In this study, the three-dimensional (3-D) velocity structure was determined by Poisson ratio Tomography method based on the arrival time of local earthquakes in Central Anatolia. For this purpose, 109,740 P-wave and 102,934 S-wave arrival time data from 27,141 earthquakes were used. Earthquakes were recorded by stations related to the National Passive Motion Seismic Network of Bogazici University, Kandilli Observatory and Earthquake Research Institute (KOERI). Distribution of the stations and earthquake epicenters shows that the Vp and Vs velocity model yield reliable results up to 40 km depth. Checkerboard resolution test and ray path distributions confirm this situation. Tomographic results indicate the presence of lateral heterogeneities in the crust and upper mantle in Central Anatolia. It is remarkable that the earthquakes occur in areas where the seismic velocity is low due to the complex tectonic and geological structure in the region. The results of the study show that all regions with low or high seismic velocities are potential areas for the accumulation of stress energy. Resulting P- and S-wave velocity models clearly show the existing seismotectonic structure in Central Anatolia.