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Short-term results of RCT of robot-assisted bilateral TKA using kinematic alignment and mechanical alignment methods

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Faculty Disclosure Information

- My disclosure is–Paid Consultant: Zimmer Biome

Patients and Methods

■ subject　July2021～

The study was conducted on patients who gave informed consent for the randomized controlled trial （RCT）

OA/89cases

178knee(KA44cases88knee, MA38cases76knee)

■method　July2021～

After obtaining consent patients were randomly assigned to the KA and MA groups for the RCT and　bilateral TKA was performed under robot-assisted for the KA we used the restricted Kinematic Alignment method

■Robot used :　ROSA knee system, Zimmer-Biomet

■Implant used : Vanguard®ID

Patients and Methods

■Items to consider

Hip knee ankle angle(HKA), lateral distal femoral angle (LDFA),
Medial Proximal Tibial Angle(MPTA), Condylar Twist Angle(CTA),
Patella Tilting Angle, Joint Line Orientation Angle(JLOA), Range of motion(ROM),
Timed Up & Go Test (TUG), Knee injury and Osteoarthritis Outcome
Score(KOOS), JOA score, Oxford Knee Score(OKS),Forgotten Joint Score(FJS)

※ Statistical JMP version 15 used.
Category DataX2Examination、Consecutive numbers Wilcoxon Examination used.
$p < 0.05$ is significantly different

Patients

July2021～　Agree with RCT

Bilateral varus knee89cases178knee

(KA44cases88knee、MA38cases76knee)

Bilateral varus knee60cases120knee
(KA31cases62knee、MA29cases58knee)

outlier（KA_MPTA＞|5| MA_HKA＞|3|）exclude

KA：1death　　MA：1 Refusal to see a doctor

More than PO6M has passed

Bilateral varus knee34cases68knee
(KA19cases38knee　MA15cases30knee)

Complications；KA→left TKA dislocation

Avulsion fracture of the patella

Infected 1 knee

More than PO1Y has passed

Bilateral Varus knee28cases56knee（KA17cases34kneeMA11cases22knee）

Complications：　KA→Infected 1 knee

MA→Popliteal artery occlusion1knee　Infected 1 knee

Results　PO1Y Progress

Baseline characteristic

	KA (17cases34knee)	MA (11cases22knee)	P
Gender	M2knee F32knee	M4knee　F18knee	0.1461
Age	72.2±7.4	70.7±6.5	0.4181
Height(cm)	153.0±5.2	154.6±6.8	0.6862
Body weight(kg)	64.1±7.9	62.4±15.0	0.1068
Body Mass Index(BMI)(kg/m^2)	27.4±3.2	25.9±4.8	0.0291

X2 test Wilcoxon

Results PO1Y Progress

X-rays

		KA (17cases34knee)	MA (11cases22knee)	P
HKA(°) (Varus:—)	Pre PO	-8.4±5.0 -2.2±2.1	-9.5±4.6 -0.6±1.6	0.3549 0.0078
LDFA(°)	Pre PO	88.2±2.5 88.6±2.1	88.8±3.4 90.5±1.2	0.2977 0.0008
MPTA(°)	Pre PO	85.0±1.9 86.7±1.2	84.8±2.6 89.8±1.4	0.8583 <0.0001
Patella Tilting Angle(°)	Pre PO	5.0±3.4 8.3±3.7	6.0±3.1 7.5±2.8	0.1768 0.5921
CTA(°)		4.2±1.7	1.6±1.3	<0.0001
JLOA (°)(Outside Fall:—)		-0.8±1.8	-4.2±1.8	<0.0001

