

The mechanism of bitemporal hemianopia is still unclear. Previous research suggested that the nerve fiber packing pattern may contribute to the selective damage of nasal (crossed) nerve fibers. Numerical models were built using finite element modeling to study the biomechanics of optic nerve fibers. The sensitivity of the mechanical behaviors of the nerve fibers to variations of five parameters in the nerve fiber model were investigated using design of experiments (DOE). Results show that the crossing angle is a very significant factor that affects a wide range of responses of the model. The strain difference between the crossed and the uncrossed nerve fibers may account for the phenomenon of bitemporal hemianopia. This work also highlights the need for more accurate material properties of the tissues in the model and an improved understanding of the microstructure of the optic chiasm.