



IOAEO



IMPACT OF FEMUR CORRECTION ON THE MECHANICAL ALIGNMENT OF THE TOTAL KNEE PROSTHESIS.

Authors: González Israel MD, Negrete Jorge MD, Garcini Franco, MD Guevara Alberto MD, López Alejandro MD, Dobarganes Fidel Prof.

Hospital Ángeles Querétaro.

Querétaro, México.

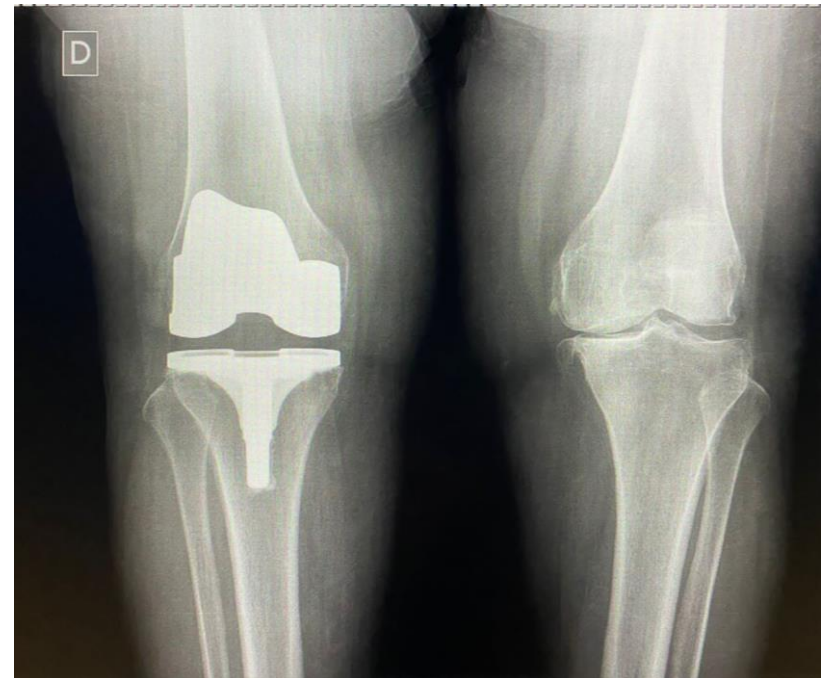
Disclosure

Prof. Dr. Fidel García Dobarganes Barlow

- ▶ Speaker Smith & Nephew
- ▶ Consultant. Dipromedic/traufix
- ▶ VicePresident. Mexican Hip Society
- ▶ None of the authors have any conflict of interest with this paper.

Introduction

- ▶ Success of TKR depends on ..
- ▶ Adequate preoperative planning, implant quality and surgical technique.
- ▶ Mechanical alignment were reported with good results.
- ▶ Dissatisfaction of about 20%.



Objective of study

- ▶ Compare postoperative satisfaction between patients with residual varus HKA vs. neutral HKA after TKR with MA.
- ▶ Determine if there is a radiological factor that may improve postoperative satisfaction scores.
- ▶ The FJS-12 questionnaire was used to measure postoperative satisfaction by phone call.
- ▶ We take >68pts as “Good satisfaction”.

ICAE



Methodology

Retrospective study.
Post-operative TKR between 2016-2020.



Inclusion criteria

Varus or neutral knee arthrosis grade IV

60-80 years of age.

Minimum 1 year follow-up.

Complete radiographic series.

Bilateral TKR were included.

Exclusion criteria

Valgus knee OA.

Pre-postoperative knee lig. instability

Post-traumatic knee osteoarthritis

Previous fractures in operated leg.

Hip or ankle OA of the operated leg.

