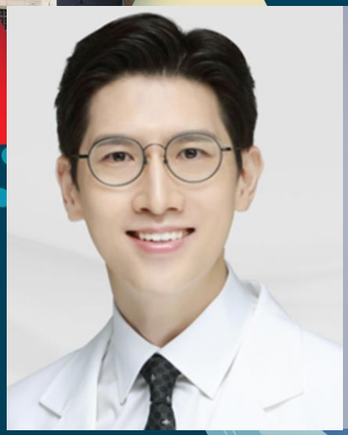
ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

KONKUK UNIVERSITY MEDICAL CENTER

Clinical and Radiological Outcomes of Medial Meniscal Allograft Transplantation Combined with Re-alignment Surgery

[1]Dhong Won Lee, M.D, Ph.D & [2]Jin Goo Kim, M.D, Ph.D
[1]Konkuk University Medical Center, Seoul, Korea, Republic of
[2]Myongji Hospital, Goynag-Si Gyeonggi-do, Korea, Republic of



Faculty Disclosure Information

- There is no conflict of interest.

Introduction

Meniscal allograft transplantation (MAT)

→ **Favorable** clinical and radiological results

Possible causes for the **inferior outcomes**

- Meniscal mobility↓
- Frequent degenerative change↑
- **Varus malalignment**

Bin et al, AJSM, 2018
Koh et al, JBJS, 2012
Makiev KG, KSRR, 2022
Van Der Straeten et al, Plos One, 2016

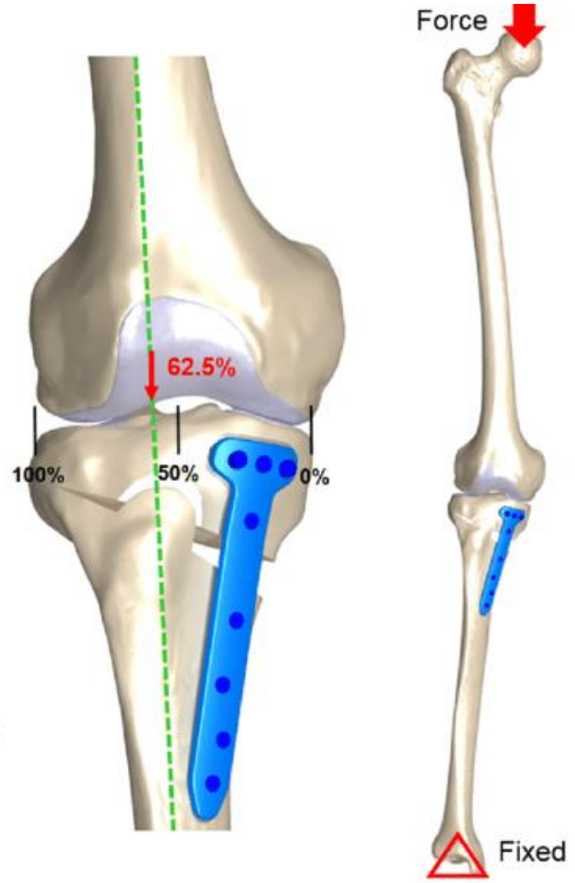
Introduction

Varus malalignment → Unfavorable outcome after MMAT

Obtain proper alignment via a **high tibial osteotomy (HTO)**

→ For a meniscal allograft to function optimally

- **Shear and compressive forces** on the medial side ↓↓
- **Graft survival** ↑
- **Stability and longevity** of the procedure ↑



Purpose

To compare the clinical and radiological results of medial MAT (MMAT) + HTO and isolated MMAT

