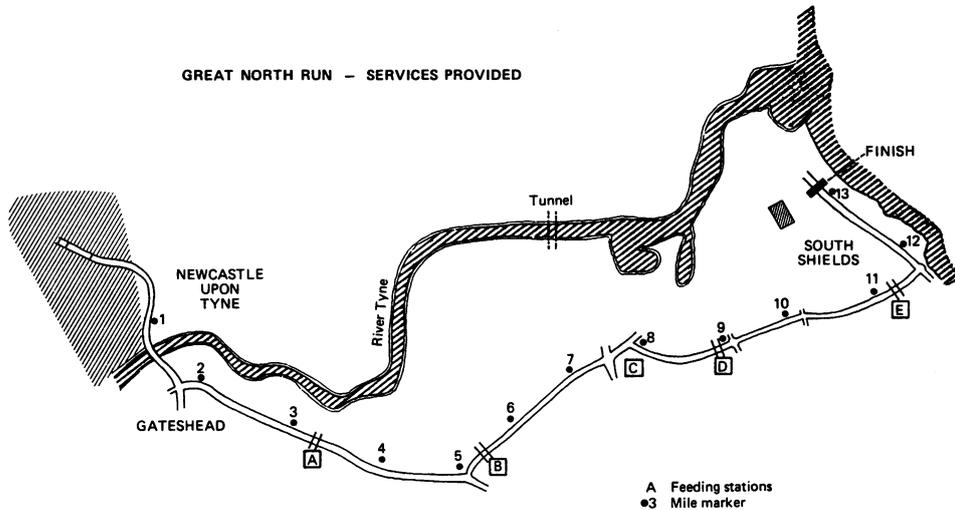


MEDICAL EXPERIENCE OF THE GREAT NORTH RUN

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The largest organised road race in Europe creates problems related to both the quality and quantity of entrants. With more than 25,000 runners (27,500 entrants) it does not take a significant percentage of collapses to generate a lot of work for the aid services.

There are problems with the geography of the event. The course is bounded by water to the north and east and the runners approach from the west and south (Fig. 1) which means there is no easy route of evacuation either for casualties or for residents who are effectively marooned for five hours. There is thus a stronger medical presence on the course and at the finish than might be expected so as to minimise the need for evacuation of casualties to hospital.

Both the British Red Cross Society and St. Johns Ambulance Brigade contribute doctors, nurses and first aiders. This year over 500 were involved. The first aiders are stationed every mile (bar the first) with doctors and nurses at each feed station (4, 6½, 8, 9½ and 11½ miles). There are podiatrists at the second and fourth feed stations and at the finish. Additional first aiders saturate the final 2 miles (every 100-200 yards) to cope with the collapses in this area as evacuation is potentially dangerous with ambulances on the same carriageway as runners. There is now an extra casualty station at 10 miles to catch collapses prior to this point (who would otherwise have to be evacuated to hospital). This is equipped with oxygen, suckers, intravenous equipment and a defibrillator although these are seldom needed at this point.

Past experience of this event has shown that, other than a few collapses prior to mile 10, most of the work is generated at the finish. Reasons for this include the emotional relief of finishing, as well as the cessation of running causing a reduction in venous return (kept going by the muscle pump) thereby causing a "faint". The latter can be reduced by having long chutes so runners are made to keep walking for some time after finishing. The collapse rate is shown in Table I. CONTACTS are defined as anyone approaching the aid services at any time be it for a smear of vaseline or broken shoe lace. CASUALTIES are those who contact a "medical" (MO/SRN/first aider) and receive treatment such as for chafing, tendonitis or cramp. COLLAPSES are those who are brought semi- or often unconscious to the medical tent. They may be hyperpyrexial with rectal temperatures of $> 41^{\circ}\text{C}$. Paradoxically they may feel cool and clammy. They may be mentally confused and aggressive and tend to have the clinical picture of hypovolaemia with low blood pressures and variation in pulse pressure. Many respond to oral fluid hydration, if conscious and given enough time. The more seriously ill collapsed patients are reassessed after 10 minutes observation in the medical tent and those whose temperatures are still not settling or who continue to vomit are treated by an i.v. infusion of saline. This rapidly restores temperature and mental state to normal but frequently several hours of further rest and observation are needed before discharge home is allowed. Hypoglycaemia *per se* does not seem to be a problem although anyone with a BM-stix test result of < 2 who is not responding rapidly is given 20 mls of 50% dextrose into their i.v. infusion.

TABLE I
Morbidity and mortality of distance running.

	Half-Marathons	Full Marathons
starters:	57,570	9,330
CONTACT	2,450 (4.2%)	376 (4.0%)
CASUALTY	513 (0.9%)	62 (0.7%)
COLLAPSE	43 (0.07%)	7 (0.07%)
CORPSES	1	0

Aggregate Statistics from several local marathons.

Although the casualty rate of 0.07% is similar to that seen after marathons and smaller fun runs, the actual numbers involved (with up to 500 crossing the finishing line each minute at peak times) ensure that the number of casualties is large. This would swamp the local casualty department (provided they could be evacuated) and so we aim to look after as many as possible. Inevitably some casualties are taken to or make their own way to the hospital (Ingham Infirmary, South Shields) and they are used to test the hospital's major accident plans. Radio links operate between the finish medical tent, the casualty station on the course and the Ingham as well as with the police and ambulance control vehicles.

