thesia. After sterilization of the scrotal skin a 3-4 cm incision is made longitudinally to expose the vas. The tissues of the cord are dissected and the divided ends of the vas identified. Portions of both ends of the divided vas are excised until normal vas with a patent lumen is reached. Patency of the vas is confirmed by (1) injecting sterile saline into the distal or prostatic end with a syringe and needle, and (2) obtaining the secretion from the proximal or testicular end on a sterile glass slide and examining under a microscope for spermatozoa. Passing a fine nylon thread may also ensure a patent lumen. Continuity is established, using a 00 monofilamentous nylon thread to act as an internal splint within the lumen of the vas. This thread is brought out through the wall of the vas about 3 cm from the divided proximal end and then out through the scrotal skin. The cut ends of the vas are brought together with three or four stitches of fine non-absorbable suture material on an atraumatic needle, taking care not to enter the lumen of the vas. The wound is closed in layers and skin stitches are applied. The stitches are removed on the fifth day and the splint is pulled out after another two days. Antibiotic cover is provided.

It is advisable to carry out reanastomosis on only one side initially. If this proves unsuccessful, another attempt can be made on the opposite side.

Cases available for follow up show a varying success rate with different surgeons, varying from 20% to 80% or more. One man aged 54 had a successful reanastomosis performed fifteen years after vasectomy.

REFERENCES
Ramayya P (1972) Personal communication
Saha H (1971) *The Journal of Family Welfare* **18**, 10–15
Shrikhande N V (1972) Personal communication
Wig N N & Singh S (1971) A Psychological Study of Symptoms Following Vasectomy (1968–70). Indian Council for Medical Research, New Delhi

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Vasectomy: Problems of Follow Up

The aims, organization and methods of the Family Planning Association Clinic in Cardiff have been described in a previous paper (Jackson *et al.* 1970). We have now performed over 1000 vasectomies and here review our results and problems.

Follow up begins immediately postoperatively with a discussion about the duration of the local anæsthetic, analgesia and wound dressings. As catgut sutures are used removal is not required and bathing is encouraged after forty-eight hours. An appointment is given for review of the wound in one week together with a letter to the general practitioner informing him of the treatment his patient has received. It is reiterated to the patient that he is not yet sterile and that whilst he can resume intercourse when comfortable he should continue to use a contraceptive technique.

Upon review the patient is asked whether he has lost time off work or suffered pain, the scrotum is examined and the results recorded. The patient is again told that he is not yet sterile, asked to provide specimens twelve and sixteen weeks postoperatively for analysis, and told that he will be notified by post when his operation is complete. Until he receives this notice he is again instructed to use a contraceptive technique.

Results: One thousand vasectomies have been performed. Of these 97 were excluded from this review since they were operated on too recently to be complete by the time of the survey; 903 cases were available for further study.

Early complications: Hæmatoma occurred in 164 patients (105 unilateral, 59 bilateral); this number may appear high, but anything palpable in the region of the vas and larger than 0.5 cm was defined as a hæmatoma, and as the cases were generally reviewed by another surgeon this was quite an exact criterion. Scrotal bruising alone (120 cases) was not of serious moment, whilst infection (26 cases) was superficial in all but 2 cases. Pain (121 cases) was in general not severe and caused little inconvenience. Epididymitis occurred in 8 patients. One man with a vast hæmatoma had Von Willebrand's disease, and this emphasizes the need for specific enquiry regarding bleeding tendencies. The solitary psychiatric problem was a patient who had a fantasy following operation thinking that his penis was shrinking, but this passed off in forty-eight hours and he remains well.

Time off work: Sixty-three per cent of patients took no time off work; 11% took time off as recommended; 11% took less and 15% took more time than recommended. Of the 44 patients who lost seven days or more the majority had a hæmatoma, but one-third had, on their own admission, no reason for being absent.

Late complications: Two patients experienced testicular discomfort following intercourse but settled down following reassurance. The one

psychiatric problem occurred four months post-operatively in a patient bereaved of his eldest child from a family of 5. He also had marital difficulties at the same time and was in debt and out of work. His difficulties settled with the passage of time and he has no regrets regarding the operation.

Other late complications were: multiple semen counts, 179; defaulters, 149; surgical problems, 6.

Abnormalities of semen analysis: For completion, two consecutive specimens of semen, taken at 12 and 16 weeks respectively, must show complete aspermia; 575 (64%) of patients fulfilled these criteria and will not be discussed further. It is emphasized that complete aspermia is required and the presence of one sperm dead or alive is considered a positive result.

Of the remaining 328 patients, 149 were defaulters; 53 submitted no specimen while 48 submitted one specimen only showing aspermia. The remainder submitted multiple specimens varying from many sperms to aspermia but failed to satisfy the criteria for completion of the operation in spite of multiple postal reminders. Ultimately practitioners were notified that these patients had defaulted. Of those defaulting 31 owed money whilst in 29 further cases all charges had been waived as the patients were considered to be socially deprived.

