

The image features three golden trophies of varying sizes, arranged in a row from left to right, slightly receding into the background. They are set on a dark, reflective surface. The background is a warm, golden glow with numerous small, colorful confetti pieces (red, blue, yellow, and white) floating in the air, creating a celebratory atmosphere. The lighting is soft and focused on the trophies, highlighting their metallic sheen and intricate details.

*Have we found the ideal
alignment for Total Knee
Arthroplasty?*

THE
PERFECT
STORM

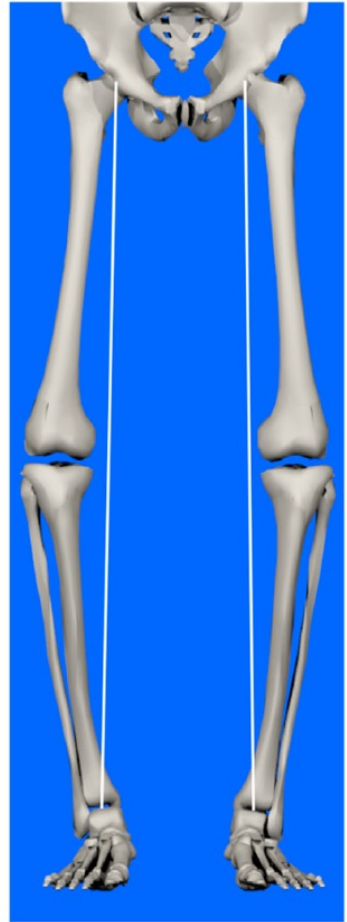
*different strategies
in TKA alignment*



what is the correct alignment?

