A Comparison of Computer Navigation to Extramedullary Guide Techniques used to Produce Posterior Tibial Slope for Total Knee Arthroplasty


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An a priori sample size calculation with \( \alpha = 0.05 \) and \( \beta = 0.20 \) showed that at least 30 samples in each treatment group were required to determine a difference of 1.5 degrees between the treatment group mean posterior tibial slope and the ideal posterior tibial slope.

Results

The mean posterior slope measurements for treatment Group 1 (4.15±3.24 degrees) and treatment Group 2 (1.60±1.62 degrees) were both significantly different than the ideal slope of 3 degrees (p=0.03 for Group 1 and p<0.01 for Group 2). This indicates that treatment Groups 1 and 2 failed to accurately produce the ideal posterior tibial slope of 3 degrees (Fig.2). The mean posterior tibial slope of treatment Group 3 (5.00±2.87 degrees) was not significantly different than the ideal posterior tibial slope of 5 degrees (p=1.00). This indicates that Group 3 accurately produced the ideal tibial slope of 5 degrees (Fig.2).

Figure 2. Mean posterior tibial slopes for the 3 treatment groups. Error bars = ± 2 x SEM.

Group 2 exhibited the lowest standard deviation and was therefore the most precise method for producing tibial slope (Fig.3).

Figure 3. Standard deviations for the 3 treatment groups.

Discussion

The most accurate method to produce posterior tibial slope was the 5 degree cutting block with an extramedullary guide. Computer navigation had the lowest standard deviation and therefore was the most precise method. However, computer navigation was not as accurate in producing the desired posterior tibial slope as the extramedullary guide with the 5 degree cutting block. The manual method of producing tibial slope with an extramedullary guide and a 0 degree cutting block was the least precise method and not as accurate as the extramedullary guide with the 5 degree cutting block.

References