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## REVIEW

## Experience Gained by Basic Surgical Trainees in Varicose Vein Surgery over a 15 Year Period - Has it Changed?

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**Objective.** The aim of this study was to see if the training provided for Basic Surgical Trainees (BST's) by one consultant vascular surgeon has changed over a 15-year period.

**Method.** From a computerized database we have a 15-year record of varicose vein operations identifying the first and second surgeon. We have analysed cases involving the BST and those in which the consultant operated alone. In such instances training opportunities were lost.

**Results.** No change was found in the total number of cases performed, the number of operations carried by the BST as the first surgeon, or the cases performed by the consultant operating alone. The number of operations performed by a BST annually correlated positively with the total number of cases. A BST was named as first surgeon in 39% of cases (632/1622).

**Conclusion.** This study has shown no definite evidence to support the view that training in varicose vein surgery has deteriorated.

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**Keywords:** Varicose veins; Surgical education; Surgical training.

### Introduction

Over recent years and especially with the introduction of the European Working Time Directive (EWTB) there has been much debate over whether surgical training is suffering as a result of a reduction in hours and changing shift patterns. Once the 48 hour week is established in 2009, the overall hours spent during a complete surgical training will be reduced by 30–50%,<sup>1</sup> depending on the frequency of the on-call rota with which comparison is made. There is concern that this has resulted in reduced opportunity for basic surgical trainees (BST's) to attend theatres and gain operative experience.<sup>2,3</sup> Published evidence is contradictory.<sup>1–4</sup> In a study relating to emergency surgery Gurjar and McIrvine<sup>2</sup> reported deteriorating experience for BST's in terms of appendicectomy and for Higher Surgical

Trainees (HST's) in respect of emergency laparotomy. By contrast the Bristol vascular surgeons showed they had maintained and improved experience by ensuring the trainee was the first surgeon in an increased proportion of cases.<sup>1</sup> These examples reflect practice in the UK, however similar concerns are expressed throughout Europe.<sup>5</sup>

In the present investigation we examined BST training in varicose vein surgery to assess if changes had resulted from altered work patterns.

### Methods

The period studied was 1 January 1991 to 31 December 2005. In 1990 a new BST post was established and we installed the MicroMed surgical audit system (Medical Systems Ltd, Great Missenden, UK). Until August 2002 all the work was done at The Princess Royal Hospital, Haywards Heath but after reorganisation of vascular surgical services and a Trust merger operations were done both in Brighton and Haywards Heath.

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There had been no audit system in Brighton so initially operations in Brighton were recorded on a spreadsheet. Subsequently the Dendrite vascular database (Dendrite Clinical Systems Ltd, Henley-on-Thames, UK) was installed for arterial work and then a venous database was created within the Dendrite system. From 2005 operations at both hospitals have been entered on this single database.

Initially the analysis was based on the experience of individual SHO's over their 6 month period of tenure. This was complicated by changes in appointment dates, locums and then the creation of further 'Clinical Fellow' posts. For purposes of analysis the latter are regarded as BST's and treated as if Senior House Officers (SHO). In fact they are more experienced having already completed SHO rotations so are more likely to be the first surgeon. On the other hand with EWTD and shift working the roster may not allow them to be present. HST's were not often involved in these cases and we have concentrated on BST training in varicose vein surgery.

The BST was credited with the case if he/she performed a significant part of the operation, most often the groin dissection in long saphenous surgery. On MicroMed up to four procedures can be entered for one visit to theatre. This is sufficient to include long and short saphenous operations bilaterally. For purposes of analysis if the trainee did just one of the four possible procedures a credit for the whole case was given, but only one credit could be earned per patient. Virtually all BST operations were supervised by the consultant. In the early years experienced SHO's occasionally operated on the long saphenous unsupervised. Nowadays with more junior staff available the SHO may operate under staff grade supervision when the consultant is away.

Total numbers of cases, cases with the BST as first surgeon and cases in which the consultant operated alone were analysed for changes over time using Spearman's rank correlation. The same method was used to compare the number of BST cases with the total cases done each year. We also created three blocks of 5 years and used the chi-squared test to look at the proportions of cases with the BST as first surgeon and the consultant operating alone. In approximate terms during the first 5 years the trainer was a general surgeon with wide interests, during the second period specialisation increased and in the final period he became a pure vascular specialist. In the last 5 years the changes brought about by the European Working Time Directive began to impact upon training schedules.

To calculate the total cases in which a BST acted as first surgeon we included all trainees including

locums and two very able SHO's who stayed on after 6-month posts and helped to operate on large numbers in the years of high throughput. Their contributions are included in the top row of column 2 in Table 1 and in the general analysis underlying Figs. 1–4. On the other hand we wished to demonstrate the experience gained by the average BST in a substantive 6 month post. This analysis is shown in the remainder of column 2 in Table 1.

