Treatment of obesity

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Most doctors feel that the treatment of obesity is unsatisfactory, but there is extreme selection bias among the obese patients who consult doctors. In virtually all species of omnivorous mammals obesity is the natural consequence of longevity and affluence—one only has to look at most domestic pets, and animals in zoos. If farm livestock or wild animals are not obese it is because their food is restricted below ad libitum amounts, or because they are killed before obesity develops. It is therefore not at all surprising that people who live long after achieving sexual maturity, and who have unlimited access to palatable food (especially fatty food) are very likely to become obese. Everyone in affluent countries has more than enough advice from the mass media about how to lose weight: the people whom doctors see are those individuals who have tried to follow this advice but who have been dissatisfied with the results.

Unrealistic expectations

In my experience of referrals to a special hospital obesity clinic, the dissatisfaction sometimes arises because the advice was totally inadequate, but more often because the expected results were unrealistic. Patients (and doctors) seem to adopt extreme and untenable positions. Some are excessively pessimistic and believe, like Astwood,[1] that "People who are fat are born fat, and nothing much can be done about it". Others, beguiled by over-optimistic advertising, believe that on diet "X" weight should fall rapidly and without effort: that it does not do so is regarded as evidence of metabolic dysfunction, for which specialist referral is appropriate. The truth lies between these extremes: the difficulty and success rate of correcting severe obesity is similar to that of mastering a foreign language—ie, it is an objective that can be achieved by virtually anyone who has reasonably competent guidance and who is prepared to invest sufficient effort, but it always takes a considerable amount of time and trouble.

Practical targets for rate of weight loss and final weight

The sex ratio among obese patients referred for a specialist opinion is about 5 females to each male. A typical obese female weighs about 100 kg with a height of 1·58 m, giving a body mass index (Quetelet's index) of 40 kg/m² (normal 20–25). Ages range from late teens to early sixties. The reasons mentioned by patients for wanting to lose weight usually include concern about appearance, shortness of breath, and poor exercise tolerance. In younger women, infertility is often a motivating factor, and in older women pain in the back, hips, or knees. Some patients need to lose weight in preparation for surgery, or to reduce drug treatment for hypertension or diabetes. Among men, the request for referral is often prompted by fear of heart disease, experience of angina, or refusal of life insurance at normal rates. Virtually every patient has tried diet restriction in the past, with varying success. Hardly any patient is actually following a diet at the time of referral.[2]

It is possible to express the obesity of a given patient quantitatively, and to choose targets that are useful and attainable. For example, a woman of height 1·58 m, would be in the "desirable" range of weight-for-height if she weighed 63 kg (point b, fig 1). If she weighs 100 kg she is at point (a). The mortality ratio at point (a) is about 250% of that at point (b), so this degree of obesity is a greater threat to health than smoking 20 cigarettes a day. The increased mortality is mainly due to heart disease: there is also a significantly increased risk of diabetes, osteoarthritis, gall-bladder disease, and some sex-hormone-sensitive cancers.[2]

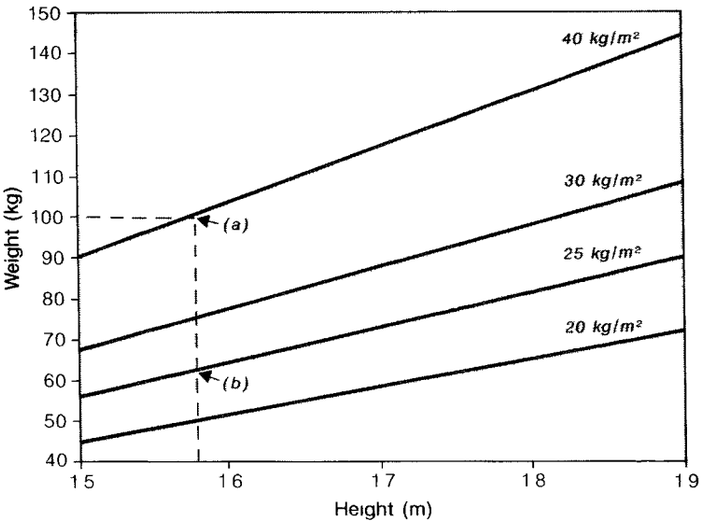

Fig 1—Relation of Quetelet's index to weight and height.

