

A possible criticism of carbohydrate loading was the fact that it increased body weight, which in its turn was detrimental to the athlete. It was shown that the increase was partly offset by the reduction in weight that resulted from the earlier period on a high protein-fat diet.

Need for drinks whilst running a marathon

A questionnaire was issued to competitors in the AAA Marathon Championship in 1975, which indicates that some increase in body water may not be without its advantages, (Newton, 1980).

Of the 149 competitors who finished the race, 109 (73%) returned forms. They were divided firstly into groups depending on whether they finished comfortably, in slight distress, in acute distress, or retired. The sub-groups were again divided into those who were on the Saltin (glycogen loading) diet and those who were not. The numbers in each group and subgroup are shown in Table V.

TABLE V
Numbers completing race and on Saltin diet

	Total	On Saltin diet	Not on Saltin diet
Finished comfortably	54	26	28
Finished in slight distress	47	22	25
Finished in acute distress	8	3	5
Retired	14	5	9
Total:	123	56	67

It is interesting that so many competitors had in fact adopted the carbohydrate loading diet. Further analysis showed the numbers who felt the need of a drink during the race and those who did not (Table VI).

TABLE VI
Numbers of drinkers during race

	On Saltin diet	Not on Saltin diet
Percentage requiring drinks	19.3	80.7

The proportion of runners completing the race without taking extra fluids was greater among those who used the diet than in those who did not. It also appeared that runners who used the Saltin diet were less dehydrated, since they resumed the production of a positive fluid balance earlier than the other group, indicated by the numbers of competitors who passed urine within 1 or 2 h (Table VII).

TABLE VII
Numbers passing urine

	On Saltin diet %	Not on Saltin diet %
Passing urine within 1 hour	29	21
Passing urine within 2 hours	16	12

From these observations it appears that a small increase in weight following glycogen loading may not be wholly a disadvantage.

REFERENCES

- Åstrand, P.-O., 1967 "Diet and athletic performance". Federation Proceedings 26: 1772-1777.
- Baldwin, E., 1963 "Dynamic aspects of biochemistry". 4th Edition. Cambridge University Press, London: 57.
- Heeley, D. M., Sharman, I. M. and Cooper, D. F., 1975 "Variations in the composition of blood and urine following the ingestion of a high protein diet". Proceedings of the Nutrition Society 34: 69A.
- Mirkin, G. and Spring, S., 1973 "Carbohydrate loading: a dangerous practice". Journal of the American Medical Association 223: (13): 1511-1512.
- Newton, F., 1980 Private communication.
- Sharman, I. M., Down, M. G. and Norgan, N. G., 1976 "The effects of vitamin E on physiological function and athletic performance of trained swimmers". Journal of Sports Medicine and Physical Fitness 16: 215-225.

DISCUSSION

Dr. Press: Dr. Sharman implied that although there was evidence that a low-carbohydrate diet was necessary after the depletion of glycogen stores before the change to a high-carbohydrate diet, this might no longer be the case. Is there any evidence that this period of a high-protein, high-fat diet is unnecessary?

Dr. Sharman: Nowadays, it is accepted that the same beneficial results can be obtained without the protein diet. If this is the case, the question of adverse effects from a high-protein diet does not arise.