third sounds. The three sounds are very close together in time and there is a clear pause before the next pulse complex.

The normal arterial sound transmitted from the probe can be recorded by the phonocardiogram. A record of the sound over the dorsalis pedis artery is shown in Fig. 2.

FIG. 2—Phonocardiographic recording of normal arterial sound.

Investigation of Arteriovenous Shunts

Twelve patients known to have diffuse congenital arteriovenous shunts were examined. In all an abnormal arterial sound was recorded (Fig. 1 B). The first, second, and third sounds could be recognized, and in addition there was a fourth small peak in

FIG. 3—Phonocardiographic recording of abnormal arterial sound.

blood velocity, which possibly represented flow through arteriovenous fistulae. These differences are most easily recognized in ultrasound phonocardiograms (Fig. 3), in which the amplitude of the sound wave can be seen to be decreased and the duration is prolonged. Three other patients thought to have a purely venous malformation showed evidence of arteriovenous shunting with the ultrasound test (Fig. 4). Presumably the degree of shunting in these cases was too small to be detected by any other means.

FIG. 4—Phonocardiographic recording of arterial sound in normal leg (A) and abnormal leg (B).

Value of the Test

We use the method of Malan and Puglionise³ in selected cases of diffuse congenital arteriovenous shunts in which the arterial branches supplying arteriovenous fistulae are divided. Ultrasound records can be used to measure the effectiveness of such an operation.

It seems likely that the ultrasound test may also prove to be of value in the evaluation of other vascular diseases. For example, a typical record of arteriovenous shunting was obtained from cases of erythromelalgia. In varicose veins and Raynaud's disease the ultrasound tests gave normal results.

References

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Removal of Corneal Foreign Bodies by Disposable Needle

Professor W. S. FOULDS, Tennent Institute of Ophthalmology, University of Glasgow, writes: The removal of an embedded corneal foreign body is a common emergency procedure in the casualty departments of general hospitals and eye hospitals. Most ophthalmologists agree that the removal of such foreign bodies is best undertaken with the use of a sharply-pointed foreign body needle, which can extract the foreign body with minimal damage to the cornea, and not by the use of the time-honoured spud, which, while appearing safe because of its bluntness, results in considerable corneal damage owing to the amount of tissue destruction which removal of the foreign body by this method entails.

The difficulty of always having a very sharp sterile corneal foreign body needle to hand has prompted many ophthalmologists to use a disposable serum needle for this purpose. Such a needle makes an imperfectly balanced instrument, however,

Handle with disposable serum needle attached.

and being short is difficult to manipulate easily. A simple solution is the handle that has been made for me (see Fig.), which consists of a light milled rod some 5 in (13 cm) long with a tapered end that will hold firmly a disposable hypodermic needle (No. 12 or 18). Such a needle can be extracted from its plastic container by inserting the taper of the handle direct into the needle in the same way as the needle is attached to a syringe. In practice it has been found that a handle of this sort greatly adds to the ease with which a serum needle can be used for the removal of a corneal foreign body, while the fact that the needle itself is disposable means that a uniformly sharp and sterile instrument is always readily available.

This handle was made by Keeler Instruments Ltd., 21/27 Marylebone Lane, London W1M 6DS.