



Knieprothesen op maat, de toekomst?

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Knee Unit

Overzicht

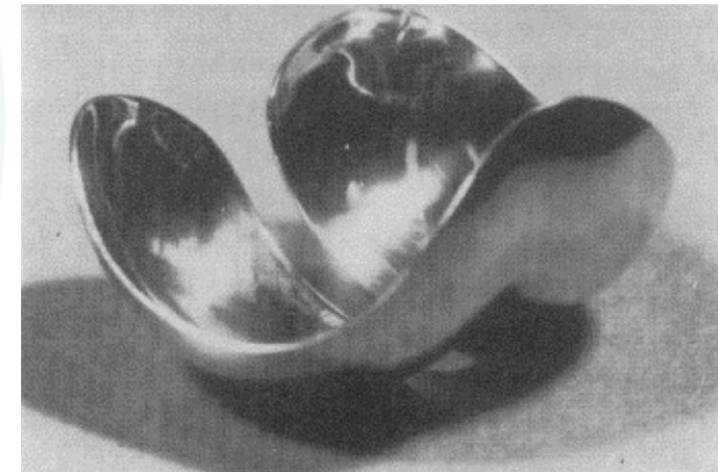
- Inleiding – Geschiedenis
- Waarom op maat?
- Indicaties - Procedure
- Voor- en nadelen
- Resultaten

Inleiding - Geschiedenis

- 1^{ste} Metalen implantaten
 - Resurfacing van het gewricht
 - Campbell en Boyd
 - Smith-Peterson
 - Vitallium
 - Chroom-Kobalt-Molybdeem



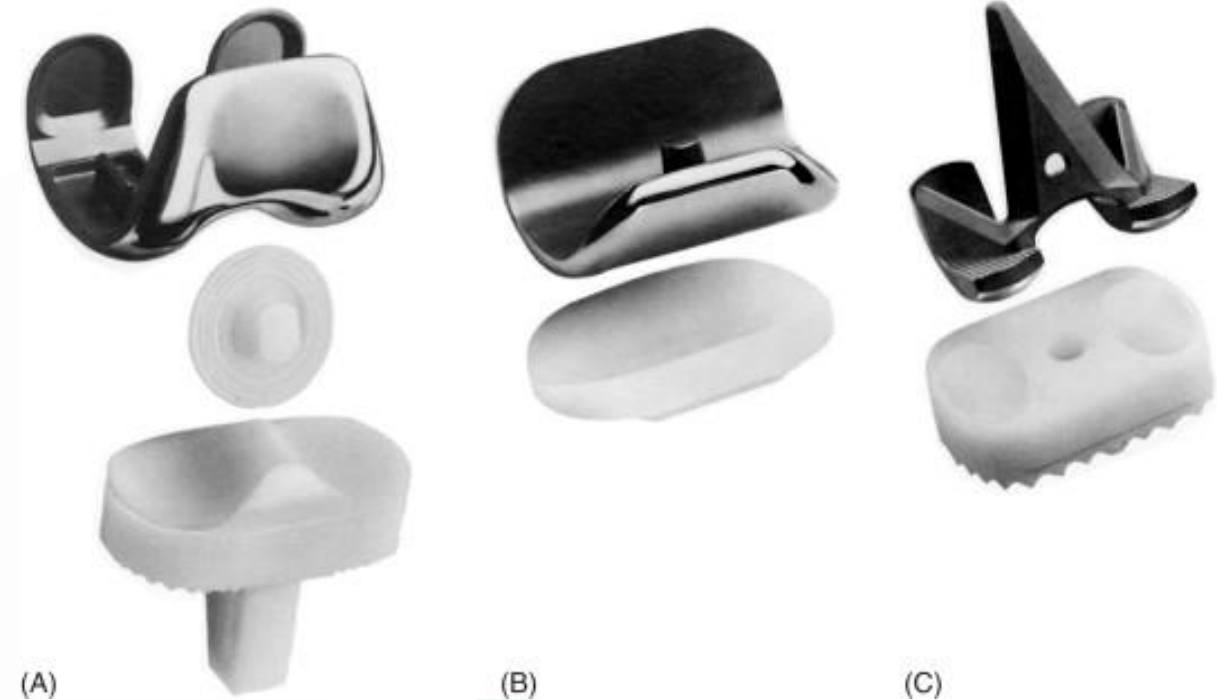
Campbell - Boyd



Smith-Peterson

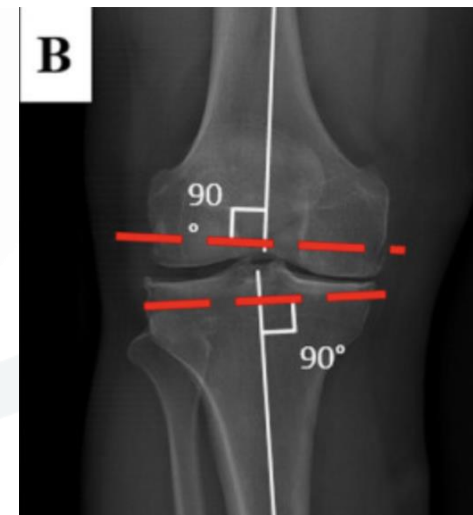
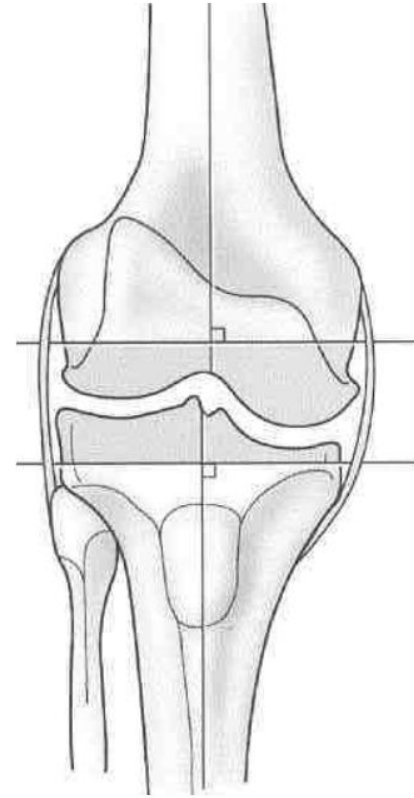
Inleiding - Geschiedenis

- 'Moderne' TKPs
 - Sinds begin jaren 70
 - Gestandaardiseerde procedures
 - Implantaten
 - Niet-anatomisch
 - Femur
 - Chroom-Kobalt-Molybdeem
 - Tibia
 - All Polyethyleen
 - Metal-backed
 - Insert
 - Polyethyleen
 - Instrumenten
 - Chirurgische techniek



