



## Review article

## Follow-up care after grommet insertion in children: Review article

Zahir Mughal <sup>a,\*</sup>, Vijay Thirunavukarasu <sup>a</sup>, Adnan Darr <sup>b</sup>, Mudit Jindal <sup>a</sup><sup>a</sup> Department of Otorhinolaryngology, Russells Hall Hospital, Pensnett Rd, Dudley, DY1 2HQ, UK<sup>b</sup> Department of Otorhinolaryngology, Walsall Manor Hospital, Moat Road, Walsall, WS2 9PS, UK

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## ABSTRACT

**Background:** Grommet insertion is a common procedure in children. A lengthy otolaryngology follow-up can have an adverse impact on clinic waiting times, new patient appointment availability, and pecuniary disadvantage for the hospital.

**Objective of review:** To consolidate research and opinion concerning follow-up care following grommet insertion in a pediatric population.

**Search strategy:** The literature between January 1990 and September 2015 was searched on MEDLINE (Ovid), Google Scholar, PubMed and Web of Science databases.

**Results:** Guidelines and consensus of opinion from the United States advocate that an initial post-operative review should take place within 4 weeks, and subsequent appointments every 6 months until grommet extrusion. Recent audit reports from the United Kingdom have shown that some groups arrange their first post-operative review at 3 months, and subsequent appointments vary considerably from no further follow-up to up to 24 months. Up to 75% of follow-up appointments were scheduled despite normal audiometry and clinical findings after grommet insertion, suggesting a large cohort of patients may undergo unnecessary specialist clinic reviews. General practitioners (GP), audiologists or specialist nurses are potential alternative providers of regular reviews to ensure normal hearing thresholds and an adequate tympanic membrane healing course.

**Conclusion:** Follow-up schedules are largely driven by consensus of opinion. A significant number of follow-up appointments in otolaryngology clinic appear to be redundant. Recently attention has been drawn to earlier discharge from otolaryngology clinic with subsequent follow-up in less resource and cost intensive clinics coordinated by GPs, audiologist or nurses, which may help alleviate some outpatient workload on acute hospital trusts.

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## 1. Introduction

Grommet insertion is one of the most common surgical procedures in children. In the United States of America (US), approximately 700,000 children [1], and in England over 30,000 children undergo the procedure each year [2]. A high success rate of 69–93% for treatment with grommets is reported [3]. Grommets tend to spontaneously extrude after 6–18 months [3].

Post-operative follow-up care is required to assess tube function, correction of hearing loss, diagnose and treat persisting otitis

media, and manage complications that may ensue. There are a wide range of clinical sequelae following grommet insertion [4], listed in Table 1. A proportion of patients will continue to have problems following grommet insertion. In one study of children aged under 16 months, 33.7% of patients at 5 years had recurrent or chronic middle ear disease [5]. Another study followed up children aged under 10 years over a 10-year period following grommet insertion and found that 17% were still under scheduled otolaryngology follow-up due to residual complications [6]. The rate of repeat grommet insertions varies from 19.9% [7] to 45% of children [6]. This is evidence to suggest that a significant subset of patients will require ongoing follow-up care under otolaryngology specialists.

Although otolaryngology follow-up is warranted in some patients, others will have an uneventful follow-up course. This was demonstrated by Haque et al. who identified that 75% of children followed up in otolaryngology clinic over two years did not require any intervention [8]. This translated to a large proportion of

\* Corresponding author. Clinical Offices Level 1 ENT Secretaries, Russells Hall Hospital, Dudley, DY1 2HQ, UK.

E-mail addresses: [zahir5019@gmail.com](mailto:zahir5019@gmail.com) (Z. Mughal), [teeveeraj@yahoo.com](mailto:teeveeraj@yahoo.com) (V. Thirunavukarasu), [adnandarr@doctors.org.uk](mailto:adnandarr@doctors.org.uk) (A. Darr), [mudit.jindal@dgh.nhs.uk](mailto:mudit.jindal@dgh.nhs.uk) (M. Jindal).

**Table 1**  
Kay et al. meta-analysis data of incidence of grommet sequelae.

Grommet sequelae	Incidence
Transient otorrhoea	
Early	16%
Late	26%
Recurrent otorrhoea	7.4%
Chronic otorrhoea	3.8%
Obstruction	7%
Granulation tissue	5%
Premature extrusion	3.9%
Medial displacement	0.5%
Tympanosclerosis	32%
Focal atrophy	25%
Retraction pocket	3.1%
Cholesteatoma	0.7%
Perforation	
Short-term tubes	2.2%
Long-term tubes	16.6%

appointments slots (62.8% out of 433) that did not lead to any intervention. This group found that only 6.6% of 181 patients required hospital based treatment for a complication, and their opinion was that the remaining 18.2% of patients that had complications could have been managed within primary care. Patients who required hospital management occupied only 10.9% of 433 appointment slots. This supports the need for a higher level of surveillance from otolaryngologists for a relatively small but significant population. However these figures do not support repeated follow-up by otolaryngologists for the majority of patients.

