

Clinical Outcomes of Double Level Osteotomy for Osteoarthritis with Joint Line Obliquity

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Indication for Double Level Osteotomy (DLO)

Severe varus deformity of the knee

- ✓ Tibial correction leads to joint line obliquity (JLO)

Deformities are present in both the femur and tibia

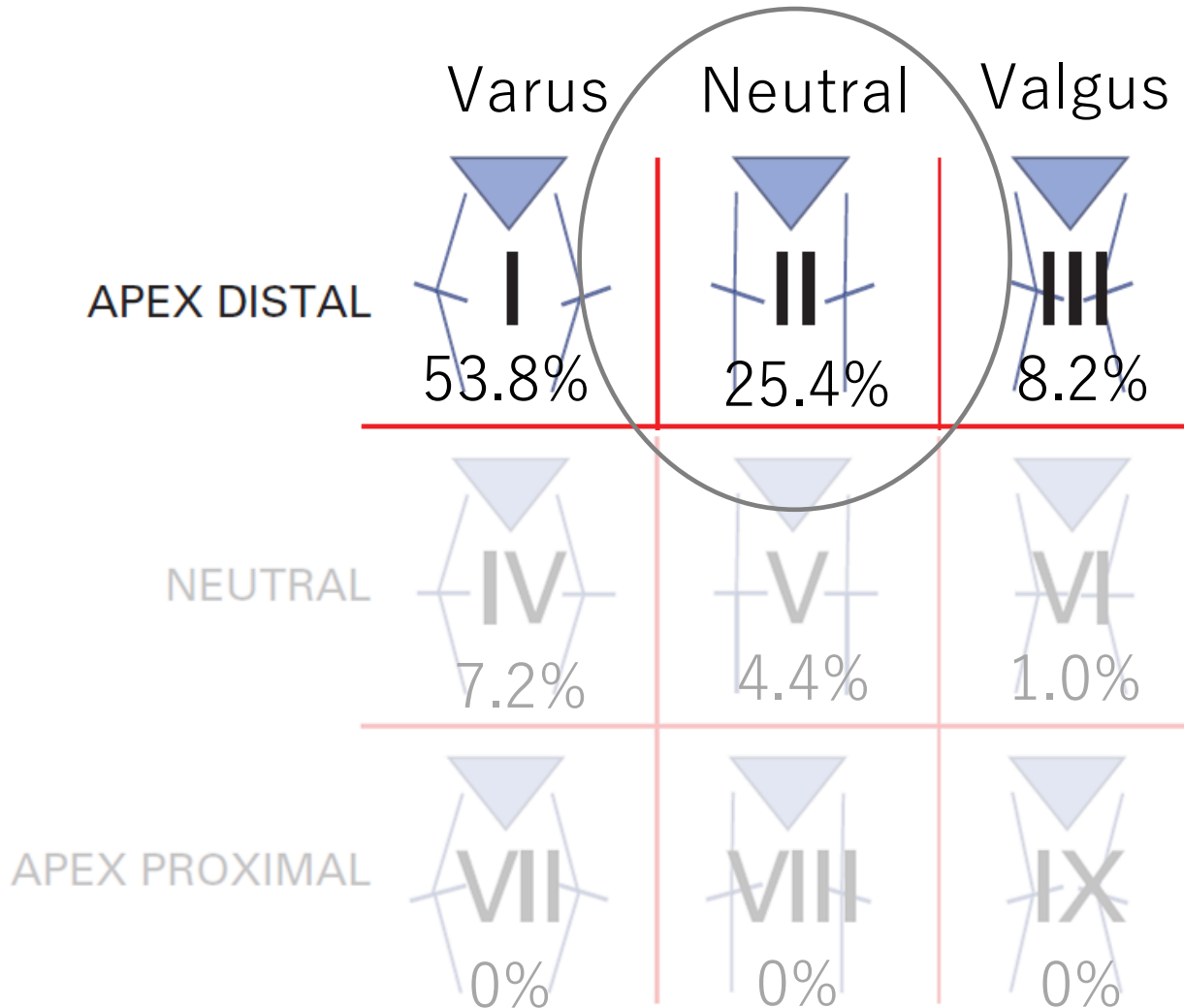
- ✓ mechanical lateral distal femoral angle (mLDFA) $> 90^\circ$
- ✓ mechanical medial proximal tibial angle (mMPTA) $< 87^\circ$

1), 2)



Indication for DLO

CPAK distribution in Japan



- ✓ $mLDFA + mMPTA < 177^\circ$
- ✓ Even in alignment-neutral knees, medial joint line inclination can lead to OA
- ✓ Clinical reports on osteotomy for CPAK type II remain limited