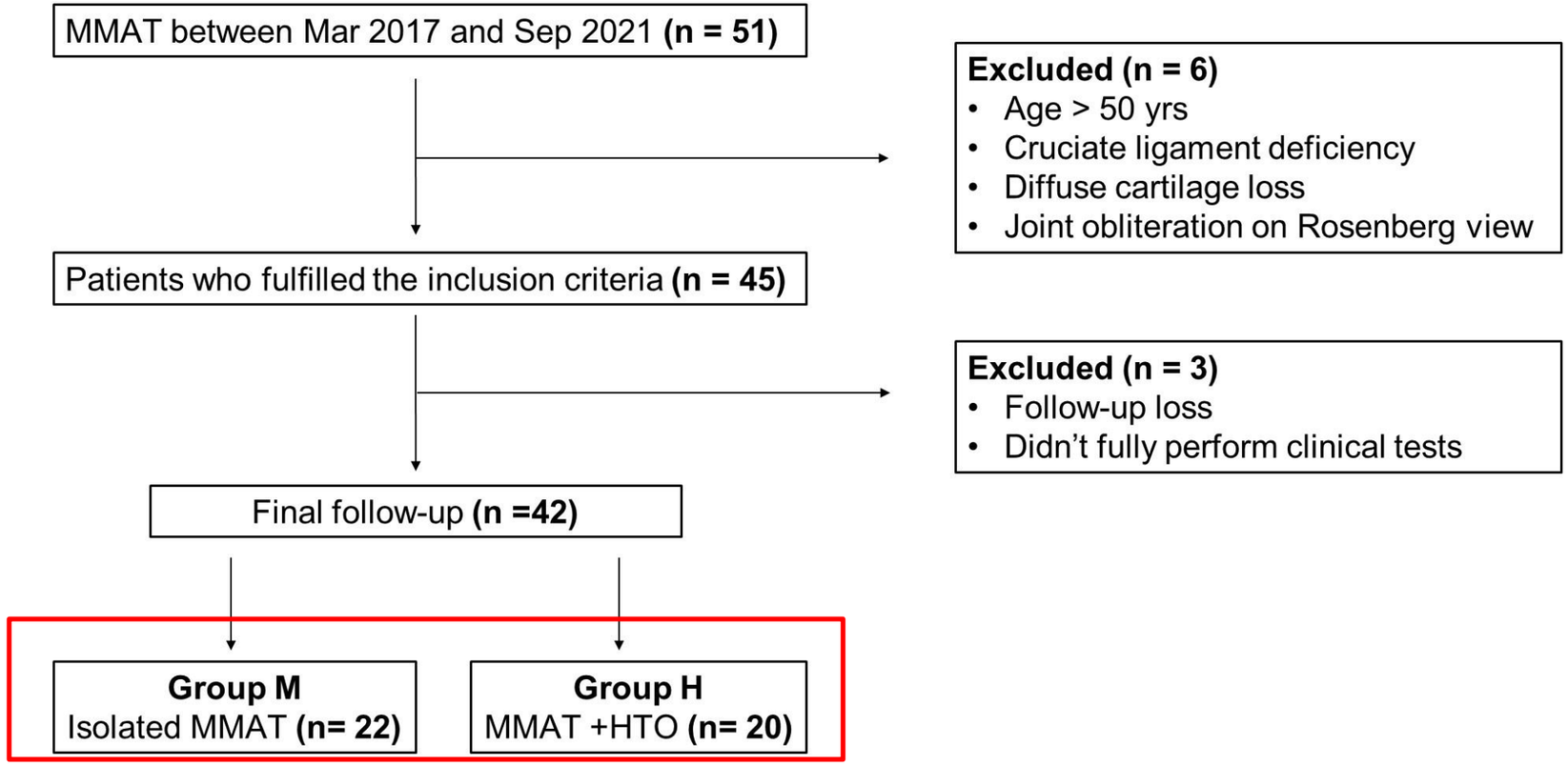
Hypothesis

The outcomes of MMAT + HTO would not be inferior to those of MMAT alone.

Methods

Inclusion criteria

- Underwent magnetic resonance imaging (MRI) examination within 2 days postoperatively & a follow-up MRI 1 year after MMAT
- Minimum of **2-year follow-up**



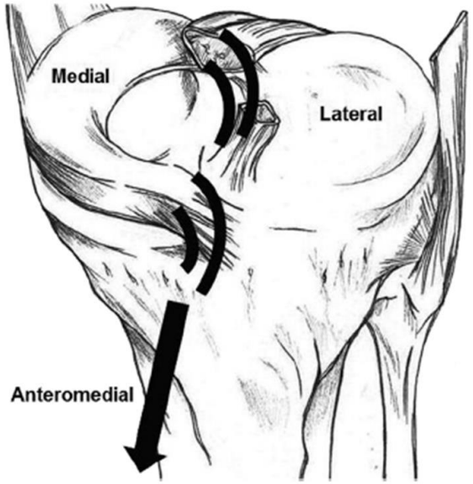
Methods (Surgical Techniques)

MMAT

Arthroscopic Medial Meniscal Allograft Transplantation with Modified Bone Plug Technique

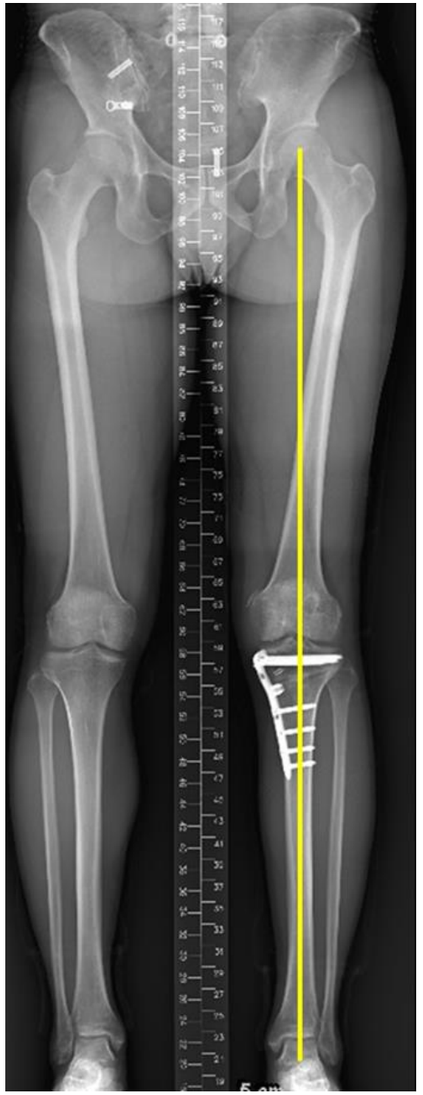
Dhong Won Lee, M.D., Jung Ho Park, M.D., Kyu Sung Chung, M.D., Jeong Ku Ha, M.D., and Jin Goo Kim, M.D., Ph.D.

