

JAW WIRING IN TREATMENT OF OBESITY

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Summary 17 patients with severe (median percentage above ideal weight 100%) and resistant obesity underwent jaw wiring. There were no major complications and patients tolerated the procedure and subsequent minor inconveniences. All patients lost weight at a rate (median 25.3 kg in six months) comparable with that of intestinal bypass surgery and one achieved and maintained her ideal weight. Two-thirds of the patients, however, regained some weight after the wires were removed. Jaw wiring is a simple effective procedure which can be carried out in most hospitals, and has a place in an integrated approach to obesity.

Introduction

OBESE patients should eat less, but treatment with dietary counselling is rarely successful^{1,2} in medical or non-medical hands.³ Medical approaches include agents to increase diet bulk, suppress appetite, and induce malabsorption.⁴ Surgical manipulations of the gastrointestinal tract^{5,6} may be more successful but cause significant morbidity and mortality.⁷⁻⁹ All these treatments ignore the basic question of why people overeat.

Obese patients respond to external cues and not to hunger.¹⁰ When external cues are removed and an obese patient is given self-regulated gastric tube feeds he reduces his caloric intake by 87%.¹¹ A practical method of reducing the response to external cues is to wire the jaws.¹² We report the encouraging results from 17 patients so treated.

Patients and Methods

17 patients (15 female; aged 16-48, median 29) underwent jaw wiring between October, 1974 and August, 1976. All had severe obesity (median percentage above ideal weight¹³ 100%, range 63-140%) which had resisted medical and other treatments for one to ten years. Psychological problems were com-

mon, including bouts of severe depression in 14 patients and attempted suicide in 3.

Before jaw wiring, routine assessment included chest X-ray and electrocardiogram, routine haematology and multichannel serum biochemistry (Technicon SMA 6/60 and 12/60), glucose tolerance, and serum lipid profile determination. The psychiatrist (R. G.) excluded psychotic illness and the oral surgeon (A. G.) assessed suitability for jaw wiring, which was considered contraindicated by nasal airway obstruction or temporomandibular joint lesions. Dental and periodontal disease were treated before wiring.

Wiring Procedure

Two interdental eyelets were placed in each canine and premolar region under local anaesthetic and the eyelets on opposing jaws wired together. Instruction was given on oral hygiene, measures to avoid aspiration, and the use of wire cutters. Patients were discharged on a fluid 800-calorie diet of 0.61 litres of milk, tomato juice, and unsweetened fruit juice, with unlimited low-calorie fluid and daily multivitamin supplements (vitamin A 3600 I.U., aneurine 1.2 mg, riboflavin 1.8 mg, nicotinamide 15.8 mg, pyridoxine 0.3 mg, sodium pantothenate 0.75 mg, ascorbic acid 95 mg, vitamin D 9000 I.U.), folic acid (5 mg), and ferrous gluconate (600 mg).

Follow-up

Patients were seen fortnightly, for repeat routine haematology and biochemistry, and were reassessed six-weekly by the dental surgeon. Wires were to be removed if there were dental complications, respiratory infections, or if weight-loss had ceased.

Results

Fixation

Patients rated the discomfort of jaw wiring as no worse than a tooth extraction, resumed normal activities the next day, and could speak normally after two days. Wire replacement was necessary in 6 patients because of damage caused by sneezing or coughing and in one because of discomfort. No patient developed serious caries or periodontal disease and only 2 patients had transient gum soreness. After wire removal 8 patients noted transient limitation of jaw movement and in 2 others this required three weeks of physiotherapy. Bad breath and lip dryness were common but easily managed by mouth washes and lip ointments.

