

## Percutaneous oxygen tension

Sir

I read with interest the article by Mr Stacey *et al.* on changes in the apparently normal limb in unilateral venous ulceration (*Br J Surg* 1987; 74: 936–9). However, I must take issue with both the method of measurement of percutaneous oxygen tension and the interpretation of the results which imply that a low cutaneous oxygen tension reflects poor diffusion of oxygen from the capillaries. Most equipment used for percutaneous oxygen measurement is designed for use in neonates who have very thin skin and can give unreliable results when used in adults<sup>1</sup>.

The actual measured oxygen tension will be a function of the amount of blood flowing into the limb, the amount of blood leaving the limb and the skin thickness. In a limb with already diseased venous circulation and a defective pump mechanism as stated in the paper, venous pooling and increased oxygen dissociation may allow for a lower measured oxygen tension. Defective arterial inflow into the limb will also give low readings and although the authors state that ankle:brachial ratios were measured, no reference to this is made in interpretation of the measured results.

In the evaluation of identical equipment I found that more reliable information was gained by having the patients breathe 100 per cent oxygen for 5 min. The gradient of the increase in oxygen tension in the limb compared with the gradient at the sternal ankle was measured rather than a static value. This method may give differing results from those obtained in the study particularly if arterial insufficiency is excluded.

R. J. Holdsworth

Ninewells Hospital and Medical School

Dundee

UK

1. Spence VA, McCollum PT. Evaluation of the ischaemic limb by transcutaneous oxymetry. Greenhalgh RM, ed. *Diagnostic Techniques and Assessment Procedures in Vascular Surgery*. London: Grune and Stratton, 1975.

### Authors' reply

Sir

Mr Holdsworth's letter highlights some of the difficulties in interpreting the  $P_{tcO_2}$  results obtained by the transcutaneous oxygen electrode. As he correctly states, it is dependent upon blood flow, central oxygenation, tissue thickness and tissue diffusion. There are numerous different measures which can be shown to influence results, including the temperature of the electrode<sup>1</sup>, raising and lowering the limbs<sup>2</sup>, and breathing oxygen<sup>3</sup>.

Unfortunately, he seems to have missed the point that these limbs had markedly different  $P_{tcO_2}$  to a group of matched control subjects lying at rest. These limbs were not ischaemic—they all had ankle:brachial Doppler arterial pressure ratios > 0.95. We have performed the measurements breathing oxygen and the difference remains true, although the baseline for both groups moves up.

When it comes to interpreting the results it is much more difficult to do so with certainty; however, we have presented data, at the Vascular Surgical Society meeting in Newcastle upon Tyne in November 1987, to show that the  $P_{tcO_2}$  ratio correlates with the extent of pericapillary fibrin deposition in the dermis. This encourages us to think that our interpretation may be correct. Does Mr Holdsworth have a better explanation for our data?

M. C. Stacey  
K. G. Burnand

St Thomas' Hospital

London SE1 7EH

UK

1. Mani R, Gorman FW, White JE. Transcutaneous measurements of oxygen tension at edges of leg ulcers: preliminary communication. *J R Soc Med* 1986; 79: 650–4.
2. Clyne CAC, Ramsden WH, Chant ADB, Webster JHH. Oxygen tension on the skin of the gaiter area of limbs with venous disease. *Br J Surg* 1985; 72: 644–7.
3. Gilliland EL, Llewellyn CD, Cornwall JV, Goldie B, Gerber C, Lewis JD. Transcutaneous oxygen values surrounding venous ulcers—field changes and response to inhaled oxygen. *Br J Surg* 1986; 73: 1039.

## Synchronous colorectal carcinomas

Sir

We read with interest the article on synchronous colorectal carcinomas by Finan (*Br J Surg* 1987; 74: 945–7). This prompted us to review our own experience in a general hospital.

Over a 4-year period (July 1983–June 1987), 147 patients were

Patient number	Site (first tumour second tumour)	Dukes' classification	Detection
1	Sigmoid	C	Operation
	Caecum	C	
2	Left colon	C	Pre-operative
	Caecum	C	
3	Left colon	C	Operation
	Sigmoid	A	
4	Right colon	C	Pathological examination
	Sigmoid	B	
5	Sigmoid	C	Operation
	Left colon	B	
6	Caecum	C	Operation
	Left colon	C	
7	Left colon	A	Metachronous
	Rectum	C	

admitted with colorectal cancer. Six (4.1 per cent) patients had a synchronous tumour and 1 (0.7 per cent) patient had an early metachronous lesion (< 3 years from initial surgery). The site, Dukes' classification, and when the second tumours were detected are shown in the Table.

In one patient who had a panproctocolectomy for ulcerative colitis, the synchronous tumour was found at pathological examination. One other patient had a sigmoid resection and presented 32 months later with a small polypoidal lesion in the rectum despite sigmoidoscopic surveillance. Our overall experience seems largely to reflect Finan's much larger series though only two out of seven patients had a better Dukes' classification in the second tumour. We agree that full colonic examination is essential in practice, where possible. However one must balance the risks of the suggested colonoscopic examination pre- or peroperatively against the very low missed pick-up rate of synchronous tumours by manual examination, particularly in the case of the obstructed colon: bowel preparation may not be possible, on-table colonic lavage may not be practised in the centre concerned, and the extra time to perform the procedure especially in the ill patient would be difficult to justify. Whether the presence of 'missed' synchronous tumours influences the prognosis and survival rate remains to be seen. If one speculates that it falls into the category of recurrent disease prognosis, Tornqvist has suggested that even with aggressive follow-up to detect early recurrence there is little or no effect on long-term survival<sup>1</sup>.

J. D. Greig  
D. F. Miller

Hairmyres Hospital

East Kilbride

UK

1. Tornqvist A, Ekelund G, Leander L. Value of intensive follow-up after curative resection for colorectal carcinoma. *Br J Surg* 1982; 69: 725–8.

## Pain scores in haemorrhoidectomy

Sir

We feel compelled to comment on the use of pain scores in the paper by Roe *et al.* in the October edition of the Journal (*Br J Surg* 1987; 74: 948–51) comparing two techniques of haemorrhoidectomy. The pain charts illustrated are not visual analogue scales, but categorical in nature and therefore give different information from visual analogue scores. Comparison with other studies using visual analogue scores is consequently not possible.

As a patient's impressions of treatment are realized to be of increasing importance, it is essential that both objective physiological and validated psychometric tests are used. Methods of psychometric comparison are well documented<sup>1,2</sup>. The true worth of the alternative techniques of haemorrhoidectomy would have been better elucidated had the same degree of effort been applied to pain assessments as was obviously applied to the physiological studies.

J. V. Roberts  
M. Baum

King's College School of Medicine and Dentistry

London SE5 9NU

UK

1. O'Young J, McPeck B. Quality of life variables in surgical trials. *J Chronic Dis* 1987; 40: 513–22.
2. Clark A, Fallowfield LJ. Quality of life measurements in patients with malignant disease: a review. *J R Soc Med* 1986; 79: 165–9.

## Authors' reply

Sir

We would thank Professor Baum and Mr Roberts for their interest and their comments. We accept the criticism implied by their letter, but do not necessarily accept that their criticism could have been overcome by the methods that they suggest or, indeed, by greater effort.

Although we accept that the chart as shown in our paper is not a true linear analogue scale because numbers have been attached to the line at the time of questioning, we believe it is still a visual analogue scale. Although Scott and Huskisson<sup>1</sup> differentiated between verbal analogue and verbal graphic rating scales, even numerical rating scales, numerical forms of the visual analogue scale are clearly accepted by Downie *et al.*<sup>2</sup> and by Reading<sup>3</sup> to be forms of a visual analogue scale. Although Scott and Huskisson<sup>1</sup> showed an increase in sensitivity obtained by the linear analogue scale compared with that from a simple four point verbal rating scale, the linear analogue scale suffers from the disadvantage that many elderly or drug affected patients find difficulty in comprehending the relevance of the scheme, and improved compliance has been shown using the light analogue pain scorer in which the pain was 'rated' into five colours described by Nayman<sup>4</sup> or by the slide type variable resistor electronic visual analogue scorer described by Welchew<sup>5</sup>.

Reliability is a problem with the linear analogue scale. The greater the complexity of the task and the greater its sensitivity, the less reliable it becomes<sup>3</sup>. Thus a linear analogue scale with an infinite number of points has greater sensitivity but lower reducibility than a linear analogue numerical graphic rating scale.

Even the linear analogue scale is subject to rating or categorizing by both the patient and the observer. It is well known that young children and deniers congregate the marks at the lower end of the scale. Those who are anxious or fearful congregate their marks at the upper end of the scale, and those who are indecisive, confused or sedated congregate theirs in the middle of the scale. Since pain scores should never be treated as parametric data, the scores themselves should be ranked or grouped for analysis, thereby introducing a rating of the patient's scoring.

We do not even accept the criticism that "comparison with other studies using 'visual analogue scores' is consequently not possible", because correlation between scales has been studied and Woodforde and Mersky<sup>6</sup> and Reading<sup>3</sup> found high correlations. Downie *et al.*<sup>2</sup> compared four scales including a verbal rating scale and numerical, horizontal and vertical forms of the visual analogue scale and showed relatively high correlations (all over 0.6).

