A New Double-Cartilage Block Ossiculoplasty: Long-Term Results

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Objectives: To determine whether ossicular chain reconstruction performed with modified double-cartilage block (DCB) ossiculoplasty used by authors, leaving the intact perichondrium layer on the cartilage surface in contact with tympanic membrane, results in significant hearing results and prevents DCB displacement and DCB loss of stiffness when compared with the original DCB technique described by Luetje and Denninghoff.

Materials and Methods: Sixty-five ossicular reconstructions using DCB ossiculoplasty were performed from 1996 to 2001 in the whole study group. Eight patients had an inadequate follow-up and were excluded from the study. In the first 25 cases, the original DCB ossiculoplasty technique described by Luetje and Denninghoff was performed (Group 1). In the second group, 32 modified DCB ossiculoplasties were performed. The same author performed all cases. The main follow-up for the whole study group was 7 years. Audiometric data were calculated according to the 1995 American Academy of Otolaryngology–Head and Neck Surgery guidelines.

Main Outcome Measures: Mean postoperative air-bone gap closure to less than 20 dB, incidence of DCB displacement from tympanic membrane, and incidence of loss of DCB stiffness.

Results: Comparison data of hearing results, incidence of DCB slippage, and incidence of DCB loss of stiffness in the group performed with original technique and in the group with modified technique showed statistical significance. Successful rehabilitation (pure-tone average air-bone gap <20 dB) of conductive hearing loss was obtained in 48% of cases in Group 1 (original DCB) and in 81.2% of cases in Group 2 (modified technique). In the group with original DCB ossiculoplasty, the displacement of implant and its loss of stiffness occurred more often than in the second group.

Conclusion: The modified DCB represents an excellent partial ossicular replacement prosthesis. The perichondrium layer left attached on the cartilage surface in contact with tympanic membrane increases the stability of DCB and prevents the displacement and the loss of stiffness of the cartilage. The modified DCB ossiculoplasty is easy to perform. Hearing results are satisfactory and lasting. The cost is null, and the tolerance is excellent.

Key Words: Double-cartilage block—Ossiculoplasty—Partial ossicular replacement prosthesis.

In 1996, the authors began to perform partial ossicular chain reconstruction in the presence of an intact stapes superstructure using the technique of double-cartilage block (DCB) ossiculoplasty described by Luetje and Denninghoff (1).

We noticed that movements and displacements of the DCB from the tympanic membrane occurred frequently. We supposed these failures were due to a lack of adhesion between cartilage surface free from perichondrium and tympanic membrane. To solve this problem, we decided to modify the original DCB technique. We left the perichondrium attached on the cartilage surface in contact with the tympanic membrane supposing the perichondrium itself would bring a faster, stronger, and long-lasting adhesion between cartilage and tympanic membrane. Moreover, the perichondrium would help to maintain the nutrition and the rigidity of DCB (2).

The purpose of our study is to describe the modification made to the classic surgical technique of DCB ossiculoplasty used by Luetje and Denninghoff and to establish if this modification can prevent the displacement of DCB from the tympanic membrane and the loss of DCB stiffness.

MATERIALS AND METHODS

Surgical Technique

A rectangular block of tragal cartilage is obtained. The surgeon judges the size fitting on the single case. The perichondrium is left on both cartilage sides unlike the technique of Luetje and Denninghoff, which performs the complete removal of the perichondrium from 1 cartilage surface. The cartilage is cut in half, avoiding transecting the perichondrium on the opposite side (Fig. 1, panel A). Next, the perichondrium is stripped...