Medial Open Wedge High Tibial Osteotomy: Risk Factors for Early Conversion to Total Knee Arthroplasty

Nicola Mackay[1], Adit Maniar[1], Lyndsay Somerville[1], Brent Lanting[1], Alan Getgood[1,2]

1. Fowler Kennedy Sports Medicine Clinic, Western University, London, Ontario, Canada.
2. Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar.

Disclosure of Conflict of Interest

We have nothing to declare for this study

Background

- Medial open wedge high tibial osteotomy (MOWHTO) in patients with medial compartment osteoarthritis aims to provide pain relief to avoid or delay the need for a primary total knee arthroplasty (TKA).

- A MOWHTO can produce a valgus deformity in the proximal tibia and potentially increase joint line obliquity (JLO).

- To restore a neutral mechanical alignment yet avoid abnormal JLO, some surgeons advocate double level osteotomy.

Background

- There is controversy in the literature how JLO affects clinical outcomes and survivorship following MOWHTO.
- Multiple parameters have been studied to establish the risk factors for conversion to TKA in patients following MOWHTO.
- To our knowledge, there is no study investigating the impact of JLO and other risk factors on the timing of TKA after a MOWHTO.

Aim

The purpose of this study is to identify risk factors for early conversion to TKA following MOWHTO

Methods

- Retrospective review of prospectively collected database identifying patients who had conversion to TKA following a previous MOWHTO

- Patients were divided into early (<5 years) and late (>7 years) conversion to TKA

- Using mediCAD and PACS software we measured:
  - Hip-knee-ankle angle (HKA)
  - Mechanical medial proximal tibial angle (MPTA)
  - Mechanical lateral distal femoral angle (LDFA)
  - Weight bearing line percentage with medial side being 0 (WBL %)
  - Joint line congruency angle (JLCA)
  - Posterior tibial slope (PTS)

Methods

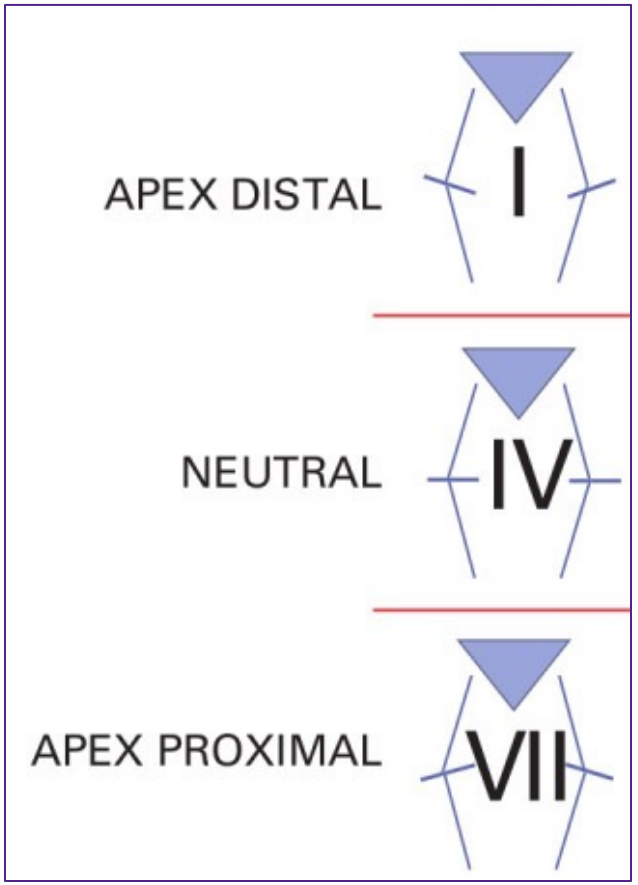
JLO = MPTA + LDFA

- JLO was calculated using the Coronal Plane Alignment of the Knee (CPAK) classification:
  - Distal (<177º),
  - Neutral (177-183º)
  - Proximal (>183º)

- Risk factors for analysis were divided into pre and post MOWHTO

- Univariate analysis followed by a logistic binary regression analysis was performed to identify independent risk factors

- The p value set at ≤ 0.05



Methods

50 radiographs: Excellent Inter-observer and Intra-observer reliability

For analysis - all measurements made by 1 observer

	Inter-observer Reliability ICC (95% CI)	**Intra-observer Reliability ICC (95% CI)**
HKA	0.99 (0.995 to 0.998)	0.99 (0.986 to 0.995)
MPTA	0.92 (0.870 to 0.956)	0.92 (0.868 to 0.955)
LDFA	0.92 (0.849 to 0.953)	0.92 (0.866 to 0.955)
WBL %	0.99 (0.996 to 0.999)	0.99 (0.998- 0.999)

