apollo™

Dynamic Balance

Plan. Implement. Learn.

apolloknee™

Corin

What is apolloknee™

ApolloKnee™ delivers personalised dynamic balance, an objective and comprehensive knee system that goes beyond personalised alignment.

apollo™

Corin

Plan...

With our ground-breaking **BalanceBot™** technology, the world's first and ONLY robotic dynamic knee balancer.

...Implement...

Using the **Apollo Robot**, our patient mounted, haptic cutting system that facilitates efficient and accurate bone cuts.

...Learn

From **CorinConnect™**, our digital ecosystem that uncovers insights by linking pre, intra and post-operative data.

Why apolloknee™

Balance and Alignment

Balance is difficult to reproduce manually, and standardization is needed[E1]

Imbalanced knees can lead to pain[E2.A], dissatisfaction[E2.C], and knee failure[1]

Robotic ligament balance with the BalanceBot™ correlates with better outcomes, less pain[E2.A]

Accuracy

To achieve an accurate result, you need an objectively accurate plan to target

The BalanceBot™ can accurately predict and achieve post-op ligament balance[E8]

The Apollo Robot delivers highly accurate component positioning[E11]

Satisfaction

There is still room for improvement in patient satisfaction[2]

The Apollo Robot and BalanceBot have excellent clinical, and patient reported outcomes[E12]

Survivorship

Having a trusted implant with great clinical results is an irrefutable need

The Apollo Robot and BalanceBot™ with Corin implants have excellent survivorship[E13]

Return on investment

Technology should add value to your practice

We restore knee balance[E14], reduce readmission[E15], and reduce manipulation rates[E16] to increase ROI

Ease of use

Technology should be accessible and efficient

The BalanceBot™ and Apollo Robot have a minimal operative storage footprint[E18]

There is a short learning curve and high patient satisfaction during the learning phase[E17]

1. Chen, et al. 2019 Mid-term patient reported outcomes and survivorship following robotic assisted total knee replacement: a cohort study. CAOS 2019

2. Paszicsnyek, Thomas. (2015). Early Experience with a Modern Generation Knee System: Average 2 Years' Follow-up. Reconstructive Review. 5. 10.15438/rr.5.4.125.

E. Evidence Base: https://www.coringroup.com/assets/File-uploads/NL-005-REV-1023-OMNIBotics-Evidence-Base-hands-2911.pdf

Apollo Station

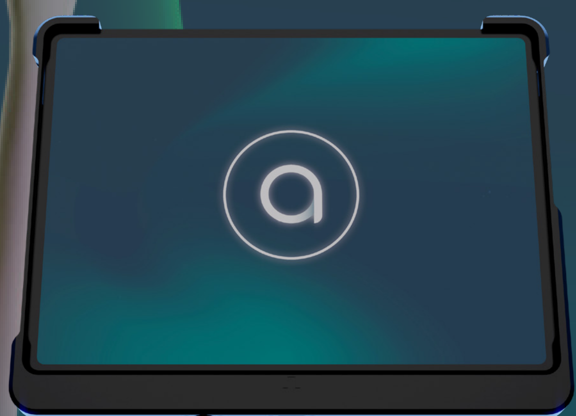
Compact station with multi-application capabilities

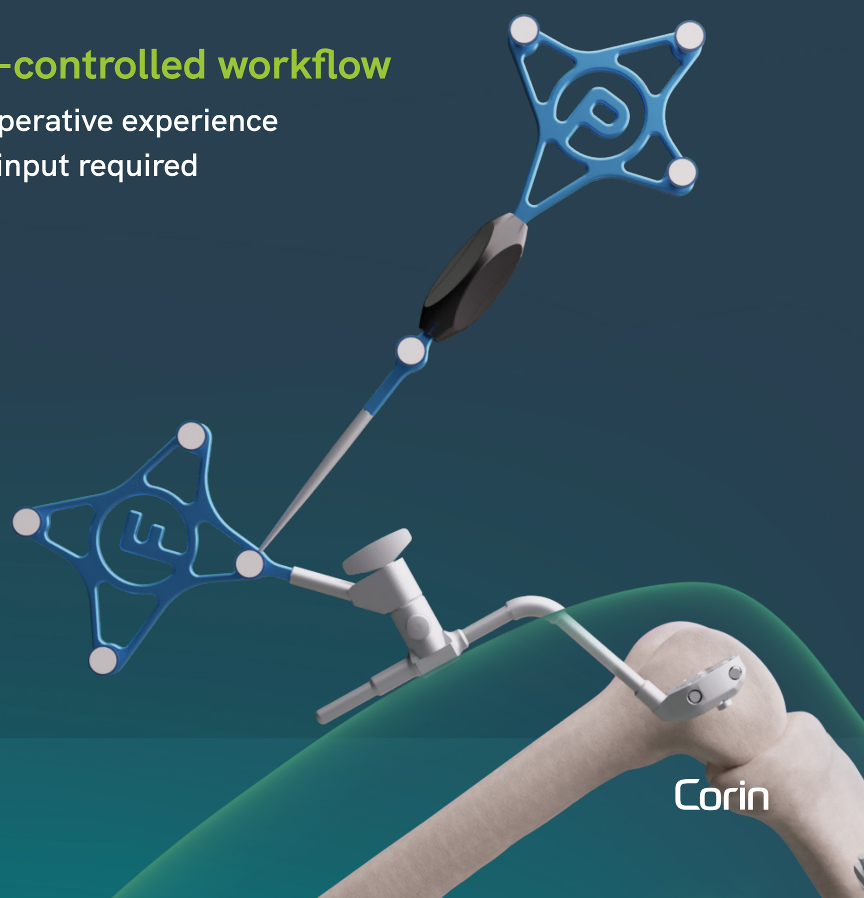
An accessible and comprehensive solution that fits into your facility