**Results**

Over the 15 year period analysis by Spearman's rank correlation showed no significant changes either for total numbers operated ( $r = 0.06, p = 0.83$ ), for those with the BST as first surgeon ( $r = 0.06, p = 0.83$ ) or for the consultant operating alone ( $r = 0.22, p = 0.43$ ). Figs. 1 and 2 illustrate these findings for the total cases and for the BST cases. Fig. 3 summarizes the numbers in 5-year blocks and again shows lack of change over 15 years ( $X^2 = 2.31, p = 0.68$ ). Fig. 4 shows that over the 15 year period there was a significant correlation between the number of BST cases per annum and the annual total cases done ( $r = 0.62, p = 0.016$ ). Overall a BST was named as first surgeon in 39% of cases (632/1622).

**Discussion**

These data collected over 15 years are judged to be reliable. A thorough audit of all theatre books for the financial year 2001/2 showed that 7% of an annual total of 132 cases were not entered on the database.

It is clear that BST's gain more experience when more cases are done and our highest numbers were done at the time of General Practitioner Fundholding when more funding was available for varicose vein surgery. Increasing specialisation might have increased the numbers in later years but it has not. Directives from the local Primary Care Trusts, who became the budget holders, had some influence in restricting the service to those patients with severe symptoms or skin complications, but during the study

**Table 1. Summary of BST training**

	total cases operated 1991–2005		total cases with BST as first surgeon 1991–2005	
median	1622	over 15 years	632	over 15 years
min	98	per annum	16	per 6 month post
max	71	per annum	4	per 6 month post
IQR	150	per annum	46	per 6 month post
	92–134	per annum	11–21	per 6 month post

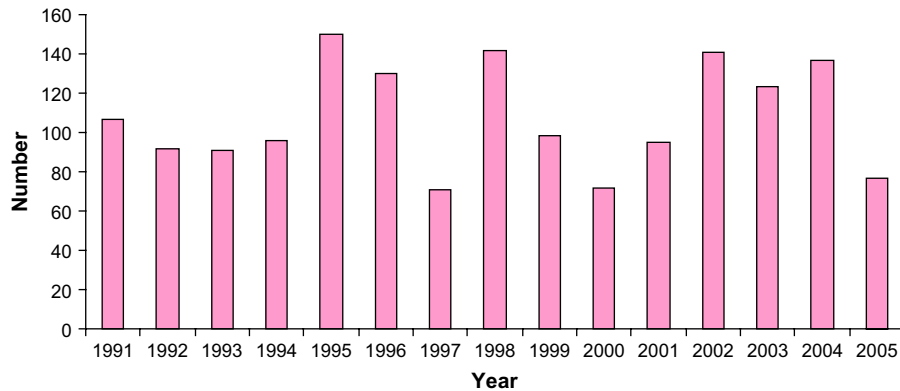


Fig. 1. Total numbers of cases operated upon from 1991–2005: no significant trend ( $r = 0.06$ ,  $p = 0.83$ ).

period these restrictions had not been rigorously enforced. Since the end of the study period this has changed and almost no varicose vein cases are now being added to the waiting list. This will soon mean that no training at all will be offered locally in this branch of vascular surgery. Simply counting the numbers of cases operated on by a trainee does not measure competency but adequate experience is essential for gaining proficiency. If varicose vein surgery is removed from the training of junior surgeons in the NHS then this is a further serious blow to training as it forms such a useful procedure in terms of identification of anatomy and learning the gentle handling of tissues.

Throughout much of the period studied the senior author did not have any registrar help. Hence he was nearly always scrubbed and closely supervising the trainee. The scenario so graphically depicted by Negus in 1993,<sup>6</sup> of the inexperienced registrar being left to operate alone while the consultant attended to other business did not arise. If the consultant was away the list was cancelled.

Several recent papers illustrate the threat that the European Working Time Directive and full shift working pose to adequate operative training.<sup>2,3,7,8</sup> Most point to falling experience for SHO's and registrars in elective and emergency surgery. In particular SHO training for elective surgery can suffer.<sup>3,8</sup> Detailed studies at The Royal Gwent Hospital in South Wales have illustrated the problem<sup>8</sup> but have also pointed to a solution by the creation of designated training lists for both emergency and elective lists.<sup>9</sup> The latter were for teaching inguinal herniorrhaphy to BST's and for the last 3 years of our study the varicose vein list could have worked in this way but often there was no trainee free to attend and learn. The senior author offered his own trainees as many opportunities as possible and sometimes it was possible to include trainees working on another firm. Overall a BST was first surgeon in 39% (632/1622) but not all cases are suitable for BST training as a proportion are short saphenous cases or recurrences while it is primary long saphenous surgery that is most suitable for training juniors. Surgeons at The Royal Gwent