NUMBERS TREATED – TOTAL

	Contact	Client	Casualty
½ Marathons (57,570)	2450 4.2%	513 0.9%	43 0.07%
Marathons (9,330)	376 4.0%	62 0.7%	7 0.07%

Accurate documentation is essential. Casualty cards (similar to those used elsewhere) are issued as each patient is admitted and completed by the nurse who looks after that runner throughout his stay. As the collapsed patient is often unable to give his name a list of runners (both alphabetical and numerical) is kept in the medical tent. A 'clerical' officer deals with documentation including radioing to the police control unit where relatives worried about a missing runner can seek information.

DEFINITION OF HELP

Contact:	Any form of help given (by any service)
Client:	Any specialist help by: Doctor First Aider Podiatrist
Casualty:	Anyone detained in a medical area or admitted to hospital

WHAT

Contact:	Broken shoelace Number flapping Sore feet Headache LMF
Client:	Blisters Chafing Strain Stings Exhaustion
Casualty:	Collapse Cyanosis Confusion

The medical tent at the finish of 120 x 40 feet (38 x 12 metres) is divided by a canvas screen into an area 80' x 40' and 40' x 40'. Triage is performed by an experienced medical officer as runners approach the tent. Collapsed runners are collected by police cadets and the Territorial Army Volunteer Reserve on stretchers and wheelchairs. Walking/talking wounded are directed to the larger area, manned by the Red Cross, their doctors and the podiatrists. Those who are unconscious or unable to respond to simple questioning are admitted to the smaller 'medical' end. The race doctor or deputy is available to assess all collapses or to see patients in the larger area whose condition is causing concern.

The smaller medical area is equipped with beds borrowed from the Blood Transfusion Service for the event. This allows the attendants to work at a reasonable height. Two beds are set up in an intensive care corner with full resuscitation facilities. This area is manned by a consultant anaesthetist and senior anaesthetic nurses. They do not get involved in the general fray but deal with patients referred specifically to them. The remaining area is arranged with two 'stars' of beds arranged around a central drip stand. Each patient is looked after by a pair of nurses with a doctor to every 2 or 3 beds.

A secondary medical centre for those who collapse 20-30 minutes after the finish is positioned by the family reunion area. It is possible to transfer cases back to the main medical area if their condition warrants it.

This event attracts many fun runners who would not normally enter a half-marathon. Some of these have not followed the training programme. Others are running when unfit but have the pressures of promised sponsorship money to fulfil. We do guarantee a place in the next year's event to anyone handing in their number before the start of the race but this service is not widely used – most of this group hand their numbers to someone else which causes logistic problems in dealing with the collapses.

The weather conditions are critical and affect the work load. This year's heat and humidity made the event difficult for many people. The aid stations ran out of water as this year the front runners drank freely, depriving the slower runners who probably needed it more. Advice to assembled runners waiting for the start given over the PA system is effective in making the

runners aware of the ambient conditions. We ask all runners with a pre-existing medical condition to mark their running number with an orange disc and write their condition and current therapy on the reverse. This works well although this group of runners is so sensible that we have only had to treat one of their number in 4 years!

BOOK REVIEW

Title: ADAPTATION, STRESS AND PROPHYLAXIS
Author: Felix Z. Meerson, 1984
Publisher: Springer-Verlag (Berlin)
 Price: DM 118 or \$45.80 329 pages, 87 figures, 61 tables, 602 references ISBN 3-540-12363-6

This book deals with one of the fundamental problems in biology and medicine, the problem of adaptation of an organism to its environment. Although the text is not specifically related to 'sports medicine', it contains relevant information for the sports physiologist, psychologist and medical practitioner.

The mechanism is described by which a non-adapted organism, lacking resistance to a given factor, is transformed into an adapted and resistant organism, whether pathological or physiological. There is an abundance of original and cited research to substantiate current theory. On a molecular basis, it is shown that enhanced function activates the genetic apparatus (nucleic acid synthesis) of cells in systems involved in the adaptive response. This results in a selective increase in structures governing cell function.

Mechanisms of adaptation and reversibility of adaptation to such factors as high altitude hypoxia, physical load, complicated environmental situations, and painful stressful situations are also described. It is suggested that the adaptive response to hypoxia may serve as a preventive factor for certain circulatory diseases such as hypertension and hyperlipidaemia. The author even recommends the use of an altitude chamber to reduce the incidence of ischaemic heart damage.

The progression from an immediate adaptive response into a gradual pathogenesis is also described fully. The damage resulting from stress related diseases — ulcerous lesions of the stomach, ischaemic heart disease and tumours — is also considered. There is also a section describing how the organism responds by urgent and long term compensatory adaptation when injury occurs.

The latter section of the book concentrates on research involving the experimental prevention of stress induced damage by natural and synthetic chemical substances.

The book is reasonably well illustrated with some excellent flow diagrams. The content assumes a knowledge that is more appropriate for postgraduate than for undergraduate study.

Roger G. Eston

BOOK REVIEW

Title: ATHLETIC ABILITY AND THE ANATOMY OF MOTION
Author: R. Wirhed, 1984
Publisher: Wolfe Medical: London
 Price: £9.95

About three fifths of this 135 page book is devoted to musculo-skeletal anatomy, about one fifth to strengthening and mobilising exercise and training and one fifth to basic mechanics. The material is presented efficiently and simply and the text is amply illustrated by line drawings and anatomical sketches. There is neither index nor appendix, normally seen as essential in any serious textbooks, but tables of origins, insertions and actions of muscles together with drawings of bones marked with the areas of muscular attachments are gathered together in the last few pages. The book should prove helpful to the non-professional physical activity leader or to the biologically unsophisticated freshman in physical education for it seeks to provide an integrated understanding of the functional basis of athletic activity. However, although physical education undergraduates may initially profit from reading the book they are unlikely to be sufficiently stretched by its treatment to warrant its adoption as a course reference.

J. Atha