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Parachuting for charity: is it worth the money? A 5-year audit of parachute injuries in Tayside and the cost to the NHS

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Abstract

All parachute injuries from two local parachute centres over a 5-year period were analysed.

Of 174 patients with injuries of varying severity, 94% were first-time charity-parachutists. The injury rate in charity-parachutists was 11% at an average cost of £3751 per casualty. Sixty-three percent of casualties who were charity-parachutists required hospital admission, representing a serious injury rate of 7%, at an average cost of £5781 per patient. The amount raised per person for charity was £30. Each pound raised for charity cost the NHS £13.75 in return.

Parachuting for charity costs more money than it raises, carries a high risk of serious personal injury and places a significant burden on health resources.

1. Introduction

Parachuting has become increasingly popular and has a glamorous public image. However, it carries a risk of personal injury, particularly when jumpers are inexperienced [1]. Parachuting for charity is popular because of its low cost; parachute centres offer free training with one free jump, provided their costs are met. These amount to £50 per person for 6 h of pre-jump training and one jump if conditions are favourable, with another date offered if conditions are adverse.

The orthopaedic unit at Perth has seen a large number of injuries from two nearby parachute centres. The majority were first time jumpers parachuting for charity, and many injuries were serious, requiring hospital admission. All charity parachuting in our study was apparently done by static line methods from 2500–3000 feet.

A 5-year audit of parachute injuries was undertaken to ascertain the incidence of injury, particularly among charity-parachutists and the associated financial burden placed upon our unit.

2. Materials and methods

A 5-year audit of all parachute injuries presenting to Perthshire Hospitals (Bridge of Earn Hospital and Perth Royal Infirmary) was carried out from 1 January 1991 to 31 December 1995.

Records were made of the patients' injuries and treatment, the amount of money raised for charity and the type of footwear used to see if this affected the severity of injury sustained.

Financial calculations of the cost of treatment were then made as in Table 1.

Time off work was noted, as nearly all participants were young and of working age.

3. Results (see Table 2)

There were 174 casualties, 85 from Strathallan and

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Table 1
Financial calculations of the cost of treatment of injured parachutists[a]

(1) A&E	
Ambulance:	£30 per callout
X-rays:	£40 per plain film taken
Plasters:	£5 gypsona, £10 Scotch cast
Drugs:	opiates £10, NSAIDS £10 per course, tetanus £5
Traction:	£10 (skin)
(2) Inpatient care	
Length of stay in hospital at £350 per day	
ITU	£550 per day
Investigations:	full blood count £10 (£20 out-of-hours), biochemical analysis £10 (£20 out-of-hours)
Blood products:	cross match £20 (£30 out-of-hours), each unit of blood £30
Imaging:	C.T. scan £350, MRI scan £400
Theatre:	anaesthetic £30 (general anaesthetic or spinal); implants AO/ASIF small or large fragment set £200, AO/ASIF intramedullary femoral nail £400, AO/ASIF intramedullary tibial nail £300, Richards cannulated hip screws £400, Orthofix external fixator £300 (fixator returned); X-rays £40 per film; image intensifier £10–50 depending on exposure time
General theatre running costs:	£500–2000 (depending on procedure and whether procedure was 'out-of-hours') (includes: cleaning and preparation, heating and lighting, equipment sterilisation and packaging, nursing staff, anaesthetic staff, recovery staff)
Drugs:	antibiotics, antithrombotics, etc. as priced in the British National Drug Formulary
Braces/orthoses:	Donjoy Goldpoint knee brace £400, spinal brace £400, cast brace £250
(3) Outpatient care	
X-rays:	as above
Plasters:	as above
Bracing/orthoses:	as above
Physiotherapy:	£30 per course
Further surgical management	

[a] Above Costs accurately represent the extra cost to Perthshire Hospitals to supply the above materials and services to treat injured parachutists during the period 1/1/91 to 31/12/95.

