Introduction
The development of ankle osteoarthritis often involves ankle malalignment in any combination of the cardinal planes. One of the least understood planal deformities of the ankle joint is within the sagittal plane with the talus being transposed either anteriorly or posteriorly in relation to the tibia. It has been termed talolisthesis as this abnormal transposition of the talus either anterior or posterior relative to the tibial anatomic axis (1). Talolisthesis has been studied in correlation to end stage ankle arthritis and the possible complications that can occur following total ankle arthroplasty. Currently the literature has yet to describe how to accommodate for preoperative complications that can occur following total ankle arthroplasty. Currently the technique that is specifically calibrated to accommodate for preoperative talolisthesis is increased if tibial implants are not properly adjusted for highly positive or negative OA. In cases of anterior talolisthesis containment can be achieved through reduction of the anterior slope, conversely in cases of posterior talolisthesis reduction of the anterior slope will aid in preventing the slope of the mobile polyethylene of the talus. (6)

In addition to the TTR the anterior tibial osteotomy (ADTA) needs to be considered when planning for surgical intervention in cases of sagittal plane deformity and ankle arthritis. Each of these measurements is important when considering the sagittal orientation of the tibial cut for mobile bearing implants. Our case describes how sagittal plane deformity and talolisthesis can be contained and corrected through adjustments in the anterior tibial slope.

Case Reports and Technique Description
Case 1: 77 year old male with a history of post traumatic ankle arthritis to the right lower extremity after sustaining multiple nonspecific ankle injuries as a child that had undergone conservative care. The patient presented to the supporting author’s clinic for TAA consultation & arthroscopies to treat his ankle arthritis in adulthood for spur removal which were not successful in alleviating symptoms. He presented to the supporting authors clinic for TAA consultation & ankle views were obtained (Figures 1, 2, 3), and one year post operative imaging (4, 5) Patients are placed supine on the operating table with full sterile precautions performed. A standard anterior midline approach between the TA and EHL tendons was made with standard dissection through the ankle capsule, exposing both gutter of the ankle. The implant jig system was applied as directed. In case one the jig was positioned to increase the anterior slope to bring the talus forward. In case two the jig was positioned to remove slope.

By adjusting the tibial guide cut to either take out tibial slope or to add slope we were able to accommodate for both direction of talolisthesis. Both patients had a routine post-operative course with full rehabilitation with no reoccurrence of listhesis of the talus.

Radiographic Measurement

<table>
<thead>
<tr>
<th>Case</th>
<th>Pre-Op</th>
<th>Post-Op</th>
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<tbody>
<tr>
<td>ADTA</td>
<td>94°</td>
<td>87°</td>
</tr>
<tr>
<td>TTR</td>
<td>61.2%</td>
<td>37.5%</td>
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Discussion
In a previous study, the demographics of talolisthesis were studied, revealing a greater incidence of anterior displacement 32.5% versus posterior displacement 27.5% (3). The adaptive changes seen in each deformity can be explained and correlated with the preoperative imaging studies described. Prior literature has linked the relationship between the ADTA and talar tilt with talolisthesis positioning having positive predictive values of determining an abnormal TTR (3). With end-stage arthritis there is profound variability ADTA (14). Linear regression has shown a 0.968 percent increase in TTR with one degree increase in the ADTA (3).

When using a mobile bearing design with no structural mechanism to control extrusion of the polyethylene, the risk of talolisthesis is increased if tibial implants are not properly adjusted for highly positive or negative OA. In cases of anterior talolisthesis containment can be achieved through reduction of the anterior slope, conversely in cases of posterior talolisthesis reduction of the anterior slope will aid in preventing the slope of the mobile polyethylene of the talus. (6)

References
7. Takakura K, et al. The development of ankle osteoarthritis often involves ankle malalignment in any combination of the cardinal planes. One of the least understood planal deformities of the ankle joint is within the sagittal plane with the talus being transposed either anteriorly or posteriorly in relation to the tibia. It has been termed talolisthesis as this abnormal transposition of the talus either anterior or posterior relative to the tibial anatomic axis (1). Talolisthesis has been studied in correlation to end stage ankle arthritis and the possible complications that can occur following total ankle arthroplasty. Currently the technique that is specifically calibrated to accommodate for preoperative talolisthesis is increased if tibial implants are not properly adjusted for highly positive or negative OA. In cases of anterior talolisthesis containment can be achieved through reduction of the anterior slope, conversely in cases of posterior talolisthesis reduction of the anterior slope will aid in preventing the slope of the mobile polyethylene of the talus. (6)