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# Osteoarthritis and Cartilage

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## Letter to the Editor

### Response to letter by TVD Cooke on “Fully automatic quantification of knee osteoarthritis severity on plain radiographs”

We greatly appreciate Dr Cooke's fruitful discussion of our publication of knee osteoarthritis computer-aided diagnosis (KOACAD), a fully automatic program for knee osteoarthritis (OA) computer-aided diagnosis<sup>1</sup>. Regarding the rotational positioning of the knee joint, we agree that the limb's flexion plane can be an appropriate mark. Since the KOACAD system aims at evaluation in daily clinical practice or in population-based epidemiologic studies, we used alignment of the second metatarsal parallel to the beam as the most conventional and convenient mark under such circumstances. Our preparatory examination has shown good reproducibility of this method unless the knee does not show severe flexion contracture. A magnification marker on radiographs is an important issue to improve the accuracy of the system, especially for application of the KOACAD system to a surrogate measure for the development of disease-modifying drugs. We are now developing a better marker than the present metal plate without parallax, such as copper cylinder and metal beads<sup>2,3</sup>, using a phantom bone.

Femoral osteophyte is indeed a feature of OA, as it is included as a parameter in the radiographic atlas of the Osteoarthritis Research Society International (OARS)<sup>4</sup>. However, the outline of the medial condyle is more difficult to detect than that of the tibia in the present version of KOACAD. In addition, the femoral osteophyte is sometimes hidden by the condyle on radiographs. Since the tibial osteophyte is more sensitive to the disease progression than femoral osteophytes, as Dr Cooke points out, we believe that tibial osteophyte is an appropriate parameter for the assessment of osteophyte formation, at least in a single projection of plain radiographs.

Regarding the femoro-tibial alignment, we indeed agree that there is no mechanical basis for tibiofemoral angle (TFA). For the assessment of the accurate mechanical axes as shown by the Mikulicz line<sup>5</sup>, longer radiographs including hip and ankle joints are necessary. We are aware of the semi-automated method by Drs Cooke and Sled that is used to measure knee alignment for the Multicentre

Osteoarthritis Studies and the Osteoarthritis Initiative. Since we are also analyzing radiographs of the entire lower leg from the Osteoarthritis Initiative database by the KOACAD system<sup>6</sup>, comparison of the data between the two methods will be very interesting. For further improvement and more widespread application of the KOACAD system which is now underway, these kinds of suggestions and direction by experts of the imaging field are very helpful.

#### Conflict of interest

The authors declared to have no conflicts of interest.

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