Results: Early vs Late Conversion pre HTO

	Early (n=41)	Late (n=85)	P value
Age at HTO (years)			
≤50	46.3%	48.2%	0.852
>50	53.7%	51.8%	
Gender (% Female)	34.1%	29.4%	0.682
HKA			
≤8	53.7%	44.7%	0.447
>8	46.3%	55.3%	
MPTA			
≤85	31.7%	37.6%	0.557
>85	68.3%	62.4%	
LDFA			
≤90	56.1%	70.6%	0.115
>90	43.9%	29.4%	
JLCA			
≤3	34.1%	18.8%	0.075
>3	65.9%	81.2%	
KL Grade			
2	12.2%	5.9%	0.475
3	51.2%	54.1%	
4	36.6%	40.0%	
JLO			
<177	63.4%	77.6%	0.182
177-183	34.1%	20.0%	
>183	2.4%	2.4%	

No significant difference

Results: Early vs Late Conversion pre HTO

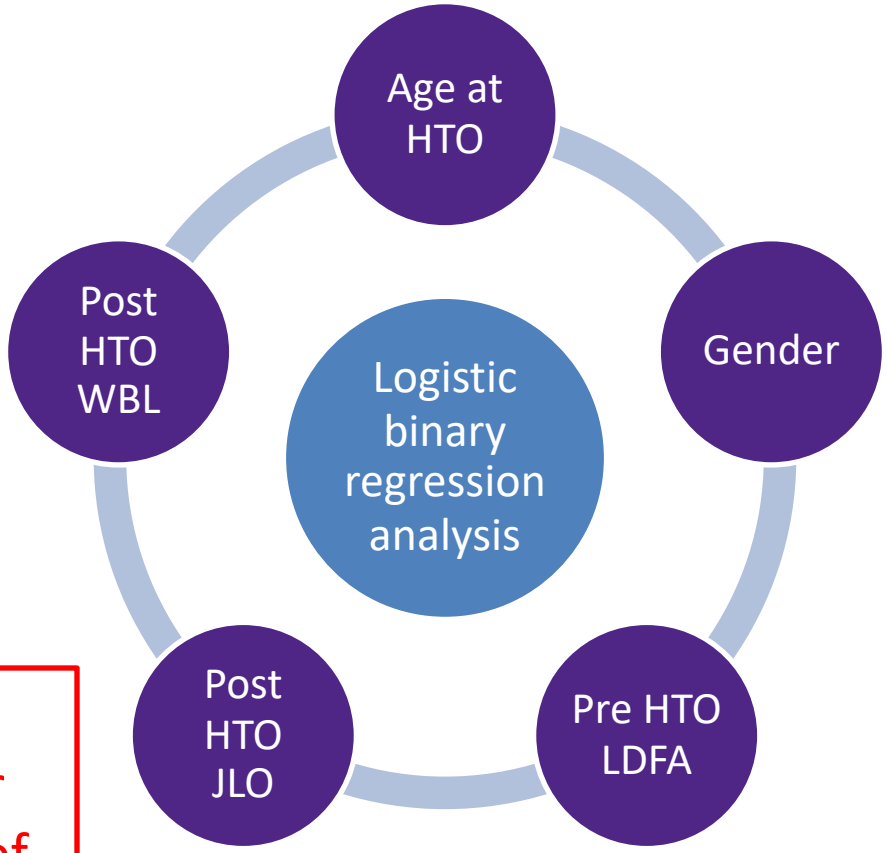
	Early (n=41)	Late (n=85)	P value
MPTA			
≤93	55.0%	40.2%	
>93	45.0%	59.8%	0.175
JLO			
<177	12.5%	6.1%	0.242
177-183	50.0%	42.7%	
>183	37.5%	51.2%	
Change in PTS			
<-3	5.6%	12.7%	0.345
-3 to +3	80.6%	66.2%	
>3	13.9%	21.1%	
WBL %			
<50	52.5%	27.7%	0.01
50-65	32.5%	60.2%	
>65	15.0%	12.0%	

No significant difference

Significant difference

Results

- Our overall model was statistically significant (p=0.04)
- Age, Gender, pre HTO LDFA, post HTO JLO were not independent risk factors for early conversion to TKA



WBL percentage <50% was an independent risk factor (p=0.04) for early conversion to TKA with an OR of 2.67 (95% CI 1.04 to 6.82) as compared to those with WBL percentage 50-65%

Conclusion

- Under correction of a MOWHTO with WBL <50% was an independent risk factor for early conversion to TKR

- Gender, pre HTO age, pre HTO femoral varus deformity and post HTO JLO were not independent risk factors

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