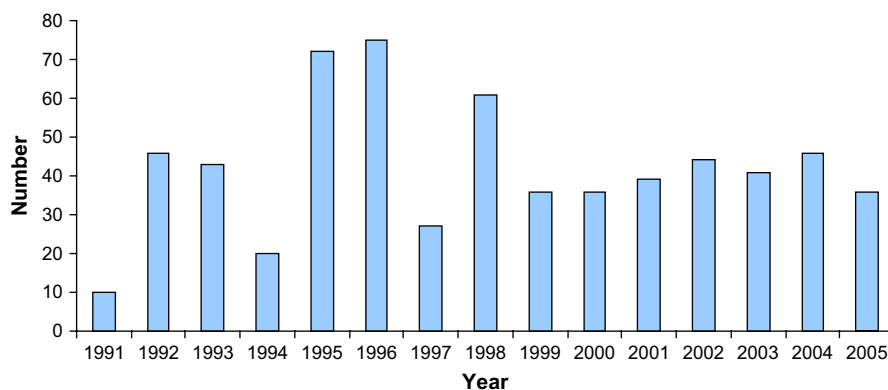


Fig. 2. Total numbers of cases operated on with BST as first surgeon 1991–2005: no significant trend ( $r = 0.06$ ,  $p = 0.83$ ).

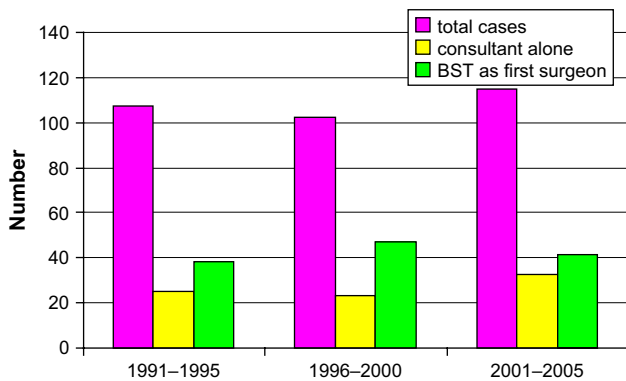


Fig. 3. 5 year averages for total cases operated, cases with the consultant operating alone and cases with the BST operating as first surgeon: no significant differences ( $X^2 = 2.31$ ,  $p = 0.68$ ).

Hospital, also studying experience during a 6-month training period, reported an improvement from a median of one inguinal herniorrhaphy to a median of five with the introduction of training lists.<sup>9</sup> We report a median figure of 16 varicose vein procedures for 6 months over 15 years.

While many changes to training have a national impact there have been local changes which have led to further loss of training opportunities. With reorganisation of vascular surgical services and then a Trust merger the varicose vein surgery was being carried out at two hospitals 15 miles apart. The BST may be in the wrong hospital at the time of the list. The BST may be unable to attend because of the post-take ward round or being on call, or may not see the consultant marking the veins preoperatively or finalising consent. Nor is the BST usually present when the patient returns for a postoperative check at 6 days. Postoperative patients are seen in a Single Visit Vein Clinic where most of the new cases are assessed, so the trainee also misses seeing much of the initial assessment, the duplex imaging and decision making.

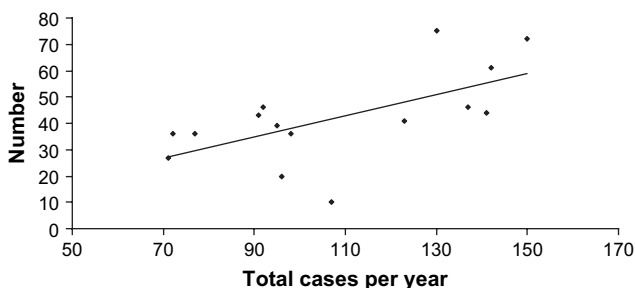


Fig. 4. Relationship between the number of cases operated on by the BST as first surgeon and the total cases operated annually. Spearman's rank correlation:  $r = 0.62$  (95% CI 0.15–0.86),  $p = 0.016$ .

Overall the numbers operated on by the trainees have not fallen but are we in danger of producing technicians rather than real consultants? One view is that by defining a specific surgical curriculum and with more education not involving contact with patients, the deficiencies can be made good.<sup>10</sup> To have any real chance of success this will need agreement from the European Commission to an additional 12 hours of educational time per week on top of the permitted 48 hours of work.<sup>5,11</sup> Thus far the European Commission has been unyielding.<sup>11</sup>

The most likely outcome is that present trainees will attain consultant status less well prepared than in the past. Consultant surgeons have always been adept at 'learning on the job'. Provided their technical skills are adequate there is a reasonable chance that deficiencies in preoperative and postoperative training can be rectified by later experience.

Conflict of interest

None.

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