Results PO1Y Progress

			KA (17cases34knee)	MA (11cases22knee)	P
NRS	Under load	Pre	5.7±2.5	6.2±2.1	0.3572
		PO3W	1.6±1.0	2.3±1.5	0.1164
		PO3M	2.4±2.2	2.0±2.4	0.3593
		PO6M	0.3±0.6	0.5±0.7	0.1522
		PO1Y	0.6±1.0	1.6±2.6	0.2094
ROM	Flexion	Pre	126.0±12.8	130.2±14.0	0.3346
		PO3W	118.1±9.4	117.7±7.0	0.9378
		PO3M	121.1±9.1	126.2±6.1	0.0457
		PO6M	123.9±9.1	125.3±7.2	0.3773
		PO1Y	123.8±8.9	123.4±4.5	0.5896
	Extension	Pre	-7.9±7.6	-5.9±4.3	0.4659
		PO3W	-1.8±3.2	-2.0±2.5	0.4059
		PO3M	-1.7±2.4	-2.9±3.0	0.1624
		PO6M	-0.5±1.6	-2.4±2.6	0.0051
		PO1Y	-0.3±1.2	-1.1±2.6	0.1415

Results PO1Y Progress

			KA (17cases34Knee)	MA(11cases22knee)	P
KOOS	Symptom	Pre PO6M PO1Y	46.4±13.4 82.1±9.3 79.6±15.7	56.5±17.8 84.0±10.5 78.9±17.5	0.0711 0.4559 0.9462
	Pain	Pre PO6M PO1Y	44.4±19.2 82.7±9.5 83.0±18.7	42.9±12.3 77.5±10.7 82.6±19.2	0.6955 0.0912 0.8131
	ADL	Pre PO6M PO1Y	57.1±17.6 82.9±8.0 83.7±14.5	57.2±17.2 79.8±16.2 83.4±13.6	0.9438 0.8789 0.7878
	Sport	Pre PO6M PO1Y	21.6±20.5 43.2±21.7 58.2±25.8	22.3±12.3 38.0±21.9 49.1±34.5	0.6963 0.3837 0.4794
	QOL	Pre PO6M PO1Y	29.7±17.0 62.1±16.7 73.9±19.7	24.4±14.0 57.6±20.0 67.0±23.5	0.3122 0.6131 0.2947
JOA score		Pre PO6M PO1Y	55.7±9.1 74.6±11.5 79.1±9.9	57.4±11.5 76.6±11.2 76.4±8.6	0.2793 0.7594 0.1835
OKS		Pre PO6M PO1Y	25.3±8.3 34.3±11.7 38.0±7.6	27.5±11.8 39.2±5.1 40.4±7.2	0.3062 0.4466 0.1565
FJS		Pre PO6M PO1Y	27.1±14.9 58.7±20.8 60.7±24.8	40.2±30.5 58.2±26.4 57.2±29.9	0.3026 0.8278 0.9197

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Results PO1Y Progress

			KA (17cases34 knee)	MA (11cases22 knee)	P
Manual muscle dynamometer (Nm/kg)	Extension	Pre	0.72±0.26	0.83±0.29	0.2754
		PO3W	0.52±0.16	0.42±0.18	0.0267
		PO3M	0.65±0.21	0.70±0.23	0.6105
		PO6M	0.78±0.22	0.77±0.22	0.7124
		PO1Y	0.91±0.27	0.84±0.21	0.2205
TUG	Maximum	Pre	9.4±2.5	8.7±1.7	0.2980
		PO3W	11.1±3.7	10.1±3.0	0.1793
		PO3M	8.4±2.1	8.1±1.3	0.8556
		PO6M	8.0±1.3	7.6±1.1	0.3622
		PO1Y	7.6±1.5	7.5±1.4	0.9198

Results

	This Study	
	KA（19cases38Knee）	MA (15cases30Knee)
Pain(PO1M)	NRS 0.6±1	NRS 1.6±2.6
OKS(PO1M)	38±7.6	40.4±7.2
FJS(PO1M)	60.7±24.8	57.2±29.9

Conclusion

- **No significant differences were observed between KA-TKA and MA-TKA in postoperative outcomes**

- **Regarding FJS (Forgotten Joint Score):**

The KA group had worse preoperative scores than the MA group

However, at 1-year postoperative results, the KA group tended to show superior outcomes

This suggests that the KA group may have a better improvement rate in FJS compared to the MA group

Reference

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