Hearing sensations are caused by air- and bone-guided sound. Of course, other biological materials like tendons, muscles and tissue are also involved during conduction of sound. To study the influence of bone conduction, a formerly developed finite element model was excited by harmonic pressure signals at the cochlea wall. The clinical finding during middle ear surgery, namely the increase in bone conduction sensitivity with removed footplate, was confirmed. Other psychoacoustic effects with bone conduction are described in the early experiments by Bárány, who proved the cancellation of air- and bone-conducted sound in humans. The simultaneous stimulation of the cochlea wall and the phase-reversed stimulation of the stapes footplate in the finite element model confirmed his findings. Further clues to the solution of unsolved problems in audiology and middle ear pathology are given.