Summary

A simple method of treating adduction fractures, and abduction fractures which have disimpacted, of the femoral neck is described. The results appear to be satisfactory according to modern standards. Bone grafting was not carried out in any case.

In those cases in which the nailing operation failed, further surgical intervention was not undertaken because of the age of the patients and their general condition.

We are indebted to Sister Pinfield, the sister of the ward in which most of these patients were treated; to our anaesthetist, Dr. R. E. Gibson; and to Miss Savin and her all-too-small band of physiotherapists for any success we may have achieved in the management of this series of fractures.

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ADDENDUM.—Since this paper was written one more case must be listed as a failure. Thus the percentage of successful cases in this series is 74.

THE KAHN TUBE TEST WITH DROPPING-PIPETTES

BY

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In recent years many laboratories have abandoned the Wassermann test and substituted the Kahn standard tube flocculation test as being superior to complement-fixation methods. The belief that the Kahn test gives more false positive results than the Wassermann has been seriously challenged by Berger and Sutherland (1944). But though the Kahn method is relatively simple, in performance it is exacting, especially in the measurement of small volumes of antigen in graduated pipettes. This disadvantage can be largely overcome, and the test set up more rapidly, by the use of pipettes standardized to deliver drops of known volume. Such pipettes have already been advocated in other serological tests for the diagnosis of syphilis—for example, in the Wassermann reaction (Donald, 1916), the sigma reaction (Dreyer and Ward, 1921), and in slide flocculation tests (Mazzini, 1942; Gradwohl, 1943; Harris et al., 1948).

As regards the Kahn test, the volumes of reagents used are economical and the smallest practicable for volumetric work in test-tubes. Osmond (1940) used a dropping-pipette to deliver the standard 0.0125 ml. of antigen suspension. He recommended a pipette with a tip diameter equivalent to No. 54 on the Morse scale (1.397 mm., or 0.055 in.).

Two pipettes are described below—one for the delivery of 0.0125-ml. volumes of antigen, the other for 0.15-ml. volumes of the patient's serum.

Dropping-pipette for Antigen

30-cm. lengths of 7-mm. soft glass tubing are drawn to make two pipettes. The tip diameter is found by thrusting the capillary portion into the No. 55 Morse gauge hole

(1.321 mm.) of a Starrett plate and cutting the tube at the point where it jams in the hole. When cut the capillary portion should be about 6 cm. long, with sides nearly parallel for the last 4 cm. The external diameter of the tip, which should be 1.30 mm. (0.051 in.), is checked by a micrometer screw gauge, making two measurements at right-angles to one another. It is useful at this stage to mark the capillary shaft with waterproof ink exactly 1 cm. from the tip, so that after cleaning, etc., pipettes with broken tips may be readily recognized and discarded.

The correct diameter (1.30 mm.) was arrived at as follows. A pipette was calibrated with mercury to contain 1 ml., and the weight of 1 ml. of antigen suspension was found to be 0.91 g. Weighed 0.91-g. amounts of the antigen suspensions were then drawn into dropping-pipettes of different tip diameter to determine which delivered 80 drops to the ml.—that is, 0.0125 ml. per drop. (A 1.397-mm. pipette (Osmond, 1940) was found to deliver 77 drops to the ml.)

This volume is delivered in one drop when the rate of dropping is one per second from a vertically held pipette. But even with care in maintaining an even rate of dropping there is some variation in the size of the drop. It was not possible, however, to minimize the error by delivering the same volume of liquid in a number of smaller drops. Thus to deliver two drops of half the required volume (0.00625 ml.) a tip diameter of 0.62 mm. was necessary, and capillary shafts of this size are too fragile for routine use.

Compared with 0.1-ml. graduated pipettes, marked to deliver 0.0125-ml. volumes, the dropping-pipette is much quicker and easier to use. In a two-tube test, one receiving one drop (0.0125-ml.) and the other two drops (0.025 ml.), it took about four minutes to dispense antigen suspension for 100 tests. With graduated pipettes the same operation took 22 minutes. The dropping-pipette technique is readily acquired by the laboratory technician, whereas the use of graduated pipettes demands more experience and entails much more eye strain.