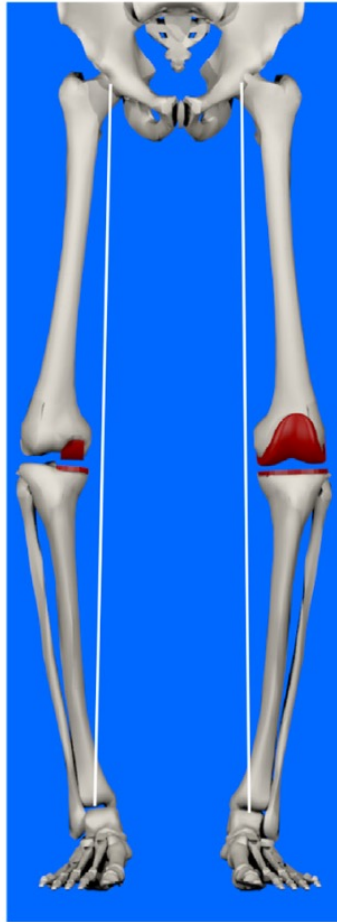


Constitutional alignment



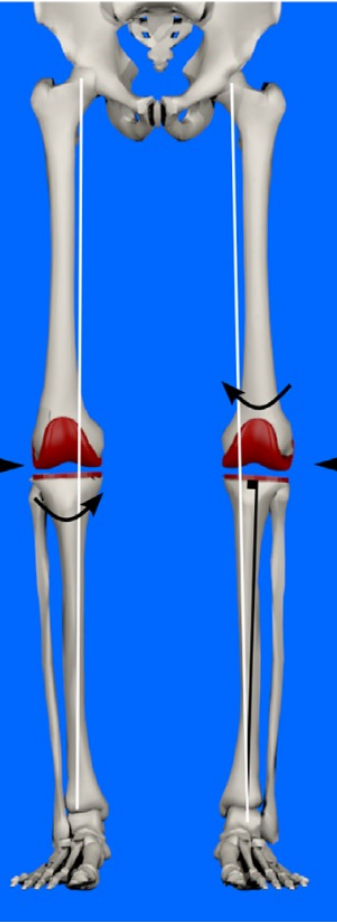
Patient-specific Alignment techniques

UKA KA



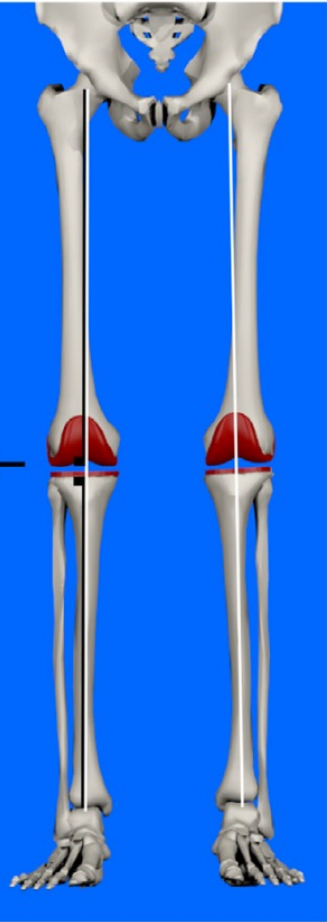
Hybrid Alignment techniques

rKA aMA



Systematic Alignment techniques

MA AA

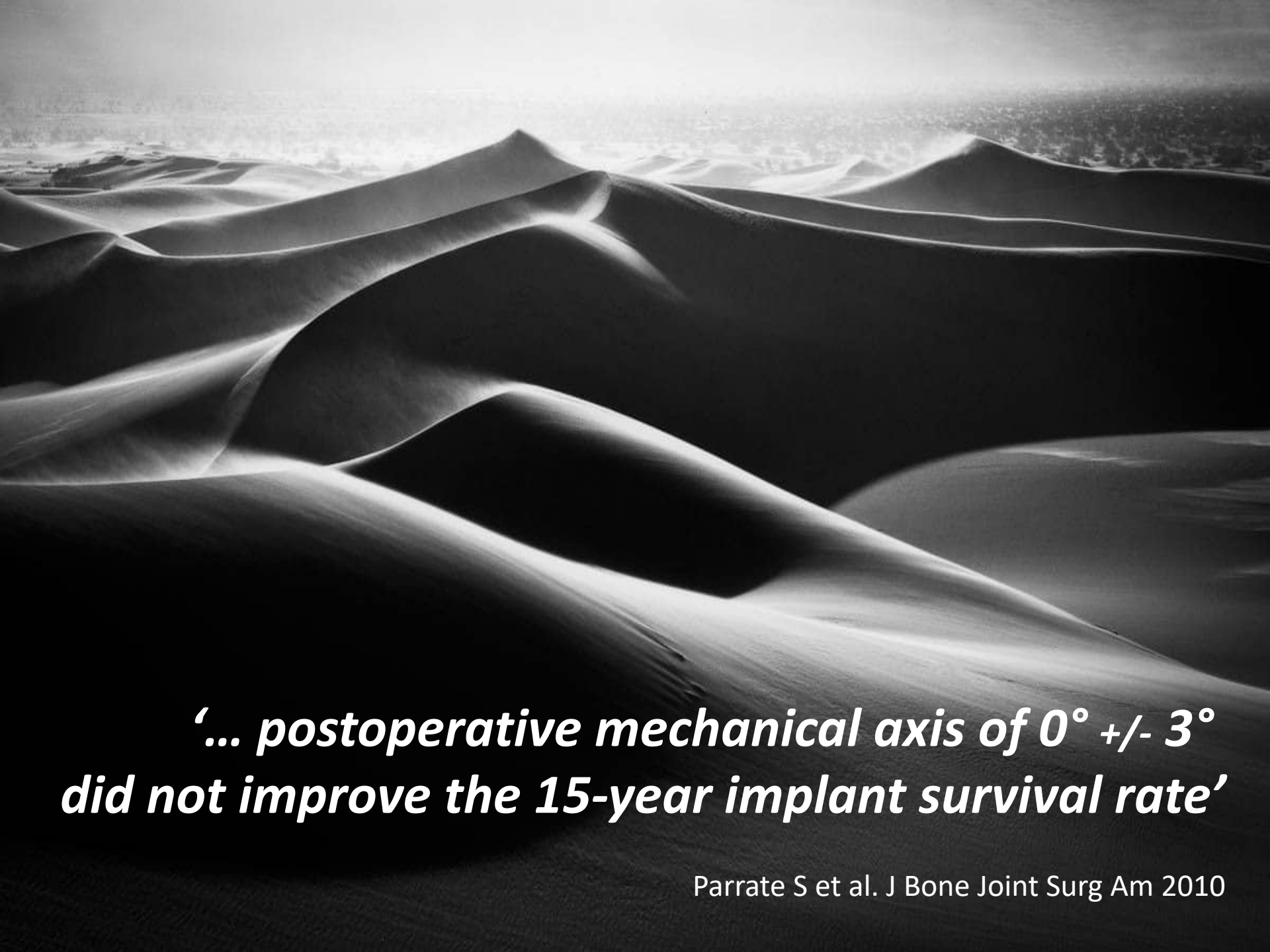






*Lotke and Ecker 1977
Denham and Bishop 1978
Jeffrey et al 1991*

...to keep neutral alignment



'... postoperative mechanical axis of $0^{\circ} \pm 3^{\circ}$ did not improve the 15-year implant survival rate'

