The size of the “sweet spot” is one measure of tennis racquet performance. In terms of vibration, the sweet spot is determined by the placement of nodal lines across the racquet head. The vibrational characteristics of a tennis racquet are explored to discover the size of the sweet spot. A numerical model of the racquet is developed using Finite Element analysis and the model is verified using experimental modal analysis. The effect of string tension on the racquet’s sweet spot and mode shapes are then calculated. An investiation is also made to determine how add-on vibrational dampers affect the sweet spot. Finally, optimized racquet design for a larger sweet spot is presented.