Dropping-pipette for Patient's Serum

The Kahn standard test requires the delivery of 0.15-ml. volumes of serum. The weight of 1 ml. of a pool of five inactivated human sera proved to be 1.02 g. Of this pool 0.918-g. amounts (0.9 ml.—that is, six 0.15-ml. drops) were tested in pipettes of different tip diameters, with the following results:

Tip Diameter (mm.)	No. of Drops in	
	0.9 ml.	0.15 ml.
2.8	18	3
5.0	12	2
9.3	6	1

Only the results with pipettes delivering simple fractions of 0.15 ml. are cited above. The 2.8-mm. diameter was selected because in practice the variation in volume is less when the 0.15 ml. is delivered in three drops than in two or one.

With this 2.8-mm. pipette, delivering 0.15 ml. of serum in three drops (0.05 ml. of serum per drop) at the rate of one drop per second, 100 sera could be dispensed, each in three 0.15-ml. volumes and with a triple rinse of the pipette in saline for each serum, in 33 minutes. With a graduated 1-ml. pipette, similarly rinsed for each serum, the same operation took 45 minutes.

The Kahn Test with Dropping-pipettes

Apart from the saving of time and labour in the performance of the test, and the ease with which accurate dropping-pipettes can be constructed by a competent laboratory technician, the dropping-pipette technique permits a modification that is useful, especially when the test is done in hot climates. In the standard test the antigen suspension is dispensed first, and when large numbers of sera are to be tested there is a real risk of evaporation of the smallest dose (0.0125 ml.) of liquid. Serum is added to antigen, and not vice versa, presumably because the antigen pipette might

become contaminated with serum left on the upper part of the tube when graduated pipettes are used. With dropping-pipettes, on the other hand, there is no chance of such cross-contamination, and the bulkier serum volume, which is proportionately less susceptible to evaporation, can be dispensed first. It is, indeed, convenient to dispense the serum while the antigen suspension is "ripening."

There seems to be no good reason why this change in the order of adding reagents should not be made. In order to make sure that nothing goes wrong if Kahn's recommendations in this respect are not adhered to, 500 sera were tested both ways, 100 on each occasion, using the same bottle of antigen each time. The results, in which 60 of the sera were positive, agreed in every instance.

Another economy can be achieved by omitting the first of the three tubes used in the Kahn standard test (Osmond, 1940; Pantan and Marrack, 1947). This tube contains the largest volume of antigen suspension (0.05 ml.), and its omission not only saves time and labour but results in a very real saving of antigen. The only advantage of this tube seems to be that its floccules, when present, are usually the most easily visible with the naked eye when the two other tubes have to be read with the aid of a magnifying glass. There is no great loss when that tube is omitted, because a magnifying lens has to be used in any case. The most useful magnifying glass for detecting small floccules is one that shows them in sharp focus when the lens mount is applied in *direct contact* with the tube. The Bausch and Lomb $\times 7$ achromatic focusing magnifier (for photomicrography) satisfies this condition. A microscope eyepiece can be used if the top lens is removed and the observer's eye applied to the lower end. The Bausch and Lomb $\times 5$ Huygenian eyepiece is satisfactory, because the Kahn tube can be held in contact with the end of the eyepiece tube, from which the top lens has been removed. Not all makes of eyepieces are suitable.

Summary and Conclusions

The performance of the Kahn standard test is greatly facilitated by the substitution of dropping-pipettes for graduated pipettes. Dropping-pipettes are easy to make and simple to use without eye strain.

A dropping-pipette with an external tip diameter of 1.3 mm. delivers the required standard 0.0125-ml. volume of Kahn antigen suspension when the rate of delivery is one drop per second. In routine tests antigen is dispensed in about one-fifth the time needed with graduated pipettes.

