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ANTI-TETANUS IMMUNISATION IN ORIENTEERS

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ABSTRACT

The present state of anti-tetanus immunisation amongst orienteering runners from 20 countries was assessed by questioning the orienteers as to when they last received an anti-tetanus injection. The results demonstrate that approximately 55% were within five years of their last injection, 18% were within 5-10 years, 12% were greater than 10 years and a further 15% did not know when or had never had an anti-tetanus injection.

INTRODUCTION

Orienteering runners must navigate between set control points in unknown terrain. Using a map and compass they achieve this as quickly and efficiently as possible by whichever route they determine as best for them. The terrain through which orienteering events are held is very varied. Generally run in hilly, forested areas such obstacles are encountered as — barbed wire fences, boulders, brambles, cliff faces, crags, gullies, marshes, rivers, streams and varying degrees of undergrowth.

The occurrence in orienteers of multiple cuts and scratches apart from major injuries, sustained in running through such variable terrain are accepted casually by the orienteer and rarely warrant medical attention (Folan, 1982). In view of a risk of contracting tetanus all orienteers should have adequate anti-tetanus immunisation.

Tetanus (Lockjaw) is caused by an organism *Clostridium tetani* which produces a potent neurotoxin, tetanospasmin that attacks the nervous system. The *Clostridia* are motile anaerobic spore-forming rods found in high concentrations in the faeces of man and animals and can be isolated from different environments, gardens, farms, home and industry. Spores of the organism are usually introduced into the body by injury to the skin produced by puncture wounds, cuts or burns. Apart from an everyday risk of contracting tetanus we might find ourselves in situations which would place us more at risk of contracting such injuries. Orienteering is such a sport.

To determine the present state of immunisation amongst orienteers this survey was undertaken.

MATERIALS AND METHODS

The survey was carried out at orienteering events on the Continent of Europe during 1982/1983. Events included the German 3 Day, Swiss Cup 2 Day, French 3 Day, Jicin 5 Day in

Czechoslovakia, Swedish 5 Day, Leinster 2 Day and other events in Ireland. The author, an orienteer questioned 327 competitors from 20 countries affiliated to the International Orienteering Federation. Orienteers were asked when they last had an anti-tetanus injection and the response was recorded in terms of the time elapsed, in days, weeks, months, years, never or not known. The orienteers were categorised according to their competition classes e.g. Damen (D) and Herren (H) 17, 19, 21 Elite, 35, 43 and 50. The numerals referring to the age class of the competitors, e.g. H43 implies men between 43 and 50 years of age. D35 implies women between the ages of 35 and 43.

RESULTS AND DISCUSSION

The response in terms of time elapsed since the last anti-tetanus injection was categorised into four groups, those within five years or less since the last injection, those between 5 and 10 years, those greater than 10 years and finally a group who either could not recall when they had been immunised or who had never been immunised.

Table I illustrates the numbers of respondents in each group classified by their competition class. Table II considers the respondents by their nationality, showing a large representation from countries such as Ireland, Sweden and Switzerland, the latter, two countries where orienteering is a very popular sport. There are single representatives from other countries.

TABLE I
Years since last anti-tetanus injection by Competition Class.

Class	Number Surveyed	5 years or less	Between 5 and 10 Years	Greater than 10 Years	Never or Not Known
♂ > 50 yrs	16	7	5	2	2
♀ > 50 yrs	2	1	0	1	0
♂ 43-50 yrs	22	10	4	7	1
♀ 43-50 yrs	9	1	2	2	4
♂ 35-43 yrs	40	20	9	5	6
♀ 35-43 yrs	13	10	0	1	2
♂ 21-35 yrs elite	120	73	22	14	11
♀ 21-35 yrs elite	36	16	5	3	12
♂ 19-21	20	17	3		
♀ 19-21	30	15	6		9
♂ 17-19	8	5	1	2	
♀ 17-19	11	6	2	1	2
Total	327	181	59	38	49

Table III provides the overall percentage result for each group showing approximately 55% of those surveyed within 5 years of their last anti-tetanus injection, a further 18% are within 10 years. The two final groups with 12% greater than 10 years and 15% in the Never or Not Known Group show approximately 27% of those surveyed with an unsatisfactory immunisation profile.