The large number of potentially avoidable consultant-led otolaryngology clinic appointments may have significant resource and financial implications. This includes lengthened waiting times for new clinic patients. The English National Health Service (NHS) outpatient tariff for consultant-led otolaryngology clinic for a new patient is £106, and £65 for follow-ups [9]. Follow-up by the surgeon after performing a grommet operation is important and should continue, however a shorter otolaryngology follow-up schedule may help to alleviate pressures on new patient clinic waiting times and financial strain on acute hospital trusts. In this review we discuss the options for delivery of follow-up care by non-otolaryngologists to evaluate whether this is a feasible, safe and effective method of managing resources and local services.

The primary aim of this review was to determine from the medical literature the recommendations and evidence base for timing and length of otolaryngology follow-up care following grommet insertion. To the authors' knowledge, this is the first review of its kind.

## 2. Materials and methods

The literature on MEDLINE (Ovid), Google Scholar, PubMed and Web of Science databases was searched. Inclusion criteria were human studies on follow-up care after grommet insertion for otitis media with effusion or recurrent acute otitis media in children under the age of 18. Exclusion criteria included children with underlying pathological predisposition to Eustachian tube dysfunction, including craniofacial abnormalities such as cleft palate and Down's syndrome, as these patients would require more vigorous follow-up and would skew the results. The keywords used in the MEDLINE search were 'grommet', 'ventilation tube', 'myringotomy', 'tympanostomy', combined with 'follow up' and 'surveillance'. The search was limited to studies from January 1990 to September 2015 and included all languages. Related articles in PubMed and reference lists within articles were also used to identify relevant articles.

Articles were screened by title and abstract, and selected articles were obtained and summarized. The evidence was graded using the Oxford (UK) Center for Evidence Based Medicine (CEBM) Levels of Evidence [10].

## 3. Results

The MEDLINE search result returned 795 articles. After screening of titles and abstracts 12 studies were included in our review and two were excluded. An additional three articles were identified through other search strategies described in methods.

### 3.1. Guidelines and consensus opinion

Isaacson and Rosenfeld devised clinical guidelines on grommet surveillance in 1996 in the US [11]. They recommended that otolaryngologists should perform the first post-operative follow-up review within 2–4 weeks, and further routine visits every 4–6 months until 6–12 months following grommet extrusion. These recommendations were used in the American Academy of Pediatrics (AAP) guidelines published in 2002 [12]. The American Academy of Otolaryngology - Head and Neck Surgery Foundation (AAO-HNS) published clinical guidelines more recently in 2013, and included a sample education sheet for parents [13], again repeating the original guidance from Isaacson and Rosenfeld [11].

### 3.2. Audit reports

In 2007 Spielmann et al. identified from a sample of 50 children that their median post-operative follow-up period was 3 months (ranging from 1 to 7 months) [14]. The mean number of appointments per child was 3.12. The United Kingdom (UK) researchers implemented a policy of a single post-operative follow-up appointment at 3 months for pure tone audiogram, and discharge from otolaryngology clinic unless clinical and audiometric findings were abnormal. This policy reduced the mean number of appointments per child to 1.83 (n = 84).

In 2012 another UK-based group Haque et al. reported that the majority of appointments within their department were given at 6 months, but there was wide variation in timing ranging from weeks to 24 months [8]. The researchers recommended that the first follow-up appointment should take place at 3 months, matching the practice described by Spielmann et al. [14]. Another group of UK otolaryngologists also supported the timing for the first post-operative review should be 3 months [15].

### 3.3. Empirical investigation

Wallace and Newbegin evaluated patients that were reviewed at 1 week and 4 weeks, and demonstrated that there was no significant difference in complication rate or frequency of visits to general practitioners (GP) outside of planned follow-up [16]. Therefore follow-up shorter than 4 weeks provided no additional benefit.

## 4. Discussion

Otitis media with effusion (OME) is a common condition of early childhood with a prevalence of 20%. Up to 80% of children are affected before the age of 10 years [2]. The UK National Institute for Health and Care Excellence (NICE) recommends bilateral grommet insertion for children with OME with persistent hearing loss over 3 months, or if hearing loss has a significant impact on a child's developmental, social or educational status [17].

Acute otitis media (AOM) affects most children at least once by the age of three years, and by the age of 6 years nearly 40% have

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