Desirable range of Quetelet's index is 20–25 kg/m². Lines at 30 and 40 kg/m² indicate the boundaries between grades I, II, and III obesity. Broken line shows that a patient who weighs 100 kg, height 1 58 m, is on the boundary between grade II and III (point a), and needs to lose 37 kg to enter the desirable range at point b.

The 37 kg by which this patient exceeds the desirable range consists of about 75% fat and 25% non-fat tissue,[3] which has an energy value of 7000 kcal (29 MJ)/kg, making a total of 260 Mcal (1090 MJ): that is a non-negotiable fact. However, in a given patient the choice of a sensible target weight and rate of weight loss depends on many factors, especially the age, family history, and present disability of the patient. A woman who weighs 100 kg, height 1·58 m, who is aged 60 years and has osteoarthritis of the knees, will derive great benefit from the loss of 10–15 kg, but will experience increasing difficulty and diminishing returns for any further weight loss. By contrast, a fit woman of the same weight and height, aged 20 years, with a family history of diabetes, would be well advised to try to achieve a weight of 63 kg, since the trouble involved in doing so is likely to be much less than the trouble arising from diabetes in middle age if she does not.

Target rates of weight loss are also influenced by age and height: younger, taller patients can usefully achieve more

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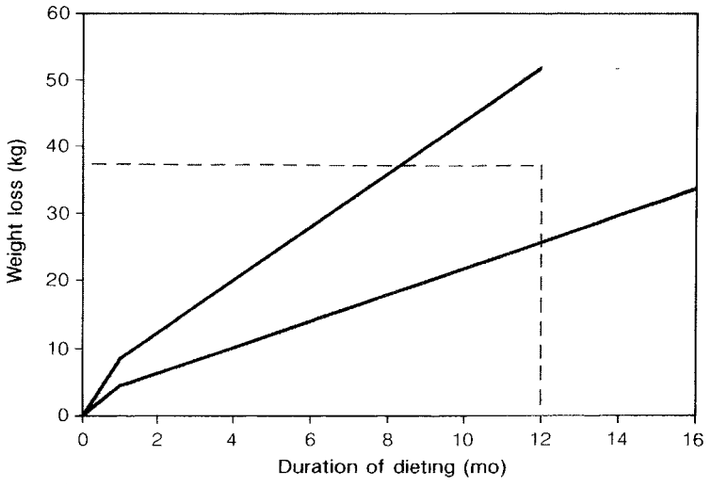

Fig 2—Rate of weight loss for obese patients.

Desirable rate is between 0·5 kg (bottom line) and 1·0 kg/week (top line), but during the first month of dieting double this rate is permissible, since some of the weight lost is glycogen and water Broken line indicates that the hypothetical patient in fig 1 might expect to take about a year to lose her excess of 37 kg

rapid weight loss than older shorter ones, which is one reason why young, fit, obese patients should lose weight now, rather than waiting until it has become more difficult, and less rewarding, to do so. A range of desirable rates of weight loss in obese patients is shown in fig 2. To achieve these rates it is necessary to keep energy intake 500–1000 kcal/day below energy expenditure: if the patient at 100 kg had an energy expenditure of 2400 kcal/day, an intake of about 1400 kcal/day would be appropriate. As weight is lost, the energy requirements decrease (the magnitude of the decrease is discussed below); so, at a given intake, the rate of weight loss decreases, or a lower energy intake is required to maintain the same rate of weight loss. It is undesirable to exceed the upper limit of the range because more rapid weight loss involves excessive loss of lean tissue. It is likewise undesirable to proceed more slowly than the lower limit because patients become demoralised at a too slow progress. In the first two or three weeks of dieting, weight loss is usually more rapid, since the material being lost is not only adipose tissue, with an energy value of 7000 kcal/kg, but also some glycogen with associated water, which has an energy value of only 1000 kcal/kg.[4] When this labile material has been lost, the rate of weight loss slows down for a certain energy deficit, which gives rise to the idea that the body becomes resistant to dietary treatment, which in turn causes despondency in the dieter, decreased dietary compliance, and hence weight regain. Much of what has been written about the inefficacy of dietary treatment of obesity is based on observations of people who are merely emptying and repleting their glycogen stores, and who do not appreciate that to lose 1 kg of adipose tissue a week it is necessary to maintain an average negative energy balance of 1000 kcal day.

