

unacceptable. There is no rapid or easy solution, but early action should be possible on several specific problems. Firstly, more must be done to make it easy for people to change houses and exchange houses for flats if the inevitable disabling consequences of age are to be circumvented. Other preparations for retirement and old age may include early adaptations of the family house or moving to suitable accommodation in anticipation of the mobility problems to come. Old large houses, particularly those occupied by solitary old people, too disabled and too poor to look after themselves and their houses, have been a social problem for decades. The answer lies in internal adaptations and the splitting of large properties as well as demolition and rebuilding: a concerted organised programme is needed between now and the end of the century. Similar attention needs to be given to public transport usable by the elderly and handicapped. The B15 Leyland bus, with its lower step, would enable 2½ million more people to use buses—people who cannot, at present, use any form of public transport.

Fortunately with changes in planning fashions local authorities have come to favour small units where communities can be self-contained for their essential needs. These should help the disabled and elderly to maintain independence and avoid some of the handicaps to which we are all prone—for we are all eventually going to be handicapped to some degree. Given the chance to do so the old, the disabled, and the handicapped can take their place as full members of the community. That opportunity should be high on any list of sociomedical priorities.

¹ *Equipment for the Disabled: Outdoor Transport*, 4th edn. Oxford, Oxford Regional Health Authority, 1977.

² *Equipment for the Disabled: Wheelchairs*, 4th edn. Oxford, Oxford Regional Health Authority, 1977.

³ Goldsmith, S, *Designing for the Disabled*. London, Royal Institute of British Architects, 1976.

Fasting and obesity

Fasting was probably first described as a treatment for obesity in 1915,¹ and has been much investigated in recent years. There is a lot of current interest in "supplemented fasting," in which small dietary supplements are prescribed rather than total starvation. These treatments are being widely promoted and discussed; but they may cause distress and possibly some danger to patients, and they may prove very expensive.

Obese people who fast completely lose some 800-900 g a day over the first 10 days, about 50-70% of this being water.² By the end of a month the loss of weight has declined to half this rate; the negative water balance is largely eliminated; the basal metabolic rate falls, the energy cost and amount of physical activity decrease; and more of the energy requirement is derived from energy-dense triglyceride.³ About 5 kg of wet lean tissue may be lost during the first month of a fast and about 2.8 kg in the second month.⁴

Several deaths have been reported during or after a total fast, but this outcome is unlikely if the patient stops fasting well before he attains his so-called "ideal" body weight. More common complications are nausea, postural hypotension, arrest of hair growth and alopecia, skin dryness, muscle cramps, fatigue, depression, inability to concentrate, halitosis, loss of libido, anovulation, decreased spermatogenesis, persistent vomiting, ketosis, hyperuricaemia, deranged liver function, and slow demineralisation of bone.^{4 5}

The incidence and severity of these complications may be reduced by giving low-energy supplements—for example, carbohydrate/protein supplements providing 200-300 kcal per day^{6 7} and pure protein supplements with about twice this energy content.⁸ The protein component is given to minimise nitrogen losses, though this need should not be overestimated, since the obese have an excess of supportive lean tissue as well as fat. The carbohydrate component is intended to reduce ketosis, but Blackburn and his colleagues⁸ believe that ketosis tends to depress the appetite and that the absence of carbohydrate minimises insulin secretion and thereby depresses gluconeogenesis from body protein. These advantages of a ketogenic diet have not, however, been confirmed; and no more than about 30 kcal per day can be lost in the urine as ketones.² Vitamins and unrestricted non-caloric fluids and potassium and some other minerals are normally given in the supplement—as they are in total starvation.

In a series of 519 patients with a mean initial body weight of 113 kg Vertes and Genuth⁶ achieved a mean weekly weight loss of 1.5 kg during supplemented fasting for periods of up to 92 weeks—a rate that compared favourably with total fasting. Nearly 80% of the patients had lost at least 18 kg by the end of their fast. Fasting supplemented in this manner appears to be accepted better by patients and to reduce side effects to an acceptable minimum. The most important advantage over total starvation, however, is that the patients—if they are carefully selected and rigorously monitored by a doctor every week—can apparently continue their normal life and work in safety. There is one caveat: people should be warned that as a do-it-yourself procedure fasting, supplemented or otherwise, may be disastrous⁹ or even lethal.

Total fasting as a treatment for obesity does sometimes have immediate advantages. Munro and his colleagues in Edinburgh found that, of 75 patients who had undergone prolonged starvation as inpatients, 10 could undergo elective surgery, nine married, and 11 could take jobs.¹⁰ In terms of weight loss, however, the long-term results were disappointing: during follow-up over a third of Munro's patients regained all their lost weight.

The outcome of supplemented fasting may be improved by giving patients at the same time a well-supervised regimen of nutrition education, exercise, and behaviour modification.⁶ But is it not time that we diverted to preventing obesity much of the effort and resources we expend on such heroic procedures as starvation, ileal bypass surgery, hypothalamic ablation, and gagging of the jaws? Should we not be investigating more intensively the feeding and exercise patterns that should be encouraged in childhood and infancy—and educating people accordingly?

¹ Folin, O, and Denis, W, *Journal of Biological Chemistry*, 1915, **21**, 183.

² Yang, M-U, and van Itallie, T B, *Journal of Clinical Investigation*, 1976, **58**, 722.

³ van Itallie, T B, Yang, M, and Hashim, S A, in *Recent Advances in Obesity Research: Proceedings of the 1st International Congress on Obesity*, ed A N Howard, p 256. London, Newman Publishing Ltd, 1975.

⁴ Drenick, E J, in *Obesity in Perspective*, ed G A Bray, p 341. Bethesda, Maryland, National Institutes of Health, 1975.

⁵ Cahill, G F, *Clinics in Endocrinology and Metabolism*, 1976, **5**, 397.

⁶ Vertes, V, Genuth, S M, and Hazelton, I M, *Journal of the American Medical Association*, 1977, **238**, 2151.

⁷ Howard, A N, and McLean Baird, I, in *Recent Advances in Obesity Research: Proceedings of the 1st International Congress on Obesity*, ed A N Howard, p 270. London, Newman Publishing Ltd, 1975.

⁸ Blackburn, L, Bistran, R, and Flatt, J P, in *Recent Advances in Obesity Research: Proceedings of the 1st International Congress on Obesity*, ed A N Howard, p 279. London, Newman Publishing Ltd, 1975.

⁹ Sotaniemi, K A, and Kaarela, K, *British Medical Journal*, 1977, **2**, 1634.

¹⁰ Campbell, C J, et al, in *Obesity*, ed W L Burland, P D Samuel, and J Yudkin, p 281. Edinburgh, Churchill-Livingstone, 1974.