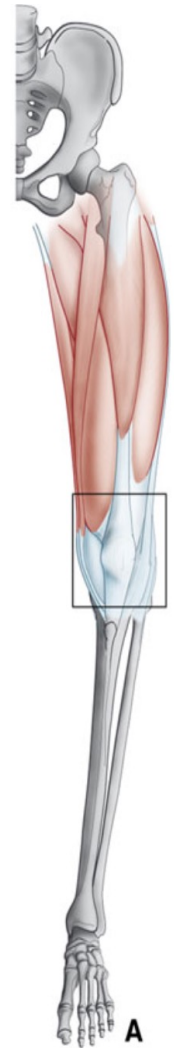
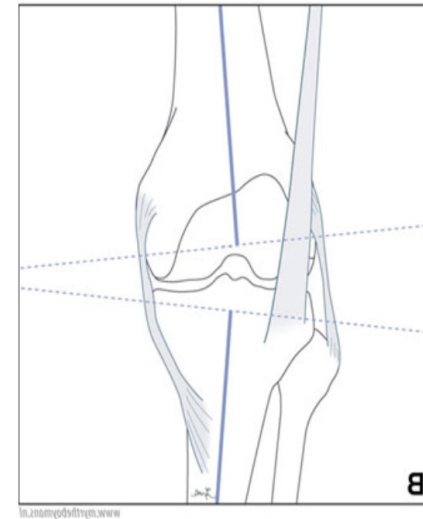
Parrate S et al. J Bone Joint Surg Am 2010

The Chitranjan Ranawat Award

Is Neutral Mechanical Alignment Normal for All Patients?