3), 4)

Purpose & Subjects

Purpose

- ✓ To evaluate the clinical outcomes of DLO in CPAK Type II

Subjects

- ✓ OA knees classified as CPAK Type II
- ✓ Resistant to conservative treatment
- ✓ Underwent DLO at our institution
- ✓ Follow-up > 2years

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- ✓ 9 knees in 8 patients (4 male, 4 female)
 - ✓ Mean age:50.4 years

Materials & Methods

Surgical Procedure

- ✓ Medial close wedge distal femoral osteotomy
- ✓ Medial open wedge distal tuberosity osteotomy

Post-op rehabilitation protocol

- ✓ ROM allowed from post-op day 1
- ✓ Partial weight bearing from 3 weeks post-op
- ✓ Full weight bearing from 6 weeks post-op

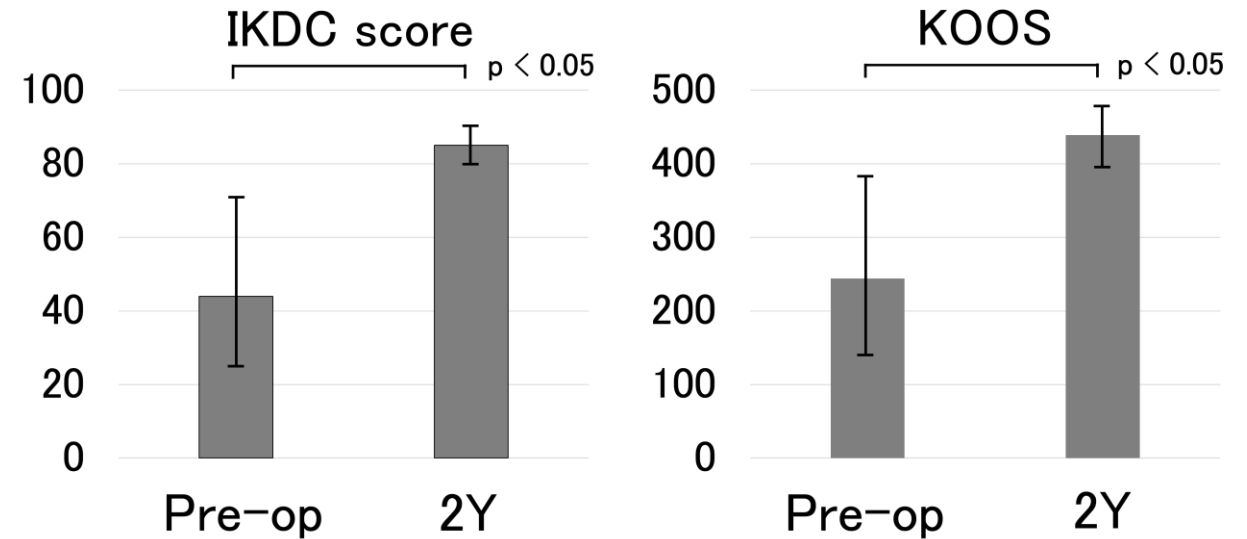
Outcome Measures

- ✓ HKA angle, mLDFA, mMPTA, JLCA
- ✓ IKDC, KOOS scores
- ✓ Statistical analysis: Mann-Whitney U test



