
Swimming and Grommets

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Background. Traditionally, children with tympanostomy ventilating tubes, or grommets, were advised that water should not enter their ears in order to prevent ear infections. This group of children has been considered somewhat handicapped regarding swimming. We conducted a prospective study to determine if there is a relation between suppurative otitis media and surface swimming in children with grommets.

Methods. Forty-two children with tympanostomy ventilating tubes were included in this study. Of the 42 children, 22 were swimmers and 20 were nonswimmers, who served as the control group. The age range was 3 to 12 years, and there was no difference in the age distribution between the groups. Surface swimming was allowed without earplugs or a bathing cap, although it was mandatory to use polymyxin B-neo-

mycin-hydrocortisone eardrops at bedtime on the day of swimming. No diving was allowed.

Results. Three of 22 swimmers and 2 of 20 nonswimmers developed otorrhea. In 4 of the 5 children, the otorrhea was followed by an upper respiratory tract infection. In all cases, a bacterial culture revealed *Pseudomonas*. The ear drainage was easily controlled with local otic treatment in all the patients.

Conclusions. Taking into consideration the possible risks of infection and bearing in mind the value and joy of swimming to children and parents, families should be reassured that surface swimming does not increase the risk of infection in children with tympanostomy tubes.

Key words. Swimming; middle ear ventilation; otolaryngology. (*J Fam Pract* 1994; 38:30-32)

Plastic ventilating tubes (grommets) have been used in the treatment of middle ear effusions for nearly 40 years.¹ Physician recommendations regarding swimming for children with tympanostomy tubes vary from a total prohibition to no restrictions. Traditionally, children with tympanostomy tubes are advised not to get water in their ears so that ear infections will not occur. These children have been considered to be somewhat handicapped regarding swimming and bathing. Some physicians allow swimming and bathing if earplugs or bathing caps, or both, are used. Our study was conducted in order to determine if there is a relation between suppurative otitis media and surface swimming.

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Methods

During a period of 3 years (1990 through 1992), 42 children with plastic ventilating tympanostomy tubes were enrolled in the study. All the patients underwent plastic ventilation tube insertion because of recurrent otitis media or serous otitis media complicated by impaired hearing. The age range was 3 to 12 years. The decision to swim was made by the patient or parents. Surface swimming was allowed without earplugs or bathing caps, although it was mandatory to use neomycin-polymyxin-hydrocortisone eardrops at bedtime on the day that the child had been swimming. No diving was allowed.

Twenty-two of the children (12 boys and 10 girls) were swimmers, and 20 (11 boys, 9 girls) were nonswimmers. There was no significant difference between the age distribution of the groups. The 22 swimmers participated in swimming from 4 to 6 times per week. Swim-

ming was done in chlorinated pool water and seawater, without any restrictions. The swimming season lasted for at least 6 months per year (April through September). The duration of swimming was ½ to 2 hours each day. The follow-up period lasted between 1½ and 2½ years. The group of non-swimmers served as the control group.

Results

Three of the 22 swimmers developed otorrhea during the follow-up period. Two of them, one boy and one girl, were 3 years old, and the other child, a boy, was 4 years old. Two of the three patients subsequently developed an upper respiratory tract infection during this period. One patient's parents forgot to administer the otic drops. Bacterial culture revealed *Pseudomonas* infections in all three patients. In all the children, the ear drainage was easily controlled by administering polymyxin B–neomycin–hydrocortisone eardrops for 7 days. Two of the 20 nonswimmers also developed ear drainage during the follow-up period, after an upper respiratory tract infection. Their ages were 3 and 4 years, and both were boys. Bacterial culture revealed *Pseudomonas* infections in both patients. The ear drainage was easily controlled by administering eardrops for 7 days in both patients.

Discussion

One of the most frequent questions asked by parents of a child with tympanostomy tubes is whether the child is allowed to swim or to bathe, and whether there is a risk that the water will pass through the grommets and infect the middle ear.

Marks and Mills² found that water pressure of 12.5 to 22.5 cm would be needed to push water through a grommet. They concluded that in most patients, no water enters the middle ear during surface swimming, bathing, or hair washing. The risk of water entering the middle ear increases if the child participates in underwater swimming or diving.

Chapman³ and Jaffe and Chesnut⁴ reported a lower incidence of otorrhea in children with tympanostomy tubes who swam without using earplugs than in non-swimmers. Earplugs or bathing caps seemed to provide no extra protection when patients used an otic suspension containing polymyxin B, neomycin, and hydrocortisone at bedtime on the day that they swam. Schwartz⁵ concluded that using otic antibiotic drops routinely after swimming was not necessary.

Approximately 2% to 3% of children with tympanostomy tubes will develop acute otorrhea, but it is usually

easily treated with topical otic antibiotic medications. Arcand et al⁶ reported that otorrhea occurred more frequently in younger children, especially those 0 to 2 years of age. They also noticed that more than 50% of the ear infections were accompanied by an upper respiratory tract infection during that period. In our study, among both swimmers and nonswimmers, otorrhea occurred in the younger children (those 3 to 4 years of age). In four of five patients, it was accompanied by an upper respiratory tract infection.

Smelt and Monkhouse⁷ irrigated the middle ear mucosa of guinea pigs with seawater, bath water, swimming pool water, and normal saline (control), and found that only bath water resulted in appreciable inflammation. The level of chlorination in swimming pools should preclude high bacterial counts,⁸ but chlorine can act as a local irritant.

Gram-negative organisms such as *Pseudomonas*, *Proteus*, *Klebsiella*, and *Escherichia coli* may be found in bath water in a high concentration,^{9,10} but it is unclear whether bath water increases the risk of ear infections in children with grommets.¹¹

Many otolaryngologists recommend earplugs for ocean swimming because of their fear that sand grains might enter the middle ear space through the tympanostomy tube.⁵ In our study, 2 of 3 children in the swimmer group developed otorrhea after swimming in a chlorinated pool and one patient after swimming in seawater.

During the follow-up period, 3 of 22 swimmers and 2 of 20 nonswimmers developed ear drainage. Their ages ranged from 3 to 4 years. In 4 of 5 cases, the otorrhea was followed by an upper respiratory tract infection. In all 5 patients, bacterial cultures revealed *Pseudomonas*. The ear drainage was easily controlled with local otic (polymyxin B–neomycin–hydrocortisone) treatment for 7 days in all the patients. No significant difference was observed between swimmers and nonswimmers.

Conclusions

In spite of the consensus in the medical literature, some pediatricians and ear specialists still recommend that water should not enter the child's ear if a ventilating tube has been inserted. The purpose of this study was to focus on this topic and to show that surface swimming is not detrimental to the health of the child. Taking into consideration the possible risks and bearing in mind the value and joy of swimming to children and parents, the family should be reassured that surface swimming does not increase the risk of infection in patients with tympanostomy tubes.

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