Unity Knee™

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Responsible Innovation

Think **isometry** Feel **balance™**

Unity Knee™

Learning from the experience of over 40 years of total knee development, Unity Knee™ is the latest evolution in total knee arthroplasty, unifying key design technologies with advanced knee kinematics, soft tissue preservation concepts and modern surgical principles.

- **Balancing the MCL**

  Utilising modern knee kinematic principles to help facilitate medial joint line preservation and collateral ligament stability[2,3].

- **Balancing the patella**

  Incorporating advanced design technologies to help optimise patellofemoral joint balance.

- **Balancing the soft tissue envelope**

  Facilitating the preservation of proprioception and mechanical function of the knee soft tissue envelope[4].

Think **isometry** Feel **balance™**


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Evidence based innovation

Unity Knee™

Balancing the MCL

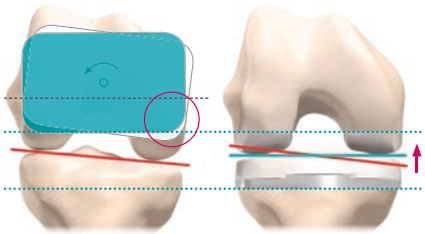
Studies show that anatomic knee designs with a single centre of rotation in the active flexion arc have the potential to facilitate collateral ligament isometry, minimising paradoxical anterior glide seen in traditional 'J' curve systems[1]. However, if the joint line is not preserved, a single radius femur can still lead to mid-flexion ligament laxity, resulting in instability and loss of function[2,3].

The challenge: As joint line orientation is not maintained in total knee replacement (TKR), most instruments provide a central pivoting rotational alignment mechanism which elevates the medial joint line, resulting in mid-flexion laxity of the MCL followed by tensioning in deep flexion[2,4].

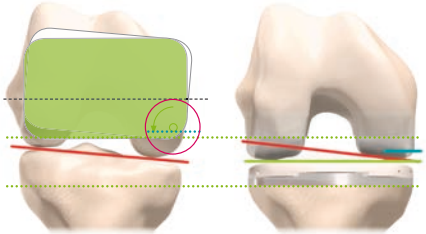
Our innovation: Taking into consideration the importance of the MCL in knee stability post TKR, Unity utilises advanced kinematic and design principles with the aim of optimising medial joint stability, providing an optimal synergy between implant and instrument designs.

Balancing the patella

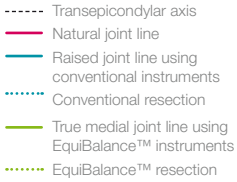
Studies of the native patella show lateral articulation against the trochlea throughout range of motion (ROM)[5,6,7]. Whilst traditional prostheses tend to track from a medial position in flexion to a lateral position in extension, resulting in increased patella constraint and extensor mechanism forces in mid-flexion[8], Unity incorporates an



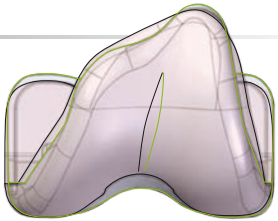
Traditional instruments rotate around a single central axis which results in elevation of the medial joint line.



Maintaining the natural joint line with EquiBalance™ instruments



anatomic, lateralised patellofemoral geometry[8] designed to accommodate lateral patella tracking and balance throughout ROM.



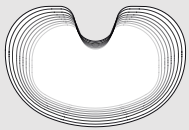
Balancing the soft tissue envelope

To avoid sensory disturbances due to ligament releases during surgery, the Unity implant design, combined with EquiBalance™ instrumentation, is designed to facilitate ligament balancing and MCL isometry throughout ROM.

And we didn't just stop there……

Utilising advanced design technologies, modern kinematic principles and anthropometric data analysis, Unity incorporates:

- **Rotational freedom principles** to accommodate variable knee kinematics, aimed to minimise soft tissue conflict[9,10].
- **Size-specific tibial tray geometries** with changing cortical profiles[11], designed to enhanced cortical fit, minimising implant overhang and soft tissue irritation[11,12].



- **Safe high flexion principles** with a 3° anterior slope posterior condylar resection, designed to allow safe high flexion without additional bone resection[13], in contrast to traditional high-flexion designs[14].
- **Difficult primary instrumentation** offering the unique ability to stem a primary PS femur and tibia.

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Traditional high-flex knee

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References:

1. Kessler O, Dürselen L, Banks S, Mannel H, Marin F. Sagittal curvature of total knee replacements predicts in vivo kinematics. Clin Biomech (Bristol, Avon). 2007 Jan;22(1):52-8.
2. Luyckx T, Victor J, Bellemans J. Effect of femoral component position and joint line changes on ligament isometry and kinematics in single radius TKA. Presented at European Knee Association Congress 2013, Florence, Italy.
3. Feeley BT, Muller MS, Allen AA, Granchi CC, Pearle AD. Biomechanical comparison of medial collaterial ligament reconstructions using computer-assisted navigation. Am J Sports Med. 2009 Jun; 37(6): 1123- 1130.
4. Delport H, Labey L, De Corte R, Innocenti B, Vander Sloten J, Bellemans J. Collateral ligament strains during knee joint laxity evaluation before and after TKA. Clin Biomech (Bristol, Avon). 2013 Aug;28(7):777-82.
5. Iranpour F, Merican AM, Dandachli W, Amis AA, Cobb JP. The geometry of the trochlear groove. Clin Orthop Relat Res. 2010 Mar;468(3):782-8.
6. Eckhoff DG, Burke BJ, Dwyer TF, Pring ME, Spitzer VM, VanGerwen DP. The Ranawat Award. Sulcus morphology of the distal femur. Clin Orthop Relat Res. 1996 Oct;(331):23-8.
7. Eckhoff DG, Montgomery WK, Stamm ER, Kilcoyne RF. Location of the femoral sulcus in the osteoarthritic knee. J Arthroplasty. 1996 Feb;11(2):163-5.
8. Unity patellafemoral track orientation. Comparison Report. Internal test data. Corin Group 2013.
9. Mikulak SA, Mahoney OM, dela Rosa MA, Schmalzried TP. Loosening and osteolysis with the press-fit condylar posterior-cruciate-substituting total knee replacement. J Bone Joint Surg Am. 2001 Mar;83-A(3):398-403.
10. Klein R, Serpe L, Kester MA, Edidin A, Fishkin Z, Mahoney OM, Schmalzried TP. Rotational constraint in posterior-stabilized total knee prostheses. Clin Orthop Relat Res. 2003 May;(410):82-9.
11. Lowry, C, Traynor, A, Girotti, G, Bellemans, J, Victor, J, Collins, S.N. The profile of the cut tibia: Is resection depth, proportionately larger for smaller tibias, responsible for change in profile? Scientific Poster, CORS 2013 Venice.
12. Dai Y, Bischoff JE. Comprehensive assessment of tibial plateau morphology in total knee arthroplasty: Influence of shape and size on anthropometric variability. J Orthop Res. 2013 Oct;31(10):1643-52.
13. Unity Femoral loosening study report. Internal test data. Corin Group 2013.
14. Bollars P, Luyckx JP, Innocenti B, Labey L, Victor J, Bellemans J. Femoral component loosening in high-flexion total knee replacement: an in vitro comparison of high-flexion versus conventional designs. J Bone Joint Surg [Br]. 2011 Oct;93(10):1355-61.

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