Similar data were reported by Brand et al from the United States in 1983 showing that in 620 patients surveyed 77% were within 10 years of their last anti-tetanus injection as compared with 73% in the present study. A further 14% contrasts with 12% in the greater than 10 years category, but there is a marked difference in the last category with 8% incompletely immunised or with an uncertain history in the States survey and 14% never or not known category in the present survey. Categorisation in the US survey recorded whether the patients had been previously fully immunised. This orienteering survey confined the question to the timing of the last anti-tetanus injection, independent of whether this had been part of a primary series of injections or a booster injection. The reason for this arose in a small pilot study where it was noted that people questioned were not aware of the

TABLE II
Years since last anti-tetanus injection by nationality.

Nationality	Number Surveyed	5 years or less	Between 5 and 10 years	Greater than 10 years	Never or Not Known
Ireland	74	36	13	7	18
Switzerland	66	46	9	2	9
Sweden	54	22	10	16	6
Czechoslovakia	25	16	6	2	1
Great Britain	24	14	2	2	6
USA	17	9	6	1	1
France	11	9		1	1
Germany (FRD)	10	6	2	1	1
Finland	10	5	4		1
USSR	9		5	3	1
Australia	7	5	2		
Canada	5	4			1
Norway	5	1		3	1
New Zealand	3	2			1
Israel	2	2			
Austria	1	1			
Hungary	1	1			
Italy	1	1			
Japan	1	1			
Yugoslavia	1				
	327	181	59	38	49

TABLE III
Overall results of survey: years since last anti-tetanus injection.

5 years or less	Between 5 and 10 years	Greater than 10 years	Never or Not Known
55.35%	18.05%	11.62%	14.98%

types of previous injection they had, may not have had full courses of injections and in the international context the language would have presented problems for in-depth questioning.

Table IV considers the sex distribution in the response groups. Applying a CHI-Squared test to this data we find that the observed values differ significantly from the expected values ($p = 0.05$). The source of the difference appears to lie with the females in the fourth group, those who never had or cannot recall when they were last immunised. An explanation for this discrepancy between males and females may be the fact that in many of the countries surveyed there is a compulsory military service for males who at this time would receive necessary immunisation.

TABLE IV
Years since last anti-tetanus injection by sex.

Sex	Number Surveyed	5 years or less	Between 5 and 10 years	10 years or more	Never or Not Known
Females	101	49	15	8	29
Males	226	132	44	30	20

We find though when looking at the Irish data where we have no military service (Table V) that the discrepancy still exists with nearly 30% of females in the Never and Not Known group. The reason for this must perhaps be sought in the

general health education awareness of the public with ignorance as to past immunisation history.

Immunisation against tetanus is achieved using tetanus toxoid by deep intramuscular injection. The basic immunisation course consists of three suitably spaced injections of toxoid. The first dose stimulates a primary antibody response conditioning the antibody forming tissues of the host so that

TABLE V
Years since last anti-tetanus injection by sex. Data for Irish orienteers.

Sex	Number Surveyed	5 years or less	Between 5 and 10 years	Greater than 10 years	Never or Not Known
Females	25	7	4		14
Males	49	25	12	8	4

when a second injection of the toxoid is given a secondary antibody response occurs characterised by the speedy production of antitoxin. This second injection is therefore delayed until the state of secondary responsiveness is present, which takes 4-6 weeks. The third injection, given 6-12 months after the second aims at stimulating a greater response to the toxoid leading to a longer immunity period. This basic immunisation course is what children now receive in their first year of life, usually combined in the 3 in 1 with immunisation against Diphtheria and Pertussis or whooping cough. With anxiety in recent years about the Pertussis immunisation there may be teenagers about who did not receive a primary immunisation when young. This primary course is also that which anyone who has not previously been immunised receives.

Booster injections of toxoid are given to enhance and prolong an immunity that otherwise might wane and disappear. It is recommended that a booster dose of tetanus toxoid be given within 10 years of the primary course (Adams et al, 1969). Orienteering caters for many older competitors in the classes over 50 and 60 years. There was insufficient data in this survey to assess clearly the state of immunity in this group. In previous surveys from Australia a lack of immunity in the over 50 age group and no reduction in the admission rate for tetanus patients over 40 years of age was shown (Newton-John, 1984).

In conclusion, this survey of 327 international orienteers show 27% of those surveyed had an inadequate immunisation profile being either greater than 10 years did not know when or never had an anti-tetanus injection. The importance of adequate immunisation needs to be emphasised not just to those who might be at risk be it from occupation or sport but to the general populace.

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