The Concept of Constitutional Varus

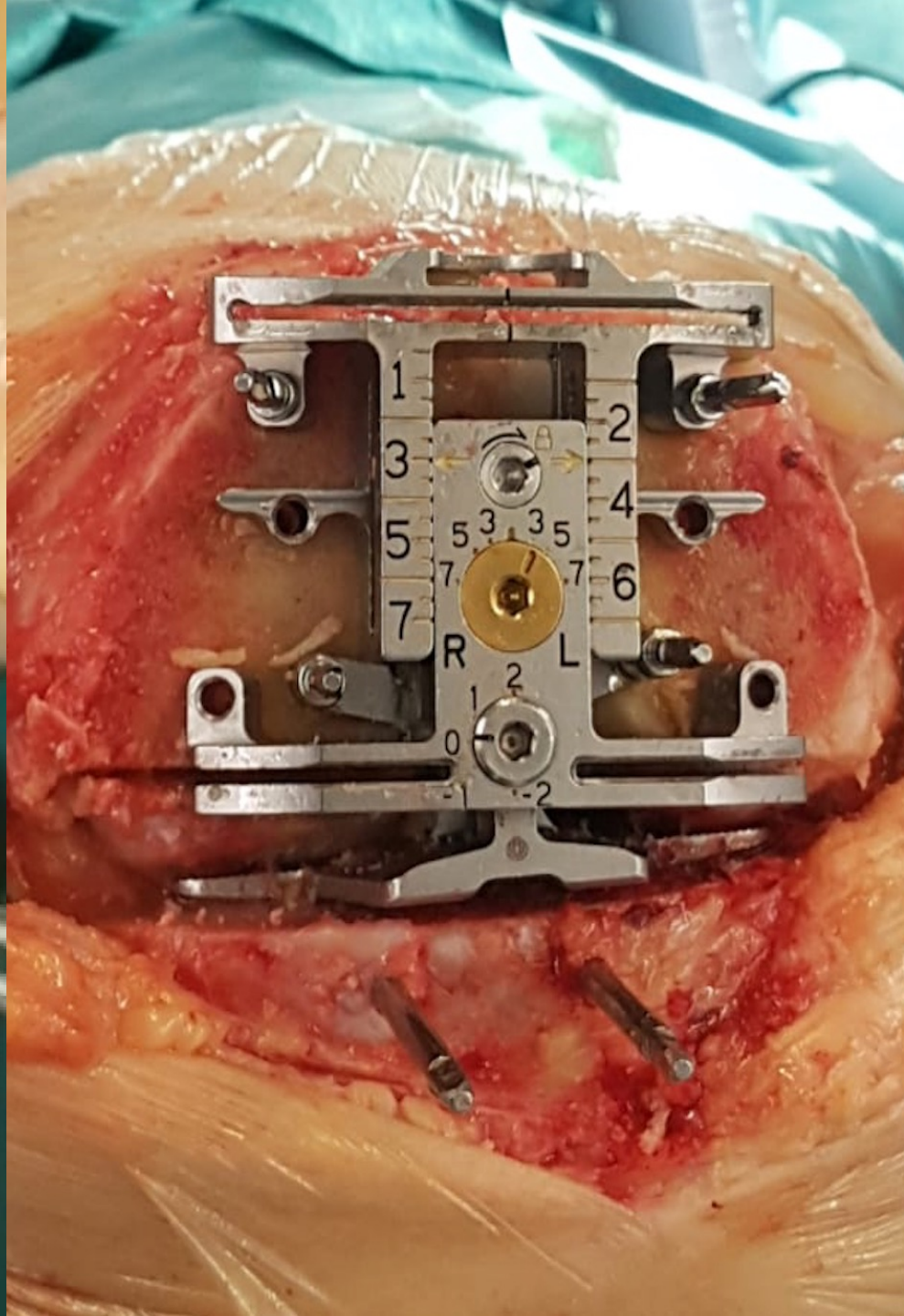
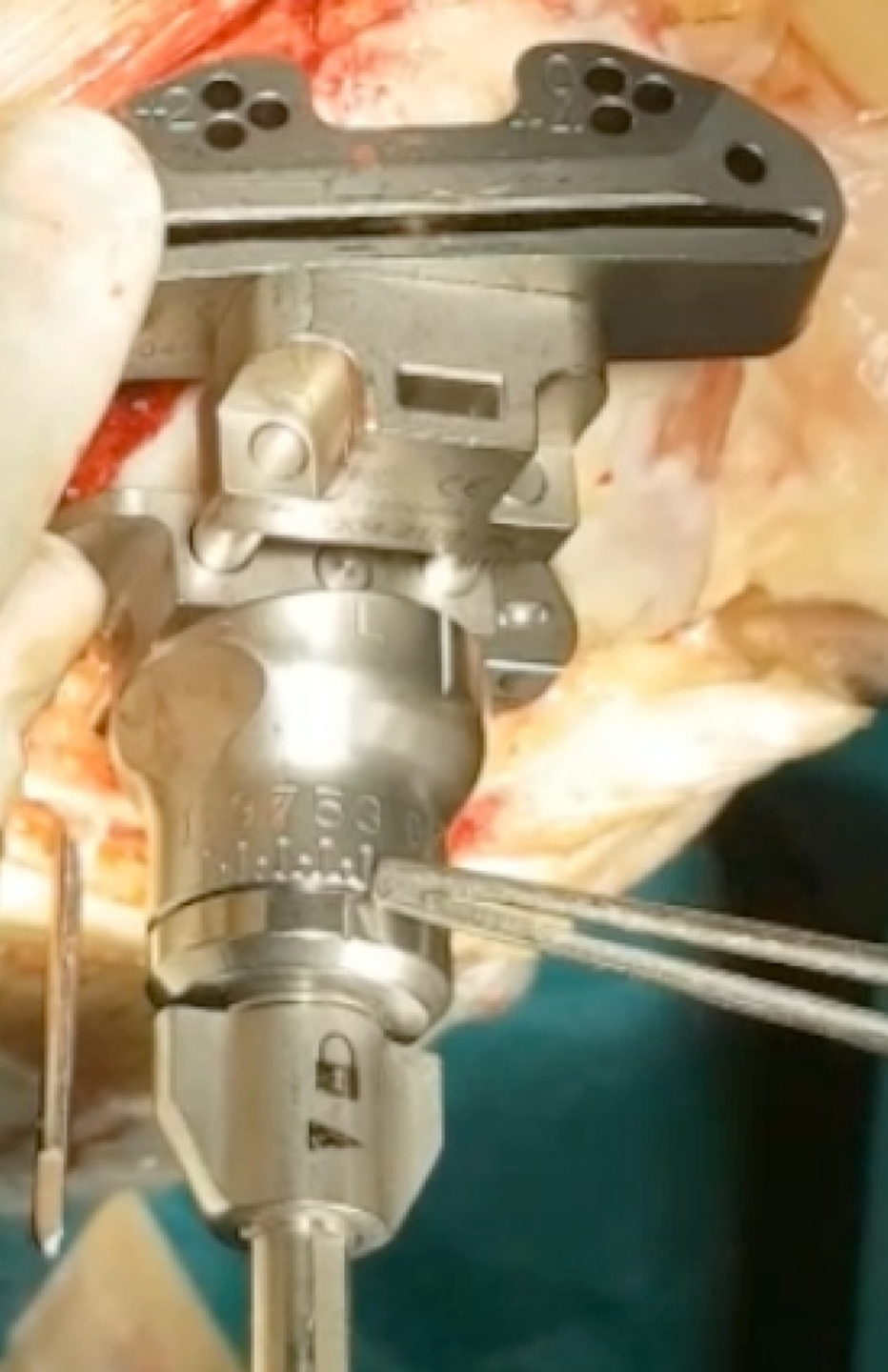
Johan Bellemans MD, PhD, William Colyn MD,
Hilde Vandenneucker MD, Jan Victor MD, PhD