User Interface

Imageless TKA with a gesture-controlled workflow

An efficient and user-friendly operative experience
Minimal surgeon and rep input required





BalanceBot™

The world's first and ONLY robotic dynamic knee balancer

Dynamic pre-resection balance through full range of motion

Dual compartment sensing & tensing balance assessment

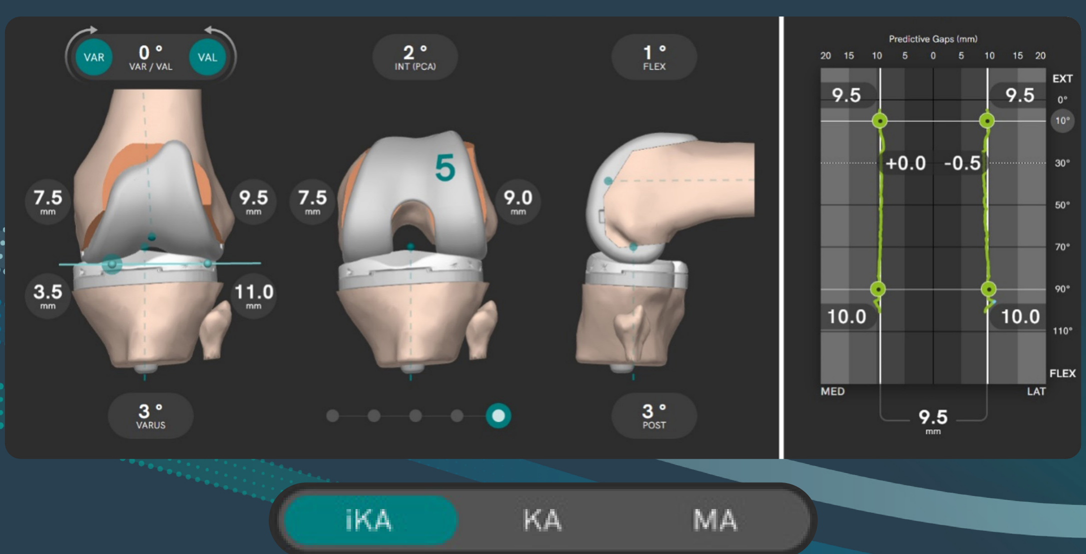
The most objective way to assess the knee, offering reproducible outcomes

Empowers you to plan each patient's knee alignment to attain personalised dynamic balance

Planning Algorithm

Allows any alignment preference with autonomous planning

Apollo will enhance your current alignment philosophy



Apollo Robot

A patient mounted haptic cutting system for femoral and tibial cuts

Reproducible accuracy with enhanced visibility

Efficient resection workflow

Ecosystem

Case data automatically collected with CorinConnect™

Benchmark results against the CorinRegistry™

Allows you to uncover meaningful insights through automated reporting

apolloknee™ Evidence

Balance is difficult to reproduce manually, & standardization is needed

Title	Arthroplasty Surgeons Differ in Their Intraoperative Soft Tissue Assessments: A Study in Human Cadavers to Quantify Surgical Decision-making in TKA
Authors	Shady SS, Sculco PK, Kahlenberg CA, Mayman DJ, Cross MB, Pearle AD, Wright TM, Westrich GH, Imhauser CW
Publication	Clin Orthop Relat Res. 2022 Aug 1;480(8):1604-1615