A dropping-pipette with an external tip diameter of 2.8 mm. delivers the required standard of 0.15-ml. volume of serum in three drops when the rate of delivery is one drop per second. It can be readily rinsed in saline for each serum. Compared with graduated pipettes, its use in dispensing serum makes routine tests about 30% quicker.

In the Kahn standard test, sera are dispensed *after* the antigen, and the small 0.0125-ml. volume of antigen may partly evaporate before serum is added. With the dropping technique the bulkier volume of serum, from which evaporation is proportionately less, may be dispensed first.

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Medical Memoranda

Hour-glass Bladder

The name hour-glass bladder seems familiar, but it is not mentioned in several standard textbooks consulted. Perhaps the apparent familiarity of the title is due to memories of hour-glass stomach. However, the following case seems worthy of record as an hour-glass bladder.

CASE REPORT

A spray painter aged 33 was seen at the West London Hospital on March 21, 1946. He had had cystitis, with difficulty of micturition, in 1942 and 1945, when cystoscopy, sulphanilamide, and prostatic massage figured in the treatment. He now again had had difficulty of micturition for nine months, with burning during the act, and slightly increased frequency (D/N=2-4 hours/0-1), but no haematuria. He also had a feeling that he was not emptying the bladder properly, and had occasionally noticed swelling of the abdomen during the past nine months, with some suprapubic tenderness, and nine months previously had had acute retention.

There was no venereal history or any evidence of stricture or enlarged prostate. The urine contained pus in fair amount, a few red cells, and many coliform bacilli. *Proteus vulgaris* was grown.

Plain x-ray films on March 28 and April 8 showed no stone shadow, but apparently a big bladder shadow that filled the pelvis. Intravenous urography on the latter date, while showing good bilateral renal excretion shadows in five minutes without renal or ureteric dilatation, also showed a big bladder shadow, filling the pelvis, even after micturition.

On April 4 cystoscopy revealed a bladder capacity of 3 pints (1.7 litres) and a well-marked narrow ridge, projecting forwards from the posterior wall, with the ureteric orifices situated laterally on the ridge. The blood urea was then 72 mg. per 100 ml. On April 11 the bladder was still up to the umbilicus after the withdrawal of 2 pints (1.1 litres) of residual urine. A $\frac{1}{2}$ English metal bougie was passed. The urine urea was 0.98%.

On admittance on April 12 the bladder, over which there was no tenderness, was found distended only half-way to the navel. Dr. Redvers Ironside found no organic signs referable to the nervous system or any clinical evidence of associated congenital abnormality.

On April 23, after a period of catheter drainage and bladder lavage, cystoscopy again showed a free interureteric bar, and cystotomy a large bladder with thickened and reddened mucosa lying convexly inwards in flabby folds.

A transverse fold, attached posteriorly, free anteriorly, and projecting forwards like a shelf, lay loosely across the bladder, with the right ureteric orifice identified and probed on it, and a very deep capacious proximal recess, bigger than a closed fist, and seemingly bigger than the distal division of the bladder.

The fleshy fold was held up and, $\frac{1}{2}$ in. (1.3 cm.) to the left of the right ureteric orifice, was cut antero-posteriorly in the middle line for about 2 in. (5 cm.), the cut not reaching to the bottom of the fold, yet entering a cavity—not the rectum, but presumably the recto-vesical interval.

The proximal mucosa was sewn to the distal mucosa by a continuous suture on the right and left of the V-shaped gap thus formed, the temptation to cut away the resulting triangular flaps being resisted because of the ureteric orifices on the free margin of the fold. The bladder and space of Retzius were drained by plain tubes.

Looking again at the intravenous urography films one detects, in the 30-minute film, some evidence of this curious division of the bladder cavity into two compartments.

On July 1 the blood urea was down to 48 mg. per 100 ml., and the residual urine to 9 oz. (255 ml.). the catheter urine showing a deposit of epithelial cells, a few leucocytes and red cells, triple phosphate crystals, and numerous Gram-