Trauma on the Isle of Man

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The Isle of Man Tourist Trophy motorcycle races remain one of the most popular venues for motorcycle races. This is despite the reduced status of the event. The reason for the loss of world championship and formula one status is the nature of the road racing circuit itself. The twisting narrow roads are only closed to the public at certain times during the practice and race weeks. Motorcycling visitors to the event attempt to emulate their heroes on machines capable of high speeds. Casualties from both visitors and racers are dealt with efficiently by an expanded medical service. This includes the use of an aeromedical evacuation helicopter. Casualties from the visitors exceeded those from the racers themselves during the period reported.

Keywords: Motorcycle races, aeromedical evacuation, trauma

The Isle of Man Tourist Trophy (TT) races began in 1907, because of increasing restrictions upon motorcycle races on public roads on the mainland. The route has remained virtually unchanged since 1911. The events were part of the official world motorcycle championships until 1976. However, this status was withdrawn following a boycott by the top riders. From 1977 to 1989 the TT was given reduced status as a Formula 1 for road racing. Even this position has now been lost. Although no longer a championship event, the TT races remain a mecca for motorcyclists from all over the world. The special appeal of the TT races is appreciated by the major manufacturers who remain big sponsors, continuing to send works teams to the Isle of Man. The island has lost much of its tourist trade to cheaper package holidays over the past decade and events such as the TT races are an important part of the island's economy. Approximately 40 000 spectators with 11 000 motorcycles (Figure 1) crowd on to the island for the TT fortnight filling the guest houses and hotels – as well as the local public houses (Figure 2). There is even a special beer for the riders, aptly named Piston Brew. The bikers are generally well behaved. The sheer number of motorcyclists visiting the Isle of Man is phenomenal. Riders travel from all over Europe, and even from across the Atlantic, bringing powerful modern machines. The vast majority of motorcycles lining

side-to-side the 3 miles of promenade of Douglas, the capital, are around 1000 cc. The Manx Grand Prix is a similar but less prestigious event held in September for amateur riders, helping to prolong the tourist season on the island.

The TT races are held annually for 1 week at the end of May. The week of racing is preceded by a week of practice, during which the riders acquaint themselves with the course and attempt to reach qualifying standards. Until 1927, the roads were not closed for the practice sessions, but now the sessions run early in the morning and in the evenings before dusk. Those living inside the ring of the course are

Figure 1. Motorcycles line the 3 miles of the Douglas promenade side-to-side, both sides of the road

Figure 2. Bushy's Pub . . . purveyors of Piston Brew, where the bikers overflow on to the pavement

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stuck during the period the roads are closed for the fortnight, and have to decide whether to be in or out!

What prompted the loss of championship status was the nature of the course, and the increasing speed of the machines themselves. The TT races are held on a 37.75-mile circuit around the island, using the roads utilized by the public for everyday travelling around the island (Figure 3). The fastest lap on the 'new' course in 1911 was 50 m.p.h., the first 100 m.p.h. lap was set in 1957. The new lap record, set in 1991, was 125 m.p.h. However, it is not so much the speed, but the nature of the course that makes the velocity so impressive. There are hair-pin bends, steep downhill sections with a 90° bend at the bottom and the mountain section where speeds of 180 m.p.h. are achieved (Figure 4). The speed of the bikes travelling along fairly narrow winding roads, and the inch perfect judgment of the top riders as they swing from one kerbside to the other has to be seen to be believed. However, what greets the rider should he lose control of the bike and run out of road, is not a comfortable bale of straw to deaden the impact at the end of a lengthy run-off, but a dry stone wall, a tree or a telegraph pole with a token piece of foam wrapped around it!

Since the races began in 1907, 162 racers have died, including four in the 1992 TT and two in the Manx Grand Prix, prompting renewed calls for the event to end¹. These figures do not include the deaths of spectators who visit the island and try to emulate

Figure 3. Normal roads are used, with trees and dry stone walls to line the route

Figure 4. Steve Hislop on a 350-cc Yamaha motorcycle. Speeds of 180 m.p.h. are achieved on parts of the course

their heroes on bikes larger than the racers themselves are allowed to use. Outside built-up areas there is no speed restriction on the island, and the temptation to exceed the speed limits set on the mainland is obviously irresistible.

Traditionally, visitors took the opportunity to go around the course as fast as they could on the middle Sunday of the fortnight. The course was open to all traffic, and a lot of trauma resulted. In order to try and reduce the mayhem, it was decided to restrict a 10-mile section of the mountain part of the course to one-way traffic only. Continental visitors frequently forget which side of the road they are meant to use in their excitement. Setting aside part of the course in this way has probably reduced the level of casualties, but with 11000 motorcycles on the road has concentrated them into one period, and given rise to the eponym 'Mad Sunday'.