Methods

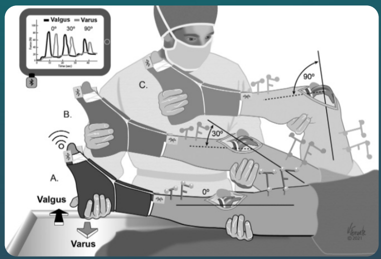
In seven cadavers, five knee surgeons with varying levels of experience and one chief orthopaedic resident independently evaluated soft tissue balance at different flexion angles and selected polyethylene inserts based on their assessments. Pliable force sensors measured the applied loads, a 3D motion capture system recorded knee kinematics, and dynamic analysis software estimated medial and lateral gaps. The study aimed to determine whether surgeons applied different moments, assessed different gaps, and whether applied moments were associated with insert thickness choice.

Results

The applied moments differed among surgeons, with the largest mean differences occurring in varus in midflexion (16.5 Nm; $p = 0.02$) and flexion (7.9 Nm; $p < 0.001$).

The measured gaps differed among surgeons at all flexion angles, with the largest mean difference occurring in flexion (1.1 ± 0.4 mm; $p < 0.001$).

In all knees except one, the choice of insert thickness varied by 1 mm among surgeons.



Conclusion

Subjective soft tissue assessment yielded 1 to 2 mm of variation in their choice of insert thickness. Therefore, developers of tools to standardize soft tissue assessment in TKA should consider controlling the force applied by the surgeon to better control for variations in insert selection.

Robotic ligament balance correlates with better outcomes, less pain

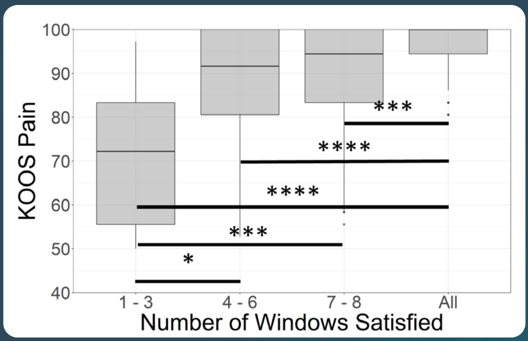
Title	Intra-Operative Laxity and Balance Impact 2-Year Pain Outcomes in TKA: A Prospective Cohort Study
Authors	Wakelin EA, Ponder CE, Randall AL, Koenig JA, Plaskos C, DeClaire JH, Lawrence JM, Keggi JM
Publication	Knee Surg Sports Traumatol Arthrosc. 2023 Oct 14

Methods

A prospective study investigating 310 robotically assisted TKAs was performed. Final intra-operative joint gap data were recorded using a digital tensioner and component alignment data were recorded by the robotics system. Patient demographics and KOOS/HSS satisfaction were recorded at 2 years post-op. A random search Simulated Annealing (SANN) optimization algorithm was used to determine global optimum laxity and balance windows at different flexion angles which maximized the 2-year KOOS pain scores. The windows were combined to determine the impact of achieving optimal laxity and balance throughout flexion.

Results

Nine laxity and balance windows were defined: Extension (Med lax: -2.0 to 2.5 mm, Lat lax: -0.5 to 2.5 mm, Balance: -3.0 to 0.0 mm), mid-flexion (Med lax: -1.0 to 2.5 mm, Lat lax: -0.5 to 3.0 mm, Balance: -2.0 to 2.0 mm), and flexion (Med lax: -2.0 to 3.5 mm, Lat lax: -2.0 to 1.5 mm, Balance: -3.0 to 3.0 mm). When all windows were satisfied, the greatest difference in KOOS pain score was observed (100.0 vs 94.4, $p < 0.0001$). The highest percentage of knees satisfying the Patient Acceptable Symptom State (PASS) for KOOS pain was also observed in knees which satisfied all windows compared to knees which did not (93% vs 71%, $p = 0.0009$).



Conclusion

Intra-operatively measured joint gaps are associated with all KOOS sub-score outcomes at 2 years after TKA.

