



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

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<b>Project Title</b> <b>Functional Orthotic Materials: Force Reduction during Impacts</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My problem was that twenty-five percent of teenage Americans, including myself, play competitive sports everyday while experiencing harmful impacts. The purpose of my experiment was to test the effectiveness of a functional orthotic on reducing force these bodies take, so that they will be less prone to injury. My hypothesis was that functional orthotics will be effective enough to help with injuries if they are prescribed properly. Also, I hypothesized that functional orthotic materials made out of subortholen would be most effective in the category of force reduction. <b>Methods/Materials</b> My testing took place inside my house on a hard wood floor. I built a stand to drop a billiards ball with the same acceleration. This stand dropped the billiards ball onto a functional orthotic material on my force sensor. The force sensor was connected to a wireless interface which gave me a reading in newtons on my software. I borrowed this software and force sensor from a scientific company called PASCO. I performed fifty trials for each of my six orthotic materials, while my control was having the billiards ball land on the sensor alone. <b>Results</b> I found out that my control had a lower force rate average of 227.5 newtons while all my orthotic samples were at least 20 newtons more. Copolymer, one of my orthotic materials, had the lowest force rate average after my control. These results showed that the functional orthotics worsened force and did not reduce it. <b>Conclusions/Discussion</b> Based on my results, I learned that functional orthotics are purely made to control joint movements, to give you a better posture. Accommodative orthotics are made to reduce force. This weights podiatrists with the responsibility to prescribe and mold functional orthotics based on a patient's needs, to help with injuries.	
<b>Summary Statement</b> My project is about testing the effectiveness of functional orthotic materials in the category of force reduction, to determine if they cure injuries.	
<b>Help Received</b> My teacher Mrs. Reed, PASCO, and Mr. Kennedy a co-owner of HERSCO orthotic labs, all helped me with advice as well as materials I needed to obtain.	