There were then 179 cases requiring multiple semen counts before achieving completion and the reasons for this are now examined. Sterility after division of the vas demands emptying of the seminal vesicle and there are a number of factors affecting the time which this takes. First, how many ejaculations are required? Experimental evidence (Freund & Davis 1969) suggests that eight are necessary and this correlates well with our clinical finding that when eight specimens have been received 97% of cases are complete.

We can also demonstrate in our series more problem cases in the over-40 age group where the frequency of intercourse is known to be lower, as admitted by the patient. The rate of completion leads us to believe it is even below the figure quoted to us by these patients.

Our longest completion took sixty weeks because the patient and his wife were involved in a road traffic accident and were separated by their injuries for some considerable period.

Second, when is intercourse resumed? In a review of this problem (Sinha *et al.* 1969) it has been suggested that 30% of patients resume in four weeks, 60% within six weeks, 80% within eight weeks and the remainder within three months. This correlates well with a survey within our own clinic and gives an obvious cause for delayed completion.

Surgical problems: There were 2 difficult vasectomies. In one case the surgeon was unsure whether he had ligated the vasa and later semen counts confirmed that they had been missed; this operation was repeated under local anæsthesia and completed. The difficulties of the second case were recognized preoperatively by the surgeon who referred him to the consultant in charge who carried out the operation successfully again under local anæsthesia. One patient had an absent vas, confirmed by careful exposure of the testis under local anæsthesia and the case was completed without difficulty. Postoperatively the patient's semen counts were negative, confirming the diagnosis.

There were 3 recanalizations. The diagnosis was established on the basis of persistently positive sperm counts in spite of frequent intercourse or masturbation. We have not seen recanalization where the semen counts are first negative followed by reversion to a positive count with fertility. There was adequate evidence to show that the vasa had been tied in each case and radiological and histological examination of specimens removed confirmed recanalization. We can add little to other published work (Pugh & Hanley 1969) on the etiology of this condition. We have used the methods of ligature suggested by them, and also overlapping and double ligation of the vas to hold the ends apart.

Anæsthetic problems: There were no complications in our series performed under local anæsthesia and in our view this is the safest method.

Recommendations

(1) Careful counselling by another doctor before surgery to exclude psychosexual problems.
(2) Review by the surgeon preoperatively.
(3) Out-patient surgery.
(4) Local anæsthesia.
(5) Double ligation of the vas, keeping the ends well apart.
(6) Specimens of semen to be submitted 12 and 16 weeks after resuming intercourse rather than 12 and 16 weeks postoperatively. Patients to be told eight ejaculations are required to empty vesicles.
(7) Repeated reminders to the patient that he is not yet sterile until his semen counts are negative and he has been notified in writing of the completion of his operation.
(8) Where patients are slow to complete, request frequent specimens to encourage ejaculation and thus empty the seminal vesicle.

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REFERENCES
Freund M & Davis J E (1969) *Fertility and Sterility* **20**, 163
Jackson P, Phillips B, Prosser E, Jones H O, Tindall V R, Crosby D L, Cooke I D, McGarry J M & Rees R W (1970) *British Medical Journal* iv, 295
Pugh R C B & Hanley H G (1969) *British Journal of Urology* **41**, 340
Sinha S N, Pain P C & Prasad B G (1969) *Journal of the Indian Medical Association* **53**, 134

Mr W K Yeates (*Newcastle upon Tyne*) said he was concerned about the amount of effort being put into following up vasectomy cases until not even immotile sperms were seen. He thought this was unnecessary and not worth the inconvenience to the patient.

He had personally microscoped well over 1000 fresh semen specimens 8 and 9 weeks after vasectomy and had not seen a sperm with the slightest sign of movement in any specimen. He regarded a nonmotile sperm at this time as being as good as none and told his patients this. He had had no cause to regret this policy over a number of years. He had never seen anything of more significance in the second specimen than in the first; although there were occasionally a few more sperms in the second specimen, they also were invariably immotile.

He asked Dr Jackson if one sperm had been seen to move in any of the follow-up examinations in her cases.

Dr Pauline Jackson (*Family Planning Association, Cardiff*) replied that the specimens usually showed no motile sperm but motility was only of significance if the specimen was fresh. Many of the specimens examined in Cardiff were sent by post. Motile sperm had been demonstrated in a few cases and in small numbers, when the total numbers were large – either in the early phase postoperatively or when recanalization had taken place.

The following papers were also read:

Indications for Vasectomy
Dr Pauline Jackson
(*Family Planning Association, Cardiff*)

REFERENCE
Jackson P, Phillips B, Prosser E *et al.* (1970) *British Medical Journal* iv, 295–297

Medicolegal Aspects of Vasectomy
Mr J A A Watt (*Hempsons, London*)