



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Brynn Bradley; Erin Shields	Project Number J1007
Project Title Muscle Hustle: Will There Be an Increase in a Soccer Player's Calf Size and Kicking Distance after 8 Weeks of Training?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of the project was to examine whether a recreational sport such as soccer could improve a player's physical fitness by increasing muscle strength and size and kicking distance.</p> <p>Methods/Materials Our voluntary subjects were our soccer team, an AYSO Girls U12 team. Eleven of the fourteen players participated in a three-phase eight-week evaluation. Three of our friends who do not play soccer were used as control subjects. Calf measurement was determined by wrapping a tape measure around the largest part of the calf. The measurement was taken three times and the mean was reported for the initial phase, mid-season (after four weeks) and at the final phase (after eight weeks). Each player drop-kicked a ball three times and the mean distance was recorded for each phase of the experiment.</p> <p>Results The results proved the hypothesis that there would be an increase in a soccer player's calf circumference and kicking distance. The greatest increase in calf size was 1.25 inches; the average increase was 0.71 inch. Significant changes occurred in kicking distance at the end of phase 3 for ten of the fourteen players. Two players showed the greatest improvement, a 19-foot gain in kicking distance from phase 1 to phase 3. The average kicking distance was an increase of 9.5 feet. As expected, the three control subjects (non-soccer-playing eleven-year-old girls) did not have a significant change in calf size or kicking distance.</p> <p>Conclusions/Discussion Soccer is a running sport that uses many muscle groups, especially the large muscles of the leg (the gastrocnemius or commonly called the calf muscle). Over an eight-week soccer season, this experiment shows that positive changes in muscle size and strength can occur. Increasing muscle strength and size are important factors in maintaining physical fitness and endurance.</p>	
Summary Statement If an eleven-year-old girl participates in an eight-week soccer season, then she will have an increase in calf size and kicking distance.	
Help Received Mothers helped take measurements of players and helped make display board; fathers helped with computer graphs and typing.	