



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> Sean P.B. McGovern	<b>Project Number</b> <b>J1218</b>
<b>Project Title</b> <b>Do You Get a Buzz Out of Exercise? The Effect of Physical Activity and Exercise on Hand Steadiness</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The specific aim of this project was to evaluate hand-grip strength (HGS) and hand steadiness (HS) after exercise as markers of physical activity.</p> <p><b>Methods/Materials</b> After providing consent, healthy 18 to 65 year olds were eligible to help with the project. MET (Metabolic Equivalent Task) minutes were calculated using the validated International Physical Activity Questionnaire (IPAQ). The MET score accounts for both time and intensity of exercise. Age, gender, handedness and body mass index (BMI) were recorded. Dominant hand HGS was measured using a handheld hand-grip dynamometer. HS in the dominant hand was measured using a homemade #buzz-wire# modified by replacing the single wire by 2 pieces of wire connected by a metal ring. HS was measured by holding a metal wand (3 mm diameter) within the ring (6 mm diameter) and counting the total number of hits in 30 seconds. A hit was recorded when the wand touched the side of the ring causing the buzz-wire to buzz. HGS and HS in the dominant hand were immediately re-measured in the same way after exercising the dominant hand by squeezing a hand-exerciser 75 times.</p> <p><b>Results</b> 40 subjects (40% male; aged 23-58 years; BMI range 18.0-32.3; HGS range 24.6-64.8 kg) completed the study. Total weekly MET minutes ranged from 249 to 5148 minutes. There were more men in the low physical activity group. In all subjects, HGS and HS decreased after exercise (mean pre-exercise HGS-39.2 kg, and post-exercise-31.8 kg; mean pre-exercise #hits#-4.4, and post-exercise #hits'-9.2). The % HGS decrease after exercise was similar between the most physically active (17.0%) and the least active (18.4%) groups. The relative increase in #hits# after exercise was highest in the least physically active (4.4 times) and lowest in the most active (1.6) groups. There was no association between change in HS and age, gender, BMI and, importantly, HGS.</p> <p><b>Conclusions/Discussion</b> These data suggest that: HS and HGS decrease after hand exercise; HGS and change in HGS are not good measures of physical activity; and the change in HS after hand exercise is a reliable and easy way to measure physical activity. There was no association between HGS decrease and HS suggesting that the decrease in HS may be a systemic and not local effect explaining its association with physical activity. These findings may be important where hand-steadiness is needed after exercise such as in the police, armed forces, and athletics.</p>	
<b>Summary Statement</b> Hand steadiness after exercise is a good, cheap and convenient measure of physical activity.	
<b>Help Received</b> My Father helped make graphs from the Excel Spreadsheets	