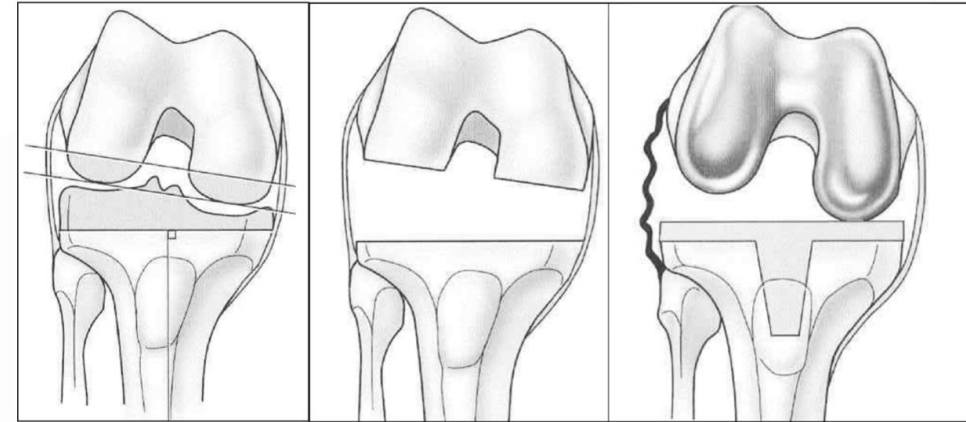
Inleiding - Geschiedenis

- 'Moderne' TKPs
 - Sinds begin jaren 70
 - Gestandaardiseerde procedures
 - Implantaten
 - Instrumenten
 - Chirurgische techniek
 - Alignment
 - Neutraal
 - Gevolgen
 - Orthogonale coupes bot
 - Verandering van gewrichtslijnoriëntatie
 - Component positie

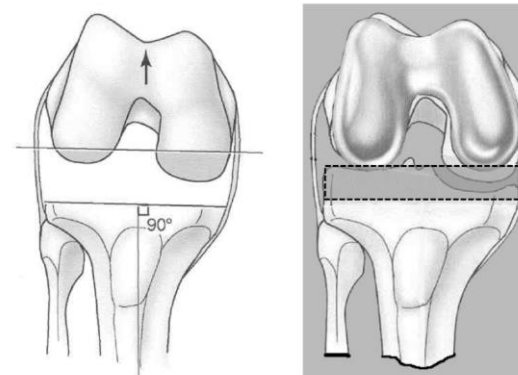


Inleiding - Geschiedenis

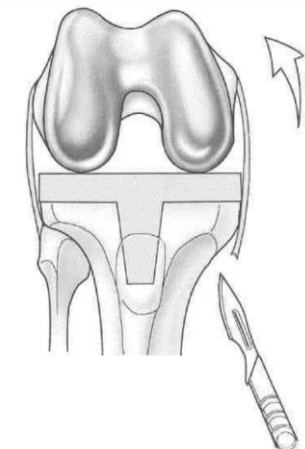
- ‘Moderne’ TKPs
 - Sinds begin jaren 70
 - Gestandaardiseerde procedures
 - Implantaten
 - Instrumenten
 - Chirurgische techniek
 - Alignment
 - Component positie
 - Niet-anatomisch
 - Gevolg
 - Gap balancing
 - Soft tissue release
 - Patellofemorale maltracking



Adapt the position of the non-anatomic prosthesis in the envelope



Adapt the soft-tissue to the non-anatomic prosthesis



Waarom op maat?



■ MANAGEMENT FACTORIALS IN TOTAL KNEE ARTHROPLASTY

Patient dissatisfaction following total knee replacement

A GROWING CONCERN?

Clin Orthop Relat Res (2010) 468:57–63
DOI 10.1007/s11999-009-1119-9

SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

Patient Satisfaction after Total Knee Arthroplasty

Who is Satisfied and Who is Not?

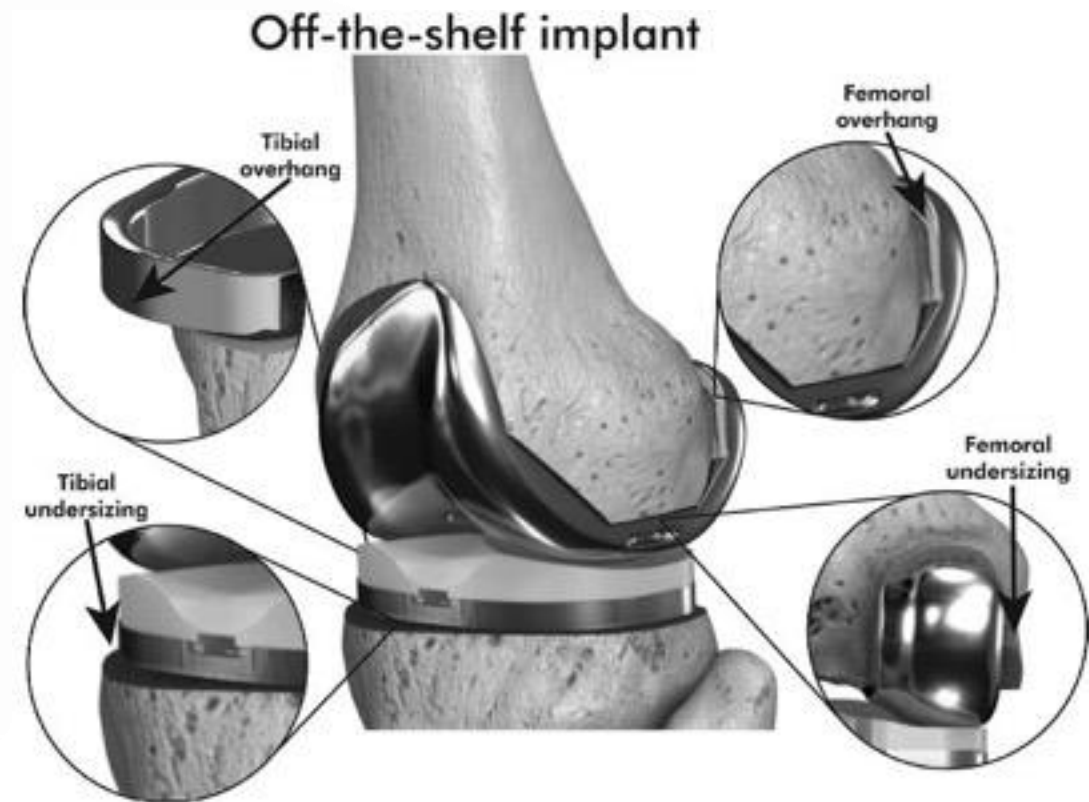


The role of pain and function in determining patient satisfaction after total knee replacement

DATA FROM THE NATIONAL JOINT REGISTRY FOR ENGLAND AND WALES

Waarom op maat?

