

Hypnosis and the management of patients with refractory irritable bowel syndrome

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ABSTRACT This review summarises the rationale, methodology and clinical evidence supporting the efficacy of hypnotherapy in patients with refractory IBS. Data sources used included English language articles published between 1966 and 2006, retrieved by a keyword search of biomedical electronic databases limited to Medline, Embase and the Cochrane Library. Only randomised controlled trials of the use of hypnotherapy in patients with refractory IBS were included in the review.

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BACKGROUND

Irritable bowel syndrome is defined as recurrent abdominal pain or discomfort for at least three months, with its onset at least six months previously, associated with improvement of discomfort with defaecation and/or the onset associated with a change in stool frequency or stool appearance (Rome III criteria).¹ Supportive symptoms include urgency of defaecation, a sense of incomplete rectal evacuation and abdominal bloating.

Irritable bowel syndrome is common and affects approximately 17% of the population, of whom fewer than 25% seek medical attention. Only a small minority of IBS consulters seen in primary care are referred for further investigation; such patients with refractory IBS are characterised by persistent IBS symptoms associated with significant psychological distress. Refractory IBS is associated with a profound impairment of quality of life, an impairment which is an expression of psychological distress as well as symptom severity.^{2,3} The impairment of quality of life in consulters and non-consulters is similar, suggesting that health-seeking behaviour is not simply the result of impaired quality of life.² Though the cause of IBS is unknown, changes in gastro-intestinal motility, visceral hypersensitivity and hypervigilance, and psychological factors have all been implicated.¹ The efficacy of drug therapy designed to improve such gut symptoms is disappointing in improving symptoms or health-related quality of life.^{3–6} For this reason, psychological therapies are increasingly being used as a first line in the management of functional disorders.⁷ Their aim is to give patients a tool to control symptoms and to gain more control of their lives, not just by calming emotional turmoil but also by facilitating

the vocalisation of feelings. Psychotherapy may comprise no more than relaxation therapy and autogenic training. Biofeedback is a behavioural technique which attempts to link symptoms with specific physiological responses and harnesses patients' capacity to cure themselves by tapping into their beliefs about the power of medical science; newer forms of biofeedback using heart rate variability are under assessment. Cognitive behavioural therapy assumes that gut symptoms are a behavioural response to life events and difficulties; it is aimed at modifying how patients interpret and respond to visceral sensations and reactions.⁸ A more psycho-dynamic approach is cognitive analytical therapy which attempts to improve a patient's understanding of why symptoms develop, what symptoms might represent and how patients might reformat attitudes and behaviour after gaining insights into their dysfunctional behaviour. In practice, a combination of cognitive and analytical therapy is often used in a fixed number of psychotherapeutic sessions known as 'brief therapy'.⁷

HYPNOSIS

Hypnosis is the alteration of the conscious state by manipulating attention circuitry in the brain and removing the normal supervisory control of the mind.^{9–18} In the hypnotic state, access to visualisation, relaxation and problem solving abilities is improved, facilities which can usefully alter mood and increase the control of physical, social and emotional problems. Under hypnosis, the subject's state of awareness shifts from the critical, rational, conscious mind (the left cerebral hemisphere), towards non-critical, deeper, subconscious or unconscious processes (the right cerebral hemisphere). Pavlov recognised that neural inhibition was fundamental

to an appreciation of brain function; responding to one stimulus is associated with inhibition of competing stimuli, and since words can be used as 'conditioned stimuli', they can also manipulate conscious states. Hypnosis may be viewed as a form of Pavlovian conditioning.¹⁷ Experts still debate about whether hypnosis is an 'altered state of consciousness' or merely the fulfilment of the subject's expectations of hypnosis, i.e. a 'psychosocial' response.^{9,18}

There are a number of key principles fundamental to an understanding of hypnosis.⁹

- A person's ability to respond to hypnosis remains stable throughout adult life, irrespective of the characteristics of the hypnoterapist such as age, gender or experience.
- The success of hypnotherapy does not depend upon the subjects motivation to become hypnotised, though negative attitudes to hypnotherapy can interfere with hypnosis.
- Susceptibility to hypnosis is not related to personality characteristics such as submissiveness, psychopathology or gullibility. It is linked to subjects' abilities to concentrate and focus their attention during activities such as reading or listening to music.
- Hypnotised subjects do not behave as automatons but as active problem solvers, retaining moral and cultural values but being responsive to the expectations expressed by the hypnoterapist.
- Hypnotisability does not correlate with the capacity for imagination or suggestibility; even in subjects with poor hypnotisability, hypnosis is as effective as a placebo in reducing pain and in highly hypnotisable subjects, hypnosis is three times more effective than placebo.

