 patients who did not have a normal radiographic grade had > 5 years f/u
- 5 patients in REP group and 1 patient in REM group required second surgery on the meniscus
- 4 of 5 patients in the REP group had a degenerative type tear at the time of the initial treatment

# Discussion

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- **Fairbank's original paper described the deleterious effects of meniscectomy**
- **Others have studied the effect of meniscectomy on the knee**
  - ▶ **Lynch 1983**
  - ▶ **Baratz 1986**
  - ▶ **Neyret 1993**
  - ▶ **Aglietti 1994**

# Discussion

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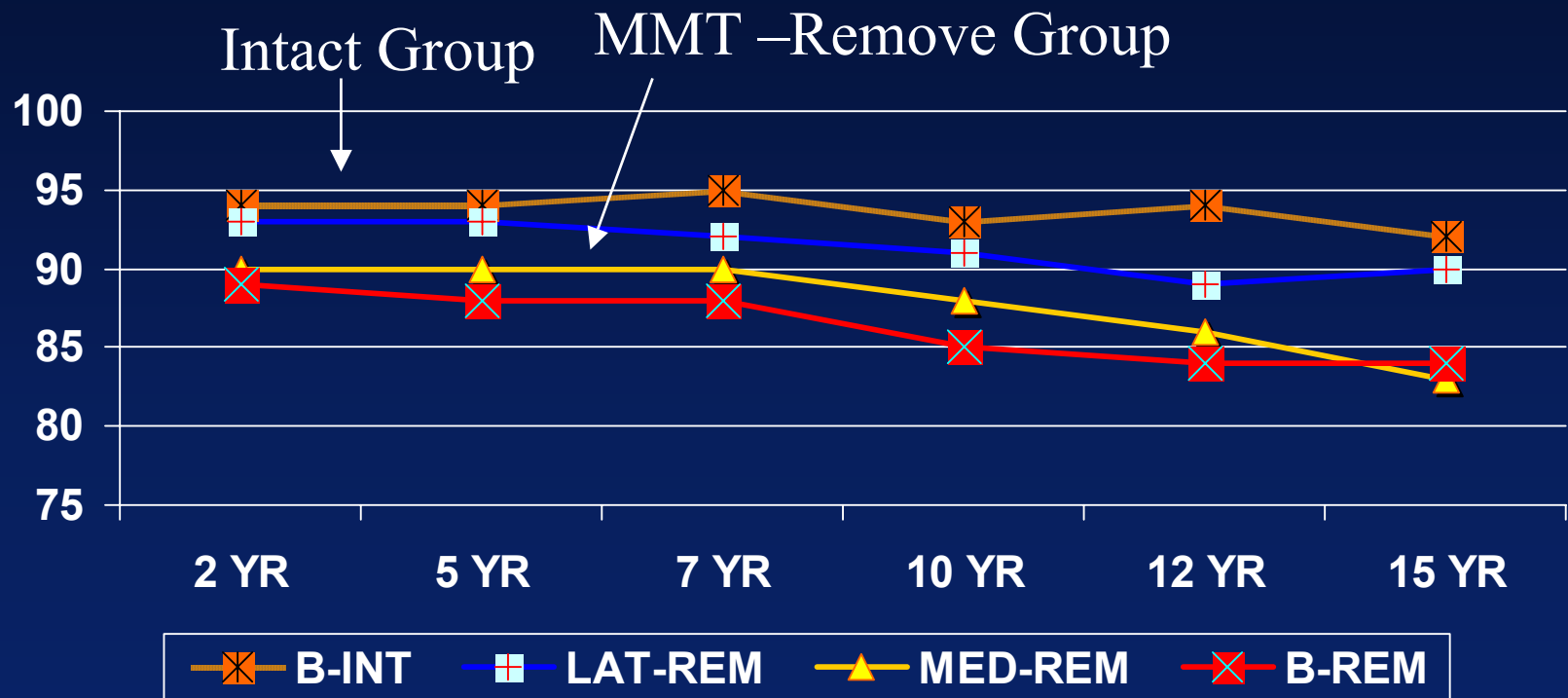
- **This group of patients is a small sub-set of our patients**
- **Specific to large unstable BH MMTs**
- **Size  $> \frac{1}{2}$  the circumference of the meniscus**