Incomplete FJS-12 questionnaire

Radiographic measurement



HKA

- Neutral: $180^\circ \pm 2^\circ$
- Varus: $<178^\circ$

aHKA

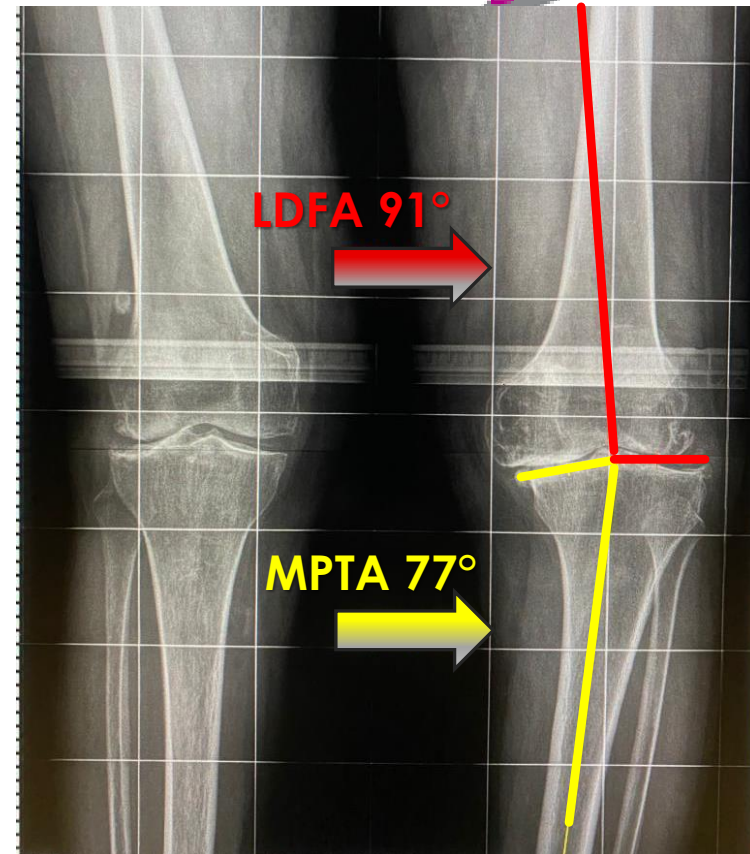
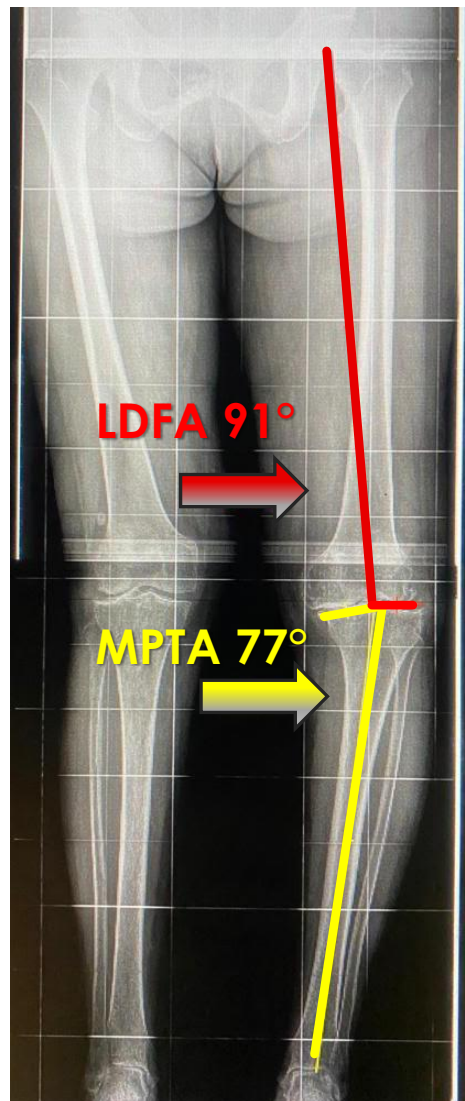
- Neutral: $0^\circ \pm 2^\circ$
- Varus: $< -2^\circ$

JLO

- Neutral: $180^\circ \pm 3^\circ$
- Apex distal: $<177^\circ$
- Apex proximal: $>183^\circ$

LDFA

MPTA



aHKA = -14° (varus)
JLO = 168° , apex distal

LOAEO



In the follow-up

Was the mechanical alignment changed?:

Yes or No

According to MA philosophy, restore of different angles was classified in..

