The relationship of the age of onset of obesity to the success of its treatment in the adult

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1. A survey was done of 2333 men and women who claimed experience of slimming.
2. Their loss of weight was determined from their maximum stated weight and their present weight. The loss of weight was calculated as the percentage of the maximum weight and was related to the stated age of onset of obesity.
3. The results showed that those people in the survey who had been fat since childhood had lost just as much weight as those people who had become fat as adults.
4. These results suggest that the treatment of early-onset obesity may not be an unrealistic objective.

The behavioural studies of Grinker & Hirsch (1972) and Grinker (1973) have shown that '...juvenile-onset obese individuals undergoing weight reduction experience a variety of behavioural changes including distortions in time perception, errors in estimation of body image and depressive and anxious symptoms. In contrast, adult-onset obese individuals experience none of these disorders.' They conclude that 'weight reduction might be an unrealistic objective' for the juvenile-onset obese person.

Although there are technical difficulties in the counting of fat cells (see Ashwell & Garrow, 1973; Widdowson & Shaw, 1973), an association between early-onset obesity and an increase in the number of adipocytes has been reported by Brook, Lloyd & Wolf (1972) and Salans, Cushman & Weismann (1973), and hypercellularity of adipose tissue persists even after weight reduction (Hirsch & Knittle, 1970; Björntorp & Sjöström, 1971). The results of some surveys have also indicated that obese children (Lloyd, Wolf & Whelen, 1961) and adolescents (Abraham & Nordseick, 1960) tend to become obese adults. The conclusion from these three independent lines of research seems to be twofold: (1) early-onset obesity must be prevented at all costs; (2) there is little hope for the successful treatment of obese adults who are early-onset obese.

Although I agree strongly with the first part of the conclusion, I would like to present some evidence to show that the second part is not necessarily true.

METHODS

The results presented in this paper were obtained from a survey done by the Consumers' Association during the preparation of the *Which? Slimming Guide* (Consumers' Association, 1972). A request was made in the magazine *Which?* to any reader who had had experience of slimming to complete a questionnaire covering many aspects of slimming; 2333 replies were received, of which it was possible to analyse a total of 2118 questionnaires (412 from men and 1706 from women). Among other details the

Table 1. *Details of present age and relative weights for 2118 respondents to a questionnaire about aspects of slimming, grouped according to age of onset of obesity*

(Mean values with their standard errors; no. of subjects in parentheses)

	Men (412)				Women (1706)			
	CO (78)		*NONCO* (334)		*CO* (369)		*NONCO* (1337)	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Present age (years)	36·1	1·23	***42·0	0·64	35·0	1·96	***37·6	0·35
Present extent of overweight (% above M)	14·1	1·32	**10·0	0·78	14·4	0·85	***10·2	0·52
Maximum extent of overweight (% above M)	37·3	1·73	***29·3	0·91	37·9	0·85	***27·4	0·50
Extent of overweight at stated 'ideal' weight (% above M)	5·2	0·88	3·9	0·49	2·3	0·47	0·3	0·69

CO, childhood-onset obese subjects; *NONCO*, subjects whose age of onset of obesity was later than childhood or not known; M, mean of 'medium frame' values for weight given by Metropolitan Life Insurance Company (1959), taken as the standard weight for a given height.

Mean values for *CO* group were significantly different from those for *NONCO* group, for men and for women: ** $P < 0.02$, *** $P < 0.001$.

respondents were asked to state their height (without shoes), their present weight (unclothed), the maximum weight they had reached and the weight they considered as 'ideal' for their height. Weight loss as a percentage of their maximum weight was calculated from present weight and maximum weight. They were also asked to identify the age at which they first became overweight.

Classification of weights. The heights and weights (present, maximum and 'ideal') of the respondents were classified using the Metropolitan Life Insurance Company (1959) tables so that relative weights could be compared. The mean of the 'medium frame' values was taken as the standard weight (M) for a given height. The extent of the excess of weight was calculated for each subject's present, maximum and 'ideal' weight, and expressed as a percentage of M.

Statistics. Statistical analyses were done using the Chi-square test and Student's unpaired *t* test.

RESULTS

In the final sample of 2118 subjects, 21% said that they became overweight during childhood (childhood-onset; *CO*) and 79% gave an age of onset which was later than childhood (non-childhood-onset; *NONCO*). For men, the percentage of *CO* was 19 and for women it was 22. Those who could not date their onset of overweight to any particular age (8% of the final sample) were included in the *NONCO* group.

Table 1 shows the age and weight for subjects in the *CO* and *NONCO* groups. Present ages were significantly greater for the *NONCO* group for both sexes (men: t 4·23, $P < 0.001$; women: t 3·53, $P < 0.001$). The present weights for both men and women in the *CO* group were significantly greater than the corresponding weights for those in the *NONCO* group (men: t 2·46, $P < 0.02$; women: t 3·9, $P < 0.001$).