- Blijvende percentage van 'ongelukkige' patiënten
 - Implantaten
 - Niet-anatomisch
 - 'over' of 'under'stuffing
 - Patellofemorale maltracking
 - Geen anatomische reproductie
 - Chirurgische techniek
 - Alignment
 - Correctie van de lange been as
 - Component positie
 - Niet-anatomische positie van prothese



Waarom op maat?

- Blijvende percentage van 'ongelukkige' patiënten
 - Implantaten
 - Niet-anatomisch
 - 'over' of 'under'stuffing
 - Patellofemorale maltracking
 - Geen anatomische reproductie
 - Chirurgische techniek
 - Alignement
 - Correctie van de lange been as
 - Component positie
 - Niet-anatomische positie van prothese

Instabiliteit
Stijfheid
Pijn

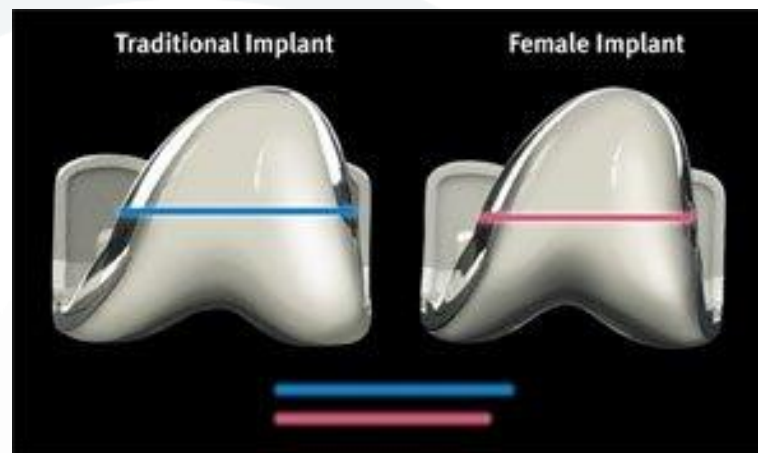
Verwachtingen?

Waarom op maat?

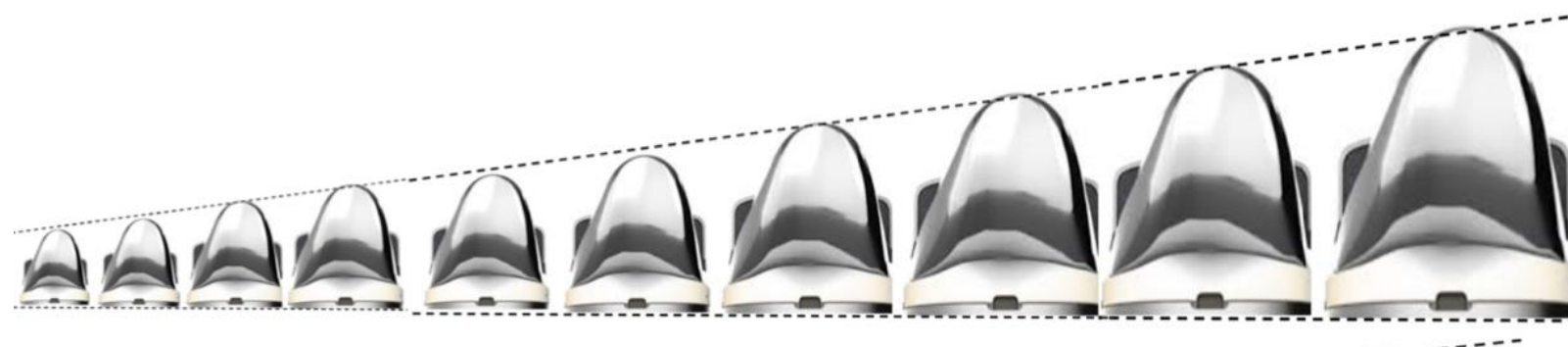
- Implantaten

- Evolutie

- 'Gender' implantaten



- Groter aantal implantaten





Waarom op maat?

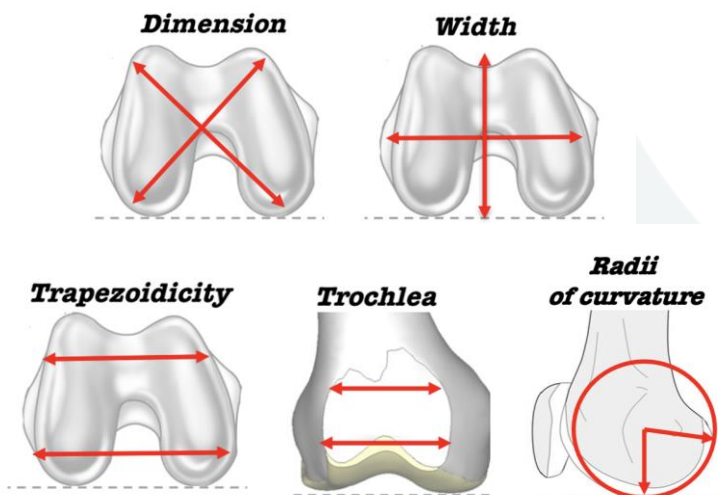
• Implantaten

• Evolutie

- ‘Gender’ implantaten
- Groter aantal implantaten

• Evidence

- Femur



Sexual dimorphism and racial diversity render bone–implant mismatch inevitable after off-the-shelf total knee arthroplasty: a systematic review and meta-analysis

Lucas Beckers¹ · Jacobus H. Müller² · Jeremy Daxhelet¹ · Mo Saffarini² · Tarik Ait-Si-Selmi¹ · Michel P. Bonnin¹