Principles of weight-reducing diets

Weight-reducing diets should have three characteristics: they must provide less energy than that required to maintain the body weight of the obese patient, they should be otherwise nutritionally adequate, and they should be acceptable to the patient. There is room for endless variation within this general specification.

The energy deficit required to produce weight loss in the range shown in fig 2 has already been discussed. In practice, one makes an informed guess at the appropriate energy intake (in the range 800–1500 kcal/day) and observes the resultant weight loss at intervals of 3–4 weeks, making adjustments as necessary. It is invaluable to work with a skilled dietitian who can interpret desired energy intakes in terms of quantities of food available and acceptable to the patient.

In the accompanying article Dr Ravussin and Dr Swinburn make the case that restriction of fat intake is especially important for the treatment of obesity, and this policy is also advocated for prevention of heart disease.[5] A low-fat diet (which will automatically be a low-energy diet) is therefore the cornerstone of dietary treatment. Other components of the diet that supply energy, but no commensurate nutrients, are alcohol and refined sugar, so these also are potential targets for restriction in a well-designed weight-reducing diet.

The third requirement is that the diet should be acceptable to the patient. It is unlikely that this requirement can be met in full, since the preferred diet of a given obese patient is presumably that on which he or she became obese. If a few simple dietary modifications had been acceptable to the patient, and effective in producing weight loss, the patient would not now be seeking medical advice. In practice, we are looking for a compromise: a diet that, although not exactly what the patient would have eaten given free choice, is at least tolerable, and seen to be preferable to the alternative—namely, the disadvantages of failing to lose weight. Patients often say that they lack the "will-power" to stick to a diet. Will-power is the ability to do unpleasant tasks that are not essential, such as voluntarily swimming in cold water in winter. Essential unpleasant tasks, such as getting up at night to feed a baby, or working in a boring job, are not ascribed to will-power: they are just things one has to do. If the obese patient is convinced that losing weight is just one of these things that must be done, and that the suggested diet is the most acceptable version of those that will achieve the objective, the need for will-power is removed.

Aids to weight loss

Physical exercise

Exercise increases physical fitness and improves insulin sensitivity, and should be encouraged as part of any health education programme.[6] However, it is a remarkably ineffective means of achieving weight loss in obese people, mainly because their exercise tolerance is so low that the level of physical activity that they can sustain makes a negligible contribution to total energy expenditure. The view that exercise causes a prolonged increase in metabolic rate even after the end of the exercise period is wrong, apart from elite athletes who are capable of high work rates for long periods.[7,8]

Drugs

Drugs for the treatment of obesity may be designed to inhibit absorption of nutrients from the gut, to increase energy expenditure, or to reduce hunger, and hence make dieting more acceptable. Although there are drugs under development in the first two categories none has yet been shown to be clinically useful. My discussion of drug therapy will therefore concentrate on anorectic drugs.

Probably the most widely used anorectic drug is d-fenfluramine, which was recently tested in a large, long-term, multicentre study.[10] The trial design called for

the patients to be given a conventional energy-restricted diet and a tablet (15 mg d-fenfluramine twice daily or placebo) for 12 months, with monthly assessments. At 12 months, 37% of the drug group and 45% of those on placebo had withdrawn for various reasons. Mean weight loss among those who completed the trial was 9·82 kg and 7·15 kg for drug and placebo groups, respectively: all the weight loss had occurred in the first 6 months. To achieve the desirable range of weight-for-height, the average patient would have needed to lose about 36 kg, so at the end of the trial those who had taken the drug had about 26 kg more to lose, compared with 29 kg for controls.

Darga et al[10] reported similar results for a long-term trial on fluoxetine in a dosage of 60 mg/day. There were 45 patients who initially weighed 103 kg, so they had about 33 kg to lose. The drop-out rate was 41% for patients in the drug group and 27% for those in the placebo group. After 1 year the mean weight losses in the completers on drug or placebo were 8·2 kg or 4·5 kg, respectively, but by a quirk of randomisation the mean starting weight of the group on fluoxetine was 5·8 kg greater than those on placebo. The maximum weight loss in the drug group was 12·4 kg at week 29, and thereafter weight was gained significantly even though patients continued to take the drug. I do not believe that the benefits derived from the use of anorectic drugs outweigh the disadvantages.