'...natural alignment at the end of growth of 3° varus or more...'

'...restoration of mechanical alignment to neutral in these cases may not be desirable and would be unnatural for them...'

POA	VAS Post	KSS-F	KSS-K	KSS-T	SF-36 M	SF-36 P
-5º/5º	2,61	82,50	91,09	173,77	47,19	43,33
6º/10º	2,73	81,75	87,71	170,16	48,40	43,43
>10º	3,80	82,00	82,50	160	36,60	39,20
POA Dif	VAS Post	KSS-F	KSS-K	KSS-T	SF-36 M	SF-36 P
-5º/5º	4,30	28,76	42,61	71,64	-0,07	11,28
6º/10º	4,51	30,72	49,02	80,84	1,46	12,06
>10º	3,40	25	38,50	58,50	2,83	5,24



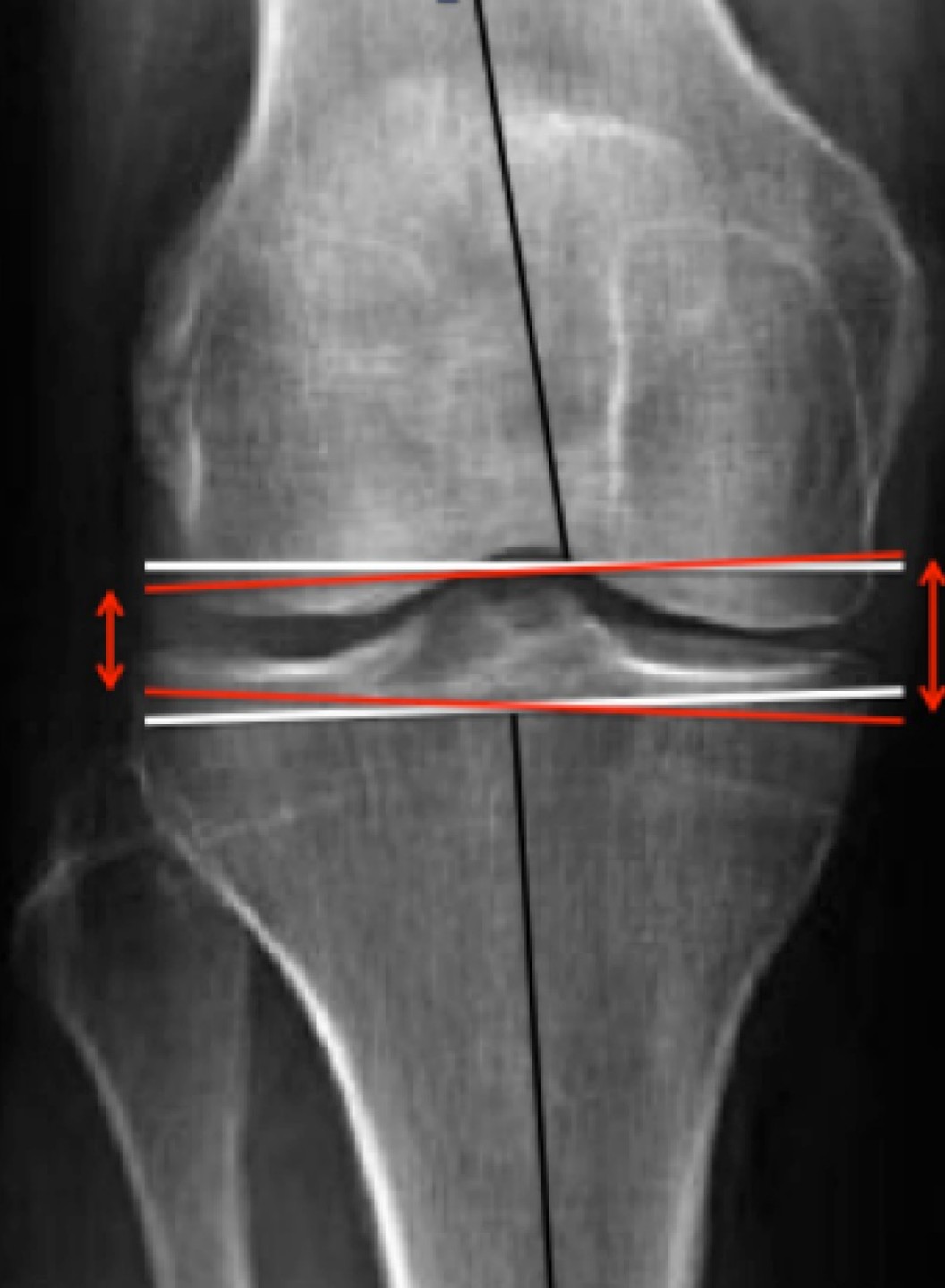
varus knee (limited range)