Table 2. *Percentage of weight loss from maximum stated weight for 2118 respondents to a questionnaire about aspects of slimming, grouped according to age of onset of obesity*

	Men				Women			
	CO		*NONCO*		*CO*		*NONCO*	
	No.	% total	No.	% total	No.	% total	No.	% total
Percentage weight loss from maximum weight:								
> 30	7	9	25	7	39	11	38	3
21–30	20	26	41	12	78	21	184	14
10–20	35	45	159	48	157	42	626	47
< 10	16	20	109	33	95	26	489	36
Total	78	100	334	100	369	100	1337	100
Average percentage weight loss from maximum weight (±SE)	16·69±1·05		*14·1±0·51		16·41±0·51		***12·75±0·22	

CO, childhood-onset obese subjects; *NONCO*, subjects whose age of onset of obesity was later than childhood or not known.

Mean values for *CO* group were significantly different from those for *NONCO* group, for men and for women: $*P < 0{\cdot}05$, $***P < 0{\cdot}001$.

Maximum weights for both men and women in the *CO* group were also significantly greater than the corresponding weights for those in the *NONCO* group (men: t 3·9, $P < 0{\cdot}001$; women: t 10·0, $P < 0{\cdot}001$). There was no significant difference in the weights given as 'ideal' by the *CO* and *NONCO* groups for either sex (men, t 1·25; women, t 1·53).

The data were also analysed to compare the size of the weight losses for the subjects in the *CO* and *NONCO* groups (see Table 2). Losses greater than 30% were more common for the *CO* men and women (χ^2 14·2, $P < 0{\cdot}001$) and losses less than 10% were more common for the *NONCO* subjects of both sexes (χ^2 21·8, $P < 0{\cdot}001$). The average percentage loss of weight from the maximum value reached was greater for the *CO* subjects (men: t 2·23, $P < 0{\cdot}05$; women: t 7·3, $P < 0{\cdot}001$).

DISCUSSION

It has been said (Knittle, 1972) that 'the treatment of obesity is at once the simplest and yet most complex of all disorders: simple in that, in the adult, all that is required is caloric restriction, and complex in that cellular, metabolic, socio-economic, cultural and psychological factors all militate against the maintenance of the reduced state'. It is suggested that 'some attempt should be made to tailor treatment to age of onset of obesity' (Grinker, 1973) and that nutritional counselling is more useful for persons of adult-onset obesity, and psychotherapy is more useful for juvenile-onset obesity.

The results reported here do not support this view; they suggested that *CO* subjects lost as much weight as *NONCO* subjects. Admittedly, the sample was not a truly random one, as it was drawn preferentially from 'middle-class' subjects. However, there is no reason to believe that the behaviour of *CO* and *NONCO* subjects in this sample should differ from that of a more representative sample of the population. The classification into *CO* and *NONCO* groups was based on an entirely retro-

spective assessment by the subject and is open to two criticisms: first that memory can lie about ages and secondly that one person's idea of being overweight might not be the same as another's. The first criticism is valid and explains why the subjects were not asked to recall an exact age of onset and why the subjects were only grouped as *CO* or *NONCO*. In the original questionnaire subjects were asked to identify their age of onset of overweight as: childhood, adolescence, 20–30 years, 31–40 years, 41–50 years, 51–60 years or > 60 years. It has been assumed therefore, that the *CO* group assigned their age of onset of overweight to the pre-adolescent years. It is unlikely that the subjects' assessment of the extent of their 'overweight' was very inaccurate, as Table 1 shows that their concept of 'ideal' weight was accurate when it was compared with M (the average weight taken from the Metropolitan Life Insurance Company (1959) tables).

The *CO* subjects had, on average, slightly higher relative weights at the maximum weights reached than the *NONCO* subjects. This could simply reflect that they had more years in which to get fat than the *NONCO* group, rather than a greater potential for increased fatness.

The fact that the *CO* subjects had lost more weight than the *NONCO* subjects could be also because they had been trying for a longer period. The period of time taken to lose weight was not covered in the questionnaire. However, the important finding is that the *CO* group did lose as much weight as the *NONCO* group.

In conclusion, it appears from this retrospective survey of over 2000 people that early-onset obesity was not resistant to treatment. Whether some individuals have a 'metabolic resistance' to losing weight should be studied using subjects given a controlled diet for the same period of time. The use of a controlled trial necessarily limits the numbers of subjects and the conclusions that can be drawn, but results of a 3-week trial using fifteen subjects (Ashwell, Priest, Bondoux & Garrow, 1975) suggested that there was no significant correlation between the age of onset of obesity and the amount of weight lost.

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