Received: 2 December 2020 / Accepted: 11 January 2021

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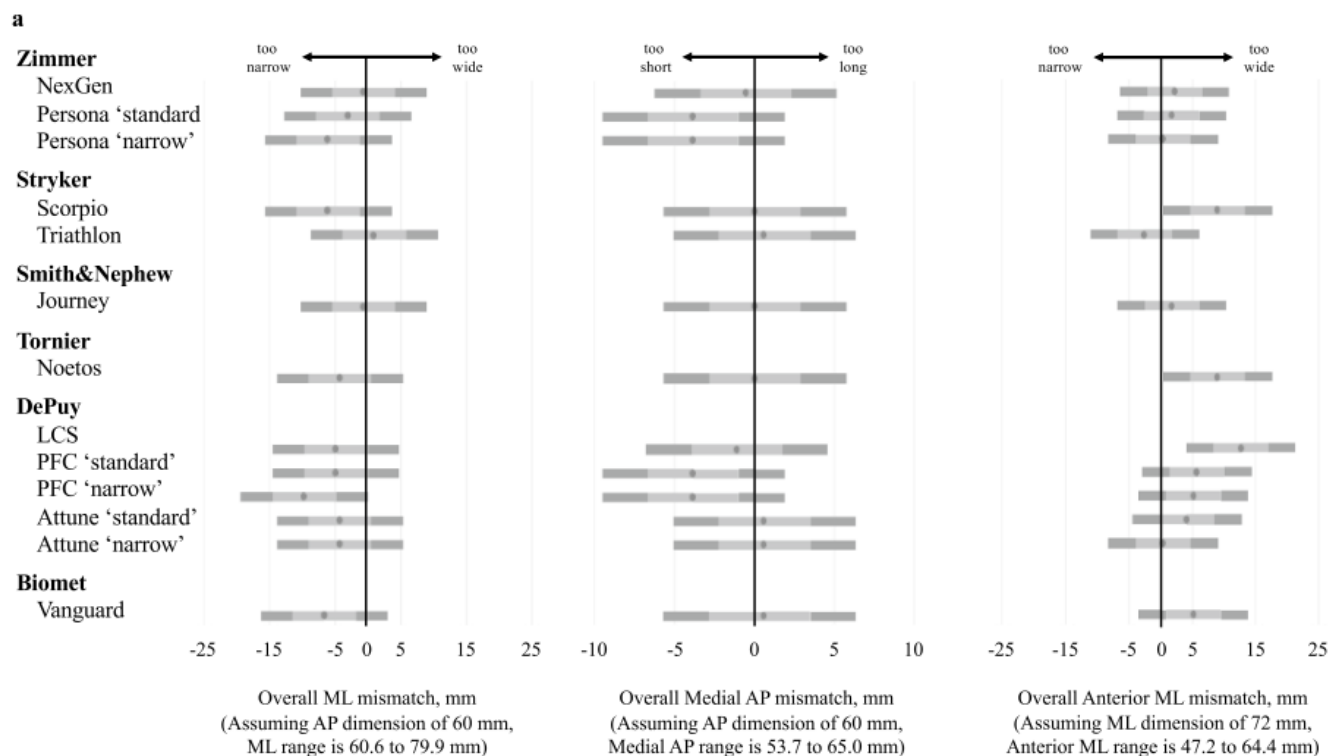
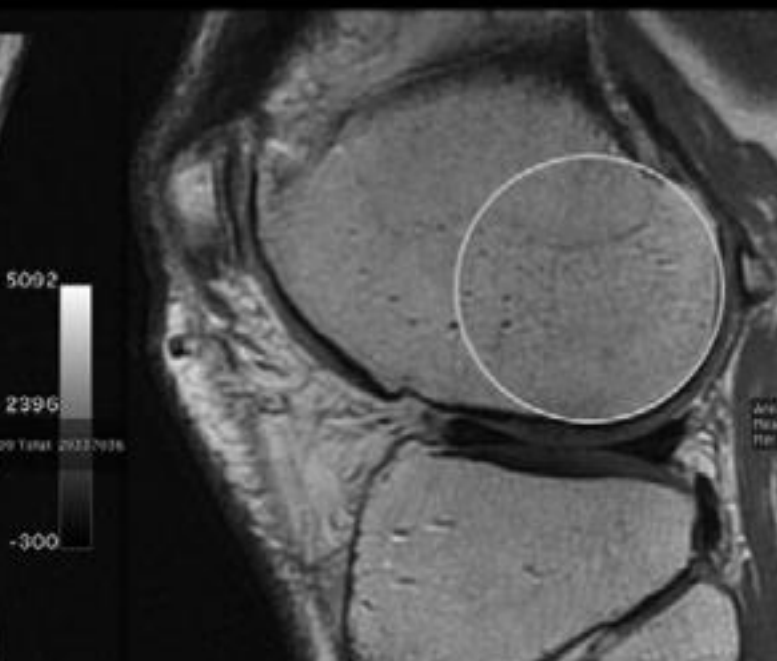
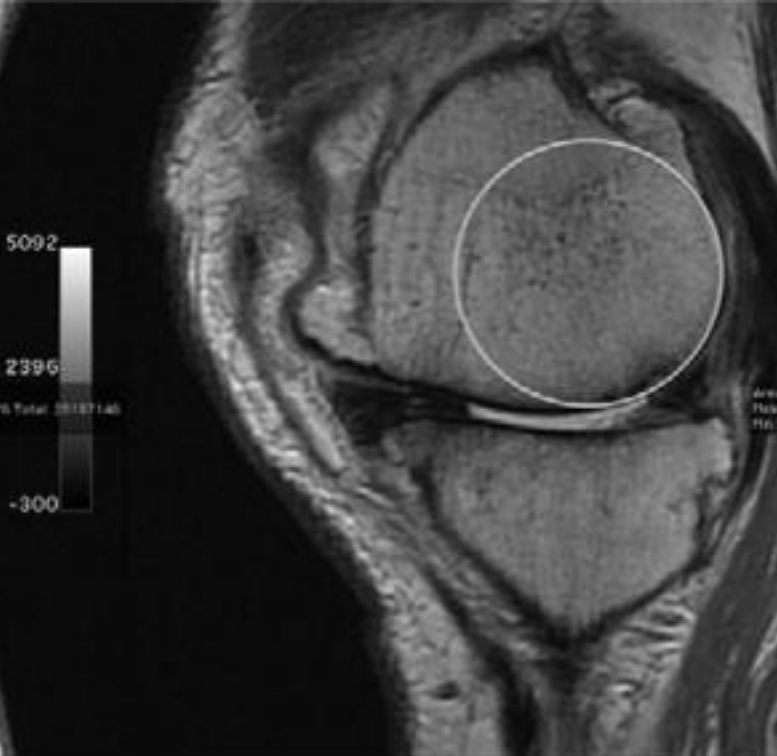


Fig. 7 Illustration of bone–implant fit across the overall mediolateral, medial anteroposterior, and anterior mediolateral dimensions in **a** Caucasian knees and **b** East Asian knees (light grey represents 1 standard deviation, and dark grey 2 standard deviations)