87 from Errol. Eleven (6%) of all casualties were regular parachutists and 163 (94%) were first time charity-parachutists. Seventy-two charity-parachutists came from Perthshire and Tayside, 85 lived elsewhere in the UK and six came from abroad. The ages ranged from 18 to 51 years, averaging 28 years. One hundred and five patients were admitted to hospital, of whom 103 were charity-parachutists. The rest (69 patients, of

Table 2
Parachute Injuries 1/1/91–31/12/95[a]

Injury	No.	Treatment		Average cost of treatment (£)	
		admitted	not admitted	admitted	not admitted
Upper limb	14	5	9	1832 (1015–2730)	251
Spine	12	7	5	12974 (7680–19130)	132
Chest/pelvis	3	3	0	3007 (1700–4880)	0
Lower limb	144	90 [88]	54 [46]	5506 [5528]	266 [284]
Femur/thigh	5	5	0	4744 (2300–7280)	0
Knee/tibia	22	16	6	5194 (1620–10590)	475
Ankle	109 [99]	62 [60]	47 [39]	6000 (1050–20980), [6049 (1050–20980)]	235 [250]
Foot	8	7	1	2383 (1340–3800)	460
Miscellaneous	1 [0]	0	1 [0]	0	5 [0]
Totals	174	105 (60%)	69 (40%)		
[Charity para.]	[163]	[103 (63%)]	[60 (37%)]		
Average cost				5757 [5781]	250 [265]

[a] Where different from the total, the figures for charity parachutists are in square brackets, otherwise the figures in normal brackets for cost of treatment represent the range of NHS expenditure.

whom 60 were charity-parachutists) were treated either in A&E or as outpatients. No fatalities were reported during the study.

Both parachute centres were evasive when approached about the number of parachutists involved, but from the size of the groups that the injured parties came from, we estimate the total number of charity-jumps during the 5-year period to be 1500 for the two centres involved. This gives an incidence of injury for first-time charity-parachutists of 11%, two thirds of whom (63%) required admission to hospital — a 7% rate of serious injury.

The number of regular jumps by experienced enthusiasts done during this period is estimated at 50,000, giving an incidence of injury for regular parachutists of 0.02% — reflecting better expertise and training. In this group, 18% were admitted to hospital.

The majority of injuries involved the lower limb below the knee — 132 (76%) overall and 122 (75%) for charity-parachutists. One hundred and nine injuries (63%) overall and 99 (61%) involving charity-parachutists involved the ankle.

Of 105 patients admitted to hospital, 66 (63%) required operative intervention. Four had open fractures, all involving the tibial shaft or ankle. Thirty-nine patients (37%) were treated nonoperatively and 11 cases required readmission. For further details, please see Table 3.

Time spent in hospital ranged from 2–43 days (average 9) for those requiring operation, and from 2–51 days (average 10) for those treated nonoperatively.

3.1. Cost to local NHS

Patients admitted to hospital (60%) cost an average of £5757 each, and those treated in A&E or as outpatients (40%) cost an average of £250 each. Charity-parachutists admitted to hospital (63%) cost an average of £5781, and those treated in A&E or as outpatients (37%) cost an average of £265 each. The average cost per casualty overall was £3573 and £3751 per charity-parachutist.

The average amount of money raised for charity was £30 after expenses had been deducted, 70% being raised for NHS-related projects. Thus, each pound raised for charity cost the NHS £13.75, and each pound raised for the NHS cost £19.65.

3.2. Footwear

Forty-nine charity-parachutists (30%) wore unsuitable footwear, the rest (114, 70%) jumped in suitable boots with ankle support. Those with unsuitable footwear seemed to have more serious injuries than the rest — 69% required admission as opposed to 57%

Table 3
Analysis of those admitted to hospital

Treatment	No.	Compications	Average No. of days in hospital
Upper limb			
Open reduction internal fixation	1	nil	5
MUA + POP	4	nil	2 (range 2–3)
Axial skeleton/chest/pelvis			
Rest + physiotherapy	8	nil	29 (range 6–51)
Bracing + physiotherapy	1	nil	37
Chest drain	1	nil	4
Lower limb			
Open reduction internal fixation (ORIF)	53	infection×1 DVT×2 malignant hyperpyrexia×1 metalwork removal×9	10 (range 4–43) 9 readmitted: 2 (range 1–3)
Intramedullary nail	4	nil	8 (range 6–11)
External fixator (EX FIX)	2	pin-track infection×1	17 (range 16–17)
(1EX FIX + ORIF combined)			2 readmitted: 3 (range 2–3)
Cannulated hip screws	2	nil	12 (range 10–14)
Arthroscopy knee	1	nil	4
Bracing	3	nil	4 (range 3–7)
MUA + POP	22	subtalar osteoarthritis×1	5 (range 2–9)
Soft tissue procedures	3	nil	3 (range 2–5)
Totals	105		
Operative	66		9
Conservative	39		10

wearing suitable footwear. All regular parachutists wore suitable footwear.