The medical support for the TT races has grown to be a proficient organization over the years. There are 71 marshalling locations on the course, virtually all equipped with a scoop stretcher, blankets and a first aid box. There is a telephone at each site, with access to the relevant emergency services. A doctor is nearly always present at each of 35 points along the course during practice as well as race periods, with a comprehensive emergency resuscitation bag for immediate first-aid care. The Rob Vine Fund has provided over £20 000 for medical equipment since its inception in 1985. Rob Vine was a well-known and respected competitor in the TT and Manx Grand Prix who died at Black Dub, at the beginning of the notorious Glen Helen section of the course. His parents gave £5000 to set up a trust to purchase equipment for the motorcycle races. The fund ensures that the quality of the medical equipment available at the roadside remains comprehensive, as well as supplying four motorsport ambulance/rescue units.

The notable feature of the medical support for the TT event is the use of a helicopter, an Aerospatiale Squirrel (Figure 5). It has, in addition to the pilot, room for two doctors and two casualties. The use of the helicopter provides rapid transfer of casualties to a school playing field from where they are taken to the Nobles Hospital by ambulance.

Figure 5. Emergency helicopter provides speedy transport to the hospital

Table 1 gives details of casualties from both practice and race periods of the TT event evacuated to the Nobles Hospital by helicopter in 1991. The swiftness of the system is shown in Table 2.

The number of casualties during the 2-week period means that the medical services are severely strained. The Nobles Hospital in Douglas is the only hospital equipped to deal with major trauma (Figure 6). There are 250 beds, with 23 for orthopaedics and trauma. Staff include only one consultant orthopaedic surgeon and two consultant general surgeons, all of whom have a registrar, and house officers. For the past 10 years the Royal Air Force has sent two surgeons in higher training, one in orthopaedics and one in general surgery to assist in the workload and gain further experience in the management of acute trauma. In addition, this year a senior registrar in orthopaedics from Liverpool took study leave for the same purpose. The casualty department is staffed by

Table 2. Summary of helicopter times

Average time taken from aimed alert to arriving at the scene of the incident	6.6 min – minimum 1 min maximum 18 min
Average time taken from aimed alert to landing casualty at Ballakermeen school playing field for 90-s ambulance trip to Nobles Hospital casualty department	17.9 min – minimum 11 min maximum 30 min
Average time spent on ground	6.6 min – minimum 2 min maximum 12 min

three clinical assistants, with one on duty at any one time, with the aid of one of the surgical/orthopaedic registrars. The volume of emergency work admitted during the TT period necessitates cancellation of all routine cases. Cold admissions are not booked for 1 week before the practice week so that the orthopaedic ward is as clear as possible.

During the 2-week period of this year's TT races, 1250 patients were seen in the casualty department. A total of 119 casualties from all sources was admitted, with 67 going to the orthopaedic unit. During the 14 days of the TT an average of 5.5 major trauma operations was undertaken every day, lasting an average of 1.1 h (Tables 3 and 4).

All patients have definitive treatment of fractures by early internal fixation where appropriate. This allows early mobilization which, in addition to the recognized benefits in avoiding fracture disease (reflex sympathetic dystrophy), maintaining joint mobility and muscle tone, permits early repatriation! The hospital is well equipped for one of its size. There was a significantly higher number of procedures undertaken on the bikers/spectators compared with

Table 1. Details of casualties taken to Nobles Hospital during 1991 TT events

Day	Site	Time to scene (min)	Time on ground (min)	Total time to Ballakermeen landing for hospital (min)	Injuries	Action
27 May	Laurel Bank	4	5	12	Fracture of right tibia/fibula and metatarsals 2, 3, 4 of right foot	Theatre
27 May	Gooseneck	12	11	30	Fracture of right little finger	Theatre
27 May	Gooseneck	12	11	30	KO injury right elbow and ankle	General surgical ward
28 May	Greba Kennels	7	—	—	Death certification	
29 May	Ballacraigne	15	12	30	Fracture of right medial malleolus and left femur + left talus and lateral malleolus	Theatre
29 May	The Nook	4	6	11	Multiple injuries. Died in theatre	
29 May	Kates Cottage	1	9	12	KO abrasions but no skull or left femur fracture	Orthopaedic ward
30 May	Kerrowmoar	7	—	—	Death certification	
1 June	Black Dub	6	4	13	Fractured carpals right wrist bruised shoulders	Discharge
1 June	Black Hut	2	10	15	Multiple injuries. Died in theatre	
1 June	Ballaugh	3	5	15	Bruised right knee and shoulder (driver)	Discharge
1 June	Ballaugh	3	5	15	Bruised knees, pelvis, right forearm and left foot (passenger)	Discharge
1 June	Waterworks	9	3	18	Fracture of second lumbar vertebra	Orthopaedic ward
3 June	Black Dub	4	4	11	Injury to head, pelvis, cervical spine and chest, no fractures	General surgical ward, observation
5 June	Verandah	18	4	26	Fracture of left humerus and left wrist, soft tissue left arm, right hand and knee	Theatre
5 June	Handleys	3	2	17	Fracture of right tibia and right humerus	Theatre

