

## THE EFFECTS OF EXERCISE ON INTESTINAL TRANSIT OF A PELLETT FORMULATION

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Comparatively little is known about the effect of exercise on the function of the gastrointestinal tract. Gastric secretion is inhibited by severe or even moderate exercise, and severe exercise is reported to inhibit gastric emptying (Campbell et al, 1928). A more recent study determined that moderate exercise had no effect on gastric emptying or intestinal transit, using the technique of the hydrogen breathe test (Cammack et al, 1982).

A pilot study in our laboratories had suggested that light exercise had an effect on gastrointestinal transit, an observation which could have great significance when considering the treatment of ambulant and sedentary patients with sustained release formulations. Accordingly, a study of graded exercise on gastrointestinal transit in normal volunteers was undertaken, using a pellet system as a radioactive marker. A group of nine healthy male volunteers was studied on three occasions, performing a different level of exercise on each study day. On the morning of the study day, ECG electrodes were applied to the chest, a load-transducer taped to the heel and both sets of wires connected to a body-borne tape-recorder. At 9.00 am after an overnight fast the subjects drank 50 ml of water and swallowed a capsule containing technetium-99m labelled Amberlite resin (2 MBq). Immediately after administration of the capsule the subject was imaged, until gastric emptying had commenced. The subject was randomly allocated to an exercise protocol which involved resting for the whole of the imaging period, periods of walking (total = 7 km) or a mixed exercise of walking (total = 7 km) and cycling to 80% maximal effort. Lunch (6000 kJ) was provided 4h into the study and a further meal (6000 kJ) given ten hours after capsule administration. Imaging continued at half-hourly intervals until the pellets had left the small intestine and could be detected in the transverse colon. Intestinal transit times were calculated between the times for 50% emptying of the stomach and 50% arrival at the colon. All subjects completed the three exercise regimes with one week between tests and the results are shown in Table 1.

Table 1. Effects of exercise on small intestinal transit (n=9, mean  $\pm$  s.d.)

	Small Intestinal Transit Time (h)
Minimum exercise	4.4 $\pm$ 1.7
Moderate exercise	5.4 $\pm$ 2.5
Strenuous exercise	4.1 $\pm$ 1.8

The mean intensity of work done during walking was calculated using the Van der Walt & Wyndham (1973) equation and it was estimated that the energy expenditure was 3.8 kJ per min during walking and 10.6 kJ per min during cycling. Mean heart rates were 66 beats/min resting, 92 beats/min walking and 160 beats/min cycling. Analysis of variance showed no significant effect of exercise on small intestinal transit times over the range of exercise likely to be undertaken by healthy subjects. These results confirm the observations of Cammack et al (1982) but do not exclude the possibility of effects of long term immobilisation on gastrointestinal transit.

Cammack, J. et al (1982) Gut, 23: 957-961

Campbell, J.M.H. et al (1928) Guy's Hosp. Report 78: 279-293

Van der Walt, W.H. and Wyndham, C.M. (1973) J. Appl. Physiol. 34: 559-563