Jaw wiring and gastric stapling

It is evident from my previous discussion that a severely obese patient who needs to lose, say, 50 kg must keep to a fairly strict diet for at least a year. The chances of success are much greater if the catering arrangements in the patient's family are adjusted to reduce the temptations to deviate from the diet. For some patients, this is especially difficult—eg, for those whose work involves preparing and serving meals, or housewives with several children to feed. In such cases, if conventional dietary advice fails, the best option may be to provide some physical obstacle to food ingestion, such as jaw wiring[11] or gastric stapling.[12]

Patients hear about these procedures and when referred to hospital announce that they have decided that this is what they want, since, for them, "diets do not work". It is necessary to explain three facts about these methods of treatment. First, they are not alternatives to dieting, but methods of enforcing dieting, so if it were true that diets did not work for them for some metabolic reason, jaw wiring or stomach stapling would not work either. In fact, investigation always fails to verify the existence of this diet-resistant type of obese patient.[2,13] Second, the rules about desirable rate of weight loss still apply, as does the need for proper dietetic supervision during weight loss. Third, and most important, after weight loss it is necessary to tackle the problem of preventing weight regain: whatever the benefits of weight loss, immunity to subsequent obesity is certainly not one of them. This difficulty is discussed further below. Despite these reservations, jaw wiring or gastric stapling is the best option for a minority of severely obese patients.[2]

Behaviour modification

Behavioural psychologists point out that eating behaviour is learned, not innate, so with guidance the eating behaviour of an obese person can be relearned in a form more favourable for weight control. If patients have to make eating a conscious activity, rather than something that happens while they are thinking of other things, or watching television, this is an important step towards controlling food intake. There was great initial enthusiasm for behavioural techniques, which were thought to be the ultimate solution to permanent weight loss or the way to maintain weight loss that had been achieved with anorectic drugs. Results have not fulfilled these early expectations,[14] but the use of food diaries to increase the patient's awareness of what is eaten is in the repertoire of any dietitian. Dieters need social support, as well as accurate dietary advice. Well-organised slimming groups provide an economical method for supplying both these requirements. The optimum size of the group is probably about 15 members meeting weekly or fortnightly for 3 months.

Investigation of "refractory" obesity

I mentioned at the beginning of my discussion that most of the obese patients who are referred for specialist advice have quite unrealistic ideas about the most appropriate diet, or the rate of weight loss that the diet should produce. However, there are a few who are obese and well informed about what they should be eating, who insist that they are keeping scupulously to the diet, and who lose no weight whatever over a period of several months. Unravelling this problem is a prolonged and expensive excercise, so it is necessary to decide if thorough investigation is appropriate. Some such patients are only slightly overweight, their health is not at serious risk, and they derive considerable satisfaction from the fact that doctors are baffled by their ability to maintain weight on a diet on which others would lose weight rapidly. In those cases thorough investigation is a waste of resources, since it is unlikely to improve their quality of life.

In other cases, the prognosis without weight loss is serious, so something must be done to help the patients who are frustrated by the refusal of successive doctors to believe their dietary history, and who will become an easy prey for charlatans who claim magic cures where conventional treatment has failed. The ultimate investigation in such cases is chamber calorimetry: the patient lives for several days in a closed chamber, so constructed that total energy expenditure is measured, and the components attributable to resting metabolism, physical activity, and the thermogenic effect of food and other stimuli are recorded.[2] Since there are very few human calorimeter chambers in the world (for example, there is only one in the UK designed for the investigation of hospital patients), less direct evidence must suffice in most cases.

The essential feature of "refractory" obesity is that weight is not lost, even on a diet that is believed to supply, say, 800 kcal/day. This event could happen only if energy expenditure is similarly low. To confirm or refute the diagnosis it is necessary to be sure that the energy intake is indeed 800 kcal/day over a period of several weeks. It is not helpful to admit the patient to a hospital ward for less than a week, partly because it is very difficult in the average hospital ward to ensure that the diet of the patient is exactly as prescribed, and partly because weight change over periods of less than a week are hard to interpret in view of the shifts in glycogen that I have described. A better plan is to suggest to the patient that for 3–4 weeks the diet should consist solely of 2 pints (1200 ml) of whole cows' milk each day (or the energy equivalent in semi-skimmed milk) with water ad libitum. This provides 800 kcal, and if weight loss is not achieved on this diet then referral to a specialist centre should be considered.