EVIDENCE THAT HYPNOSIS CHANGES BRAIN FUNCTION

Positron emission tomography has demonstrated changes in regional cerebral blood flow during hypnosis with differential activation of the different cortical and sub-cortical regions involving visualisation and problem solving areas.¹⁰ The areas of the brain most consistently stimulated by hypnosis are the thalamus, insula, occipital lobes and the anterior cingulate cortex. These brain centres are known to be involved in the control of states of consciousness and mechanisms of executive attention. The anterior cingulate cortex appears to have an important role in monitoring the attentional state.¹¹ Focussed concentration increases the cingulate theta signal, which is abolished by anxiety.¹²⁻¹⁶

Pain is a complex experience embracing discriminative sensation, affective motivation, autonomic arousal and reflex motor stimulation. Positron emission tomography studies have shown activation of an intricate neural matrix; non-painful gut stimulation elicits bilateral activation of the somato-sensory cortex and insula, and painful stimulation,

the additional activation of the anterior cingulate cortex.¹⁹ Patients with functional gastro-intestinal disorders often selectively attend to gut sensations, a finding which correlates with a different pattern of activation of brain centres compared with that seen in healthy volunteers. In healthy subjects, there are gender-specific differences in the activation of brain centres in response to gut sensations; activation of the anterior cingulate cortex is more marked in females suggesting enhanced sensitivity in those brain centres which process cognitive and emotional aspects of gut sensations.¹⁹ Males with IBS show more intense activation of the insula cortex than females. Cortical-evoked potential responses to electrical stimulation of the gut have identified patients with functional bowel disorders associated with visceral hypersensitivity and/or hypervigilance.

PHYSIOLOGICAL RESPONSES TO HYPNOTHERAPY

Changes in central command are reproducibly induced by hypnosis.²⁰ Cardiovascular responses to handgrip, both real and imagined, involve central activation of the insula and anterior cingulate cortex independent of muscle afferent feedback, physiological responses which are not under conscious control. Changes in blood pressure, heart rate variability, bronchial reactivity, smooth muscle tone and gastric secretion as well as immune responses have all been described in the hypnotic state. Hypnosis increases the rate of habituation to sound indicating a reduction in amygdalar sympathetic input to autonomic activity.²¹ Hypnosis slows oro-caecal transit times²² and suppresses colonic motility.²³ Hypnotically induced anger and excitement increase colonic motility while happiness reduces colonic motility.²³ Sensory responses to balloon distension of the rectum in IBS can be reduced in those patients with rectal hypersensitivity and increased in patients with rectal hyposensitivity during hypnosis.²⁴⁻²⁶ Hypnotherapy also reduces both the sensory and motor components of the gastrocolonic response to food in IBS.²⁷⁻³⁰

POTENTIAL ADVERSE EFFECTS OF HYPNOTHERAPY

The potential adverse effects of hypnotherapy are anecdotal. Patients with marked psychopathology, and particularly patients with major depressive illness, are least likely to respond well and may be exposed to the hazards of reduced psychomotor retardation, increasing the risk of subsequent self-harm, if the primary underlying psychiatric illness is not treated.

THE TECHNIQUE OF HYPNOSIS

There is a wide range of techniques used in hypnosis; most comprise a similar sequence of steps which begin with a simple explanation of hypnosis to dispel any

TABLE 1 Randomised controlled trials of hypnotherapy in IBS.

