ORTHOVERSE · HIGH-YIELD CARD

Gap Balancing in TKA

Interactive simulator
orthoverse.org/simulators/tka-gap-balancing/

HIGH-YIELD

- Distal femoral cut changes the extension gap only; each millimeter equals one millimeter of gap change.
- Posterior femoral cut (component size, anterior referencing) changes the flexion gap only.
- Tibial cut and insert thickness alter both gaps equally; they cannot correct a gap ratio.
- Target: 1–2 mm of balanced laxity in both extension and flexion after final cuts.
- Joint-line elevation ceiling: 4 mm; exceeding this risks mid-flexion instability.
- PCL release opens the flexion gap 4–6 mm and the extension gap less than 2 mm (cadaver data).
- Femoral component parallel to TEA equals approximately 3° external rotation from PCA; produces a rectangular flexion gap.
- In valgus with a hypoplastic lateral condyle, the PCA is unreliable for rotation; use TEA or AP axis.
- In CR, PCL release does not treat flexion contracture; it only widens the gap discrepancy.
- Revision joint-line landmarks: 14 mm above fibular head, 23 mm from lateral epicondyle, 28 mm from medial.

PITFALLS

- Tibial resection or insert change when only one gap is wrong — both tools alter both gaps and disturb the balanced side.
- PCL release for flexion contracture in CR — only enlarges the flexion gap and worsens the discrepancy.
- Posterior condylar axis for rotation in valgus with hypoplastic lateral condyle — causes internal rotation and lateral patellar tilt.

NUMBERS TO KNOW

Target balanced laxity	1–2 mm
Maximum joint-line elevation	4 mm
PCL release — flexion gap opening (cadaver)	4–6 mm
PCL release — extension gap opening (cadaver)	< 2 mm
Femoral external rotation from PCA (standard)	3°
Peroneal nerve distance from posterolateral corner	~1.5 cm
Recurvatum — reduce distal resection by	2–3 mm
Joint line above fibular head (revision)	14 mm

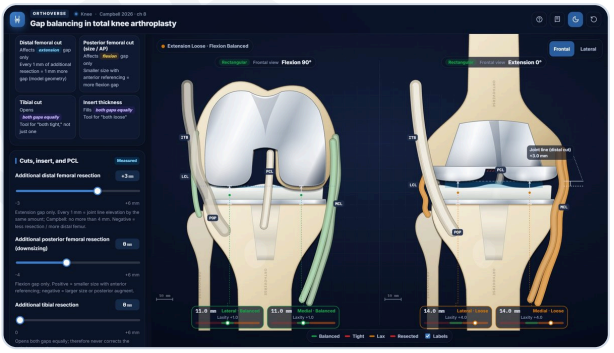


Figure. More distal femur opens the extension gap and leaves flexion alone.

FURTHER READING

Campbell's Operative Orthopaedics, 15th edition (2026): Arthroplasty of the Knee, ch 8 (gap balancing, soft-tissue releases, PCL and femoral rotation).

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