Error

alignment

valgus knee (comfortable range)

Own series (xRay)	N	Mean	SD
Femoral Cut	340	1,8	1,5
Tibial Cut	340	1,3	2,2
Boonen et al. (2D CT-Scan)	N	Mean	SD
Femoral Cut	26	1,8	1,3
Tibial Cut	26	1,7	1,2
Leeuwen et al. (3D CT-Scan)	N	Mean	SD
Femoral Cut	42	1,2	1,5
Tibial Cut	42	0,4	2,5



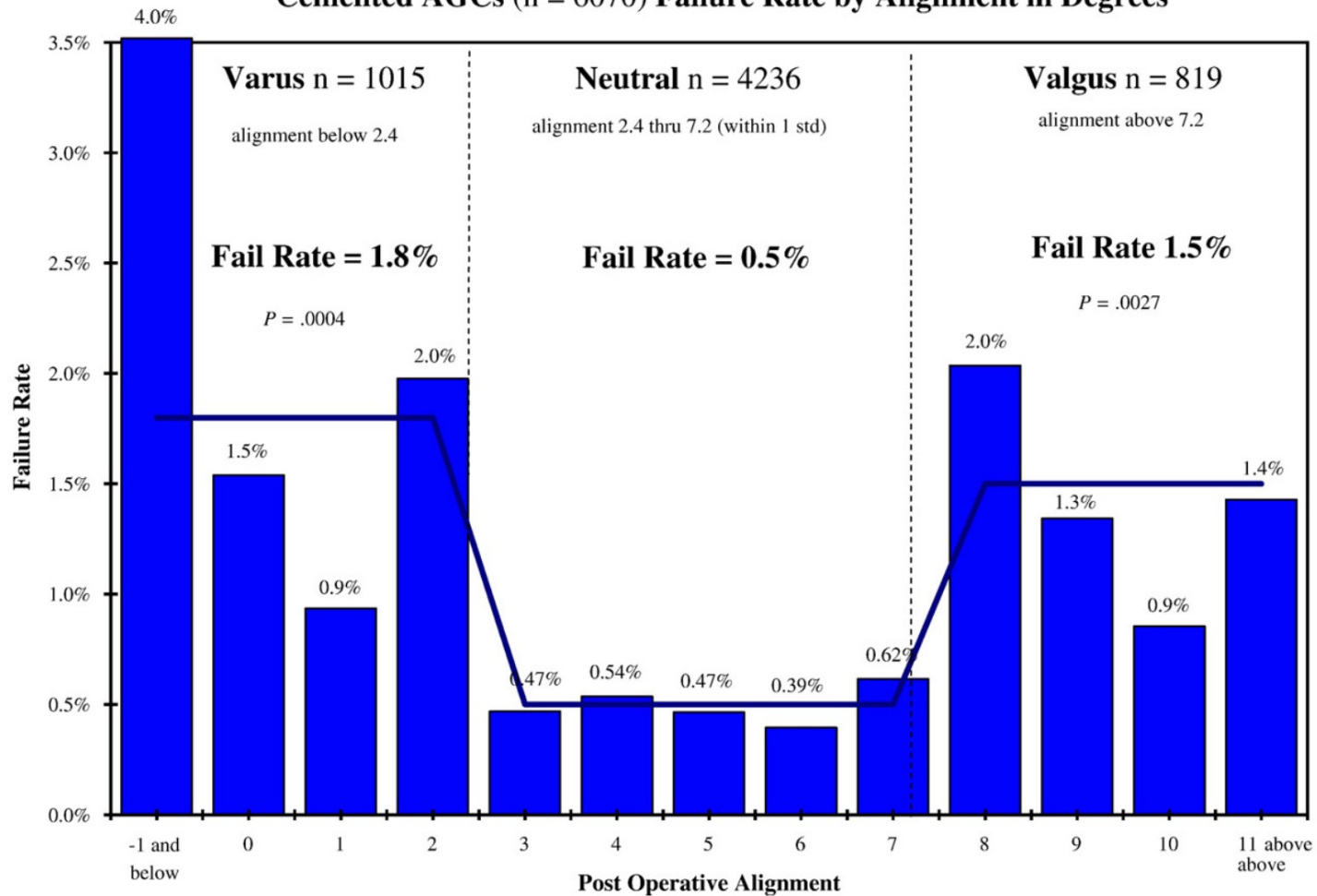
*stability
preservation*



*safe zones
consideration*

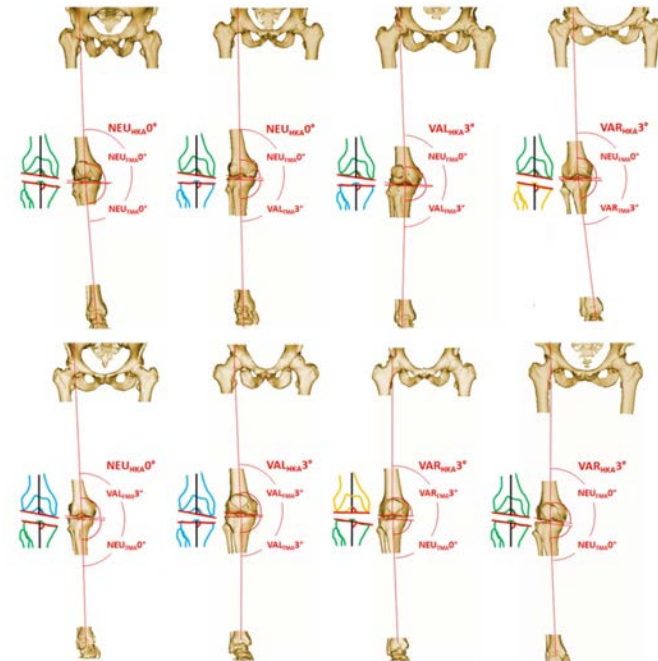
DANGER

Cemented AGCs (n = 6070) Failure Rate by Alignment in Degrees



'...the ideal coronal alignment 2.4° to 7.2° of valgus and the best survival of total knee implants...'

Coronal Alignment				Average value
HKA	VAR _{HKA}	VAR _{HKA} 9°	169.5°<HKA<172.5°	171°
		VAR _{HKA} 6°	172.5°<HKA<175.5°	174°
		VAR _{HKA} 3°	175.5°<HKA<178.5°	177°
	NEU _{HKA}	NEU _{HKA} 0°	178.5°<HKA<181.5°	180°
	VAL _{HKA}	VAL _{HKA} 3°	181.5°<HKA<184.5°	183°
		VAL _{HKA} 6°	184.5°<HKA<187.5°	186°
VAL _{HKA} 9°		187.5°<HKA<190.5°	189°	
FMA	VAR _{FMA}	VAR _{FMA} 6°	85.5°<FMA<88.5°	87°
		VAR _{FMA} 3°	88.5°<FMA<91.5°	90°
	NEU _{FMA}	NEU _{FMA} 0°	91.5°<FMA<94.5°	93°
	VAL _{FMA}	VAL _{FMA} 3°	94.5°<FMA<97.5°	96°
		VAL _{FMA} 6°	97.5°<FMA<100.5°	99°
	TMA	VAR _{TMA}	VAR _{TMA} 6°	79.5°<TMA<82.5°
VAR _{TMA} 3°			82.5°<TMA<85.5°	84°
NEU _{TMA}		NEU _{TMA} 0°	85.5°<TMA<88.5°	87°
VAL _{TMA}		VAL _{TMA} 3°	88.5°<TMA<91.5°	90°
	VAL _{TMA} 6°	91.5°<TMA<94.5°	93°	



