Abstract
Oral cancer survivors across the world live with a condition called trismus, or spasm of the jaw muscles, that restricts their ability to perform basic functions such as eating and talking. In order to relieve these patients of their symptoms, we propose a novel wearable device with the capability to adjust to the complete 6 degree of freedom movement of the jaw to perform therapeutic exercises and run real-time diagnostics. These diagnostics can identify certain stiffness parameters that define a patient’s capabilities of each portion of the 3 closing muscle pairs. Two approaches were implemented: i) physician input trajectory, and ii) physician input forcing function. For the input trajectory method, a linear least squares approach and a nonlinear least approach were attempted. An extended Kalman filter approach was utilized for the force input method. The results concluded each method is feasible but both depend on the accuracy of the model and initial estimate. The degree of mouth opening dictated the amount of information regarding certain stiffness parameters and dictated the success of each approach.