The procedure is prevalent and dehiscence and infection can lead to substantial morbidity. TAA is a common treatment for end-stage ankle arthritis, and innovations in preoperative guides, instrumentation and prosthesis design facilitate a more patient-specific approach to this intervention. Despite technical advancements, wound complications continue to be a prevalent postoperative problem, and have been reported to affect 16-28% of cases (3). We aimed to determine if a 25% reduction in risk of post-TAA wound-healing complications exists when associated with a preoperative and postoperative strategy aimed at minimizing the risk of postoperative wound complications. In the preoperative period, no risk factor has been shown to predict development of an anterior incision wound complication other than patient age (4). Patton et al. (5) showed at 14 days after surgery that, as diabetes, to be predictive for postoperative dehiscence and infection, and Raikin et al. (6) showed that a history of inflammatory diabetes and diabetes were associated with major and minor wound complications post-TAA. In general, it is thought that a preoperative strategy aimed at minimizing the risk of postoperative wound complications could promote more favorable outcomes. Interestingly, however, the use of prophylactic or simultaneous soft tissue coverage and preoperative oxygen tension measurements failed to reduce the incidence of postoperative wound complication after TAA (7,8).

Methodology and Hypothesis
The medical records of 56 consecutive primary TAA patients, having surgery between June 1, 2014 and June 30, 2017, were reviewed with attention paid to the first 90 days postoperative period. We used the University of Pennsylvania Health System (UPHS) electronic medical record to identify patients who underwent TAA (CPT 27002) during the observation period, in whom an anterior, longitudinal, linear incision was used. Six different surgeons performed the operations. Demographic and radiographic measurements were obtained for patients that met our inclusion criteria, and prospective anteroposterior (AP) and lateral weight bearing radiographs were assessed using the measuring tool in the UPHS radiograph viewing software. On the AP, radiograph, we identified the level of the tibiotar joint (TTJ) as the tangent to the talus dome, and measured the medial of the talar to medial soft tissue silhouette (Fig. 2). We then measured this same distance at 2 and 4 cm proximal to the TTJ. On the lateral radiograph, we measured the length of the anterior-to-posterior soft tissue silhouette at the TTJ and at 2 and 4 cm proximal to the TTJ (Fig. 2). Also on the lateral radiograph, a measurement of the anterior soft tissue depth (ASTD), tibial cortex to anterior soft tissue, was made at 2 and 4 cm proximal to the TTJ. For these measurements we extrapolated the circumference of the extremity at the TTJ and at 2 and 4 cm proximal to it. The measurements were made by two assessors (AK, WWM), and Pearson’s product moment correlation coefficients confirmed the inter- and intra-rater reliability of these radiographic measurements. We also procured data from the records and used the CT code for wound debridement, skin thickness skin graft, delayed primary closure, local soft tissue re-arrangement, and free flap, to identify dehiscence and/or surgical site infection observed during the first 90 days postoperatively. The data were described in statistical terms with attention to type and distribution, and the incidence of anterior wound dehiscence was calculated. Tests of the null hypothesis and logistic regression model were used to identify statistically significant associations between risk factors and dehiscence. To determine the potential influence of an unmeasured confounder, a Greenland sensitivity analysis (1) was undertaken. We evaluated operating characteristic (ROC) analyses and the Youden index (2) to determine the ASTD cut point that maximized diagnostic sensitivity and specificity for the outcome, and ROC analyses were performed by one author (DSM), and statistical significance was defined as the 5% (p ≤ 0.05) level, and 0.1% for inclusion in the adjusted logistic model. We hypothesized that a smaller diameter and less depth of the soft tissues about the ankle and lower leg, as measured using standard preoperative radiographs, would be associated with anterior wound dehiscence following TAA.

Radiographic Measurements

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Anterior Soft Tissue Depth</th>
<th>Anterior Soft Tissue Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 cm proximal</td>
<td>70.61 (67.47, 75.06)</td>
<td>70.61 (67.47, 75.06)</td>
</tr>
<tr>
<td>4 cm proximal</td>
<td>71.42 (68.27, 74.58)</td>
<td>71.42 (68.27, 74.58)</td>
</tr>
</tbody>
</table>

Results
Table 1 Statistical description of the cohort (> 56 TAA in 56 patients)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>BMI (kg/m²)</th>
<th>males</th>
<th>females</th>
<th>index</th>
<th>defera</th>
<th>Dehiscence</th>
</tr>
</thead>
<tbody>
<tr>
<td>69.0±13.9</td>
<td>80.5±12.3</td>
<td>45</td>
<td>11</td>
<td>3.536</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

Discussion
The incidence of dehiscence was 21.43%, and the anterior soft tissue depth (ASTD) at the joint line, as viewed on the standard preoperative lateral radiograph, was statistically significantly associated with post-TAA anterior wound dehiscence. We believe that a 25% reduction in risk of post-TAA wound-healing complications exists when associated with a preoperative and postoperative strategy aimed at minimizing the risk of postoperative wound complications. The posterior soft tissue depth was statistically significantly associated with wound dehiscence, and the ASTD was less predictive for postoperative dehiscence and infection, and future investigations are needed to further refine the predictive value of this readily available measurable property of the soft tissue at the ankle.

References