We present the results of a global magnetohydrodynamic (MHD) simulation of a pair of substorms on August 11, 2002. Comparisons of data with simulation results reveal an agreement regarding the timing and sequence of events in the magnetosphere. We then present the results in the simulation of a plasmoid flux rope formed during the second substorm. Unlike standard 2-D depictions of reconnection and plasmoid release during a substorm, the simulation shows a highly complex structure that has considerable winding of both closed and open field lines. Additionally, the flux rope does not move tailward uniformly, but rather has an asymmetric motion in which the dawn flank portion moves tailward prior to the dusk end of the flux rope, resulting in a skewed flux rope that runs almost downtail instead of crosstail. The flux rope structure begins on closed field lines, then progresses through open field lines and finally onto IMF field lines. Using the global simulation we can connect the large scale magnetotail reconfiguration with features on the auroral boundary of the model. The results shown here are in agreement with existing MHD tail simulations as well as flux rope observations from satellite data.