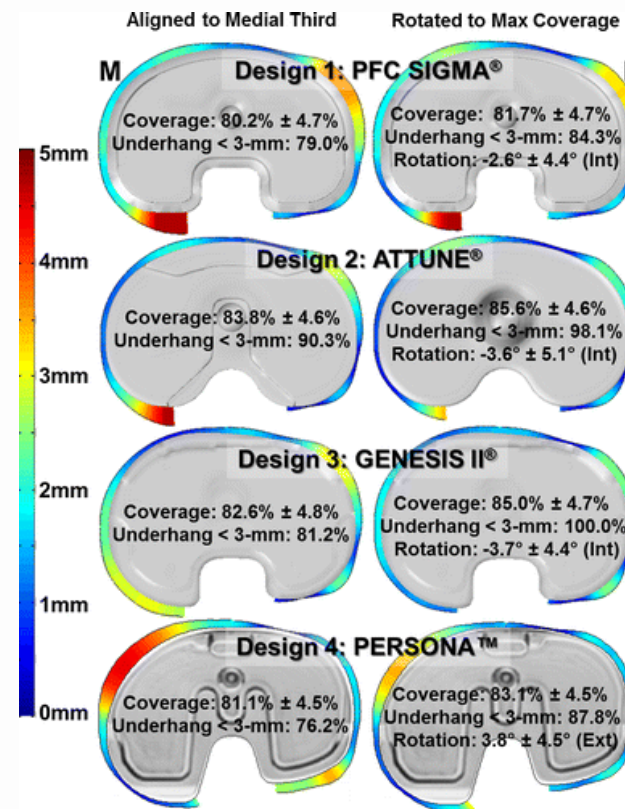
Waarom op maat?

- Implantaten
 - Evolutie
 - ‘Gender’ implantaten
 - Groter aantal implantaten
- Evidence
 - Tibia

Considerable inter-individual variability of tibial geometric ratios renders bone–implant mismatch unavoidable using off-the-shelf total knee arthroplasty: a systematic review and meta-analysis

Lucas Beckers¹ · Jacobus H. Müller² · Jeremy Daxhelet¹ · Salvatore Ratano¹ · Mo Saffarini² · Tarik Ait-Si-Selmi¹ · Michel P. Bonnin¹

Received: 19 March 2021 / Accepted: 21 May 2021
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Waarom op maat?

- Aligment/Component positie

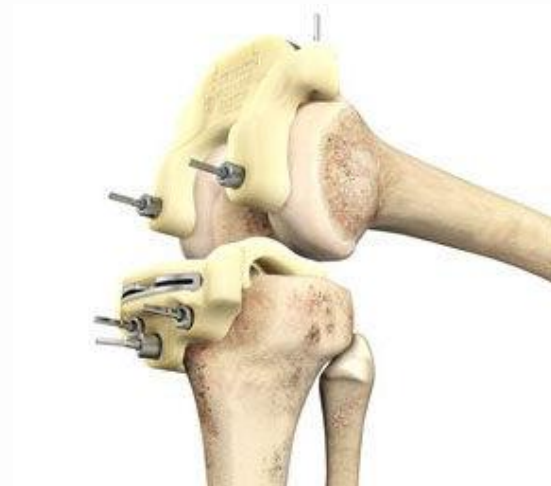
- Evolutie

- Bevorderen van positie van de implantaten

- Patient Specific Guides
 - Robotica/Navigatie

- Impact

- Joint line obliquity
 - Aligment
 - Ligamentaire stabiliteit



Waarom op maat?

- Aligment/Component positie

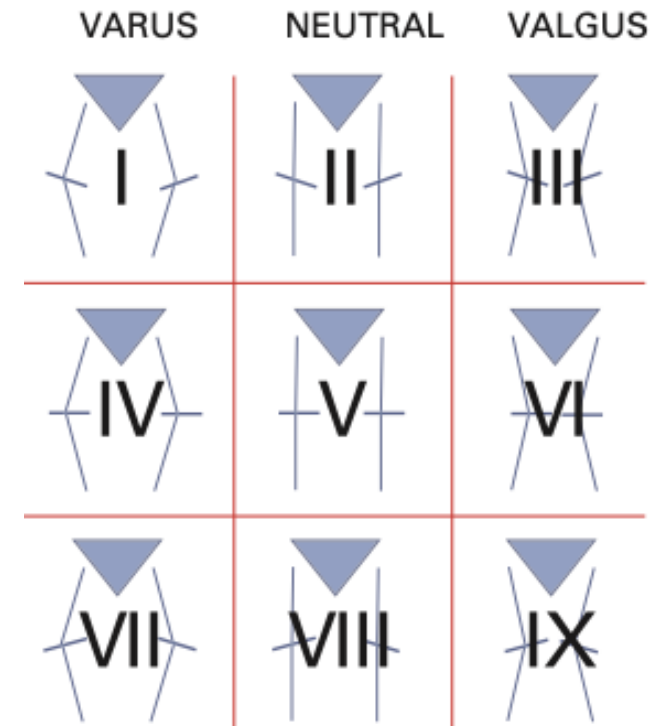
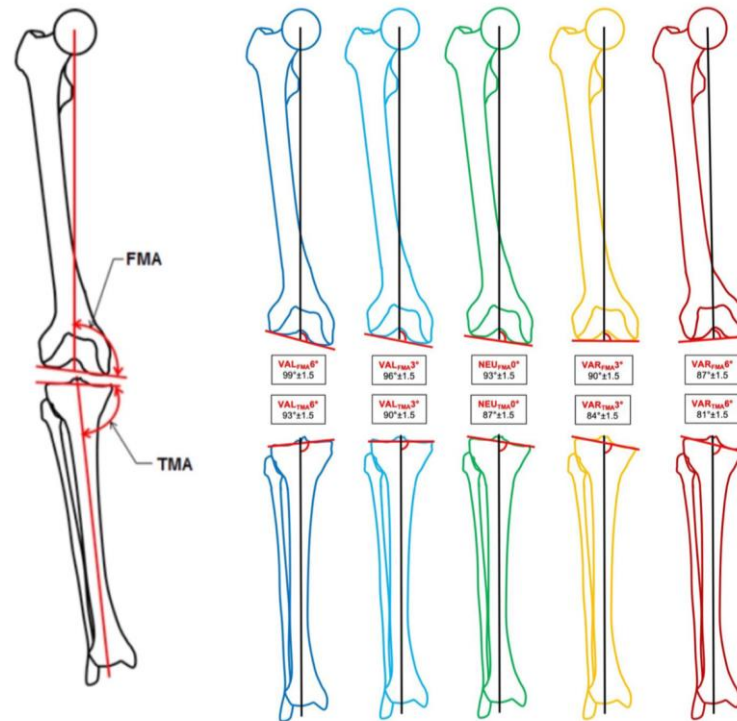
- Evolutie

- Bevorderen van positie van de implantaten

- Evidence

- Aligment/Phenotypes

- Joint Line Obliquity



Indicaties - Procedure

- Gepersonaliseerd/Geïndividualiseerd
 - Vorm van het gewricht
 - Aligement
 - ROM
- Facilitatie in personalisatie
 - 3D beeldvorming
 - Pre-op planning en software
 - Robotica/Navigatie/Patient-specific guides

