

Dr SK Hong

So we had to make comparisons for a given skin fat thickness. They were very skinny in 1960's. I think this reflected, to some extent, the poor economy.

Question:

The Ama divers are female. Is that because they adapt better, or because they are pushed into it?

Dr SK Hong

My theory is that they are there because they can tolerate cold water better than males. Because, if you look at history, both male and female divers were once involved but gradually male divers disappeared from the scene. However, in Japan, where they dive only during the warm season, you find both male and female divers. So there is nothing magic about the absence of male divers in Korea where they do dive all year round, they have to tolerate the cold stress and have to compete with women, and there is no way that they can win.

Question:

Why are present day Ama fatter?

Dr SK Hong

Nutrition accounts for the increase in the amount of body fat in contemporary divers. But remember, our data are based on a given skin fat thickness, so we have ruled out skin fat as a variable.

Question:

Did the effect of the wet-suit increase their breathhold capacity?

Dr SK Hong

We do not know. Breathhold time is longer in divers than in non-divers, but not much. Breathholding time is not an issue, because usually they do not breathhold for long. They hold their breath for a diving time of about 30 to 40 seconds, and we have reasons why they do that. To get the maximum bottom time and to increase the fraction of time they spend on the bottom, shorter and shallow dives are better.

Question:

When you say that breathholding is a matter of training, is it partly a personal thing, or is it endless practice that makes them able to breathhold just that bit longer? Do they go down on a shot line and get there quickly, or do they have to swim down?

Dr SK Hong

I think it does require skill. They have to learn to swim and to dive from shallow to deeper and deeper depths, and they have to learn all the tricks.

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IMAGINARY CONSULTATION

"MY STUPID EARS"

Noel Roydhouse

In a letter recently published in an Underwater Association newsletter a reader asked for their Medical Adviser's advice on solving his problem. It was a problem which troubles many divers, "Ears". I have set down the *thoughts* which would have occurred to me had he **told his tale** during a consultation concerning his problem to draw attention to the problem of misdirection of attention if the patient's diagnosis is uncritically accepted.

"I have a diving problem, my ears. I have a history of sinus problems." *Prior to 1920 this would have been "nasal catarrh" but owing to a world wide tendency for ENT Surgeons to operate on normal, non-infected sinuses in the 1920's, folk medicine changed this to "sinus trouble", as the patients underwent thousands of operations upon their normal sinuses. The reason they improved temporarily is well documented by the Immunologists but basically the shock of the operation gave three to six month cure, after which they relapsed and their catarrh was often worse. By the 1940's such operations were given up but folk medicine "sinus" problems have incorrectly and mistakenly persisted. "At the age of thirteen I had my tonsils removed." Probably unnecessarily so, as in my 34 years of taking out children's tonsils the age group of ten to fifteen years rarely need tonsillectomy. "And ever since then I have been plagued by sinus." Nasal catarrh really, and it is stuffiness or blockage of the nose with or without a mucous or thin discharge from the nose, sometimes with a "pressure" in the nose or under the eyes.*

"I noticed when snorkelling that I was unable to equalise pressure as readily as before the tonsillectomy." *No wonder. "Sinus" is often stress induced and the unnecessary operation of tonsillectomy would be enough to bring on nasal catarrh. "Over the years the problem has got steadily worse." I would guess four to five years - see later. "Now I've only got my stupid ears." He is getting emotionally involved with his problem and this adds to the stress and makes him worse again. "Wet in the bath, and I've got earache." I have published several papers on this^{1,2} and he fits the typical case described. Appendix 1 is an abstract of Reference 2.*

"I have all but completed the divers' course necessary to get a certificate but was unable to pass the medical due to blocked Eustachian tubes." *Named after Bartolomea Eustachi, an Italian Anatomist (1520-1574) who first described this tube which is also known as the Internal Auditory tube. "After a half hour dive to about 30 feet." Diving to 30 feet meant that he had cleared his ears or he would have ruptured his ear drums. Diving, in itself, does not cause any permanent blockage of the Eustachian tube. If one does not clear one's ears on descent the water pressure compresses the inner soft tissue end of the Eustachian tube and at two metres unless equalisation has occurred the Eustachian tube is locked. This means that the chest muscles cannot produce enough pressure to open the Eustachian tubes as they cannot raise the pressure*

behind a blocked nose to this water pressure. "I had prolonged earache for about six weeks afterwards." This is due to the Mandibular Dysfunction Syndrome.³