Default, Dietary Adherence, and Follow-up (Table I)

Although all patients found the liquid diet monotonous, no patient complained of the hunger, fatigue, lightheadedness, and palpitations commonly associated with low-calorie regimens. 9 patients admitted "cheat-

TABLE I—WEIGHT-LOSS IN EACH PATIENT WITH JAW WIRING

Patient	Age (yr)	Sex	Initial weight (% above ideal)	Total weight-loss (kg)	Final weight (% above ideal)	Duration of wiring (mo)
1	41	F	123	24.0	83	6
2	23	F	85	46.3	Ideal weight	8
3	25	F	88	22.9	47	5
4	25	F	86	15.3	61	6
5	34	F	140	46.0	56	10
*6	28	M	93	18.0	70	2
7	29	F	127	38.2	61	7
8	33	M	74	26.5	36	9
*9	16	F	106	Default at 1 mo		—
10	29	F	109	23.6	69	12
11	48	F	100	10.3	83	5
†12	34	F	119	35.6	50	8
†13	31	F	93	25.5	59	6
†14	27	F	113	30.4	68	6
†15	20	F	87	13.8	60	2
†16	28	F	63	5.4	53	1
17	31	F	105	Wires removed at 2 wk		—

*Arranged wire removal themselves.

†Still wired in September 1976.

ing" with high-calorie fluids, homogenised food, or solid food squeezed between the teeth.

Wires were removed after two weeks to twelve months, most commonly because of a plateau in weight-loss (6 patients). This plateau occurred after four months and was associated with loss of enthusiasm and missed appointments. The 2 patients who defaulted were unwired after six months and one year, and 4 others were unwired because of need for anaesthesia, shingles, hair-loss; and in one case at the request of a husband. 5 patients were still wired and continued to lose weight at the time of the report.

Weight-loss During and After Jaw Wiring (Tables I and II and Figure)

Weight-loss occurred in all patients, 1 patient reaching her ideal weight by losing 46 kg. Median rate of loss fell from 9 kg/month to 1.5 kg/month over six months. Apart from 3 who either defaulted or were unwired within a month, all patients were followed up. After unwiring weight remained stable in 2 patients, decreased in 1, and increased in 6.

Laboratory Assessment and Complications

4 patients had type-IV and 1 type-II hyperlipidaemia and 2 patients had abnormal glucose tolerance; during follow-up, fasting serum glucose and cholesterol concentrations did not change. After one month of wiring, the median serum-urea concentration decreased from 4.4 to

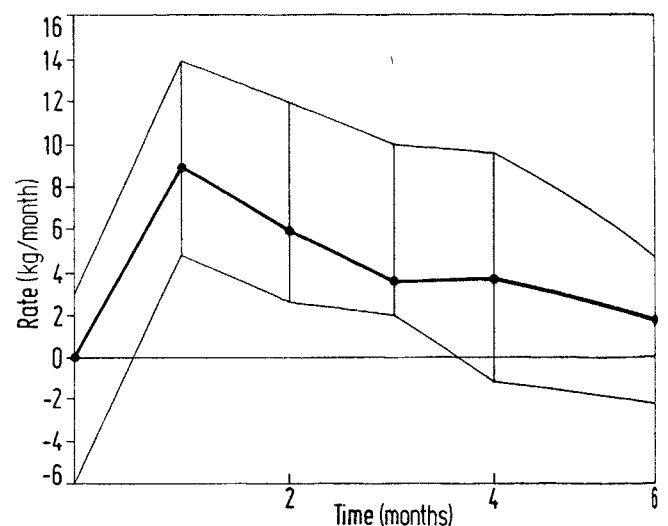
TABLE II—WEIGHT-LOSS WITH JAW WIRING ACCORDING TO DURATION OF WIRING

Duration of wiring (mo)	No. of patients	Cumulative weight-loss (kg)		Rate of weight-loss (kg/mo)	
		Median	Range	Median	Range
1	16	9.0	4.6–13.8	9.0	4.6–13.8
2	14	15.7	7.1–22.6	6.0	2.5–12
3	12	18.9	10–32.8	3.4	2–10.2
4	10	21.8	10.3–37.2	3.7	–1.3–9.8
6	10	25.3	15.3–38.2	1.8	–2.7–4.3
8	4	36.2	25.5–46.3	1.8	–2.5–5.8

3.0 mmol/l ($P < 0.01$ by Wilcoxon rank-order test¹⁴) and reverted to baseline by three months. 2 women suffered diffuse scalp-hair loss two and four months after jaw wiring. The integument was otherwise normal and there was no evidence of deficiency of vitamins A, B₁, B₆, or K or of folate, zinc, or copper. Scalp biopsy showed telogen effluvium¹⁵ and hair regrew. 3 patients vomited without ill-effect whilst wired. Apart from 1 patient who made a suicidal gesture unrelated to jaw wiring, there were no known psychological problems.

