Stapes Surgery Teaching Tool: A Simple and Stable Technique

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Abstract Stapedotomy followed by placement of a piston prosthesis is the mainstay for surgical management of otosclerosis primarily undertaken to improve hearing in patients. Although a simple and elegant procedure, prosthesis placement in stapes surgery is difficult to master. Improper surgical technique or improper placement of prosthesis may result in complications which may require revision surgery. We here describe a training technique that is simple, inexpensive, improves the skills and can be done using easily available materials such as a disposable syringe, stapler pin and micro-forceps. Regular practice with this training module minimizes surgical time and can even be done just prior to the surgery, however, this is not a substitute for temporal bone dissections.

Key words Stapes surgery · Teaching module · Using syringe and needle

Stapedotomy followed by placement of a piston prosthesis is the mainstay for surgical management of otosclerosis primarily undertaken to improve hearing in patients. Although a simple and elegant procedure, prosthesis placement in stapes surgery is difficult to master. Improper surgical technique or improper placement of prosthesis may result in complications which may require revision surgery [1]. Temporal bone dissection has been an important adjunct to operative experience and anatomic knowledge in training practicing surgeons and residents, however

the high cost and scarcity of temporal bones limit their availability as teaching tools [2].

Stapes surgery, a highly skilled surgery among otological procedures needs good dexterity and to improve the skills one may need to practice controlled hand movements necessary for the procedure through temporal bone dissections [1]. We here describe a training technique that is simple, inexpensive, improves the skills and can be done using easily available materials such as a disposable syringe, stapler pin and micro-forceps. Regular practice with this training module minimizes surgical time and can even be done just prior to the surgery, however, this is not a substitute for temporal bone dissections.

Author uses a disposable syringe in which a disposable needle bent to 90° is fixed to the barrel and acts as the long process of incus. Multiple fenestrae are made on the barrel of the syringe below the horizontal shaft of the needle that simulate the fenestra made on the footplate of stapes for the placement of the distal end of the piston (molded stapler pin) (Fig. 1). The stapler pin, used as stapes piston (Fig. 2) has one end bent to form a loop while the other end acts as the shaft (Fig. 3). With the use of micro-forceps the trainee attempts to place the piston into the fenestra and loop its upper end over the shaft of the needle acting as the long process of incus. This is to practice the simulated surgical steps of stapes surgery on a teaching module hence we choose the needle 21 Gauge and height of the vertical part is approximately 5 mm however the vertical height may vary depending on the length of the stapler piston corresponding to the size of the incus, however it can be adjusted according to the height needed by inserting it more into the syringe.

With repeated performance of placing and removing the piston one can improve the surgical skills and make the surgeon confident and well versed with the movements of

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Fig. 1 The bent shaft of the needle acts as incus

Fig. 2 Stapler pin shaped as piston

Fig. 3 Staple-piston placed into fenestra using forceps and hooked on shaft of needle

the surgical steps. Unlike temporal bone dissections, this simple training technique does not require elaborate preparations, can be performed with easily available materials and can be practiced anywhere and whenever one finds the time.

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