3.3. Delayed jumps

Twenty-seven charity-parachutists (17%) had their jumps deferred to another day due to unfavourable conditions — on average 1 month after training had finished. This group seemed to have more severe injuries with an admission rate of 72%.

3.4. Time off work

In injured patients, time off work averaged 3 months (4 months for those requiring admission and 1 month for those not requiring admission) (range 1 week to 15 months).

4. Discussion

There is a considerable risk of serious injury among first-time charity-parachutists, which we feel is unacceptable. The injury rate in this group was nearly double that of the parachute arm of the US Rangers in active military combat duty in the Gulf War [2]. This may be due to lack of suitable experience and training, as these injury rates are not seen among regular parachutists [3–5].

Parachutists are at most risk during landing, with highest risk to the lower limbs [1,4–8]. Correct landing technique is vital, with inexperience, obesity and poor physical fitness increasing the risk of injury [1,3–5,7,9].

All injuries in our study occurred on landing (landing speed 5–6 m/s [3,10]), which together with the high rate of ankle injury concurs with previous studies identifying landing as the most hazardous part of the jump [1,3–7,11], and the ankle as the most vulnerable area [1,3–7,11]. Nineteen participants claimed that they landed some distance from their target — up to a mile away (often in the River Tay). This suggests poor parachute control, as the ground wind speed was apparently never above 10 knots, as per recommendation by the British Parachute Association, and if the wind changed, this was apparently taken into account. However, gusts can increase wind speed, may account for some loss of control, and at ground level can increase landing speed making error and injury more likely [1–3,6,7,11]. Many participants experienced anxiety upon landing when seeing the ground rushing towards them, and some felt that conditions were unsuitable. These patients said that they forgot their training under these circumstances, landing with the legs apart and the knees straight, as opposed to the legs together with the knees flexed, as recommended [1]. This was particularly prevalent among those with ankle injuries (59%).

This suggests that the 6-h training period for the jump is not enough. The recommended training period should extend over a few days [5] rather than being compressed into one day, with the jump being performed the day after training finishes and in good weather. Both centres in our study practised landing techniques using a 4-foot platform, with the jump being performed either that day or the day after. No participant whose jump was postponed underwent a refresher course. The participants came from all walks of life, were often overweight, the 'wrong' size and were unfit. Most only required a clean bill of health from their G.P. Bearing in mind Essex-Lopresti's description of the ideal parachutist [1], the selection criteria of participants may not be stringent enough, and the fact that charity-parachutists jumped with inadequate footwear bears testament to lax controls.

Training periods, methods and selection procedures in the Army are much more stringent, with rigorous fitness and selection tests first. The training is much more thorough — lasting 4 weeks, and involves jumps from barrage balloons and a number of qualifying jumps [3–5,9]. Despite the fact that they often jump with heavy kit, the injury rate is much lower — series reported vary from 0.6 to 2% [1,5,7,9,11]. The proportion seriously injured is much lower among army parachutists with admission rates of 25% [5,11]. Even in combat situations the military casualty rate [2] is half that of charity-parachutists.

The human cost in terms of injury, time off work, rehabilitation and subsequent problems such as later degenerative change may be high, as nearly all the participants were young, active and of working age [12].

The extra financial cost to the Health Service is considerable, particularly when set against the amount of money raised for charity (each pound raised for charity cost the Health Service £13.38), and considering that approximately 70% was raised for NHS-related causes, the cost of jumping for charity is prohibitive.

Both parachute centres seemed to be less than forthcoming with information required to compile this study.

5. Conclusions

Parachute jumping for charity is not cost-effective in raising money, as the cost of treatment of the 11% who are injured is far in excess of any money raised by the rest. The injury rate among this group appears excessive, with the potential for disastrous and crippling injury and places an unnecessary burden on local health services.

These findings suggest that the training period of 6 h may be inadequate and that much tougher selection criteria should be considered.

Participants should have to retrain if their jump has been delayed for a significant period.

Thus it appears that parachuting is not for the casual participant, and that the concept of parachuting for charity should be challenged.

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