Tympanoplasty with canal wall reconstruction was performed using sliced cartilage, fascia, and inferior based musculoperiosteal flap in 46 patients with open mastoid cavities and hearing loss. All patients were followed for more than two years after the last operation. The mastoid skin was elevated and trimmed, and then the fascia and sliced auricular cartilage were transplanted to the mastoid side of the skin and covered using musculoperiosteal flap. The remaining space in the mastoid cavity was filled with bone chips (42 cases). In the cases involving a normal or shallow eardrum (24 cases, group A), ossicular reconstruction was performed at the same time. Among the cases involving an adhesive eardrum, two-staged surgery was planned in 11 cases (group B). The other 11 patients with adhesive eardrums were treated with one-stage ossiculoplasty where possible (group C). Hearing improvement was achieved in 75% (18/24 cases) of the cases in group A, 45% of the cases in group B (5/11 cases), and 18% of the cases in group C (2/11 cases) at 12 postoperative months. None of the patients developed recurrent discharge, cholesteatoma or granulation tissue, although one patient in group C (2%) suffered re-adhesion. The reconstructed tympanum and posterior canal wall appeared to be thick structures made of skin and sliced cartilage. The boot-shaped reconstructed canal was suited to staged ossiculoplasty because the shape-memory effect provided an adequate combination of stiffness and flexibility for the second stage. The structure remained relatively stable over the long term. This method has advantages for patients with adhesive eardrums that require secondary ossiculoplasty or an active middle ear implant.