HKA

- Undercorrected: $> +182^\circ$.
- Neutral: $180^\circ \pm 2^\circ$.
- Overcorrected: $< 178^\circ$.

LDFA

- Undercorrected: $93^\circ \pm 1.5^\circ$.
- Neutral: $90^\circ \pm 1.5^\circ$.
- Overcorrected: $87^\circ \pm 1.5^\circ$.

MPTA

- Undercorrected: $87^\circ \pm 1.5^\circ$
- Neutral: $90^\circ \pm 1.5^\circ$.
- Overcorrected: $93^\circ \pm 1.5^\circ$.

Results

- 275 patients with TKR.
- 35 complete inclusion criteria and 7 TKR bilateral

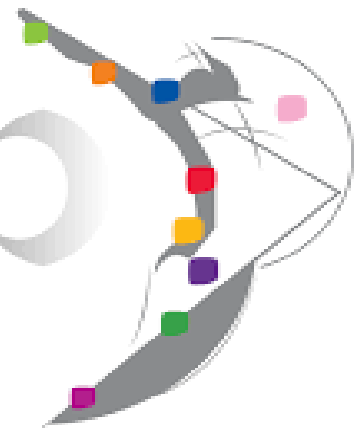
Total → 42 knees

Mean age was 70

Mean follow up 2.2 years

69% women

IOAEO



Restauration

HKA

- Change 52% .
- Same alignment 47%.

αHKA

- Change 47%
- Same arithmetic alignment 52%

Correction.

HKA

- Undercorrection 36%.
- Neutral 60%.
- Overcorrection 5%.

LDFA

- Undercorrection 21%.
- Neutral 50%.
- Overcorrection 29%.

MPTA

- Undercorrection 69%.
- Neutral 31%.

LOAEO



Better FJS-12 scores.

-Postoperative varus HKA (undercorrection) and aHKA.

-Maintain postoperative native HKA.

-Postoperative neutral or undercorrected LDFA (90°-93°).

-Postoperative overcorrected LDFA

-Postoperative valgus HKA (overcorrection).

Worst FJS-12 scores.



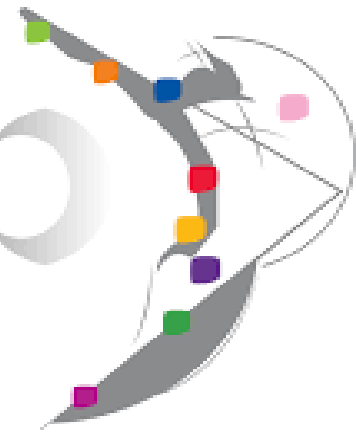


Best predictors for FJS-12 >68pts.

	FJS-12 >68pts	FJS-12 <68pts	Sig.
Postoperative LDFA	90.48°	87.84°	.000
Postoperative aHKA			.001
-Varus	14 (54%)	1 (6.3%)	
-Neutral	11 (44%)	15 (93.8%)	
Same aHKA			.001
Yes	17 (68%)	5 (17.6%)	
No	8 (32%)	14 (82.4%)	
Same HKA			.010
Yes	16 (64%)	4 (23.5%)	
No	9 (36%)	13 (76.5%)	

- Postoperative change from native aHKA to neutral alignment was associated with 19-times higher odds of dissatisfaction after TKR with MA.
- Binomial logistic regression shows that postoperative LDFA is the most important factor to → FJS-12 >68pts

LOAEO



What is the ideal postoperative LDFA?



