It should be borne in mind that, in recording EMG of subjects making violent movements in a screened room, it is also necessary to use shielded electrode leads.

The chief shource of interference with electrography encountered in metal working shops is to be found in the variable electrical field of the power and lighting systems.

In order to eliminate these sources of interference we used a differential amplifier, connecting the body of the subject to its housing by means of a "null" electrode. With the resistances between the electrodes as mentioned above, the amplifier should have a discrimination coefficient of only about 1,000-1,500.

The equipment used by us for ECG and EMG recording at a workshop bench consisted of a two-channel amplifier and an oscillograph. Devices transforming elements of the movements of the workmen into electrical impulses were connected to the oscillograph. The input points of the amplifier were connected through shielded leads to a plug fastened to a belt worn by the workmen. Single shielded leads connected the plug to the electrodes.

The equipment had an independent current supply. In many cases the equipment did not need to be grounded.

We made ECG and EMG recordings, using the above-described equipment, from persons working in a metal-working shop. Figure 1 shows the electrogram recorded during cutting of metal with a chisel, and Figure 2 that during filing of metal. In addition, we took ECG and EMG recordings of men engaged in drilling metal on a lathe and with an electric drill, and in working a shaping lathe.

In working with grounded equipment it should be borne in mind that the subject is also grounded and strict safety precautions should be observed.

Should it be necessary to record a one-channel ECG, this may be done using the EKP-4 electrocardiograph, or some similar instrument. In such cases the electrode leads should be shielded.

Our results show that electrographic methods may be applied to the study of bioelectric processes taking place during work in a factory, and this facilitates the solution of a number of problems of the physiology of work under industrial conditions.

INSTRUMENT FOR NARROWING THE LUMEN OF THE AORTA, IN SHORT EXPERIMENTS

A. Kh. Khaidarov

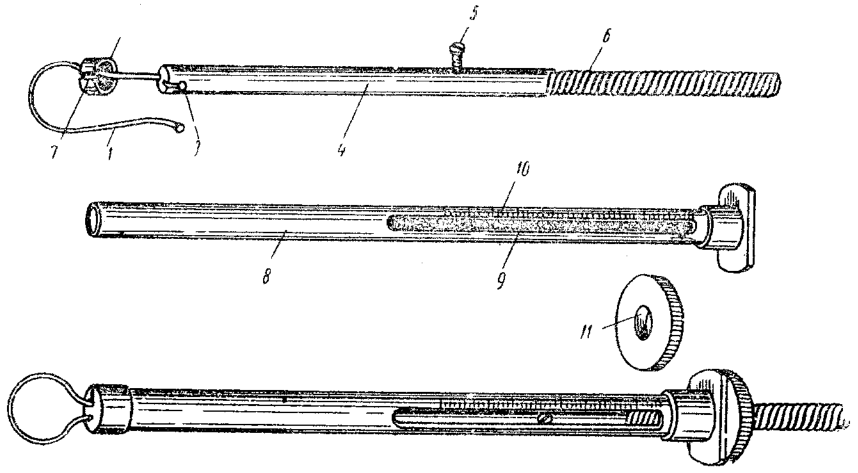
From the Laboratory of Clinical Physiology (Director: Prof. P. K. Anokhin, Member Acad. Med. Sci. USSR), A. V. Vishnevsky Institute of Surgery, Acad. Med. Sci. USSR (Director: Prof. A. A. Vishnevsky, Corresponding Member Acad. Med. Sci. USSR)

(Received May 18, 1956. Presented by P. K. Anokhin, Member Acad. Med. Sci. USSR)

A study of arterial pressure levels, and of depressor nerve activity, in experimental aortic stenosis is of considerable importance to the development of modern cardiovascular surgery.

The existing instruments for determining the degree of narrowing of the lumen of the aorta are very imperfect [1, 2]. We were not able, from a search of the literature available to us, to find a single description of an instrument which would be simple in operation, and which would produce accurately any required degree of stenosis of the aorta, under conditions of short experiments in the laboratory.

The instrument devised by us (see Figure) consists of a metal cylinder, containing a threaded piston rod, a nut, a cap, and a movable guide. The cylinder is 12.5 × 0.5 cm. A window is cut in the upper third of its length, dimensions 5 × 0.5 cm, to enable movements of the piston rod to be observed. A scale is engraved on the right-hand side of the window, graduated in mm from 0 to 20 mm. The rod consists of three portions: a thread is cut into the upper portion, serving for moving the rod along the cylinder, a pointer is inserted into the middle third, serving for indicating the degree of stenosis achieved, and a hole, dimensions 3 × 3 mm, is drilled through the lower end of the rod, with a notch at each opening leading to the end of the rod. The ends of a loop are fitted into the hole and notches. Slits are cut on each side of the cap, and an opening is made in the top, through which the loop passes. The loop is made of tough, flexible material, and has a diameter of 20 mm.



Instrument for narrowing the lumen of the aorta. 1) oop; 2) cap; 3) opening and notches in the piston rod; 4) piston rod; 5) pointer; 6) threaded end of piston rod; 7) slit in cap; 8) cylinder; 9) window in cylinder; 10) scale; 11) nut.

Method of use of the instrument. The animal is anesthetized, and the carotid and iliac arteries are connected to a mercury manometer. Depressor nerve impulses are registered with the aid of an oscillographic equipment. The normal blood pressure and activity of the depressor nerve are recorded before stenosing the aorta. A transverse incision is then made on the left side, at the level of the 5th-6th ribs, and the thoracic cavity is opened layer by layer. One end of the loop is passed under the descending arc of the aorta and fitted into the notch at the end of the rod, so that the aorta is fully encompassed by the loop, which assumes the shape of its cross-section. The diameter of the aorta is then read from the scale, and the knurled nut is turned, so as gradually to narrow the lumen of the aorta until a rise in carotid artery pressure, and a fall in iliac artery pressure, are noted, together with alteration of impulsation from the depressor nerve.

The narrowing of the lumen of the aorta is then read from the scale, in mm. Knowing the diameter of the aorta before and after constriction we calculate the area of the cross-section of the aorta from the formula $S = \pi R^2$. Having determined these cross-sections, we can readily calculate the percentage narrowing of the lumen.

The instrument was used experimentally on 15 dogs and 25 rabbits. It enabled us to grade the degree of stenosis of the aorta, and to operate with known aortic diameters throughout an experiment; using the appropriate equipment, it made it possible to relate the arterial pressure and the activity of the depressor nerve to the degree of aortic stenosis.

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