Custom made TKP

Off-the-Shelf TKP

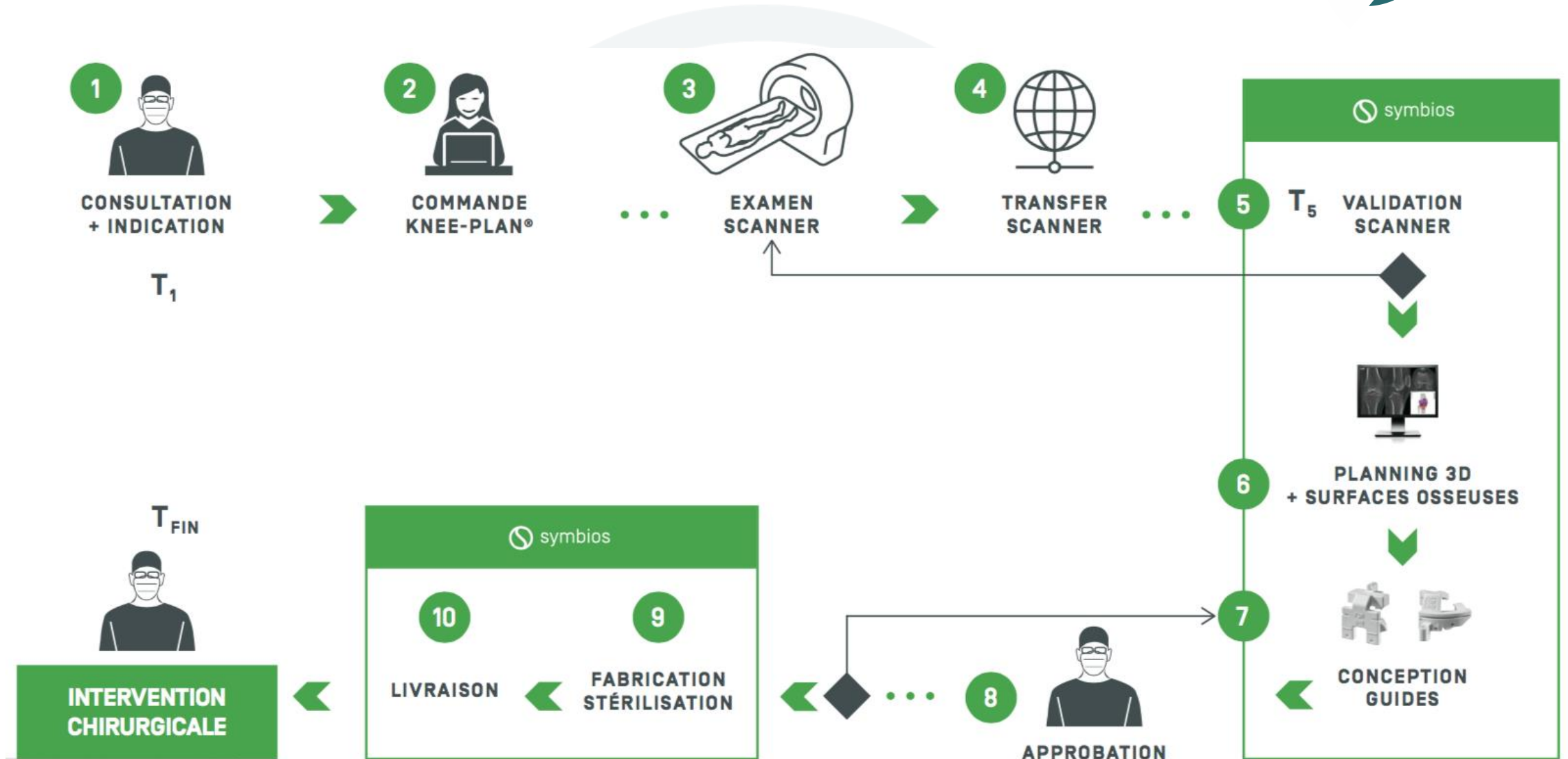
Indicaties

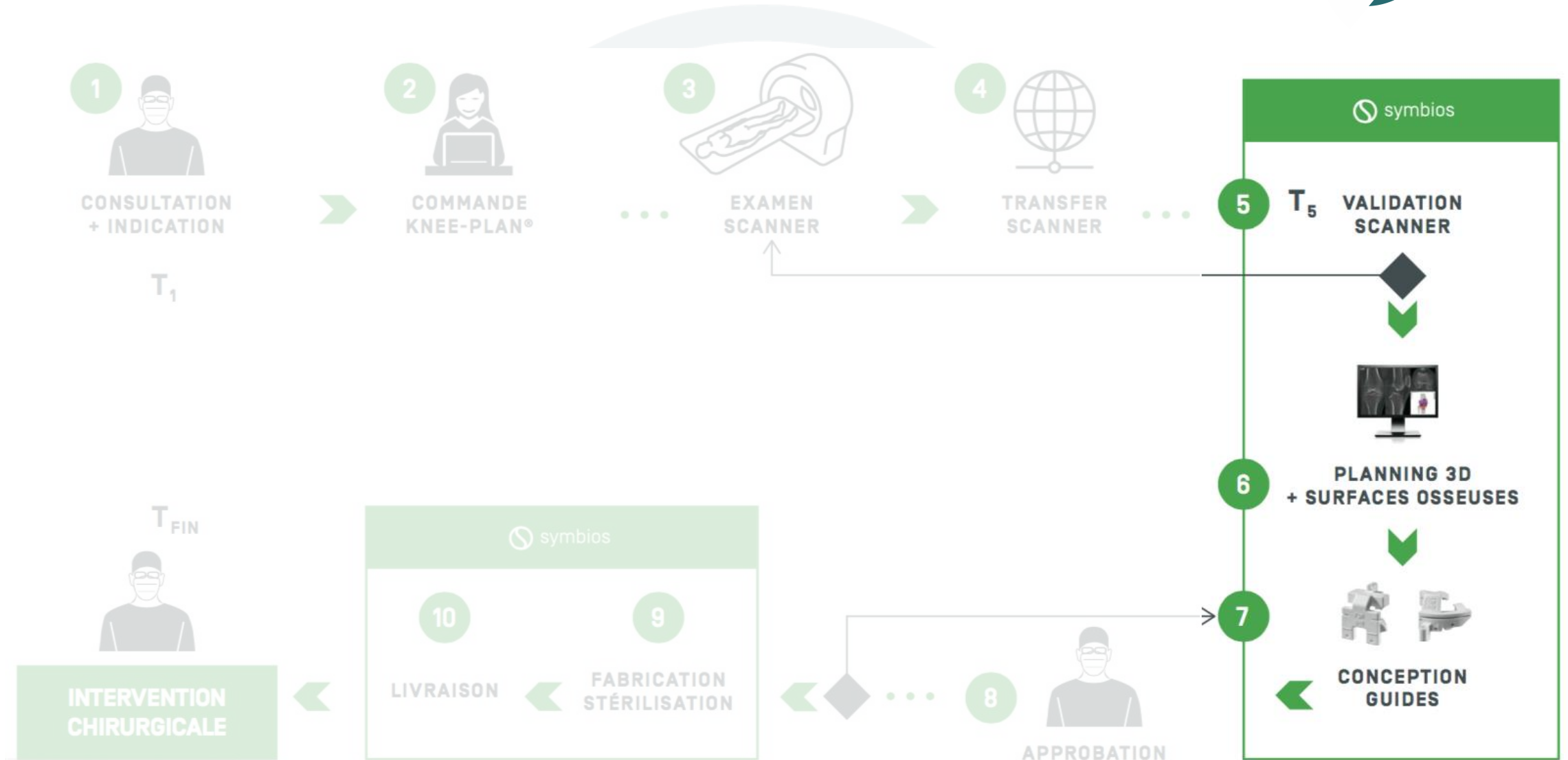
• Indicatie

- 'Standaard' gonartrose
 - Kleine/grote maten
 - Osteosynthesemateriaal
- Osteonecrose
- RA

• Contra-indicaties

- Valgus $>10^\circ$
- Varus $> 10^\circ$
- Fixed Flexion deformity $> 5^\circ$
- Recurvatum $> 5^\circ$
- Post HTO, post-trauma
- Ligamentaire insufficiëntie
- Ernstig bot verlies/erosies
- Moeilijke exposure
 - Patella baja
 - BMI