Functional knee phenotypes: a novel classification for phenotyping the coronal lower limb alignment based on the native alignment in young non-osteoarthritic patients

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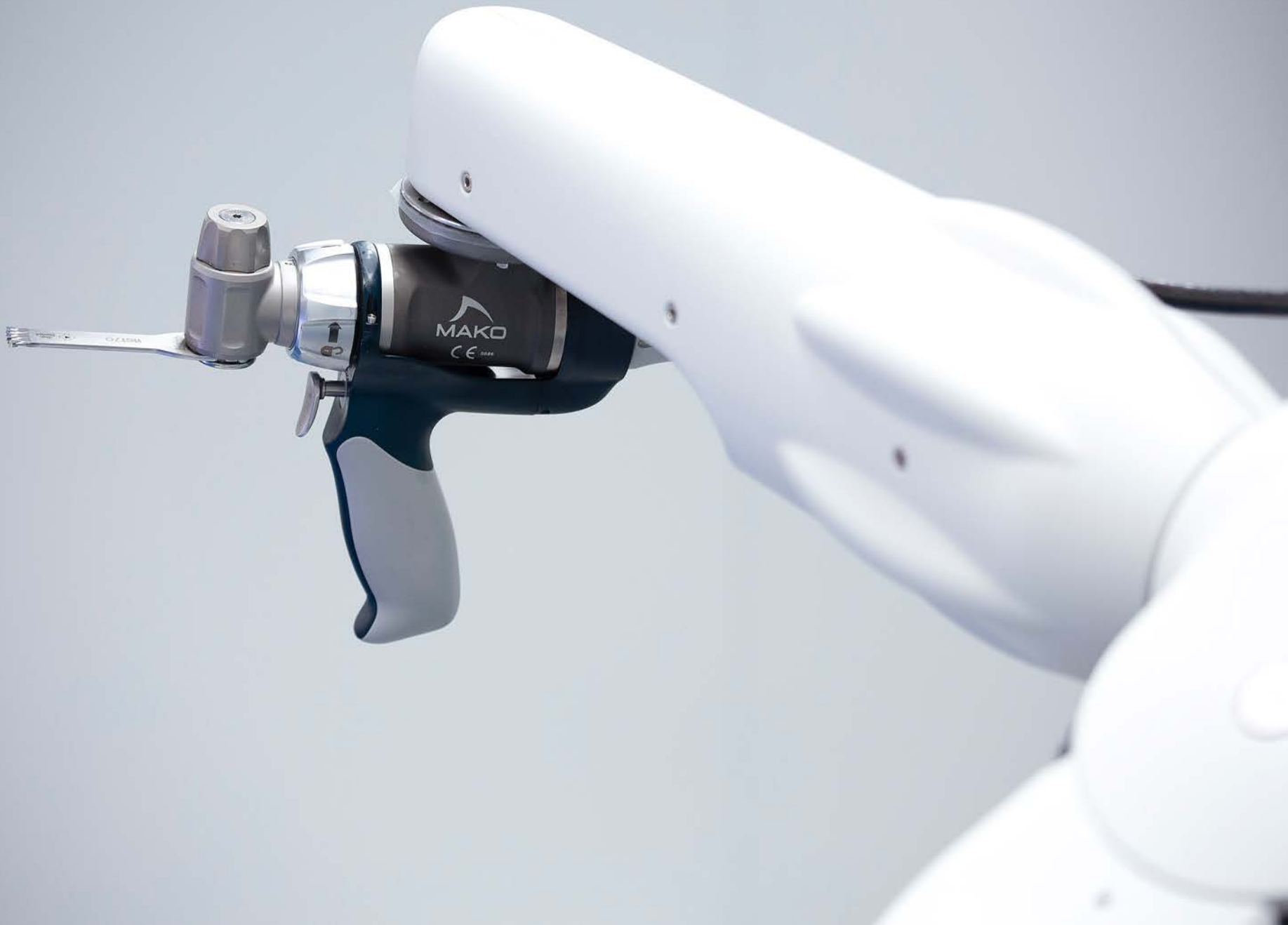
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individual approach

*different phenotype
different biomechanics*

*The pertinent question is what is the
envelope of alignment for each individual knee?*



robot learning

specific proposals

AI