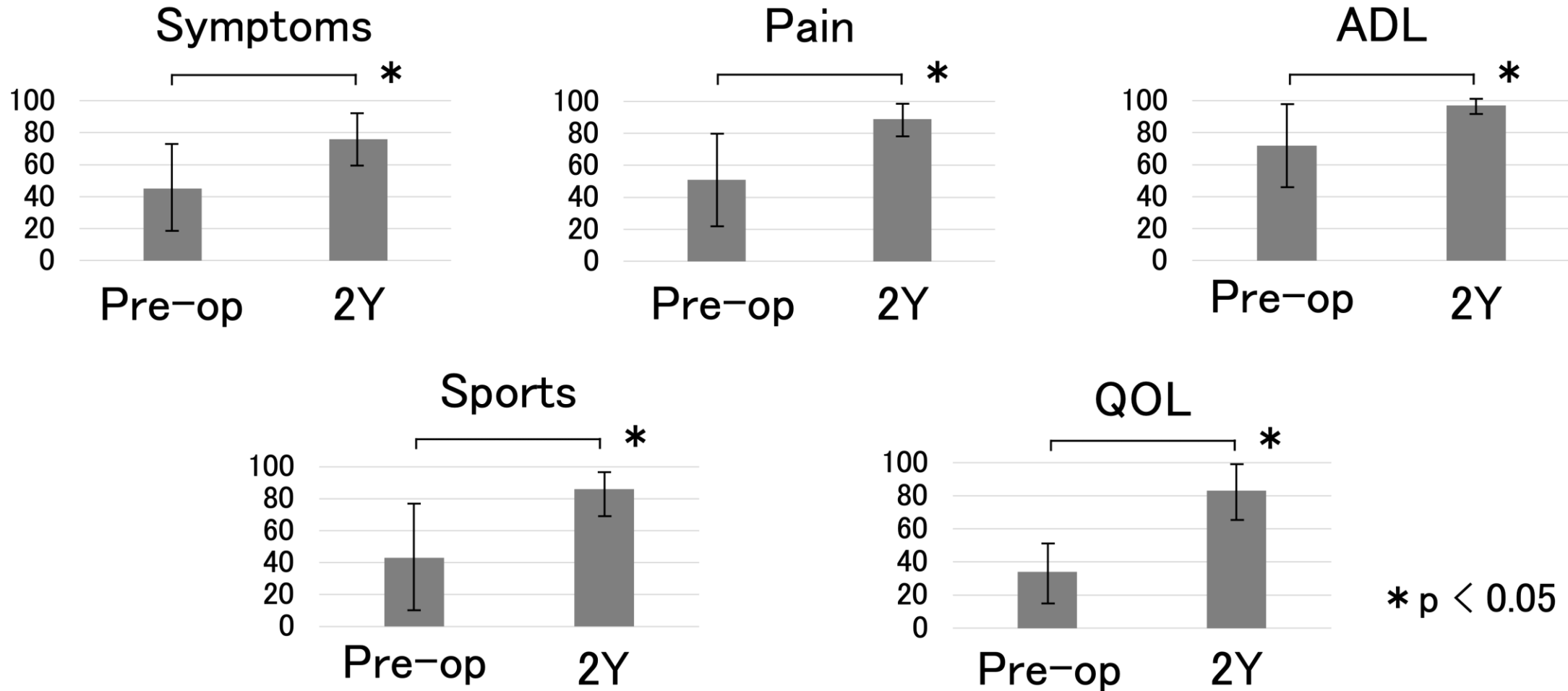
Results [Parameters / IKDC / KOOS]

	Pre-op	2Y
HKA angle	1.3 ± 1.9° varus	0.5 ± 1.9° valgus
mLDFA	83.9 ± 1.2°	87.5 ± 1.6°
mMPTA	82.6 ± 1.7°	87.4 ± 1.3°
JLCA	1.5 ± 1.5°	1.6 ± 1.1°



- ✓ The preoperative JLO was corrected and leveled by performing DLO
- ✓ Both IKDC and KOOS scores showed significant postoperative improvement

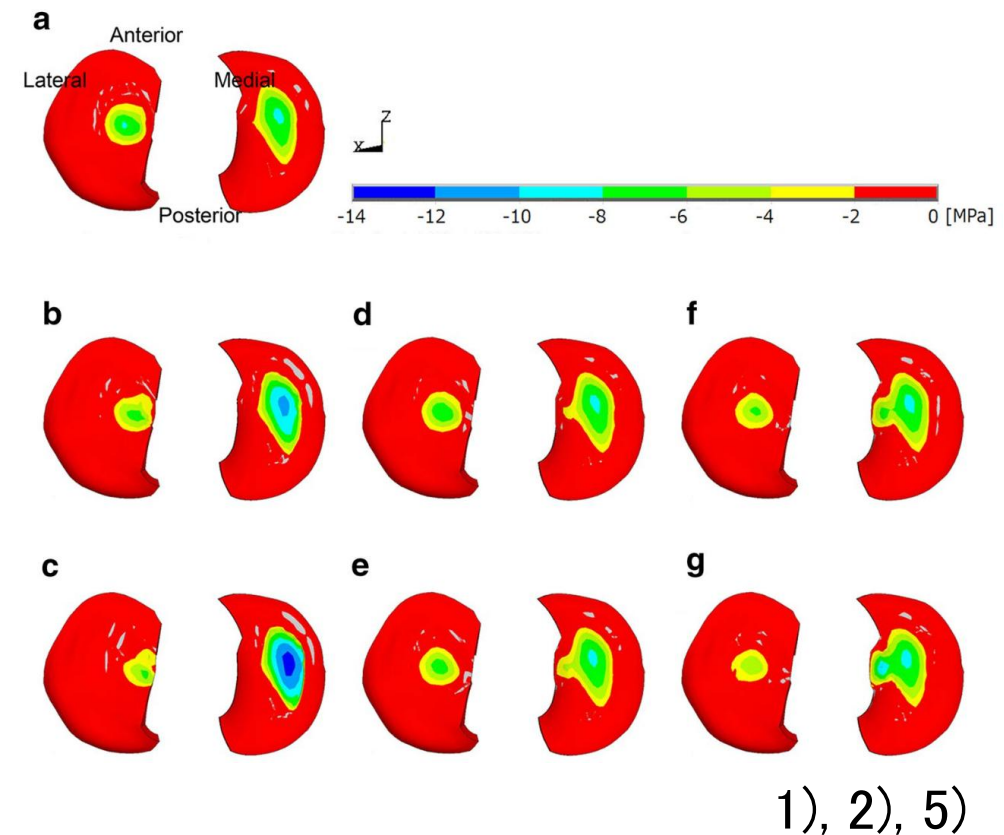
Results [KOOS sub-scores]





