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Technical note

The Vigo grommet trainer

C.M. Chiesa Estomba*, J.M. Meléndez García, M.I. Hamdam Zavarce, F.A. Betances Reinoso

Department of Otorhinolaryngology–Head and Neck Surgery, University Hospital of Vigo, Rua Pizarro, #36, 5to A, 36204 Vigo, Spain

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ABSTRACT

Introduction: Transtympanic grommet placement is perhaps the most common otologic outpatient procedure and is the junior resident's first step in otologic surgery. Drain placement requires a high level of skill and only after painstaking practice, will the young physician be prepared to perform the procedure.
Technical note: We describe a home-made training model for grommet placement, consisting of a wooden base holding a syringe, with a sheet of latex simulating the tympanic membrane.
Results: The model is cheap and easy to build. It allows ear tube (grommet) placement to be simulated in a practical and risk-free manner. The technique is reproducible, allowing the young physician to develop his or her skills without patient involvement.
Conclusion: Although a simulator cannot perfectly replicate surgery, the Vigo grommet trainer is an excellent tool to provide valuable practice in acquiring and developing the skills needed to perform drain placement in the operating theater.

1. Introduction

The placement of transtympanic tubes is perhaps the most common otologic procedure and the most frequently practiced ambulatory surgery in children. In the United States approximately 667,000 drainage tubes per year are placed in children under 15 years of age [1]. It is also the first step in otologic surgery for junior residents. Indications are quite clear and ENT societies around the world have established consensus criteria for placement. There remain, however, some differences in placement technique and the types of drain found on the market.

Despite the frequency with which drains are placed, there is difficulty associated with proper placement, and only after a painstaking learning curve can the procedure be performed correctly. The first dedicated training model dates back to 1968; since then, other homemade models have been reported. The aim of this publication is to describe a homemade, easy-to-produce, inexpensive model which allows the user to perform an approximate simulation of the art of grommet placement.

2. Technical note

Building the simulator requires wood (of any sort which allows the necessary stability), anchoring tape, foam, scissors, 5 mL syringes, wood glue and latex gloves (Fig. 1).

First, the parts are drawn on the wood and cut out. The pieces are then glued together. A knotted anchor is then attached in which

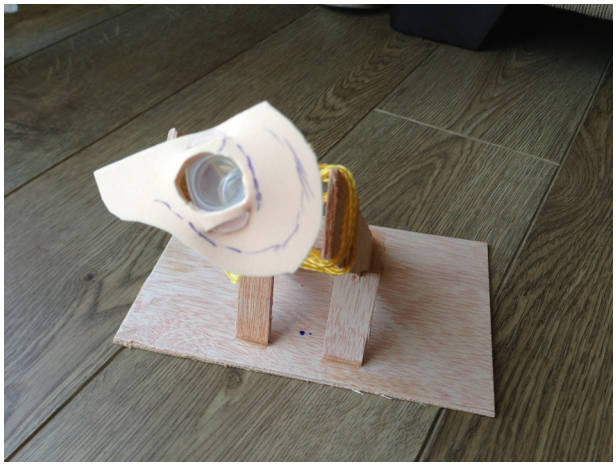

Fig. 1. The Vigo grommet trainer.

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* Corresponding author. Complejo hospitalario universitario de Vigo, Servicio de ORL, calle pizarro, nº 11. 4to D, 36204 Vigo, Spain. Tel.: +0034635793435.
E-mail address: chiesaestomba86@gmail.com (C.M. Chiesa Estomba).

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Fig. 2. Latex membrane with an angle of approximately 45° at 25–30 mm depth, to simulate the characteristics of the tympanic membrane.

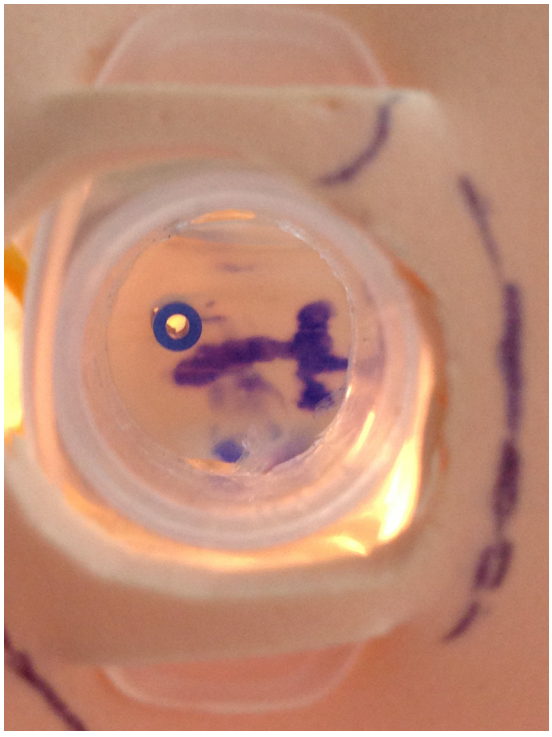

Fig. 3. Grommet placement on the latex membrane.

the syringe, simulating the ear canal, is placed. Before attaching the syringe, two 25–30 mm deep lateral incisions are made at an angle of approximately 45° to simulate the characteristics of the tympanic membrane (Fig. 2). Once the incisions are made, a piece of latex glove is introduced, simulating the feeling of strength and stress experienced when working on the real membrane and on which the malleus can be tattooed to serve as landmark. An ear, made of cut foam, is attached to the wings of the syringe to simulate the traction often necessary to visualize the tympanic membrane. In addition, the ribbons simulate the mobility of the ear canal.

Once the structure has been built, any microscope in our center's practice room can be used to practice the myringotomy technique and the placement of various models of transtympanic drainage tube, over and over, in a situation free of risk for patients (Fig. 3).

3. Discussion

Grommets have been shown to produce considerable improvement in the hearing of patients who meet the criteria for placement. They are also associated with decreased rates of acute otitis media, and provide a mechanism for draining the contents of the middle ear and for topical administration of antibiotics in persistent acute otitis media. There are studies reporting improved quality of life enjoyed by patients fitted with grommets [2,3].

However, despite all such benefits, there are risks and possible adverse consequences associated with grommet placement: excessive incision, insertion of the tube into the middle ear, damage to the ossicles, tympanosclerosis, focal atrophy, and permanent membrane perforation that requires surgical repair and may affect up to 2% of cases [4].

That is why various training systems have been designed: cadavers, acrylic simulators, homemade models similar to ours (e.g., the Wigan and Bradford grommet trainers) and the most state-of-the-art virtual models [5–9]. Both cadavers and virtual simulators, however, are expensive for hospital departments, and there is a tendency to develop alternative simulators, such as presented in this publication.

We describe a model which is simple and cheap to build, and which allows junior physicians to practice ear tube placement without risk, while guaranteeing the reproducibility of the technique under a given set of conditions. Unlike the previous models described, once the tympanostomy drain has been fitted into place, the trainee need only to remove the piece of latex simulating the membrane and replace it with a new one, a maneuver that takes just a few seconds, so that the exercise can be repeated.

This model is used by all junior residents starting their training in otologic microsurgery in our center. Significant satisfaction has been reported.

4. Conclusion

In this paper, we describe a cheap and easy to build training model, which allows junior physicians to practice ear tube placement in a risk-free setting, while guaranteeing the reproducibility of the technique under a given set of conditions. Although a simulator is not able to replace surgery, this is an excellent tool for practicing the procedure, learning to use the necessary tools, and acquiring the skills needed to perform tympanostomy drain placement in the operating theatre.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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