Maintenance of weight loss

Metabolic factors that predispose to weight gain have been reviewed in the accompanying article. Obese patients probably have these metabolic characteristics, and energy requirements are lower after weight loss than before: about 12 kcal/day reduction per kg weight loss.[15] The following table shows the mean (SD) resting metabolic rate of 19 obese women before and after the loss of 30 kg body weight in the course of a year:[15]

	Before	*After*
Weight (kg)	104·5 (9·1)	73·7 (10·5)
Observed RMR (kcal/day)	2030 (230)	1638 (184)
Predicted RMR (kcal/day)*	1946 (119)	1624 (109)
Observed/predicted RMR	1·04 (0·08)	1·01 (0·09)

*RMR (resting metabolic rate) predicted from current age, weight, and total body potassium

After weight loss metabolic requirements are reduced from their initial high level, but they are similar to those of women of the same age, weight, and fat-free mass who were at stable weight. The effect of weight loss on total energy expenditure will depend on the amount of physical activity before and after weight loss. The cross-sectional data in fig 1 of the accompanying article indicate a difference in total energy expenditure of 12·3 kcal/day (in women) and 13·7 kcal/day (in men) per kg difference in body weight.

In addition to these metabolic considerations there are social factors that predispose to substantial weight gain, such as a low educational level, chronic disease, little physical activity, high alcohol consumption, loss of employment, and (in women) parity.[16,17] It is therefore folly to assume that an obese patient who has managed to lose 30 kg or so is unlikely to regain this weight over the next few years if nothing is done to prevent it. Of course the patient does not wish, or expect, to regain the weight: the gain is insidious and may not be recognised until a dishearteningly large part of the weight that had been lost has been regained. It is undesirable that ex-obese patients should become weight bores, obsessively weighing themselves at frequent intervals to detect the first sign of weight gain. However a simple device that provides unmistakable early warning of weight regain is an inextensible nylon cord fitted round the waist which fits comfortably at the desired weight, but becomes tight if a substantial amount of weight (about 7 kg) is regained.[18]

Effects of cyclical weight loss and regain

There is good evidence that people whose body weight fluctuates widely are more liable to heart disease and premature death than are people who maintain a relatively constant body weight. This observation, with the notion that weight regain after weight loss is almost inevitable, has been used in the argument that it would be better not to try to lose weight in the first place. However, there is no evidence that the association between weight variation and heart disease is causal, nor that weight regain is inevitable, whereas there is good evidence that obesity is a serious health risk. Therefore, a reasonable conclusion is that the prudent course is for obese people to lose weight at a rate that is sustainable, and to take care to maintain the weight loss, rather than to alternate periods of rapid weight loss and regain.

"The diet relationship trap"

It is remarkable that otherwise sensitive and caring practitioners sometimes feel very hostile towards obese patients, and often these feelings are reciprocated. I believe that this breakdown in normal therapeutic rapport arises because both doctor and patient fall into what I have called the "diet relationship trap".

If a seriously obese patient consults a doctor, their relationship is at first hopeful: the patient has a disability for which help (in the form of a weight-reducing diet) is being offered, so both patient and doctor find themselves in appropriate, even gratifying, roles. At follow-up visits this is sustained and reinforced by satisfaction at the weight loss achieved. The difficulties arise when, at a follow-up visit, no weight has been lost, or there has even been some gain in weight by the patient. Obese patients have notoriously low self-esteem, so they either default from follow-up, or they are excessively apologetic about their poor performance; they assure the doctor that they realise it is all their fault, that they are wasting the doctor's time when he or she has more deserving patients to see, and so forth. The doctor can easily be persuaded that the patient is wasting his or her time, and is hardly worthy to be treated with normal courtesy. (I write from experience: I have to struggle to avoid this trap at every outpatient session). Thus, the relationship between patient and doctor is subtly transformed from one of victim and rescuer into one of defaulter and prosecutor. This relationship is false and non-therapeutic: it has arisen because the obese patient has on this occasion failed to lose weight and has low self-esteem (which is one of the factors that the doctor should be trying to improve, rather than making worse). Having fallen into the trap each party becomes angry, and regards the behaviour of the other as unreasonable and ungrateful.