Study	Randomisation	IBS patients (n)	Contact time	Study Period (weeks)	Results (GI symptoms)	Statistics	Follow up time (GI symptoms)
Whorwell PJ, Prior A et al. ³²⁻³³	Hypnotherapy vs Brief Psychotherapy	15 vs 15	7 x 30min over 12 weeks	12	Well-being + all symptoms improved in all Hyp pts	Difference Hyp vs Psy p < 0.05	18 months 15 Hyp only All improved
Harvey RF, Hinton RA et al. ³⁴	Group hypnotherapy vs Individual hypnotherapy	17 vs 16	4 x 40min over 7 weeks	12	20/33 improved No improvement 5 (group hypnosis) 8 (indiv. hypnosis)	Difference Group vs Indiv. Hyp n.s.	3 months
Galovski TE, Blanchard EB ³⁵	Crossover design Hypnotherapy vs Symptom monitoring	6 matched pairs	12 x 30min over 12 weeks	12	7/12 improved No improvement during symptom monitoring	Difference t = 2.95 p = 0.16	2 months 5/9 improved; p = 0.14
Forbes A, MacAuley S et al. ³⁷	Hypnotherapy vs Relaxation tape	25 vs 27	6 x 30min over 12 weeks (Tape 30min/day)	12	11/22 improved 12/23 improved High drop-out rate	Difference n.s.	3 months
Palsson OS, Turner MJ et al. ³⁸	Crossover design Hypnotherapy vs Symptom monitoring	15 vs 15	7 x 45min over 12 weeks	16	At 4 months post-Hyp All symptoms improved in all pts	Difference Pre vs Post-Hyp p = 0.01	10 months All improved Mean 68% improvement (n=21)
Roberts R, Wilson S et al. ³⁹	Hypnotherapy vs Symptom monitoring	40 vs 41	5 x 30min over 5 weeks	12	82% follow up at 3/12 Both hyp and control mean symptom scores reduced (-13.0 vs -4.5)	Difference Hyp vs Control P = 0.008	12 months 65% follow up Hyp vs controls P = 0.8 (n.s.)

erroneous concepts which may have been obtained from its portrayal in the media.³¹ Subjects are told that they will experience a heightened state of consciousness and not unconsciousness and that at no time will they be under the control of the practitioner. It can be useful to give subjects a simple explanation of gut physiology and the origin of functional symptoms based on the model of heightened perception of gut sensations (visceral sensitivity) and a generalised increase in gut motility in response to the normal stimuli which affect the gut. The reflex, autonomic changes which affect gut function can be easily demonstrated and can help to reinforce the concept of the central nervous system control of visceral responses.

CLINICAL EVIDENCE OF THE EFFICACY OF HYPNOTHERAPY IN REFRACTORY IBS

There have been many controlled trials of hypnotherapy in IBS (see Table 1). Whorwell *et al.* first demonstrated its efficacy in a group of 30 patients with severe IBS randomly allocated to hypnotherapy or psychotherapy

supplemented by placebo medication.³² Hypnotherapy comprised of seven, 30 minute sessions over 12 weeks and was directed at general relaxation and control of intestinal motility. Hypnosis was induced with arm elevation followed by standard deepening procedures and aided by visual imagery techniques. The control group comprised of seven, 30 minute sessions of supported psychotherapy together with a placebo medication. Psychotherapy included a discussion of symptoms and an exploration of the contributory emotional problems and life events.

At 12 weeks, there was a marked improvement in general well-being in all 15 hypnotherapy patients compared with the control group using global ratings. Symptom scores for abdominal pain, distension and altered bowel habit were significantly improved in the hypnotherapy group compared with control.³² Experience with a further 35 patients, again demonstrated a marked improvement in symptom scores.³³ Patients with functional abdominal pain rather than IBS fared less well with a response rate of 43% compared with typical IBS patients whose

response rate was 95% with respect to symptomatic improvement. Patients over the age of 50 and patients with high levels of anxiety and/or depression using the general health questionnaire were significantly less likely to achieve symptom control. Follow-up over a mean period of 18 months of the original 15 patients who received hypnotherapy also confirmed that all patients remained in remission.³³