✓ All sub-scores showed significant improvement postoperatively

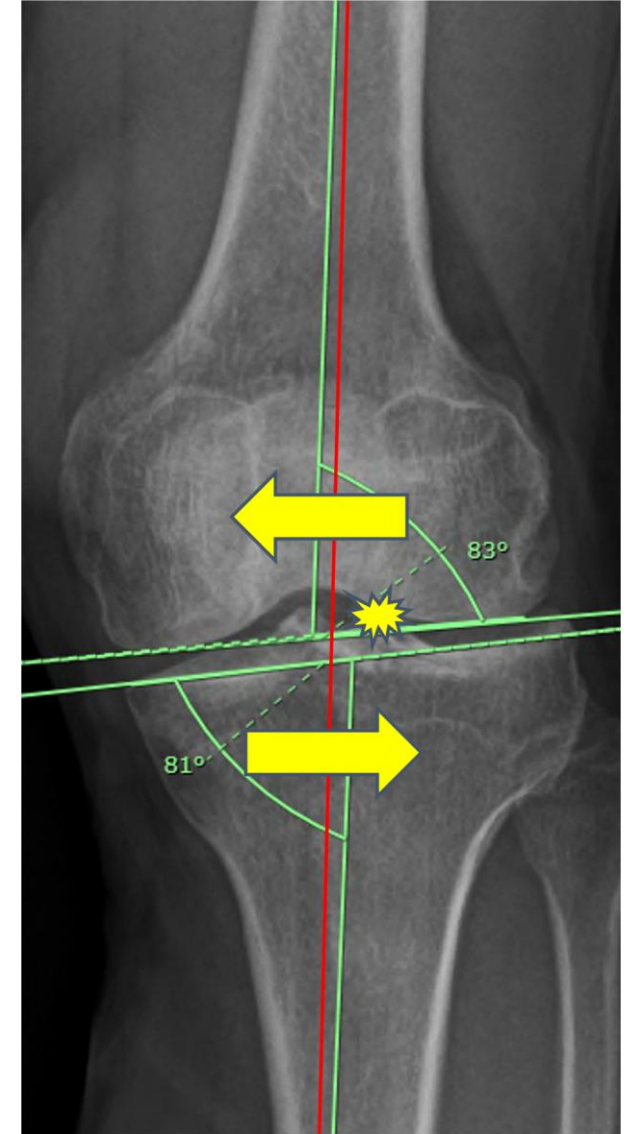
Discussion [JLO on Knee Osteotomy]

- ✓ No consensus on **preoperative** JLO based surgical indication
- ✓ If **postoperative** JLO is greater than 5° , DLO is recommended to achieve a horizontal joint line
- ✓ Increased JLO leads to shear forces and pressure on intercondylar eminence



Discussion [DLO for CPAK TypeII]

- ✓ CPAK Type II knees have JLO
- 
- ✓ JLO induces shear forces and pressure on intercondylar eminence
 - ✓ Cartilage on the intercondylar eminence wears down
- 
- ✓ Develop Knee OA
- DLO enables joint line horizontalization while preserving neutral limb alignment



Conclusion

- ✓ DLO for CPAK Type II OA knees with joint line obliquity resulted in favorable outcomes
- ✓ Even in alignment-neutral knees, DLO may be an effective treatment option for CPAK Type II OA

Limitations

- ✓ Small sample size
- ✓ Short follow-up period

References

1. *ESSKA formal consensus project*
2. *Nakayama H, et al. KSSTA. 2018*
3. *MacDessi, et al. Bone & Joint. 2021*
4. *Toyooka J, et al. Knee Surg. 2022*
5. *Ollivier M, et al. KSSTA. 2023*