

## Fecal weight, transit time, and recommendations for dietary fiber intake

Dear Sir:

Spiller et al. (1) have discussed the relationship between fecal weight and intestinal transit time in man. It was hypothesized (1) that beyond an average production of 140 to 150 g of feces per day a further increase in fecal weight is not accompanied by a further decrease in transit time.

In the course of an investigation into the relation between dietary fiber and serum cholesterol (M. Stasse-Wolthuis, et al., in preparation) we have obtained data that may be relevant to this question.

Forty-four human volunteers between 19 and 26 years old consumed a high-fiber diet containing 19 g of dietary fiber per 1000 kcal and a low-fiber diet containing 6 g/1000 kcal for 3 weeks each; a cross-over design was used. About 55% of the dietary fiber was provided by fruits and vegetables and the rest by bread and other cereal products. Feces were collected for 4 or 5 days at the end of each period. Intestinal transit times were measured using radio-opaque plastic pellets as described by Hinton et al. (2).

There was a strong influence of the amount of fiber eaten on both transit time and fecal fresh weight. Transit time (2) was  $45 \pm 16$  hr (mean  $\pm$  standard deviation) for the high-fiber period and more than 70 hr for the low-fiber period. Statistical analysis showed the difference to be highly significant. Fecal fresh weights were  $184 \pm 75$  and  $69 \pm 50$  g/day on the high- and low-fiber diets, respectively, the difference being significant.

As shown in Figure 1, transit time went down as fecal weight went up, but in contrast to the suggestion of Spiller et al. transit time continued to decrease as fecal weight increased above 140 to 150 g/day. In this respect our results resemble those of Burkitt et al. (3). For 17 subjects data for the low-fiber period are missing because their transit times exceeded the time of collection (about 90 hr), but this is of little consequence for the lower end of the curve where the short

transit times and high fecal weights are found.

It was suggested (1) that transit time is more predictable at fecal weight levels above 140 to 150 g/day. We did not find this with our subjects; the correlation between log (fecal weight) and log (transit time) was poorer on the high-fiber diets, which induced high fecal weight and rapid transit, than on the low-fiber diets ( $r = 0.24$  and  $r = 0.58$ , respectively).

The apparent discrepancy between the results of Spiller et al. (1) and ourselves is probably due to the fact that our group of subjects, as a whole, had shorter transit times and higher fecal production than the subjects studied by Spiller et al. It should be noted that transformation of a linear log-log relationship to the exponential form will yield a curve that becomes truly asymptotic only as transit time approaches zero and fecal weight approaches infinity. The region where the curve begins to appear nearly flat

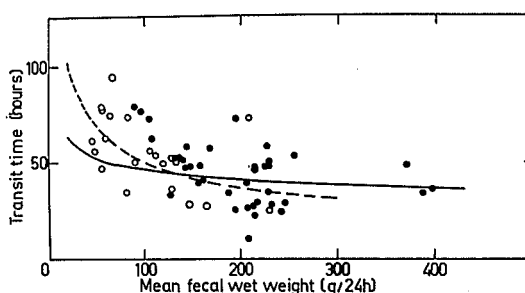


FIG. 1. The relationship between average fecal wet weight per day and intestinal transit time for volunteers consuming high-fiber (●) or low-fiber (○) diets. The transit time was calculated as the time between swallowing 20 Ba-impregnated polythene rings (1 mm sections cut from radio-opaque tubing with external diameter 4.5 mm and density 1.63 g/cm<sup>3</sup>, Portland Plastics, Hythe, Kent, England) and the reappearance of the 16th ring (2). The relationship between transit time (TT) and fecal weight (FW) could be described by the equations  $\log_{10}TT = 2.04 - 0.18 \log_{10}FW$  (low-fiber period;  $r = 0.24$ ,  $n = 40$ ) and  $\log_{10}TT = 2.58 - 0.44 \log_{10}FW$  (high-fiber period;  $r = 0.58$ ,  $n = 21$ ). The *full* and *dashed* curves were drawn according to these two equations, respectively, after exponentiation.

depends on the persons studied and on the scale selected for plotting the data.

Our subjects constituted a fairly homogeneous group and they had been on the same diets for 2 to 3 weeks. In spite of this, transit times on the high-fiber diet ranged from 14 to over 100 hr, and average daily fecal weights from 75 to 400 g. During the high-fiber period about one third of the subjects produced less than the 140 g/day that was proposed by Spiller et al. as a recommended minimum. In view of these observations we feel that recommendations for individual dietary fiber intake should not be based on a rather arbitrarily set "fecal-weight goal" of 140 to 150 g/day or a "transit-time goal" of less than 3 days (cf. Reference 4).

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#### References

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