Discussion

Jaw wiring induces major weight-loss without serious complications. The median weight-loss of 25.3 kg in the 10 patients wired for six months is comparable with that reported for intestinal bypass surgery.^{6-8,16-19} An appropriately controlled trial was not possible but the patients had previously attended the same clinic and had not lost weight. Jaw wiring is simple, well tolerated, and available in any hospital which treats jaw injuries. Since it can be done as an outpatient, it is considerably cheaper than gastrointestinal surgery as well as having little morbidity. The major risk (aspiration) is minimised



Rate of weight-loss (median and range) in ten patients with jaw wiring for 6 months.

by correct posturing during vomiting. Temporary hair-loss also occurs in other weight reduction programmes.¹⁹⁻²³ The transient fall in serum-urea concentration presumably reflects an initially decreased protein intake with later "cheating". No other clinical or biochemical abnormalities were seen. After four months, patient enthusiasm diminished and weight reached a plateau. After wire removal, a tendency to gain weight correlated with failure to attend for follow-up. Although intermittent jaw wiring is possible, jaw wiring must be regarded only as a method of inducing weight-loss and the patient's eating behaviour must be modified if permanent success is to be achieved.

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SURVIVAL AFTER CARDIAC ARREST IN HOSPITAL

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Summary A 10-year experience of cardiac arrests in a district general hospital is reviewed. 1063 arrests in the general areas of the hospital were studied, excluding the coronary and intensive care units. In 718 (67.5%) initial resuscitation was unsuccessful; in 252 (23.7%) the patient died later in hospital, 93 patients (8.7%) were discharged alive. After discharge from hospital there was a progressive annual mortality of about 7% for the first five years, but thereafter no patient died. Significant incapacity after discharge was also unusual. The probability of successful resuscitation was greater in patients with primary cardiac disease (11.8% survival), drug overdose (22.2% survival), or undergoing anaesthesia (20.0% survival). The success-rate was significantly greater in the accident and emergency department (7.9%) than on the wards (2.1%), but this difference was due entirely to the more successful resuscitation of patients with myocardial infarction in the accident and emergency department. Within each diagnostic category the survival-rate was independent of the age of the patient. Prolonged survival after resuscitation but ending in death before discharge was unusual.

Introduction

ALTHOUGH the first case of successful resuscitation outside an operating-theatre was published in 1956¹ it was only after the development of closed chest massage by Kouwenhoven et al. in 1960² that cardiopulmonary resuscitation became widely feasible. Since then several large series have been reported.³⁻¹² Many of these include cardiac arrests in specialised-care areas with better results.^{8,11,12} We report here our experience over 10 years with a hospital resuscitation service covering all

the wards, the accident and emergency department, the operating-theatres, and the X-ray department, but, unlike previously reported series, excluding the coronary and intensive care units, which do not use the hospital resuscitation service. Our objective was to see whether there had been any change in our success-rate, and whether we could identify any diseases or places in which the results of resuscitation were particularly good or particularly poor. We also assessed progress in patients who had survived to hospital discharge.

Patients and Methods

The Central Middlesex Hospital is a 700-bed district general hospital in North West London. It has a neurological and neurosurgical department, but there is no investigative cardiology or thoracic surgery. A cardiac-arrest service has been running in the hospital since 1960, but it was only established on hospital-wide basis when the coronary-care unit was opened in 1966. The pattern of organisation and clinical practice has remained substantially unchanged since then. A D.C. defibrillator and associated equipment are kept in the accident and emergency department and moved to the site of the arrest when a special telephone number is dialled. The coronary and intensive care units do not use this service because they have their own equipment. This report is based on an analysis of a register kept on the resuscitation trolley between Jan. 1, 1967, and Dec. 31, 1976.

In analysing the entries only patients with a genuine cessation of effective circulation have been included. Patients with syncopal and epileptic attacks, and otherwise uncomplicated respiratory arrests have been excluded. Only the first arrest on each admission in each patient is counted; second or subsequent arrests, if unsuccessfully treated, are recorded as a later death, and have been ignored if the patient survived. 3 patients had a second cardiac arrest after discharge and they have been counted twice. Resuscitation was deemed successful if a stable circulation was established and the resuscitation team disbanded.