# Discussion

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- **Benefit of meniscus repair/salvage should be apparent soon after surgery**
- **Study by Shelbourne/Gray**
  - ▶ **Difference in results of patients with intact/repared meniscus and patients vs. meniscectomy and articular cartilage damage**
  - ▶ **Seen early after surgery**

# Subjective scores through time



# Discussion

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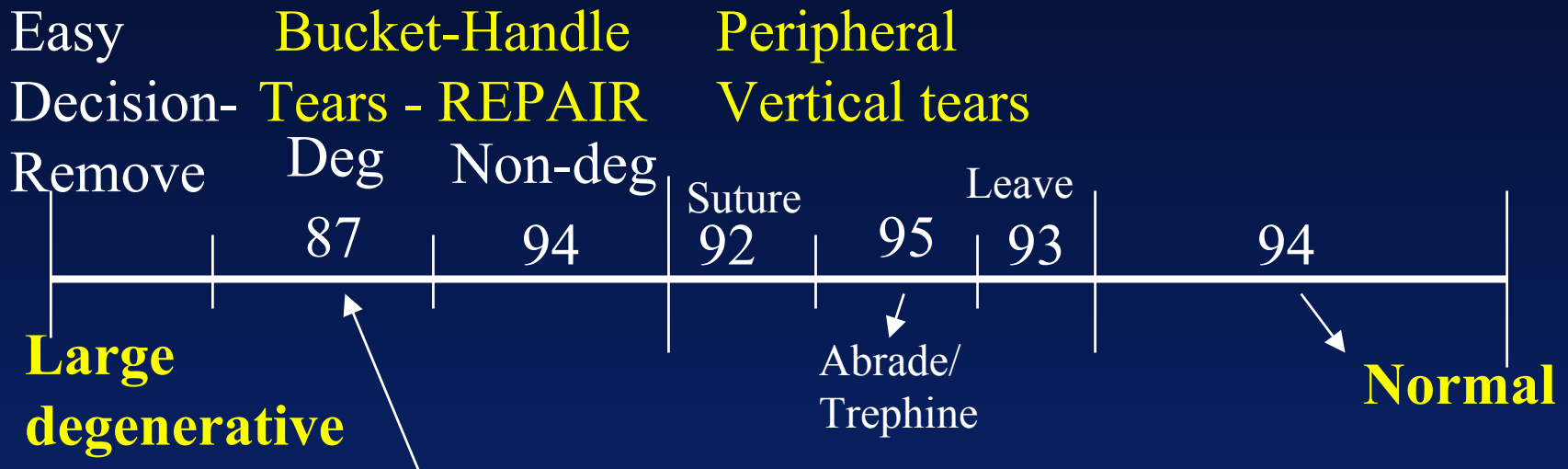
- **Study by O'Shea showed “healing” of the meniscus or at least a low incidence of symptoms requiring removal**
- **However, no statistically significant difference between meniscus repair and partial meniscectomy, at least with the follow-up of 6 to 8 years**

# Discussion

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- **Further sub-analysis based on type of tear**
- **Results of degenerative tears worse than nondegenerative tears (87 vs. 94 points)**

# Algorithm of treatment



Although you can obtain a high rate of healing with repair of BH MMTs – degenerative tears do not appear to function like a normal meniscus

# Discussion

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- **Need to critically evaluate the risk/benefit of meniscus repair is difficult**
- **Repair techniques – potential problems**
  - ▶ **Scratching /denting condyle**
  - ▶ **Nerve injury**
  - ▶ **More pain from the repair**
  - ▶ **Some advocate slower rehabilitation**

# Conclusion

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- **Although technically possible and healing can be achieved well, degenerative unstable BH MMTs do worse than nondegenerative tears and the patient may not benefit from a repair**