Cannulated Pedicle Screw (CPS) is the instrumentation that has been introduced in Biomedical field in order to stabilize the spine structure and also to enhance the pullout strength in osteoporotic patient. The cement is injected through the CPS which is flow from the screw head to the radial hole and then distributed around the CPS to give higher performance of pullout strength. However, the fracture still reported to happened around the radial hole. This paper is aim to focus on the effect of the position and different diameter of radial hole on the CPS. Three designs were constructed using SolidWork software where two of it are the current models whereas the third was the proposed design which the radial holes were position differently (skewed to each other) and its size is smaller than the current model, 1.0 mm and 1.5mm respectively. The software used for Finite Element Analysis (FEA) is Ansys workbench 16.0. The Finite Element Models were verified with FEA result of the previous research. The FEA results of torsional stress for current and proposed design were then compared to obtain the maximum torque that both designs are able to resist before fracture. It can be concluded that the performance of CPS can be improved by the proposed design which is 2 radial hole skewed to each other and smaller radial hole diameter (1.0mm) than the current cannulated pedicle screw (1.5mm).