A comparative study of the Saltzman and modified long-leg radiograph for assessing hindfoot alignment in patients undergoing TKA

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The authors have no conflicts of interest
In our clinical practice, we have observed that patients who come in with a varus knee tend to have a valgus hindfoot, and the opposite with a valgus knee.
Evidence Supports Looking at Hindfoot in TKA

The Planovalgus Foot: A Harbinger of Failure of Posterior Cruciate-Retaining Total Knee Replacement

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Persistent Hindfoot Valgus Causes Lateral Deviation of Weightbearing Axis after Total Knee Arthroplasty

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Saltzman (Hindfoot Alignment) View

However, at present, the best way to assess hindfoot alignment accurately, is to do a separate radiological view like a Saltzman view or few other variations of it.
Can we assess hind foot alignment from the standard long leg radiograph?

Potential Benefits
• No need for additional X-ray & Radiation
• All information about Lower Limb in a single view
Initial Pilot

- 15 modified long-leg views
- Satisfactorily view of hindfoot anatomy and alignment was possible in the pilot study
Formal study

- Ethics Committee Approval for 65 Cases
- Prospective comparative observational study
- All patients to have two X-ray views
- “Modified” long-leg view & Hind foot alignment (Saltzman) view
- 2 observers (independent, and blinded)
- The angle as measured on both the views using Bland Altman plot and limits of agreement of 3 degrees
Measuring Tibio-Calcaneal Angle

WT BEARING

10.01

10.22
Results

- 2 independent observers
- Intraclass Correlation Coefficient (ICC) for Inter-observer Variability –0.94 for Long Leg View, 0.87 for Hindfoot Axial View (Excellent agreement between observers for both)

<table>
<thead>
<tr>
<th>Tibio-Calcaneal Alignment</th>
<th>Long Leg View</th>
<th>Hind foot Axial View</th>
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<tbody>
<tr>
<td>Mean</td>
<td>9.29</td>
<td>8.99</td>
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<tr>
<td>SD</td>
<td>4.26</td>
<td>4.16</td>
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No significant difference between these two (p=0.207, Related Sample Wilcoxon Signed Rank Test)
Results

Scatter Plot
Spearman’s Rho Correlation Coefficient 0.892

Bland Altman Plot
Difference Between Measurements: Mean 0.297, Standard Deviation 1.69
Can we assess hind foot alignment from the long-leg radiograph?

Yes, We Can

Always assess hindfoot position in patients undergoing TKA