

again completely inhibited, and the animals succumbed with characteristic symptoms.

In several cases in which theelin or antuitrin "S"† was administered following adrenalectomy and inhibition of estrus, the restoration of estrus was brought about by such treatment.

Repeated administration of cortico-adrenal extract to young, immature female rats brought about a slightly earlier opening of the vagina than in litter controls.

6586

Effects of Alternate Suction and Pressure on Circulation in the Lower Extremities.

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(Introduced by M. H. Jacobs.)

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According to Poiseuille's law the volume of fluid flowing through a rigid tube is proportional to the fall in pressure along the tube. It seems possible, therefore, that if the peripheral fall in blood pressure could be increased the total amount of blood flowing past an arterial obstruction in unit time would be greater. The fall in pressure through the arterial tree may be increased physically in two ways, (a) by elevating aortic blood pressure or (b) by reducing peripheral blood pressure to a negative value. The first method is impracticable for numerous reasons but it is possible temporarily to reduce capillary and venous pressure by applying suction to the extremities.

An aluminium box was built large enough to accommodate the lower extremity to a point about 6 inches above the knee and strong enough to withstand pressures of -120 to $+120$ mm. Hg. A mercury manometer, communicating with the interior of the box, was equipped with electrodes so arranged that the one-half horse power motor operating an air pump was stopped through an electrical relay, whenever the pressure in the box exceeded or fell below atmospheric pressure by 120 mm. Hg. A valve was inserted between the pump and the box so that for 25 seconds the pump evacuated air from the box while for 5 seconds the pump expelled cooled air into the box.

† The theelin and antuitrin "S" used in these experiments was generously supplied to us by Parke, Davis and Co., through the kindness of Dr. Oliver Kamm.

The effects of alternate suction and pressure were first studied by using a circulation schema in which a rubber bag simulated the distensible capillary and venous bed. The rate at which water flowed through the system under a pressure of 80 mm. Hg. was measured first without external pressure variations and then for a like period with alternate suction and pressure. During the latter period the total outflow was increased by between 60 and 80%, indicating the correctness of the working hypothesis.

In order to test the effects of alternate suction and pressure on local circulation the leg was inserted into the aluminium box through the opening of a rubber diaphragm and exposed alternately to suction (-100 to -120 mm. Hg. for 25 seconds) and to pressure ($+80$ to $+120$ mm. Hg. for 5 seconds), while skin temperature was measured to detect changes in blood flow. The short periods of positive pressure were employed in order to empty the engorged capillaries and veins of blood drawn in by the negative pressure so that the next period of suction might again fill the peripheral vascular bed with fresh arterial blood. Continuous suction could not be expected to increase total blood flow except during the brief period required to distend the veins and capillaries.

The left leg was placed in the aluminium box while the right leg was placed in a control box of similar shape and size. Compression and expansion of the air within the aluminium box caused air temperature to fluctuate but by means of electric lamps the control box was always kept slightly warmer than the aluminium box.

TABLE I.

Room temp. °C.	Digit	Skin temp. be- ginning of suc- tion and pres- sure. °C.	Fall in temp. Av. during suction and pressure. °C.	temp. of air in box. °C.
12.2-13.0	L1 suction and	33.0	-1.3	19.2
	L3 pressure	32.3	-2.7	
	R1 control	33.9	-5.6	20.8
	R3 control	33.8	-7.4	
12.0-13.0	L1 suction and	32.7	-2.8	19.2
	L3 pressure	32.5	-6.4	
	R1 control	32.8	-7.4	20.8
	R3 control	32.5	-8.9	
11.3-13.1	L1 suction and	33.4	-1.7	20.2
	L3 pressure	32.7	-2.9	
	R1 control	34.8	-4.5	22.2
	R3 control	33.7	-6.4	

The effects of alternate suction and pressure on the rate of cooling of an extremity previously warm are shown in Table I. With the right, or control, leg in a slightly warmer environment the left leg was exposed to suction and pressure for 22 to 58 minutes while the extremities cooled. The right toes cooled rapidly (Table I) while the left toes cooled more slowly, remaining from 1.4 to 4.5°C. warmer. The temperature of the aluminium box was always lower than that of the control box. The air in the aluminium box was moving whereas that in the control box was still. The left extremity was slightly congested by the rubber cuff while the right was not. All of these factors would favor more rapid cooling of the left extremity but nevertheless the left extremity remained definitely warmer as long as suction and pressure were continued. In view of control experiments it is believed that this was due to increased blood flow produced by the alternating periods of suction and pressure.

The practical value of this method of increasing blood flow is to be tested in patients with obliterative structural disease of the arteries of the extremities. It is possible that improved circulation accompanied by repeated distention of those blood vessels which are not entirely rigid due to organic disease may favor the development of collateral circulation and may thus delay or prevent the advance of threatened gangrene.

6587

Incidental Hyperguanidinemia in Dogs in Parathyroid Tetany.

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In the course of studies of the chemical composition of the blood to determine the relative importance of certain variations which may contribute to the picture of tetany following parathyroidectomy the guanidine concentration has been determined. The interest in guanidine bases originated in the work of Paton and collaborators^{1, 2} who believed that guanidine accumulated as a result of parathyroid deficiency and was the cause of parathyroid tetany.

¹ Paton, D. N., and Findlay, L., *Quart. J. Exp. Physiol.*, 1916, **10**, 318.

² Paton, N., *Edinburgh Med. J.*, 1924, **31**, 541.