

Effect of Semi-Starvation on Propulsive Motility of the Small Intestine. (20276)

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A number of workers have reported the effects of fasting or of semi-starvation on gastric motility. There are but few reports in the literature, however, on the effect of the above states on the propulsive motility of the small intestine.

Our object was to study the effect on the propulsive motility of the small intestine of rats which had been placed on a semi-starvation diet and had lost a pronounced degree of weight. Such a study is of academic and clinical interest since chronic illnesses may cause undernutrition and certain peoples chronically experience semi-starvation.

Methods. Twenty-four adult male albino rats (Wistar-strain) weighing 196-262 g (avg. 217 g) were used—12 as controls and 12 subjected to semi-starvation. Each rat was housed in a separate cage and kept in a 72°F environment. An adequate diet and water were given *ad libitum* to the control animals. The experimental group was allowed water *ad libitum*, but received progressively less of the same diet for an average of 19 days (16-22 days) so weight was progressively lost. When they had lost the desired amount of body weight and showed definite signs of physical weakness they were starved for 12 hours and the propulsive motility of the small intestine studied. Each semi-starved rat was paired with a control animal, which had been starved for the same length of time. Each member was given 2 cc of a mixture of 10% powdered charcoal suspension in 10% gum acacia solution by stomach tube. Forty minutes later the animal was killed, the small intestine removed and the distance the charcoal-mixture had traversed the gut measured.

Results. The experimental rats weighed an average of 225 g at the start, semi-starvation reduced this to 137 g, an average loss of 39%.

During this period the controls gained from 208 g average weight to 262 g, a 26% gain. Motility was as follows: The charcoal traversed an average of 72% of the gut in the controls, and an average of 91% in the semi-starved. The difference is significant at the 0.1% level (t test).

Discussion. Menville(1) found intestinal motility in rats stimulated by semi-starvation (using a buttermilk barium sulfate mixture). Our results are in agreement. Jonas(2) in man and Dagaew(3) in dogs found gastric motility influencing intestinal motility. Other evidence(4) indicates that the stomach of dogs may be severely depressed by hypoxia without affecting intestinal motility. The mechanism of intestinal stimulation by semi-starvation is therefore obscure; there is a possibility that the hypoglycemia known to occur(5) may directly affect the intestine.

Summary. The effect of semi-starvation on the propulsive motility of the small intestine of albino rats was studied by Macht's technique. At the end of 40 minutes, the charcoal-mixture traversed 72% of the small intestine of the control animals, and 91% in the semi-starved animals.

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