Other groups have confirmed the efficacy of hypnotherapy in refractory IBS. Harvey *et al.* studied 33 patients with refractory IBS and randomly allocated patients to receive either individual hypnotherapy or group hypnotherapy.³⁴ Group hypnotherapy used a similar induction technique in groups comprising 5–7 individuals. Hypnotherapy was undertaken in 40-minute sessions on four occasions over seven weeks and patients were followed for 12 weeks. Sixty per cent of patients reported an improvement in their symptoms, of whom 50% were symptom-free at 12 weeks. Group hypnotherapy was as effective as individual hypnotherapy.³⁴

Galovski and Blanchard attempted a systematic replication of Whorwell's findings using six matched pairs of IBS patients randomly assigned to either hypnotherapy or symptom monitoring and a subsequent crossover to hypnotherapy.³⁵ Patients were matched for current psychiatric diagnoses and susceptibility to hypnosis. Hypnotherapy comprised twelve, 30–60-minute sessions on a weekly basis and assessments were made at 12 weeks and 20 weeks. Hypnosis was induced using eye fixation and progressive relaxation with standard deepening techniques of ego-strengthening and guided visual imagery. Patients were given tapes of a hypnosis session to practise auto hypnosis daily.

Hypnotherapy was significantly superior to symptom monitoring; 11 of the 12 subjects experienced a significant improvement in the symptoms of abdominal pain, constipation and flatulence. Global symptom reduction scores were calculated to reduce the potential of type I statistical errors; 73% of patients improved to a greater or lesser degree with hypnotherapy, particularly in respect of abdominal pain, constipation and flatulence but without improvement in diarrhoea or abdominal bloating. There was a significant reduction in state and trait anxiety scores during hypnotherapy. Interestingly, there was a positive relationship found between the incidence of psychiatric illness and the overall level of improvement.

Vidakovic-Vukic studied 27 patients with IBS using twelve, 60-minute sessions of hypnotherapy. The method of induction and deepening of the hypnoidal state and gut-directed hypnotherapy were similar to that used by Whorwell.³² Patients were asked to practise the technique of auto hypnosis daily using a tape recording of a hypnotherapy session. Of the 27 patients studied, three

dropped out and all of the remaining patients experienced a significant improvement in pain, flatulence and bloating with normalisation of bowel habit. Similarly, a significant improvement in well-being and energy was reported by all patients completing 12 sessions with hypnotherapy. Telephone follow-up 6–12 months after completion of hypnotherapy has confirmed the persistence of symptomatic improvement.³⁶

Forbes *et al.* recruited 52 patients with refractory IBS, all of whom had failed dietary and pharmacological therapy.³⁷ Patients were randomly allocated into one of two groups. One group received hypnotherapy comprising six, 30-minute sessions of hypnosis at two-weekly intervals over 12 weeks, supplemented by daily auto hypnosis using an audiotape of a hypnotherapy session. The other group were instructed to use a relaxation audiotape, lasting 30 minutes, every day with clinic interviews at six and 12 weeks; symptom diaries and global symptom scores were assessed at 2-week intervals. At weeks 0 and 12, assessments were made using a general health questionnaire, hospital anxiety and depression ratings and quality of life measures. Data analysis was undertaken by intention to treat and the assessor was blinded to group allocation. There was a greater reduction, which was statistically significant, in median symptom scores in the hypnotherapy group compared to the audiotape relaxation group, but overall, the assessor considered 52% in each group to have improved symptomatically. The ease and economy of audiotape relaxation, though possibly inferior to hypnotherapy, were considered to be sufficiently economic to recommend audiotape relaxation as a second line option in the management of refractory IBS whilst reserving hypnotherapy for treatment failures.³⁷

Palsson *et al.* designed a study to assess the efficacy of hypnotherapy and its effects on visceral sensitivity and psychological symptoms in 18 IBS patients.³⁸ Hypnosis was delivered in seven, 45-minute sessions over 12 weeks and patients were randomly assigned to two treatment subgroups, one subgroup receiving pain-specific verbal suggestions during hypnotherapy sessions and the other did not. The method of hypnosis induction, deepening of hypnoidal state and gut-specific relaxation was similar to that described by Whorwell.³² Patients were asked to practice autohypnosis on a daily basis using a tape-recorded session. Rectal muscle tone and pain thresholds were assessed using standard barostat techniques.