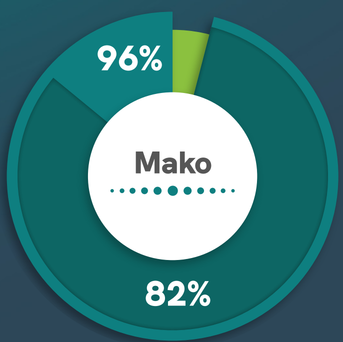
Robotic-Assisted Systems' Footprint Comparison

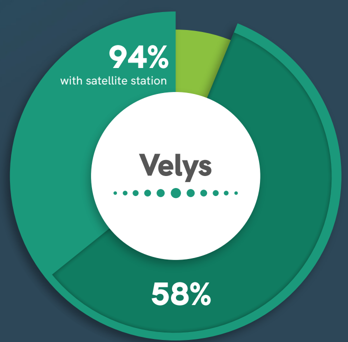
Background

In the operating room, efficiency is key. While an efficient operating room can generate significant revenue for a hospital, inefficiencies can quickly transform into one of the most expensive areas to manage[1]. In recent years, robotic-assisted systems have been gaining traction in the orthopedic space. Most systems require several pieces of equipment, each being extremely bulky[2], thus reducing the overall maneuvering space, specifically around the patient and sterile field.

The Apollo™ system was designed to address these challenges and mitigate the risk of OR inefficiencies.

Apollo's Reduction in Footprint



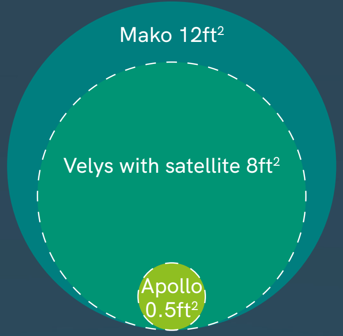


- Sterile Field Footprint Reduction
- Storage / Overall Footprint Reduction

- Sterile Field Footprint Reduction
- Storage / Overall Footprint Reduction

Visual Footprint Comparison

Sterile Field Footprint



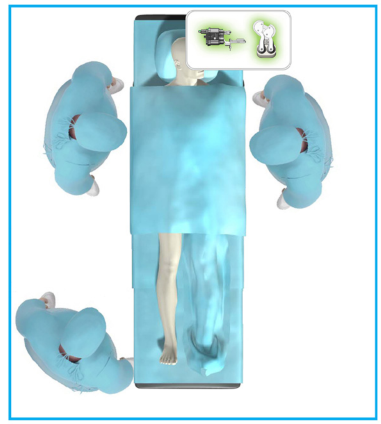
Storage / Overall OR Footprint

Conclusion

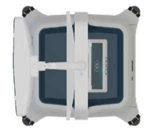
The Apollo system consists of compact, handheld robotic components and is substantially smaller than major competitive systems. The sterile field footprint of Apollo is 96% less than Mako, and 94% less than Velys. The total storage footprint of Apollo is 82% less than Mako, and 58% less than Velys. The compactness of the Apollo system is expected to reduce OR inefficiencies. The portability of the Apollo system allows easy transfer from OR to OR. This can help maximize utilization and efficiency.

Visual Comparison

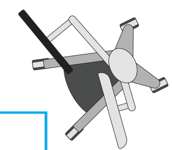
APOLLO

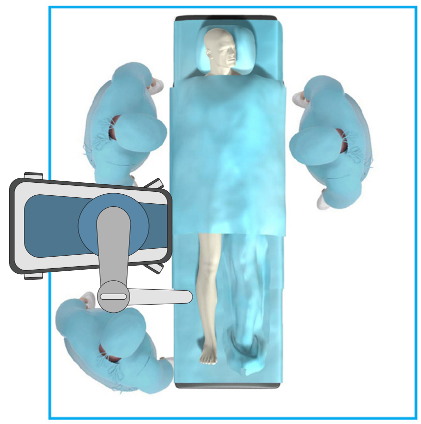


- 1 non-sterile station
- 2 sterile, patient mounted robots

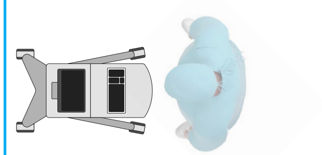


MAKO



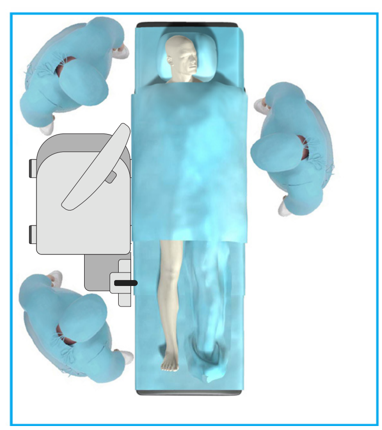


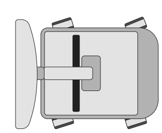
- 2 non-sterile stations
- 1 large sterile robotic assisted arm



- In addition to Sales Rep, a MAKO specialist required to operate system

VELYS





- 1 non-sterile station
- 1 optional sterile satellite station
- 1 sterile bed mounted robotic assisted arm