We also studied 80 patients who survived to be discharged before Jan. 1, 1976, and could therefore be followed up for at least a year. Energetic attempts were made to trace them all and to obtain details of their best subsequent standard of health and the circumstances of death if they had died. The effect of the arrest on functional capacity, and the time of return to work were also ascertained. Life-table analysis was done by the method of Cutler and Ederer,¹³ and statistical analysis by χ^2 tests and tests for linear regression.

Results

Of the 1063 patients 345 (32.4%) were successfully resuscitated but 252 of these died later in hospital, giving 93 survivors (8.7%). The 970 deaths constitute 9.3% of the total hospital mortality during the period under survey, and this proportion remained constant year by year. The number of cardiac-arrest calls varied between 77 and 134 per year, and the percentage surviving to discharge varied from 4% to 13.8%. No significant trend could be demonstrated in either of these. Survival-rates for males and females were equal.

Table 1 distinguishes the patients by diagnosis; the survival-rates for patients with myocardial infarction (15%), drug overdose (22%), and operative arrests (20%) are high, averaging 16.1% as a group. It averages 6.6% in patients in the cardiovascular and respiratory categories, but less than 2% in the traumatic, neurological, and various miscellaneous categories. This last figure is significantly lower than the five former categories ($p < 0.001$).

DR RODGERS AND OTHERS: REFERENCES

1. Bray, G. A. *Am. J. clin. Nutr.* 1970, **23**, 1141.
2. Stunkard, A. J., McLaren-Hume, M. *Archs. intern. Med.* 1959, **103**, 79.
3. Williams, A. E., Duncan, B. *Med. J. Aust.* 1976, **1**, 800.
4. Burnet, R., Rowland, R., Mukherjee, T. M., Wise, P. E. Unpublished.
5. Mason, E. E., Printen, K. J., Hartford, C. E., Boyd, W. C. *Ann. Surg.* 1975, **182**, 405.
6. Payne, J. H., De Wind, L. T. *Am. J. Surg.* 1969, **118**, 141.
7. Bray, G. A., Barry, R. E., Benfield, J. R., Castelnuovo-Tedesco, P., Drenick, E. J., Passaro, E. *Ann. intern. Med.* 1976, **85**, 97.
8. Starkloff, G. B., Donovan, J. F., Ramach, K. R., Wolfe, B. M. *Archs Surg.* 1975, **110**, 652.
9. Buchwald, H., Varco, R. L., Moore, R. B., Schwartz, M. Z. *Curr. Prob. Surg.* 1975, p. 1.
10. Schachter, S., Roden, J. *Obese Humans and Rats*. Washington, 1974.
11. Hashim, S. A., Van Itallie, T. B. *Ann. N.Y. Acad. Sci.* 1965, **131**, 654.
12. Garrow, J. S. *Nutr. Soc. Proc.* 1974, **33**, 29A.
13. Chicago Society of Actuaries. *Build and Blood Pressure Study*. 1959.
14. Wilcoxon, F. *Biometrics*, 1945, **1**, 80.
15. Kligman, A. M. *Archs Derm.* 1961, **83**, 175.
16. Payne, J. H., De Wind, L., Schwab, C. E., Kern, W. H. *Archs Surg.* 1973, **106**, 432.
17. Wood, L. C., Chremos, A. N. *J. Am. med. Ass.* 1964, **186**, 63.
18. Salmon, P. A. *Surgery Gynec. Obstet.* 1971, **132**, 965.
19. Wills, C. E. *J. med. Ass. Georgia*, 1969, **58**, 456.
20. Odom, R. B., Goette, D. F. *J. Am. med. Ass.* 1976, **235**, 476.
21. Goette, D. K., Odom, R. B. *Archs Derm.* 1975, **111**, 930.
22. Baird, I. M., Parsons, R. L., Howard, A. N. *Metabolism*, 1974, **23**, 645.
23. Goette, D. K., Odom, R. B. *J. Am. med. Ass.* 1976, **235**, 2622.