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MAIN ARTICLE

Surfers' awareness of the preventability of 'surfer's ear' and use of water precautions

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Abstract

Objective: To establish surfers' knowledge of the preventability of external auditory canal exostoses ('surfer's ear'), and their use of water precautions.

Method: Survey of surfers conducted between December 2009 and March 2010 at beaches in Cornwall, UK.

Results: Ninety-two surfers were included (78 males and 14 females, mean age 27 years, standard deviation 7.9 years). Participants were grouped according to their awareness of the preventability of surfer's ear (55 aware, 37 unaware). These groups were comparable in age, surfing history and gender mix ($p > 0.05$). Surfers aware of the preventability of exostoses (66 per cent) were more likely to use water precautions than those who were not (38 per cent) ($p < 0.01$). Two surfers used water precautions regularly and 48 used them occasionally. Sixty-one of the 76 surfers who did not use water precautions (ear plugs) suggested they would consider doing so in the future.

Conclusion: Awareness of the preventability of surfer's ear was associated with greater use of water precautions. Further research should explore reasons for the low uptake of such precautions. Most surfers not already using ear plugs would consider doing so in the future.

Key words: Exostoses; Ear, External; Public Health

Introduction

Surfing is an increasingly popular recreational activity in the UK, particularly in the South West of England, where the mean sea temperature is 8–12°C from November to March.[1] Surfers are prone to otological disease, namely external auditory canal exostoses ('surfer's ear'), otitis externa and tympanic membrane perforation.[2] Exostoses are bony growths of the external auditory canal which develop in response to cold water exposure.[3]

Such exostoses are usually asymptomatic. However, if large they can cause conductive hearing loss, recurrent otitis externa and otalgia.[2] Management strategies include conservative measures such as regular aural toilet and antibiotic ear drops. Surgery is indicated when conservative measures fail. Epidemiological studies of surfing communities in several countries have identified a higher prevalence of exostoses in populations exposed to colder waters.[3–6] This has led to many experts advocating the use of ear plugs or wetsuit hoods to prevent the ingress of cold water into the external auditory canal. Such precautionary measures should prevent the development and limit the progression of exostoses.

In our experience, the use of water precautions amongst surfers is not commonplace. We conducted a survey of surfers at several beaches in Cornwall to establish their understanding of surfer's ear and preventative measures.

The study aimed to establish surfers' current understanding of exostoses and to ascertain the prevalence of water precaution usage.

Methods

Between December 2009 and March 2010, we approached surfers at beaches in the county of Cornwall, UK, and invited them to participate in this study. Surfers with a history of ear surgery (other than grommets in childhood) were excluded. We conducted the study during the colder months to minimise the inclusion of infrequent surfers who only surfed during the warmer months.

The items of information gathered are shown in Appendix 1.

Responses were entered onto a Microsoft Excel spreadsheet (Microsoft, Redmond, Washington, USA). Descriptive statistics were used to demonstrate the prevalence of water precaution usage and the prevalence of knowledge about exostoses and their preventability. Statistical analysis was performed using the Statistical Package for the Social Sciences version

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11.0 software program (SPSS Inc, Chicago, Illinois, USA), to compare the characteristics of surfers who were and were not aware of the preventability of exostoses.

The study protocol was discussed by the relevant local ethics committee and institutional research review body, which deemed that the study did not require ethical approval.

Results

The study included 92 surfers: 78 males and 14 females (mean age 27 years, age range 15–49 years, standard deviation 7.9 years). Almost all participants ($n = 91$) surfed during autumn and winter, when the sea temperature was significantly colder (8–12°C during autumn and winter, compared with 12–16°C during spring and summer).

Seventy-two surfers were aware of the term 'surfer's ear'. Forty-seven knew the associated symptoms, and 55 were aware of the condition's preventability.

We divided the surfers into two groups – those aware and those unaware of the preventability of surfer's ear – in order to identify differences in demographics and water precaution usage (see Table I). Statistical analysis was performed to identify any statistically significant difference between these two groups (using the Mann–Whitney test for age and surfing history, and the chi-square test or Fisher's exact test for dichotomous data).

There was no statistically significant difference between these two groups in terms of age, surfing history and gender distribution. Surfers who were aware of the preventability of exostoses were more likely to use water precautions. After being educated about the preventability of exostoses, 61 of the 76 surfers who did not use ear plugs suggested they would consider doing so in the future.