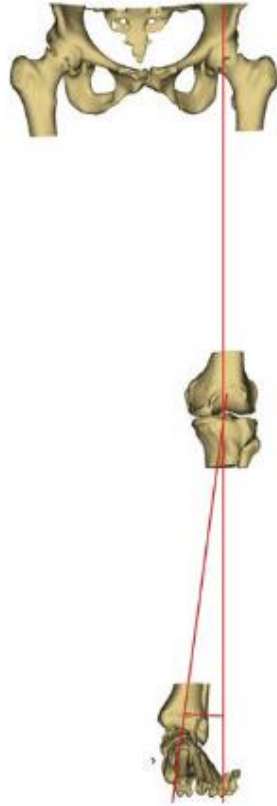


Preop XR



HKA = 168°
FMA = 91°
TMA = 82°

Preop CT



HKA = 172°
FMA = 93°
TMA = 83°

Planning



HKA = 178°
FMA = 93°
TMA = 85°

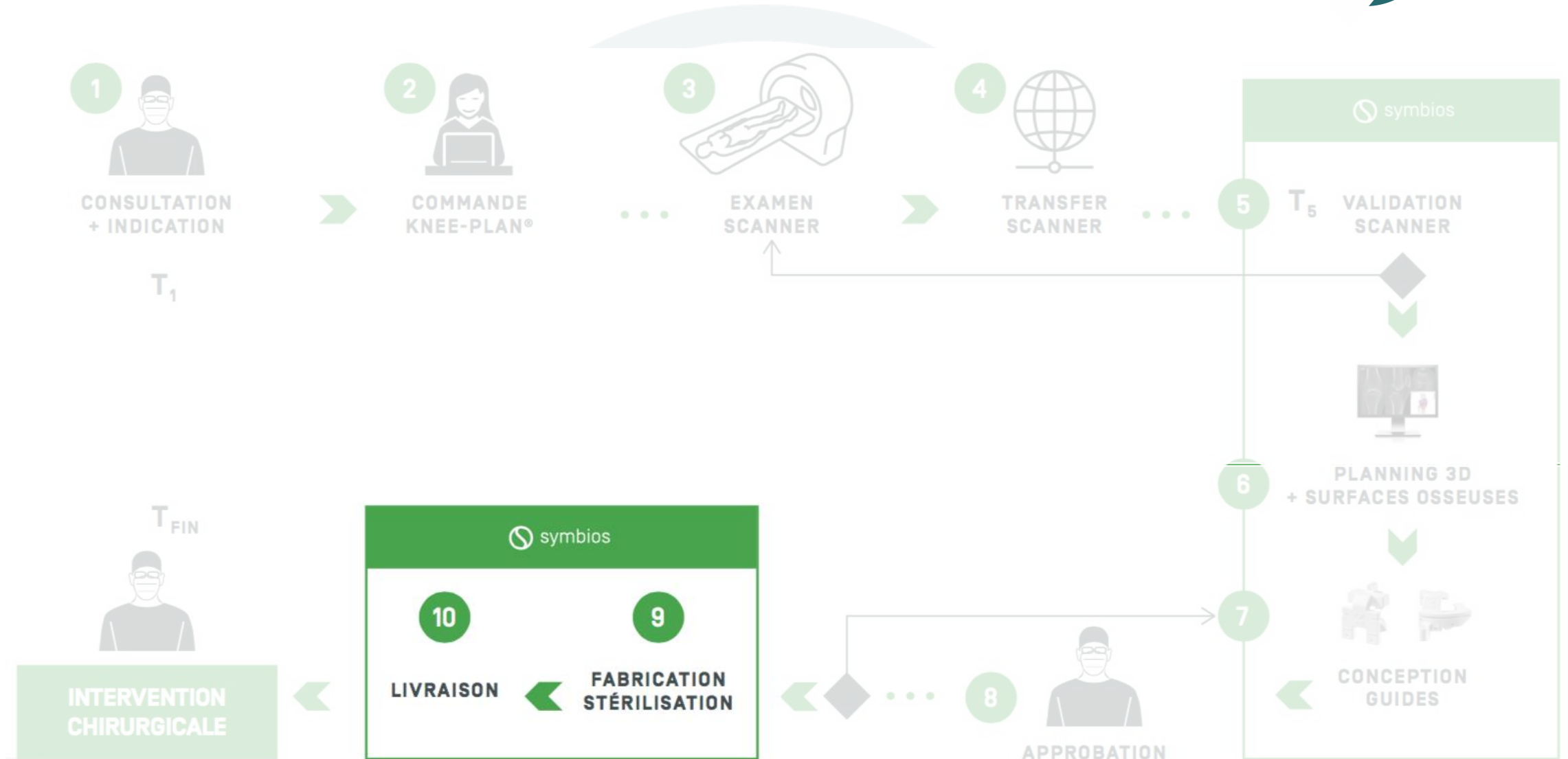
Postop XR



HKA = 177°
FMA = 92°
TMA = 85°

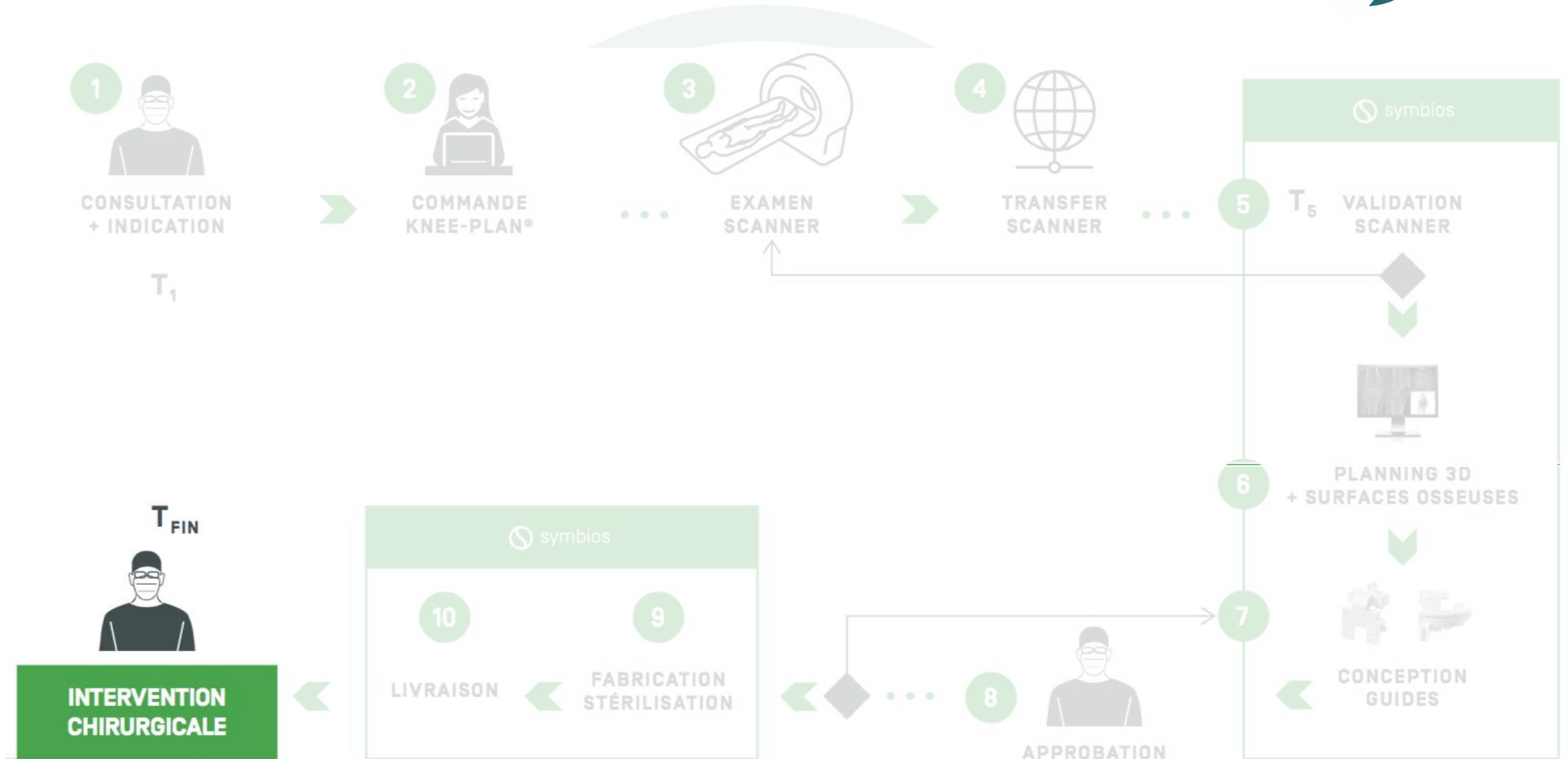
Planning Matrix

		FEMUR																							
		VARUS				NEUTRAL				VALGUS															
		80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100			
TIBIA	VARUS	Preop XR												Preop CT-scan											
	80	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189		
	81	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190		
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	88	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197		
	89	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198		
NEUTRAL	80	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198			
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VALGUS	90	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208			
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100	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219			



- Prothese
 - Femur
 - Tibia
 - Insert
 - 0 mm
 - + 2mm
- PSI guides





disclaimer

- Volgende intra-operatieve beelden werden verwijderd.

Voordelen

- **Implantaat**
 - Optimale 'pas' vorm
 - Herstel van de curvatuur
 - behoud/herstel van de ligamentaire spanning
 - Herstel van patellofemorale anatomie
- **Herstel van native alignment**
- **Chirurgie**
 - Minder sets
