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Letter to the Editor

Response to letter: Static knee alignment and its association with radiographic knee osteoarthritis☆

The paper by Teichtahl *et al.* has shown an association of lower extremity anatomic axis (measured on a standing anteroposterior knee X-ray) and radiographic osteoarthritis (joint space narrowing and osteophyte)[1]. As shown by Kraus *et al.* in 2005[2], the anatomic axis of the knee correlates with the angle measured on the more cumbersome and costly full-limb radiograph and entails less radiation exposure to the subject. Malalignment measured from a long-limb X-ray (mechanical axis) has been shown to be a potent risk factor for knee osteoarthritis[3–5] and to synergize with other mediators, such as obesity and baseline osteoarthritis severity, to increase the risk of knee osteoarthritis progression[6–8]. The letter by Cooke reminds us of their valuable contribution to the field in 1999 showing an association of knee malalignment and radiographic features of osteoarthritis[9].

Recently, malalignment measured from a semiflexed anteroposterior knee X-ray (anatomic axis) has also been shown to predict progression of knee osteoarthritis[10]. Thus the anatomic axis measured from a knee X-ray is a validated means of obtaining useful information for assessing a potent osteoarthritis risk factor, namely malalignment.

The paper by Teichtahl *et al.* has analyzed anatomic axis as a continuous variable (“per degree of valgus increase”) and stratified into quartiles. This precluded the necessity of defining neutral alignment, which would require correction for the offset of the anatomic axis from the mechanical axis (offset of ~3° for women and ~6–7° for men)[2]. No mention was made of the use of a standard positioning device to minimize limb rotation, shown to improve the association of the anatomic axis with the mechanical axis.

The choice of methods for assessing knee malalignment for clinical or clinical trial purposes is subject to considerations of accuracy, reliability, repeatability, prognostic capability, facility of performance, cost, and radiation exposure to the subject. Cooke points out that long-limb X-rays acquired digitally likely entail less radiation exposure than non-digitally captured long-limb X-rays. This is presumably due to both decreased intensity of the X-ray beam, and a reduced likelihood of having to repeat the X-ray due to the greater dynamic contrast range for digitally acquired images. A knee X-ray however entails still less radiation exposure, less cost, and less specialized X-ray equipment. With minimal modification (to minimize limb rotation and reproducibly position the limb), knee X-rays can be optimized to provide reliable anatomic axis information with applicability to clinical practice and as recently demonstrated[10], to clinical trials. Ultimately, these discussions highlight the fact that knee malalignment has come to be recognized as a very important risk factor for osteoarthritis. The decision of method to use for its assessment will depend on the available funds, time, facilities, considerations of study power, and purpose to which the measure will be applied.

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