- ▶ Postoperative 90° LDFA → 69pts of FJS-12 score would be expected. But...
- ▶ Postoperative 92° LDFA will be better → 72pts of FJS-12 score.
- ▶ In fact, when is compared to neutral (90°) correction of LDFA, undercorrected (92°) increase 4-times of higher satisfaction after TKR with MA.

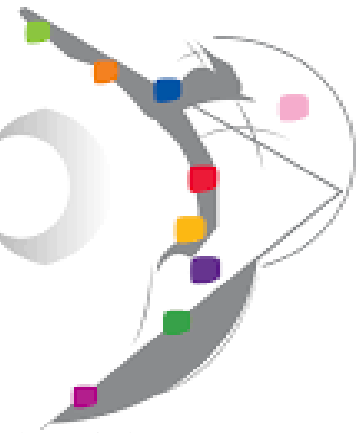
So, We can say....



- ▶ Important to do preoperative planning.
- ▶ Postoperative LDFA → best predictor for good FJS-12 scores.
- ▶ Try not to be too aggressive with soft tissue and bony cuts to maintain postoperative residual varus LDFA (90° - 92°), HKA and aHKA.
- ▶ keep in mind safe postoperative alignment boundaries.

Bibliography

IOAEIO



- Hirschmann, M. T., Hess, S., Behrend, H., Amsler, F., Leclercq, V., & Moser, L. B. (2019). Phenotyping of hip-knee-ankle angle in young non-osteoarthritic knees provides better understanding of native alignment variability. *Knee Surgery, Sports Traumatology, Arthroscopy*, 27(5), 1378-1384.
- MacDessi, S. J., Griffiths-Jones, W., Harris, I. A., Bellemans, J., & Chen, D. B. (2021). Coronal Plane Alignment of the Knee (CPAK) classification: a new system for describing knee phenotypes. *The Bone & Joint Journal*, 103(2), 329-337.
- MacDessi SJ, Griffiths-Jones W, Chen DB, Griffiths-Jones S, Wood JA, Diwan AD, Harris IA (2020) Restoring the constitutional alignment with a restrictive kinematic protocol improves quantitative soft-tissue balance in total knee arthroplasty: a randomized controlled trial. *Bone Joint J* 102-B:117-12
- Bellemans, J., Colyn, W., Vandenuecker, H., & Victor, J. (2012). The Chitranjan Ranawat Award: is neutral mechanical alignment normal for all patients?: the concept of constitutional varus. *Clinical Orthopaedics and Related Research*®, 470(1), 45-53.
- Magnussen RA, Weppe F, Demey G, Servien E, Lustig S. Residual varus alignment does not compromise results of TKAs in patients with preoperative varus. *Clin Orthop Relat Res*. 2011 Dec;469(12):3443-50. Epub 2011 Jul 26
- Sappey-Marinière, E., Batailler, C., Swan, J., Schmidt, A., Cheze, L., MacDessi, S. J., & Lustig, S. (2021). Mechanical alignment for primary TKA may change both knee phenotype and joint line obliquity without influencing clinical outcomes: a study comparing restored and unrestored joint line obliquity. *Knee Surgery, Sports Traumatology, Arthroscopy*, 1-9.
- Nishida K, Matsumoto T, Takayama K, Ishida K, Nakano N, Matsushita T, Kuroda R, Kurosaka M (2017) Remaining mild varus limb alignment leads to better clinical outcome in total knee arthroplasty for varus osteoarthritis. *Knee Surg Sports Traumatol Arthrosc* 25:3488-3494
- Delpont H, Labey L, Innocenti B, et al. Restoration of constitutional alignment in TKA leads to more physiological strains in the collateral ligaments. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(8):2159-2169
- Shin KH, Jang KM, Han SB (2020) Residual varus alignment can reduce joint awareness, restore joint parallelism, and preserve the soft tissue envelope during total knee arthroplasty for varus osteoarthritis. *Knee Surg Sports Traumatol Arthrosc*.