Figure 6. The forces involved in accidents in motor sport are considerable. This radiograph shows the head of the femur pushed into the pelvis, an injury which can lead to serious problems in both the short and long term

Table 3. TT racers and spectators seen in casualty with trauma and disposal

	Admissions	Deaths on circuit	Discharges from casualty and diagnoses
Racers	16	2	7 Acromioclavicular joint dislocation Fractured clavicle and fractured lunate Soft tissue injury and abrasion $\times$ 4
Visitors/bikers	41	0	43 Fractures 8 Head injuries 5 Bruising 23 Laceration 5 Abrasion 9

Table 4. Diagnoses of those admitted, some with multiple injuries

Admissions and diagnoses	Racers		Visitors	
Head injury	6		15	
Soft tissue injury				
Abrasion	7		0	
Bruising	7		11	
Laceration	0		5	
Total	20		31	
Fractures	All	Open	All	Open
Head and face	1	1	0	0
Shoulder	4	1	7	0
Arm	4	1	6	2
Wrist	5	1	3	0
Hand	2	1	14	3
Chest	0	0	3	0
Spine	0	0	4	0
Pelvis	1	0	0	0
Ribs	1	0	0	0
Hip	0	0	1	0
Leg	3	1	12	6
Ankle	7	1	4	2
Foot	5	2	3	0
Total	33	9	57	13
Overall total	53		88	

the number of admissions, particularly to soft tissues. This is probably due to the much superior quality of the leather clothing, body protectors and gloves worn by the professional racers (Figure 7). Careful attention is paid to soft tissue injuries as the energy involved in a collision at speeds well in excess of 100 m.p.h. is considerable (Figure 8). The shearing injuries produced by sliding along the road lead to degloving type skin lesions (Table 5).

The orthopaedic beds fill quickly, and to avoid overspill, as far as possible, after definitive fixation patients are either transferred home or to another hospital. The resident orthopaedic surgeon has always had the utmost cooperation from other units on the mainland in this respect, and is grateful for their help in maintaining the rapid turnover necessary during this period. Over the past 2 years, eight patients have required transfer to France, Germany or Switzerland. The employment of German house officers has been of enormous benefit in overcoming difficulties in communication with both patient and receiving hospital. Local residents with language skills also give assistance. Not all the motorcyclists

Figure 7. The rider's equipment includes high quality leathers and body armour

Figure 8. A severe soft tissue injury overlying fractures. This is a Grade 3a compound wound of tibia/fibula, with skin and muscle loss; the result of a high speed, high energy impact. External fixation stabilizes the fractures and permits urgent treatment of the soft tissues

Table 5. Procedures undertaken in the operating theatre

	Racers	Visitors
Open reduction and internal fixation		
Plate/screws	4	13
External fixator	0	1
K-wires	1	4
Intramedullary nail	5	6
Pins for traction	0	3
EUA/MUA	5	5
Bone graft	0	2
Total	15	34
Soft tissues		
Wound débridement	3	15
Fasciotomy	1	0
Primary suture	0	2
Delayed primary suture	0	11
Skin graft	0	2
Total	4	30
Overall total	19	64

bring insurance with them, and evacuating a European national at short notice is expensive. The cost of the air ambulance has sometimes been borne by the Isle of Man Government. The option of occupying a bed for the whole period is impractical. The riders themselves are often more concerned about what will become of their motorcycles! However, the repatriation of the machine is their concern.

The criticism of the TT races as excessively dangerous recurs annually². The riders are aware of the risks but continue to flock to this unique circuit for the challenge. The casualty rate reported by Varley³ for the TT and Manx Grand Prix for the years 1989 and 1990 was 1 per 113 000 km, a figure which compares favourably with other motor sports. Mont

Blanc has claimed 600 lives in 200 years of climbing, and 100 trawlermen have lost their lives fishing in the Irish Sea over the past 10 years.

It is quite a sight on the wards, to see rows of injured young (and not so young) motorcyclists, all with their helmets displayed on their lockers as a badge of pride. The lack of serious head injuries bears testament to the efficiency of modern helmets. Their conversation is inevitably to do with motorcycles, and their radios and the ward television are switched to the race coverage. The fanaticism of the TT enthusiast is quite remarkable. Take the case of the Swedish rider who rode his high-powered bike to the Isle of Man wearing a cast brace from a previous knee injury, only to fall off his motorcycle again and fracture his clavicle.

Anyone interested in participating as a race-side marshal or medical officer should contact Dr David Stevens at the Nobles Hospital. The doctors are paid, and it is a good chance to have a rewarding holiday on an attractive island.

Acknowledgement

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