TABLE I
COMPARISON OF SURFERS AWARE AND UNWARE OF PREVENTABILITY OF 'SURFER'S EAR'

Parameter	Aware	Unaware	*p*
Number (*n*)	55	37	
Age (mean ± SD; y)	27.1 ± 8.0	27.0 ± 7.8	0.946*
Surfing history (mean ± SD; y)	10.0 ± 7.4	7.11 ± 4.38	0.096*
Gender ratio (male:female)	48:7	30:7	0.555†
Water precautions used (*n* (%))	36 (66)	14 (38)	0.009†a
Ear plugs used (*n* (%))	13 (24)	3 (8)	0.090‡
Wetsuit hood used (*n* (%))	30 (55)	12 (32)	0.037†b
Ear plugs & wetsuit hood used (*n* (%))	7 (12)	1 (3)	0.137‡
Regularity of water precaution usage (*n*)			
– Always	2	0	0.541‡
– Sometimes	34	14	0.024†b
If no ear plug use**, consider in future?			
– Yes:no (*n*)	33:9	28:6	0.680†

*Mann–Whitney test; †Pearson chi-square test; ‡Fisher's exact test. [a]$p < 0.01$; [b]$p < 0.05$. **76 subjects. SD = standard deviation; y = years

Discussion

Our study findings provide an insight into UK surfers' understanding of external auditory canal exostoses and the use of water precautions. Sixty per cent of surfers knew of the preventability of exostoses; however, only 2 per cent 'always' used water precautions, whilst a further 52 per cent used them 'sometimes'. Surfers with an awareness of preventability were significantly more likely to use water precautions.

The role of cold water exposure in the development of exostoses has been demonstrated in animal studies involving aural cold water irrigation, which encourages osteoblastic activity and subsequent bony overgrowth.[7] Aural symptoms ensue once the ear canal is substantially occluded by exostoses, as it is then unable to clear itself. The severity of exostoses is dependent on the total duration of cold water exposure.[4] Studies have identified a greater exostosis prevalence and/or severity in surfers on coasts with colder waters, compared with those surfing the warmer waters of New Zealand,[3] Australia,[4] Japan[5] and the USA.[6]

- **External auditory canal exostoses ('surfer's ear') are bony growths of the external auditory canal which develop in response to cold water exposure**
- **Surfers in colder waters have a higher prevalence of such exostoses**
- **The use of ear plugs or a wetsuit hood stops cold water entering the external auditory canal; this may limit the development and progression of exostoses**
- **Only 54 per cent of the surfers surveyed used water precautions**
- **Awareness of the preventability of exostoses was associated with greater use of water precautions**
- **Health promotion may increase the uptake of water precautions**

Despite the general consensus that the use of ear plugs may prevent the development of such exostoses, there has been no research to test this theory. Such a study would not be feasible due to the duration involved and the high subject compliance required. The evidence for ear plug usage is limited to case reports and expert opinions. DiBartolomeo[8] reported a series of 70 patients with external auditory canal exostoses, of which one surfer had exostoses on the left but a normal ear canal on the right. This patient had undergone a myringoplasty (for a surfing-induced tympanic membrane perforation) on the right ear 10 years earlier, and subsequently had continued to wear an ear plug in

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that ear when surfing, but not in the left ear. Timofeev *et al.*[1] demonstrated a statistically significant reduction in the recurrence of exostoses following primary exostosis removal surgery, in patients who regularly used ear plugs during water exposure. Other studies have not established any advantage of using ear plugs or wetsuit hoods; however, this result was inconclusive as the numbers of surfers using ear plugs was very low and the regularity of use was not evident.[3]

Surgery for external auditory canal exostoses is seldom required. Reported complications of such surgery include tympanic membrane perforation, hearing loss, tinnitus, vertigo and facial nerve injury.[9–11]

Conclusion

External auditory canal exostoses (surfer's ear) is a preventable disease. It is thus surprising that regular use of water precautions is not more prevalent, even among surfers aware of the condition's preventability. Further research is necessary to understand the reasons for such low uptake of water precautions. It is encouraging that, once educated about exostoses, most surfers who had not previously used ear plugs indicated that they would consider doing so in the future. This suggests that health promotion may increase the use of water precautions, which would reduce the progression of external auditory canal exostoses and associated morbidity.

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Appendix 1. Survey questions

Age (years)
Surfing history (years)
Gender (male/female)
When do you surf? (autumn/winter/spring/summer)
Have you heard of surfer's ear? (yes/no)
Do you know the symptoms of surfer's ear? (yes/no)
Do you use water precautions? If yes, please specify (ear plugs/hood/both)
If you do use ear plugs/hood/both, how often? (always/sometimes/never)
If you have heard of surfer's ear, did you know that surfer's ear is preventable? (yes/no)
If you do not already use ear plugs, would you consider using them in the future?

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