"One of the two ENT Specialists I saw ..." He obviously shopped around and was probably told by the first one that there was nothing wrong with his nose or sinuses. As he had already had his tonsils out I suspect he had been circumcised and had his appendix out and came from a surgically minded family⁴ and was all set for another ENT operation. All surgeons are trained to operate! "...performed a right anterior" where else do you do it! He probably means intra-nasal. "Antrostomy to dry and relieve the sinus." This calls for prolonged comment. Apart from the intra-nasal antrostomy being a useless operation harking back to the witch doctoring of the 1920's, the diver produced no evidence that it was ever indicated. If purulent sinusitis, for which antrostomy is indicated, was present, and he was having trouble with both ears, one would assume that the operation would have been done on both sides if at all. Also, the vast majority of ENT specialists would have washed out his sinuses first to confirm that there was some infection present before embarking upon the antrostomy operation. The operation is not indicated to "dry" the sinuses but to provide immediate free drainage of pus from the antrum. He could have misinterpreted the reason or have been misguided. Anyway, he states that both sides of his nose are less blocked, further illustrating the "shock" or immunological effect of operating on normal sinuses.

"While I admit that side is freer" Does he mean more nasal discharge, a complication rather than a benefit. "to the extent that my nose is seldom blocked, my ears always feel under pressure." It is about time he had his impacted wisdom teeth removed, or he should give up grinding and clenching his teeth and give up biting his mouthpiece so hard, as the Mandibular Dysfunction Syndrome is about the only condition which can produce this pressure and the prolonged earache (six weeks) that he suffered previously.

My advice to this diver would be to suggest cauterisation of his inferior turbinates, counselling on the techniques of clearing the ears, and to have his wisdom teeth removed or, if these were not troubling him, to do jaw muscle stretching exercises and give up worrying, or at least to give up grinding and clenching his teeth and biting his mouthpiece. Do not get me wrong but patients can strew the path with red herrings or even lobsters. To get at the bottom of a diver's problem can be difficult as he has not had a medical training which includes a new vocabulary of about 14,000 words that a medical student picks up in his first 6 years. The doctor has to act as his own interpreter.

REFERENCES

1. Roydhouse N. Earaches and the adolescent swimmers. In: Eriksson B and Fuberg B (eds). *Swimming Medicine IV*. Baltimore: University Park Press, 1978; 79-84.
2. Roydhouse N. Earache and adolescent swimmers. *NZ J Sports Med*. 1977; 5(2): 15-18.

3. Roydhouse N. The jaw and scuba diving. *J Otolaryn Soc Australia*. 1977; 4,2: 162-165.
4. Miller FJW, Court SDM, Walton WS, Knox EG. *Growing up in Newcastle Upon Tyne*. London, Nuffield Foundation: 1960; 21, 224.

APPENDIX I

Roydhouse N. Earache and adolescent swimmers. *NZ J Sports Med*. 1977; 5(2): 15-18.

"Swimmers, both surface and underwater, seem to suffer from earache more commonly than the average sports person. Because many doctors, including Ear, Nose and Throat Surgeons, regard water sports as the reason for the earache they tell their patients to give up swimming. Accordingly the case histories of twelve adolescents who suffered earache and were swimmers were examined. In all cases it was shown that the primary causative pathology was not in the ear and that immersion in the water was not the prime cause of the trouble. The prime cause was erupting or impacted molar teeth, teeth grinding and psychological upset, with the exposure to the cold water as the precipitating factor. Prevention is to put up with the problem until the molar teeth have erupted or to have the appropriate dental treatment. Reassurance after explanation with the cessation of grinding and clenching the teeth was often all that was needed."

COMMENTS FROM MELBOURNE

John Knight

Dr Roydhouse, in his entertaining and instructive Imaginary Consultation states that unless equalisation has occurred by the time the diver has descended to 2m the Eustachian tubes are blocked, or locked shut, by water pressure compressing the inner soft tissue end of the Eustachian tube, and that the chest muscles cannot generate sufficient pressure to overcome the external pressure. This would be true for a snorkeller, but is it true for a Scuba diver, whose chest and pharynx are at ambient pressure? In this case the pressure to be overcome is either negative, if the diver is descending feet first, or at most 0.5m if he is descending vertically head first, and these relativities will not change with depth.

Many scuba divers "clear" their ears to the extent that discomfort goes, but do they restore the normal middle ear volume? Judging from those I see they do not, as they have evidence of barotrauma. Oxygen is taken up from the middle ear by the tissues lining the middle ear, leading to a drop in middle ear pressure. Normal pressure is restored every time the Eustachian tube opens and air travels up it. The normal openers of the Eustachian tubes are movements of the pharyngeal muscles. Divers do not suck a dummy, which would move their pharyngeal muscles, they have their teeth biting into a regulator. They seldom talk, swallow or otherwise move their pharyngeal muscles. They usually have to make an effort to get air up their