MoJoint: A Motion Visualization and Kinematic Analysis Software for Temporomandibular Joint

Mei, Angela (School: Academic Magnet High School)

Temporomandibular joint disorders (TMDs) are a common and significant health issue affecting about 5-12% of the US population. While clinical data has indicated strong associations between temporomandibular joint (TMJ) motion and TMD, the current lack of a customizable TMJ kinematic analysis software, along with an emphasis on univariate analyses of individual motion parameters, have limited the applications of TMJ motion analyses in TMD diagnosis and treatment. Last year, we developed MoJoint to collect quantitative TMJ motion data. Here, we used MoJoint to calculate various motion parameters and conduct subsequent multivariate analyses. While none of the 52 individual motion parameters that were compiled based on previous studies can consistently distinguish human subjects with demographic characteristics associated with differentiated TMD risk, principal component (PC) 1, which is derived from principal component analysis and accounts for 23% of the variance in this human sample, is capable of consistently differentiating TMJ motion by sex, skeletal class, and TMD status. These results demonstrate MoJoint's remarkable potential to transform the diagnosis and treatment of TMDs.

Awards Won: