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**The Long Term Effects of the  
Fluctuating, Conductive Hearing Loss Caused by  
Otitis Media with Effusion on  
Learning and Behaviour for Adolescent Students.**

**Janice S. Stenton**

**2003**

**The Long Term Effects of the  
Fluctuating, Conductive Hearing Loss  
Caused by  
Otitis Media with Effusion on  
Learning and Behaviour for Adolescent Students.**

**This thesis is submitted in fulfilment of the requirements of the  
Degree of Doctor of Philosophy**

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**August 2003**

## **Abstract**

Children frequently experience fluctuating conductive hearing loss during and following episodes of otitis media with effusion. With the prevalence of the disease increasing in the non-Aboriginal population in Australia, many children may be at risk of long-term learning and behavioural problems. There are conflicting findings in the research literature regarding the effects of this type of hearing loss. Although it is expected that the insertion of tympanostomy tubes (grommets) will reduce the duration and prevalence of both the disease and the conductive hearing loss, this does not always happen. For some primary school aged children it appears that experience with otitis media with effusion with or without grommet insertion is associated with various education problems including poor academic achievement and inappropriate behaviour. A current concern is whether or not these possible effects would continue to influence the learning and behaviour of children as they continue into their high school years.

A review of the literature suggests that multiple factors including interrelationships between experience of otitis media with effusion, family and childcare environments may be involved in explaining why some students do not achieve as expected at school (Roberts et al., 2000). The literature further suggests there may be a cumulative effect in these factors, which introduces both quantitative and qualitative aspects to the discussion.

A study was undertaken to identify the impact of otitis media with effusion and its associated sequelae on the learning and behaviour of high school students. Information from parents of high school students in Years 8 and 9 was used to identify students for inclusion in the study and to provide information on their medical and educational history as well as the parents' perceptions of various aspects of the students' learning and behaviour (including social skills). Three groups were formed: a Non-OME/Non-Grommet Group ( $n = 28$ ), an OME/Grommet Group ( $n = 17$ ) and an OME/Non-Grommet Group ( $n = 32$ ). The TORCH, WRAT 3 and the Test of Syntactic Abilities (Screening Test) were administered to the students who also provided their own perceptions of specific aspects of their own learning and behaviour on a survey form. Teachers' perceptions on these areas were also collected. School academic records as well as data from school behavioural records were used.

Analysis of the results revealed a range of mild effects. These included poorer academic results particularly for girls with a history of grommets, who also exhibited a lack of confidence in their social skills. An increase in behaviour problems for boys with a history of the disease (with or without grommets) was also found. The study identifies a number of associated teaching and learning issues including noise levels in childcare environments and school classrooms, current teaching and learning methodology and the training of new teachers. It recommends a number of areas for future research including more in-depth questioning of parents regarding their awareness of hearing problems in their children, the use of more fine-grained measures to assess learning outcomes and the identification of possible gender differences associated with the disease and experiences with grommets.

## Dedication

This project is dedicated to the researcher who significantly influenced my developing mind. He encouraged me to question and he enthusiastically infected me with the notion of using my imagination in the search for answers while applying a rigorous approach to the process – thanks Dad – I learned more than you expected from those seeds!



Ron Moore  
Sorghum Plant Breeder  
(1929 – 1974)

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- ◆ Colleagues from the school community who encouraged me to undertake this study and provided the data.
- ◆ My loving family Graham Stenton, Chantal Watson and Inga Clancy who unconditionally accepted and supported my commitment to this project.

## Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

**Janice S. Stenton**

**Date: .....**

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## Chapter 1

### Introduction

Otitis media in all its forms is one of the most frequently occurring childhood diseases (Majeed & Harris, 1997). This condition and its various sequelae, including conductive fluctuating hearing loss, may have a long-term impact on how children learn and behave. The scale and degree of the impact of the sequelae to otitis media are currently a topic of debate and the associated affects on speech, language and child development as well as on cognitive, academic and behavioural performance are being researched.

Current research indicates that the development and performance of some children who have repeated episodes of the disease are at risk, however, there are also numerous other research findings in the area that dispute this assertion. Making sense of the varied research outcomes is related to an understanding of the disease itself and its sequelae. This includes identifying various aspects of the disease, including symptoms and how the disease is described, classified, identified and treated. It also includes estimating the prevalence of the disease in various populations and identifying the factors that put some children at a higher risk of contracting otitis media. One of the sequelae of otitis media is mild, fluctuating conductive hearing loss, and some researchers indicate that this hearing loss has a negative impact on the academic and behavioural performance of some children. However, the results of the research are inconsistent although it is clear that some children who have had conductive hearing loss are failing to reach their educational potential.

This study originated in the field of education. During many years of working in schools, on numerous occasions parents were heard expressing the opinion that having middle ear infections as a child had compromised the potential of their student to learn academically and/or to behave appropriately at high school. They did not appear to understand how or why this had happened but they were concerned that, in their view, when they compared the student with a history of middle ear infections with siblings and classmates who did not have such a medical history, there was a difference in school grades and behaviour. According to the parents, the students with the history of middle ear infections had more problems with academic learning and were in trouble more frequently at school. Some parents added that, although their student had

grommets inserted when they were young because their middle ear problems were not resolving despite medical intervention, their school reports continued to be poorer than those of their peers who were without a similar history. This study was originally initiated in an attempt to confirm or deny these opinions. For example, were the parents correct in their observations that even after the middle ear infections had ceased to occur there continued to be a negative impact on learning and behaviour continuing into the high school years?

In order to understand the issues surrounding middle ear infections and how the associated fluctuating, conductive hearing loss may have an effect on learning and behaviour an extensive review of the literature was undertaken in Chapter 2. This included a review of the medical aspects of the disease in order to understand the problems associated with diagnosis and classification of the disease and followed by an examination of the sequelae of the disease so that the links between the disease and the associated hearing loss could be explored in terms of the implications on students' learning and behaviour. An outcome of the literature review was the clear need for further exploration of this link between the disease, the hearing loss and learning and behaviour.

As parents had raised their concerns, in some cases quite strongly, regarding their observation of a link between middle ear infections and learning and behaviour problems it was important that input from parents be a strong feature of this research. A study was devised where information obtained from parents was used in conjunction with data from other sources so that the learning and behaviour outcomes of high school students could be studied in an attempt to link them with middle ear disease and fluctuating conductive hearing loss. Chapter 3 outlines the procedures used in this study to examine these links and Chapters 4 and 5 present the results from the study and discuss them in terms of the literature review and the home, learning and teaching environments of the students. The conclusions that may be drawn from the process are discussed in Chapter 6, including a consideration of possibilities for future focus in research in the area and the implications of the research on the learning and teaching environment.

## Chapter 2

### Literature Review

#### 2.1 Otitis Media - The Disease

Otitis media is a widespread disease and its sequelae affect numerous children and families in various situations including in the classroom. In order to understand how this happens it is important to consider how otitis media is defined and classified, as well as the process of the disease itself, because these elements (definition and classification) influence the treatment children receive and in turn their hearing capability and consequently their learning and behaviour.

##### 2.1.1 Definitions and Classification of Otitis Media

Otitis media is a general term for a number of conditions that affect the middle ear. Such conditions range from acute to chronic and may be with or without symptoms. Over the last thirty years there has been a great deal of discussion regarding the terms used by researchers to describe the numerous conditions associated with otitis media and researchers have used a variety of definitions (Daly, 1997).

Attempts have been made to establish consistent, internationally accepted terminology during a number of International Symposia on Recent Advances in Otitis Media as well as at various Post-Symposium Research Conferences held since 1975 (Lim, Bluestone, & Casselbrant, 2002). One of the goals of the Post-Symposium Research Conferences was to develop a consensus on definitions and classification of otitis media (Lim et al., 2002). In 1978, the task force from the Post-Symposium Research Conference tried to establish a general consensus over the terminology and definitions used to describe the various stages of otitis media. However, this consensus did not include grading, according to severity, of acute otitis media and otitis media with effusion or the classification and staging of the complications or sequelae of otitis media and related conditions (Bluestone, Gates et al., 2002). It has been noted that "although experts have recommended using standard terms with standard definitions when communicating about otitis media, in practice, researchers have used a variety of definitions to describe conditions in the otitis media continuum" (Daly, 1997, p. 4). Bluestone (1999) suggests that generally there is consensus regarding use of the terminology, however, controversy over the use of terminology in the area does continue to linger.