

## Native non-osteoarthritic knees have a highly variable coronal alignment: a systematic review

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### PURPOSE

Coronal alignment of the knee is defined by the hip-knee-ankle angle (HKA), the femoral mechanical angle (FMA), the tibial mechanical angle (TMA), and the joint line convergence angle (JLCA). To date, there is still a lack of knowledge about the variability of native coronal knee alignment. The purpose of this paper is to present a systematic review of the current literature about the variability of coronal knee alignment (HKA, FMA, TMA, and JLCA) in non-osteoarthritic knees.

### METHODS

The electronic databases MEDLINE, EMBASE, and Google Scholar were searched from database inception to search date (November 1, 2018) and screened for relevant studies. The PRISMA guidelines were followed. Inclusion criteria were studies that reported the coronal alignment of the native, non-osteoarthritic knee.

### RESULTS

A total of 15 studies met the inclusion criteria. Thirteen studies performed the measurements on weight-bearing long-leg standing radiographs (LLR), one study used MRI, and one study used the EOS imaging system. The mean HKA ranged from  $176.7^\circ \pm 2.8^\circ$  (male) to  $180.7^\circ$  (female). The mean FMA ranged from  $92.08^\circ \pm 1.78^\circ$  (female) to  $97.2^\circ \pm 2.7^\circ$  (female). The mean TMA ranged from  $84.6^\circ \pm 2.5^\circ$  (female) to  $89.6^\circ$  (female). The mean JLCA ranged from  $-0.47^\circ \pm 0.98^\circ$  (male) to  $-1.9^\circ \pm 1.4^\circ$  (female).

### CONCLUSION

This systematic review provides a detailed overview about the variability of the coronal knee alignment in non-osteoarthritic knees. The broad variability of all coronal alignment parameters highlights the necessity for a more anatomic and individualized approach in knee arthroplasty. It also offers the fundament to understand the changes in osteoarthritic knees.

### LEVEL OF CLINICAL EVIDENCE

Systematic review, Level IV.

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