To judge from the referral letters I have received over the past 20 years that have asked for assessment of obese patients, many hospital referrals are made when the relationship between doctor and patient has broken down in the manner described above.

Conclusion

Obesity is an important factor predisposing to cardiovascular disease, diabetes, osteoarthritis, gallbladder disease, and some sex-hormone-sensitive cancers—diseases that are increasing in prevalence in both developed and developing countries. There are many unanswered questions about its aetiology, which Dr Ravussin and Dr Swinburn review in the accompanying article, but we know enough to use modes of treatment that are at least as effective as those available for most chronic diseases. There are few reports of the outcome of medical treatment of severe obesity with follow-up for several years. In Sweden, 104 out of 107 severely obese patients were traced 4 years after beginning a behavioural modification programme: of these, 33 had left the programme, 8 were above their initial weight, 17 had lost 0–5 kg, 35 had lost 5–20 kg, and 14 had lost more than 20 kg.[20] In the UK, 38 patients were treated by jaw wiring and waist cord:[18] 9 dropped out during the jaw wiring phase, 12 were lost to follow-up having lost 36·8 (SD 11·1) kg while their jaws were wired, 14 lost 42·4 (7·4) kg during 11 months of jaw wiring and had maintained 32·8 (12·7) kg of that weight loss 3 years later, and another 3 had lost a similar amount of weight without jaw wiring and had maintained a loss of 33·0 (12·1) kg 20 months later.

These results leave much room for improvement, and were not achieved without a considerable input of effort both by patients and by therapists. Nonetheless, they indicate that the patient indicated in fig 1 has a possible route of escape from the mortality and morbidity associated with severe obesity. The purpose of this article has been to indicate how patients can best be helped to find that route,

and in particular to indicate realistic expectations of what can be expected from dietary treatment, and the dangers to both doctor and patient of the diet relationship trap.

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VIEWPOINT

Look at the patient, not the notes

INGER NJØLSTAD IVAR AARAAS SVERRE LUNDEVALL

In an experiment to be described elsewhere, videotape recordings were made of six encounters between an actress taking the role of a patient and four different general practitioners. When we analysed the recordings, we observed that the doctors' use of the patient's medical record seemed to hinder communication between them in ways beyond those reported previously.[1,2]

The actress played the part of a patient meeting each general practitioner for the first time, in the absence of her regular general practitioner. She was instructed to present the same symptom first in each consultation and to develop her role in response to the doctor's behaviour. The doctors were told to behave as they would when meeting a new patient attending for urgent reasons, but they were not told what those reasons were. The fictional patient was based on a real patient who had had many previous consultations, mainly about intermittent tachycardia and minor gynaecological problems. A new problem—fear of HIV infection—had arisen after her latest visit and was therefore not mentioned in the record. The doctor was allowed a few minutes before the consultation to read a summary of the medical record. After the consultation, each doctor was asked whether he or she would like to see the patient again; two requested return consultations. We also recorded an evaluation discussion among all the participants.

At the start of each encounter, the patient described palpitations of the heart ("an attack harder than usual") as her reason for attending. The doctors quickly turned to the record for more information or referred to record information in their responses. The patient continued with a vague hint, "I wondered—could it be something else?". Two doctors responded with an open question, "What do you have in mind when you say that?", but they returned to the heart condition when the patient gave a vague response. One doctor ignored the cue, and one answered as if the patient was referring to heart disease. All the doctors spent most of the consultation time (a maximum of 12 min was allowed) on that first symptom and used record information to search for possible reasons for palpitations. The patient repeated her "something else" cue two or three times to each doctor, but none discovered her real fear and her desire for an HIV test.

The patient's fear of HIV infection was connected with shame and guilt because of one episode of extramarital sex. In the evaluation talk, the actress explained her evasive way of talking: "I think that the more socially stigmatised a problem is, the more you will try to hide behind physical problems, which are acceptable". To disclose her fear, she would need enough time and the doctor's full attention. She said that these elements were lacking despite the empathetic attitude of all the doctors. To one doctor, she said that she had been ready to reveal her secret at the return consultation, having assured herself of his open and empathetic attitude at the first; however, that doctor was dissatisfied with himself after the first encounter and read the record more thoroughly before the second, which was more doctor-centred than the first. A common feature of all encounters was that the doctor turned to the record when the patient was hesitant or ambiguous. Several times the camera

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