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INFLUENCE OF MINI APPROACH INSTRUMENTATION ON COMPONENT ALIGNMENT IN UNICONDYLAR KNEE REPLACEMENT

(ABSTRACT # 22057)

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Presenters Financial Disclosure

I (or a member of my immediate family) **do not** have a financial interest or other relationship with a commercial company related directly or indirectly with the ***ISAKOS 14th Biennial Congress 2023.***

INTRODUCTION

- In 1998, Oxford UKR (Unicondylar Knee Replacement) Phase 3 knee with fully congruous mobile bearing was introduced with Minimal Invasive Instrumentation.
- The prognosis of Unicondylar Knee Replacement is strongly associated with the accuracy of the implant placement.
- The minimally invasive approach obscures surgical landmarks and hence makes intra-operative orientation and positioning of the components difficult.
- The MIS approach uses a small incision and limited exposure without dislocation of patella. This leaves quadriceps tendon intact and is beneficial for fast recovery.
- Recovery was 2 times as rapid in the minimally invasive group versus the standard UKA group and 3 times as rapid versus the standard TKA group.

AIM OF THE STUDY

- To evaluate the accuracy of implant placement using mini approach instrumentation for mobile bearing Oxford Unicondylar Knee Replacement (UKR).

Femur	Normal Range
1. Varus/ Valgus	< 10^0 Varus --- < 10^0 Valgus
2. Flexion/extension	<10^0 Flexion— <5^0 Extension
3. Medial/ lateral placement	Central
4. Posterior fit	Flush or < 4mm overhang
Meniscal bearing	
X-ray marker central, and parallel with the tibial component	

Tibia	Normal Range
1. Varus/ Valgus	< 5^0 Varus --- < 5^0 Valgus
2. Postero-inferior slope	7^0 +or -5^0
3. Medial fit	Flush or < 2mm overhang
4. Posterior fit	Flush or < 2mm overhang
5. Anterior fit	Flush or < 5mm short

MATERIALS AND METHODS

- It was an Interventional Prospective clinical study with 33 knees of Medial compartment osteoarthritis.

- Varus/ Valgus of femoral and tibial components were measured relative to long axis of tibia on AP view.

Demonstrate Varus placement of Femoral Component
(A- Long Axis of Tibia, B- Line Parallel to long axis of Tibia, C- Long Axis of Femoral component)

Demonstrate Varus placement of Tibial Component
(A- Long Axis of Tibia, B- Line perpendicular to long axis of Tibia, C-Line parallel to border of Tibial Component)

MATERIALS AND METHODS

- Flexion/extension of femoral & tibial component was measured relative to posterior cortex respectively on lateral view.

Demonstrate Flexion position of Femoral Component

(A-Line parallel to posterior femoral cortex, B-Line parallel to peg of femoral component)

Demonstrate Tilt of tibial Component

(A-Line parallel to posterior Tibial cortex, B-Line perpendicular to posterior tibial cortex, C-Line parallel to femoral component)

RESULTS

Femoral Component	Mean (Range)	Normal Range	SD
Varus /Valgus	4.21º varus (3.3º valgus -8.6º varus)	<10º varus - <10º valgus	2.98
Flexion /Extension	7.21º flexion (1.2º flexion-14.4º flexion)	<10º flexion – < 5º extension	4.30
Medial/Lateral fit (mm)	0.82 lateral (1 mm medial to 5 mm lateral)	central	-
Posterior fit (mm)	0.73 overhang (1mm short to 2.5mm overhang)	Flush or < 4mm overhang	-

RESULTS

Tibial Component	Mean (Range)	Normal Range	SD
Varus/ Valgus	5.8º varus (3º valgus - 13.2º varus)	<5º varus – < 5º valgus	3.89
Posteoinferior Tilt	3.6º superior tilt (5.4º inferior tilt – 9.1º superior tilt)	7º +or -5º	2.69
Medial fit (mm)	0.4 short (2 short to flush)	Flush or < 2mm overhang	-
Anterior fit (mm)	0 (1 short to 1 overhang)	Flush or < 5 mm short	-
Posterior fit (mm)	0.2 short (3 short to 2 overhang)	Flush or < 2 mm overhang	-

DISCUSSION

- All component of oxford UKR can be placed with high accuracy using mini-approach instrumentation.
- Femoral central and Tibia Varus alignment has maximum error rate due to technical errors and learning surgical curve.
- Functional outcomes of knees outside the recommended range of alignment of the components of UKR has been excellent.

DISCUSSION

Parameter	Shakespeare et al	Clarius et al	Gulati et al	Our Study
Femur	**(Outliers/total)**	**(Outliers/total)**	**(Outliers/total)**	**(Outliers/ total)**
1. Varus/Valgus	0/224, Mean=0.5º varus	*2/56, Mean=2.8^0 varus	3/211, Mean=1.4^0 varus	0/33, Mean= 4.21^0 varus
2. Flexion/ Extension	18/224, Mean=0.2ºflexion	#18/56, Mean=2.1^0 flexion	**40/211, Mean= 0.8^0 ext	9/33, Mean= 7.21^0 Flexion
3. Medial/ lateral placement	—	40/56, Mean=1.2mm medial	—	15/33, Mean= 0.82 mm lateral
4. Posterior fit	13/224, Mean= 0.8mm overhang	19/56, Mean =1.2mm overhang	—	3/33, Mean= 0.73 mm overhang
Tibia				
1. Varus/valgus	2/224, Mean=1.8º varus	$1/56, Mean = 4.4^0 varus	18/211, Mean=2.1^0 varus	15/33, Mean= 5.8^0 Varus
2. Posterior slope	0/224, Mean=5.7º	7/56, Mean = 6.1^0	16/211, Mean=5.1^0	9/33, Mean= 3.6º superior tilt
3. Medial fit	25/224, Mean=0.6 mm overhang	25/56,Mean=0.1mmunder hang	—	9/33, Mean= 0.4 mm short
4. Posterior fit	75/224, Mean=0.6 mm underhang	43/56, Mean =2mm underhang	—	9/33, Mean= 0.2 mm short
5. Anterior fit	24/224, Mean=0.4 mm underhang	&22/56, Mean =1.7mm underhang	—	3/33, Mean= Flush

*= acceptable range 10^0 valgus to 10^0 varus, # = acceptable range 5^0 flexion to 5^0 extension

$ = acceptable range 5^0 valgus to 10^0 varus, & = acceptable range exact fit to < 3mm shorter

** = acceptable range 10^0 flexion to 10^0 extension

CONCLUSION

- Components of UKR i.e. Femoral component, Tibial component and Meniscal bearing can be placed with high accuracy using mini-approach instrumentation

- Excellent results can be obtained with mini approach instrumentation with proper patient selection and with strict adherence to the surgical technique.

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