1. *Visual Footprint Comparison Apollo's Reduction in Footprint Sterile Field Footprint Storage / Overall OR Footprint [1] Foust, C. (2020, November 30). OR Efficiency | SpecialtyCare | Operating Room Services. SpecialtyCare. ~ https://specialtycareus.com/why-specialtycare/efficiency/*
2. *Satava RM, Bowersox JC, Mack M, Krummel TM. Robotic surgery: State of the art and future trends. Contemp Surg. 2001;57:489-99*
3. *RIO Technical User Guide (February 24, 2021). Internal Report 103732371*
4. *The VELYSTM Robotic-Assisted Solution versus Mako®. (2021, February). https://www.jnjmedicaldevices.com/sites/default/files/user_uploaded_assets/pdf_assets/2021-03/ VELYS%20vs%20Mako%20Footprint%20Evidence.pdf*

apollo™

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apolloknee™ Clinical Success

BALANCE & ALIGNMENT

1st to market and only Robotic Knee Balancer

>90% Knees balanced within **2mm** through full ROM[1]

Personalised Dynamic Knee Balance

ACCURACY

Final implant placement within **1°** of plan[2]

Cut accuracy within **0.6 mm**[2]

ROI

$2,000 Cost savings in 90-day episode of care[3]

87% Reduction in manipulations under anesthesia[4]

50% Reduction in soft tissue release rate[5]

1. Shalhoub S, et al. 2019. Imageless, robotic-assisted total knee arthroplasty combined with a robotic tensioning system can help predict and achieve accurate postoperative ligament balance. Arthroplasty Today 5 (2019) 334-340 2. Koulalis D, et al. 2011. Sequential versus automated cutting guides in computer-assisted total knee arthroplasty. The Knee 18 (2011) 436-442 3. Vermue H, Stroobant L, Thuysbaert G, de Taeye T, Arnout N, Victor J. The learning curve of imageless robot-assisted total knee arthroplasty with standardised laxity testing requires the completion of nine cases, but does not reach time neutrality compared to conventional surgery. Int Orthop. 2023 Feb;47(2):503-509. doi: 10.1007/s00264-022-05630-8. Epub 2022 Nov 17. PMID: 36385186; PMCID: PMC9668703. 4. Plaskos C, Lawrence JM OMNI BalanceBot - DOCSF CASE STUDY 2019 - Digital Orthopaedics Conference San Francisco (DOCSF) 2019. 5. Plaskos C, Wakelin E, Shalhoub S, Lawrence J, Keggi J, Koenig J, Ponder C, Randall AL, DeClaire JH (2020) Frequency of Soft-Tissue Releases and their Effect on Patient Reported Outcomes on Robotic-Assisted TKA. EPiC Series in Health Sciences 4:240-245

SURVIVORSHIP

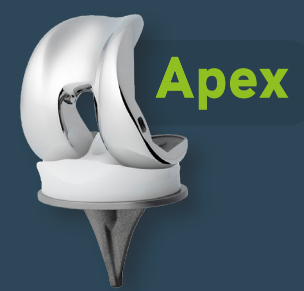
99% Survivorship at 6 years

with **Apex** and OMNIBotics®[6,7]

12+ YEARS

OF ROBOTIC CLINICAL HISTORY[8]

Compatible with 2 clinically proven TKA systems



SATISFACTION

>97%

Patient satisfaction @ 1YR[9]

EASE OF USE

CorinConnect™

- Apollo 0.5ft²
- Velys with satellite 8ft²
- Mako 12ft²

Remote Patient Management App

Customized surgical tools

Intuitive surgeon dashboard

Global patient registry

1st **Connected Robotic System for TKA**

6. Chen, et al. 2019 Mid-term patient reported outcomes and survivorship following robotic assisted total knee replacement: a cohort study. CAOS 2019 7. Lonner, J.H., Total Knee Arthroplasty Technique: OMNIBotics, in Robotics in Knee and Hip Arthroplasty: Current Concepts, Techniques and Emerging Uses. 2019, Springer: Philadelphia, PA. 8. Data on file at Corin Group ltd 9. Keggi JM, Wakelin EA, Koenig JA, Lawrence JM, Randall AL, Ponder CE, DeClaire JH, Shalhoub S, Lyman S, Plaskos C (2021) Impact of intra-operative predictive ligament balance on post-operative balance and patient outcome in TKA: a prospective multicenter study. Archives of Orthopaedic and Trauma Surgery. doi:10.1007/s00402-021-04043-3

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Connected Orthopaedic Insight

OPT-REC-MK-87 Rev1