 - Geen sterilisatie kost
 - Kortere set-up tijd

Nadelen

- **Implantaat**
 - Unieke anatomie/componenten
 - Beperkte lange termijnsresultaten
- **Chirurgie**
 - Zeer beperkte aanpassingen intraoperatief mogelijk
- **CT scan noodzakelijk**
- **Strikte indicaties voor toepassing**
 - 'Straight forward cases'
- **6– 8 weken levertermijn**

Resultaten

- Geen Randomized Controle Trails beschikbaar
- Retrospective cohort studie met Symbios implantaat

Knee Surgery, Sports Traumatology, Arthroscopy
<https://doi.org/10.1007/s00167-023-07318-x>

KNEE



Custom total knee arthroplasty combined with personalised alignment grants 94% patient satisfaction at minimum follow-up of 2 years

Lampros Gousopoulos¹ · Andreas Dobbelaere¹ · Salvatore Ratano¹ · Louka Bondoux¹ · ReSurg² · Carsten O. Tibesku³ · Tarik Aït-Si-Selmi¹ · Michel P. Bonnin¹

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KNEE



Custom TKA combined with personalised coronal alignment yield improvements that exceed KSS substantial clinical benefits

Salvatore Ratano¹ · Jacobus H. Müller²  · Jeremy Daxhelet¹ · Lucas Beckers¹ · Louka Bondoux¹ · Carsten O. Tibesku³ · Tarik Aït-Si-Selmi¹ · Michel P. Bonnin¹

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Conclusie

- Extra tool in gepersonaliseerde behandeling met TKP
- Pro
 - Anatomische reconstructie gewricht
 - Herstel alignement
- Contra
 - Beperkte aanpassingen intra-articulair
 - Beperkte FU/lange termijnsresultaten
- Geselecteerde casussen



Dank voor uw aandacht!