Arthrosc Tech, vol 6, No 4, 2017



HTO

- Varus alignment (absolute mechanical axis > 3 degrees)
- Target alignment : **Lateral tibial intercondylar eminence**
- Weightbearing line pass through **55% to 60% laterally**



Methods

X- rays

Before surgery, 6 and 12 months after surgery, and every year

K–L grade : Rosenberg view

- **HKA angle**
- **Joint line congruence angle**

Magnetic Resonance Imaging (MRI)

2 times: Preoperatively and at 2 days and 12 months

- **ICRS grades:** High grade : ICRS ≥ 3
- **Graft extrusion**

✓ Coronal plane at the posterior border level of MCL

✓ Pathologic extrusion : graft extrusion of 3 mm

- **Signal intensity of the graft**

Clinical evaluations

Before surgery, 6 and 12 months after surgery, and every year

Subjective knee function

Lysholm score

International Knee Documentation Committee (IKDC) knee score

Tegner activity scale(TAS)

Objective knee function

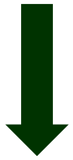
Isokinetic strength test : Biodex System III dynamometer at an angular velocity of 60 deg/s.

Results (Demographic Data)

	Group M (n=22)	Group H (n=20)	*P*
Age, y	34.4 ± 5.2	37.7 ± 6.3	.074
BMI	22.7 ± 2.4	23.2 ± 3.1	.565
Sex, n, male/female	22/9	20/10	.719
Clinical follow-up period, mo	29.2 ± 4.9	27.4 ± 5.3	.262
MRI follow-up duration, mo	12.8 ± 1.9	12.4 ± 1.7	.476

Results (Clinical Scores)

Preoperative	Group M (n=22)	Group H (n=20)	*P*
Lysholm score	55.4 ± 9.5	52.6 ± 8.9	.331
IKDC subjective score	51.4 ± 10.3	49.3 ± 11.4	.536



Postoperative	Group M (n=22)	Group H (n=20)	*P*
Lysholm score	81.3 ± 9.7	84.2 ± 10.2	.352
IKDC subjective score	79.6 ± 9.4	81.4 ± 8.3	.514
Isokinetic extensor strength, %	155.8 ± 25.4	163.2 ± 28.1	.375

Results (X-rays)

Preoperative	Group M (n=22)	Group H (n=20)	*P*
Joint space width	3.6 ± 1.1	2.9 ± 1	.037
Hip-knee-ankle angle, deg	**Varus 1.8 ± 1**	**Varus 4.2 ± 1.9**	**<.001**
Joint congruence angle, deg	**1.6 ± 1.1**	**2.8 ± 1.3**	**.002**
KL grade, n, 1/2/3/4	10/11/1/0	4/12/4/0	.115

Postoperative	Group M (n=22)	Group H (n=20)	*P*
Hip-Knee-Ankle angle, deg	**Varus 1.2 ± 2.2**	**Valgus 2.2 ± 0.7**	**<.001**
Joint congruence angle, deg	**1.5 ± 1.3**	**1.8 ± 1.5**	**.492**
KL progression	4 (18.2%)	2 (10%)	.115
K-L grade ≥ 3	3 (13.6%)	4 (20%)	.143

Results (MRI)

Preoperative	Group M (n=22)	Group H (n=20)	*P*
ICRS grade on MFC ≥ 3	3 (13.6%)	6 (30%)	.269
ICRS grade on MTP ≥ 3	1 (4.5%)	3 (15%)	.333
Graft extrusion (Post 2days)	**0.5 ± 0.4**	**0.6 ± 0.4**	**.269**

Postoperative	Group M (n=22)	Group H (n=20)	*P*
ICRS grade on MFC ≥ 3	2 (9.1%)	3 (15%)	.269
ICRS grade on MTP ≥ 3	1 (4.5%)	1 (5%)	.333
Graft extrusion (Post. 12mo.)	**3.3 ± 0.7**	**2.7 ± 0.8**	**.014**
Pathologic extrusion	**9 (40.9%)**	**4 (20%)**	**0.143**

Conclusion

- **Clinical scores significantly improved** after isolated MMAT and MMAT combined with HTO
- **Postoperative graft extrusion** was **greater** in patients who underwent **isolated MMAT**

=> Active correction of varus alignment during MMAT may help in intra-articular biomechanics.

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