Athletic Kicks vs. Strain of the Patellar Tendon

Grubb, Mackenzie

Athletics play a important role in American society. Injuries in athletics are inevitable, however there are ways one can prevent these injuries from occuring. Approximately 15% of all sports related injuries pertain to the knee; 46% of thos involve soccer. This experiment could provide athletes with the degree of angle the patellar tendon can withstand and the angle in which it will rupture. As a result decreasing the percent value of injuries pertaining to this tendon and related injuries to the knee. In order to test this experiment I built a knee model using carpentry supplies. I used various dimensions of the wood and a metal U-channel,guitar tuner, in addition to furniture casters and a strong spring to represent the quadricep. the metal strip representing the patella and a string to represent the tendon. After building my model I adjusted the tuner in oder to get the knee at equilibrium. Next I used a functional knee brace to test the knee angle measure of three different style kicks. I repeated each kick three times to assure accuracy. After collecting my data I represented each angle by physically adjusting my knee model to the desired angle for each style kick. I then applied my calculations to Hooke's law and recorded my final data. The thesis I was able to construct after this experiment is that athletes could potentially reduce the amount of strain put on their patellar tendon by using these calculations. For example in these three different style kicks one could decrease their risk by applying more corner kicks and passing rather than penalty kicks to the game. Also they could monitor their angles and make them less than 100.5 degrees to reduce strain.

Awards Won: