Fig. 2 Final poster (after enlargement) with photographs inserted with removable adhesive tape.

available a print out from the word processor can be enlarged or reduced and an area of text from black on white to white on black can be inverted (Figs. 1 and 2).

ARRANGEMENTS BEFORE ENLARGEMENT

When all the text is ready, and the selection of pictures has been made, all pieces of paper with text are glued on to a clean white sheet of paper or card which has half the length and half the width of the final poster. This "miniposter" can now be enlarged. This usually has to be carried out by specialist firms, but companies that carry out such enlargement are located in most towns. I have excellent experience of Photobition, Byam Street, London SW6, who will deliver the poster in two days from reception of the "miniposter" at a cost of about £30. They also provide a tube of hard paper for transportation.

FINAL PRODUCT

The poster is black and white and printed on a paper, which is semigloss and also soft enough to be rolled. On this final version selected areas can be underlined with fluorescent textliners or overpainted to make the poster more colourful. The photographs are inserted

into the spaces with removable double sided adhesive tape (Fig. 2). When returning back from the conference the photographs may of course be fitted more permanently with dry stick adhesive.

Due to the ease with which this poster can be produced, there may be a temptation to insert too much text, which also can be seen in the example given (Figs. 1 and 2). This poster is on one piece of paper on which all text, Tables, and legends are present. This is better than five to 10 separate pieces that may be lost or damaged during transportation to the meeting, and carrying the poster in a paper tube allows it to be carried easily on flights. On arrival at the meeting the poster is ready to hang without the need to arrange individual pieces. This method therefore provides a neat easily transportable poster, which can be rearranged and improved until shortly before the meeting.

I thank Dr H Thaw and Professor U Brunk, Linköping University, Sweden, who initiated this work.

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Plastic processing of cemented hip joint replacement specimens

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In 1960 Sir John Charnley presented the preliminary results of a new method to anchor the femoral head prosthesis.¹ This entailed the use of bone cement (methylmethacrylate). Since then the cemented hip prosthesis has been widely used and some 100 000 hip arthroplasties are performed annually throughout the world. Some implantations, however, fail after many years and with the introduction of cement free prostheses the concept of cement has come under debate.² Sixty one cemented hip joint replacement specimens, which had originally been inserted by Charnley 15-21 years before their removal, were available for examination. All the cases had had a good clinical result, and the aim of the study was to examine the bone and cement interface to assess the cellular and bone reaction and the biological stability.

It was imperative, therefore, to examine the bone and cement interface intact. This required histological

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sections to be prepared including undecalcified bone and intact cement. It was also necessary to prepare large sections to allow assessment of the overall reaction pattern in different locations and to prepare slab radiographs and microradiographs from the same block of tissue for comparison with the clinical radiographs.

The prostheses had been inserted using methyl methacrylate bone cement, and blocks of femur and acetabulum were processed with the tissue and cement interface intact and with the cement in contact with the tissue. Previous work has usually entailed the interpretation of decalcified sections,³ the production of which necessarily entails the removal of the cement from the tissue. Decalcification also has the disadvantage that tissue shrinkage may be considerable. Methacrylate resins have also been used for processing⁴ but would not have been suitable for use in this study. One reason is that the blocks processed were on average $25 \times 30 \times 4$ mm and were often much larger. It would not have been possible to use methacrylate for such large blocks as it becomes increasingly difficult to produce good quality sections from methacrylate embedded blocks as the block size increases. The large number of blocks in this study also entailed the use of some 50 litres of processing resin. This amount of methacrylate resin would have been extremely expensive to buy and time consuming to purify.

Polymaster 1209 AC resin is a low cost resin, being one sixth of the cost of methyl methacrylate, and has been used as an embedding medium for over 10 years.⁵ The usual method of use, however, was not found to be suitable in this project for two reasons. Firstly, it entails the use of cellosolve (2-ethoxyethanol) for dehydration, which dissolves bone cement. Secondly, curing the blocks at 56°C causes the cement to soften. The modified Polymaster method described permits more effective preservation of bone cement, thus enabling its point of contact with tissue to be seen and examined while still allowing assessment of osteoid v mineralised bone. Unfortunately, some softening of the cement does still occur due to the solvent action of the Polymaster resin itself and also, possibly, the action of the dibutyl phthalate plasticiser. Using line intersection counting techniques with dark ground microscopy we discovered that 75% of the blocks from the femur retained cement. An average of 41% of the bone surface had cement remaining in contact with tissue. Even within a particular case, however, the variation is considerable with some blocks retaining all the cement and others retaining none. The reasons for this are unclear, but it seems that the cement is less likely to be removed from the block if it is intermingled between trabeculae than if it adjoins a fairly smooth surface. The degree of polymerisation of bone cement, and

therefore the level of solubility in processing fluids, may also vary from case to case. The mixing protocol used in the preparation of bone cement is known to affect the mechanical strength due to variations in factors such as the mixing rate.⁶ This may affect the stability in the processing method.