Increased reliability has been given to the scale in our paper by the presentation of two fixed points. In the linear analogue scale only one point is known—that of no pain. The other, that of greatest pain imaginable, depends upon the imagination, and is altered by the patient's present experience. In our pain chart from the second postoperative day onwards there are two fixed points, that of no pain, and that of the pain of the previous day. The study of Revill *et al.*<sup>7</sup> suggests that the memory for the position of any previous mark on a visual analogue score is so good that it would not make much difference to the new score if the previous score was seen<sup>8</sup>.

We have obviously considered other methods of measuring pain: consumption of analgesics, frequency of demand, cross modality matching, experimental intensity matching, McGill questionnaire, evoked responses, electro-encephalography frequency latencies, but came to the conclusion that either they were too complex to be administered in the normal clinical setting without affecting the patient's perception or anxiety, or that they were too invasive, or that they were so complex as to be unreliable. The wide range of pain scores would suggest that the method was sufficiently sensitive and that the discrimination between the two methods would not have been improved by increased sensitivity of the method of measurement of pain.

A. M. Roe  
J. I. Alexander

Bristol Royal Infirmary  
Bristol BS2 8HW  
UK

1. Scott J, Huskisson EC. Graphic representation of pain. *Pain* 1976; 2: 175–84.
2. Downie WW, Leatham PA, Rhind WM, Wright V, Branco JA, Anderson JA. Studies with a pain rating scale. *Ann Rheum Dis* 1978; 37: 378–81.
3. Reading AE. In: Wall PD ed. *Textbook of Pain*. Edinburgh, London, Melbourne, New York: Churchill Livingstone, 1984: 195–206.

4. Nayman J. Measurement and control of postoperative pain. *Ann R Coll Surg* 1979; 61: 418–29.
5. Welchew EA. A postoperative pain recorder: a patient control recording device for assessing postoperative pain. *Anaesthesia* 1982; 37: 838–41.
6. Woodforde JM, Mersky H. Some relationships between subjective measures of pain. *J Psychosom Res* 1972; 16: 173–8.
7. Revill SI, Robinson JO, Rosen M, Hogg MIJ. The reliability of a linear analogue for evaluating pain. *Anaesthesia* 1976; 31: 1191–8.
8. Dodson M. In: *The Management of Postoperative Pain*. London: Edward Arnold, 1985.

## Surgical technique

Sir

Few would argue with the sentiments expressed by Mr Matheson's letter (*Br J Surg* 1987; 74: 1190) that 'craftsmanship' in surgery is important and technical prowess a requisite for appointment as a consultant surgeon. The general acceptance of this view is the main reason why clinical ability is seldom 'aired as an important criterion of (consultant) appointments'. By the time a surgical trainee is considered for elevation to consultant status he has generally spent some 14 years in postgraduate surgical training and his 'craftsmanship' has sufficiently matured for appointment committees to be confident about technical competence—especially when supported by three testimonials from senior surgeons.

The thrust of Mr Matheson's argument, however, is not so much related to the positive acquisition of technical expertise but rather that academic and research endeavour in some mysterious way inhibits the craft of surgery. In a leading article in the same issue (*Br J Surg* 1987; 74: 1073–4) I attempted to express the view that these two arms of surgical practice, surgical science and clinical expertise, should be intermingled in surgical training programmes.

Over the last 20 years there has been increasing acceptance that surgical training demands both the acquisition of scientific knowledge and clinical judgement, as well as technical ability. If a trainee has not been exposed to ongoing research or clinical investigation at some stage during his training he may well not be in the position to take full advantage of developments which will inevitably occur during his consultant years.

Many, if not most, consultant surgeons will admit that their own research experience has resulted in the adoption of a more critical attitude to clinical problems. This can only improve the standard of clinical care for the individual patient and the current demands for surgical audit and the assessment of cost effectiveness of operative procedures are but an example of this attitude. The present generation of practising surgeons trained, in part, in critical assessment of all that they do has resulted in overall better surgical care. Whilst technical expertise in surgical practice is absolutely essential, exposure to research endeavour amalgamated with clinical practice should not be denigrated in the overall training programme.

I. Taylor

Southampton General Hospital  
Southampton SO1 6HU  
UK

## Loop mattress suture

Sir

The suture technique described by Mr Gault and colleagues (*Br J Surg* 1987; 74: 820) has been published previously<sup>1</sup>. The originator was a Seattle surgeon, Van Hillman, who taught the stitch to my mentor, Henry Harkins, who taught it to me. These acknowledgements were, to my embarrassment, deleted from my paper by the editor of *Surgery, Gynecology and Obstetrics*, and I am pleased to have this opportunity to set the record straight.

R. E. Condon

Medical College of Wisconsin  
Wisconsin 53226  
USA

1. Condon RE. Locked vertical mattress stitch for skin closure. *Surg Gynecol Obstet* 1968; 127: 839.