Sections can be stained using the same techniques allowed by the original method (Fig. 1). A different clearing agent and mounting medium, however, must be used as xylene and DPX cause the cement to be removed. The cement itself cannot be stained but can be visualised using dark ground microscopy (Fig. 2). The method has also allowed $100\ \mu\text{m}$ sections for microradiography from the same blocks to be produced, the technique for which has already been described (Fig. 3).^{7,8}

It cannot be guaranteed that this technique will retain all bone cement associated with tissue but it does retain sufficient to allow an accurate assessment of its relation to the tissue in most cases. This method, therefore, may be of use to many other workers in the field of orthopaedic implant studies.

Method

The method to be used is as follows:

- 1 Fix tissues in 10% buffered formalin. At least one week is recommended.
- 2 Dehydrate in absolute alcohol. Test for completion using the silver nitrate test.⁵
- 3 Infiltrate (note 1) with agitation at room temperature, allowing four changes of 24 hours each in Polymaster 1209 AC 100% (note 2).
- 4 Infiltrate at room temperature and under 700 mm vacuum, allowing three changes of 24 hours each in Polymaster 1209 AC 95% and dibutyl phthalate 5%.
- 5 Infiltrate with agitation at room temperature for eight hours in Polymaster 1209 AC 95% and dibutyl phthalate 5%, with the addition of 1% Butanox 50 catalyst (methyl-ethyl-ketone peroxide) and 1% of 1% hydroquinone in ethanol.
- 6 Embed in a siliconised glass mould and leave in a waterbath heat sink until polymerised for at least 36 hours at room temperature.
- 7 Place in 37°C oven to harden for at least 48 hours.
- 8 Remove from glass mould and trim off the excess resin using a bandsaw and sander (note 3).
- 9 Cut sections using a motorised microtome.
- 10 Stain sections free floating and mount using Euparal essence as a "clearing agent" and Euparal as a mountant.

Fig. 1 Masson Goldner stain showing wide area of fibrosis at bone and cement interface. Femur. $\times 130$.

Fig. 2 Dark ground microscopy of a Masson Goldner stain showing the bone and cement interface. (Bone on the left, cement on right.) Femur. $\times 130$.

Notes

1 Processing times will vary according to block size, but longer exposure of cement to processing resin will cause increased softening of the cement. A balance must be achieved between the quality of processing of tissue in the final block and the amount of cement retained.

2 The resin is only slightly miscible with alcohol and so is infiltrated at a 100% concentration rather than using increasing dilutions.

3 A sharp sanding disc should be used when trimming off excess resin as use of a blunt one will cause overheating of the block and softening of the bone cement. If this happens the block should be left to allow rehardening before cutting.

Fig. 3 Microradiograph of 100 μ m ground section of femur showing formation of secondary cortex around prosthetic site. Kodak high resolution plate: 20KV, 3mA, 75 minutes. Original magnification $\times 6$.

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Letters to the Editor

Mobiluncus spp: pathogenic role in non-puerperal breast abscess

We report a female patient (we believe to be the first in the United Kingdom) in whom a *Mobiluncus* spp was isolated from an infected site outside the genital tract. The species may play a role in the causation of non-puerperal breast abscess.

A 38 year old woman presented to her general practitioner with a painful left

breast. Three years before, breast implants had been inserted following bilateral sub-mammary excision for benign mammary dysplasia and duct ectasia.

On examination the breast was tender, inflamed, and discharging pus. A swab was taken, and the patient started on ampicillin and flucloxacillin.

The swab was cultured both aerobically and anaerobically and yielded a heavy mixed growth of two anaerobes. These were a *Bacteroides* species, and a Gram negative curved rod resistant to metronidazole,

which was identified by the National Collection of Type Cultures, Public Health Laboratory Service, Colindale as *Mobiluncus curtisii*, subspecies *holmesii*.

Anaerobic curved rods were first isolated from the female genital tract in 1913. More recently the possible role of these organisms in non-specific vaginitis and their taxonomic position has been discussed.¹

In 1984 Spiegel and Roberts² compared 22 strains of curved rods (isolated from the vaginas of 22 women with non-specific vaginitis) against phenotypically similar species