Analysis of pooled data for 24 patients showed that hypnotherapy achieved a 50% reduction in abdominal pain scores, 25% reduction in bloating scores and 30% reduction in bowel frequency scores at 12 weeks, the effects being sustained during four months of follow-up. Similarly, there was a significant reduction in psychological symptoms and anxiety ratings. There was no evidence that hypnotherapy made any significant change in rectal pain thresholds, rectal muscle tone or autonomic

cardiovascular reflexes. The authors concluded that hypnotherapy might improve IBS symptoms by altering the patient's focus of attention and/or changing beliefs about gut sensations in contrast to the findings of others.^{24,25} Clearly changes in visceral sensitivity are not necessary for clinical improvement to occur with hypnotherapy. Palsson and Whitehead have shown that in patients with severe IBS responding to hypnosis, symptomatic improvement was maintained for 10 months following hypnotherapy, with an estimated degree of improvement of approximately 68%.³⁸

LONG-TERM BENEFITS OF HYPNOTHERAPY

In a randomised, controlled pilot study of 81 patients with refractory IBS symptoms in primary care, gut-focussed hypnotherapy significantly improved symptom scores at three months compared with controls; patients were followed up for 12 months but the beneficial effects were not sustained beyond three months and no improvement in the quality of life was found.³⁹

In a postal study of 204 IBS patients who had completed gut-directed hypnotherapy at least one year previously, patients were asked to complete IBS symptom scores, quality of life scores and hospital anxiety and depression skill scores, pre- and post-hypnotherapy.⁴⁰ The response rate of 273 patients was 75%. Immediately after hypnotherapy, 71% of patients considered their symptoms to be very much or moderately improved, of whom 81% had maintained a benefit of treatment during long-term follow-up. The maintenance of symptomatic improvement

did not appear to be associated with how regularly responders continued to practise hypnotherapy techniques during follow-up. This study demonstrates that the beneficial effects of hypnotherapy appear to last for at least five years. Because of the sustained effects in the majority of patients, the cost of therapy could be rapidly offset by the ensuing reduction in other healthcare demands.^{40,41}

SUMMARY

Hypnotherapy reduces patient anxiety and improves symptom control in the majority of patients with refractory IBS. Though not all symptoms can be cured, symptoms can often be much better controlled. Benefits extend well beyond symptom control and include improvements in quality of life and reduction in emotional distress. The longevity of the hypnotherapeutic response and the significant reduction in demand for medical resources, consultations, investigations and drug therapy could justify the initial costs of providing hypnotherapy, though more studies are needed. Audio-taped hypnotherapy sessions, relaxation audiotapes and group hypnotherapy could all improve the cost-effectiveness of hypnotherapy in the minority of patients whose symptoms are resistant to conventional therapy. Such an approach empowers patients, shifts the responsibility from doctor to patient, and helps patients to develop different ways of coping with troublesome symptoms. Intuitively, primary care seems the optimum setting for a hypnotherapy service; given proof of efficacy and appropriate funding, its introduction would further enhance the care of IBS patients in the community.

REFERENCES

- Longstreth GF, Thompson WG, Chey WD, Houghton LA, Mearin F, Spiller RC. Functional bowel disorders. *Gastroenterology* 2006; **130**:1480–91.
- Halder SL, Locke GR 3rd, Talley NJ, Fett SL, Zinsmeister AR, Melton LJ 3rd. Impact of functional gastrointestinal disorders on health-related quality of life: a population-based case-control study. *Aliment Pharmacol Ther* 2004; **19**:233–42.
- Houghton LA, Heyman DJ, Whorwell PJ. Symptomatology, quality of life and economic features of irritable bowel syndrome – the effect of hypnotherapy. *Aliment Pharmacol Ther* 1996; **10**:91–5.
- Camilleri M. Management of the irritable bowel syndrome. *Gastroenterology* 2001; **120**:652–68.
- Mertz HR. Drug therapy: irritable bowel syndrome. *N Eng J Med* 2003; **349**:2136–46.
- Avigan M, Justice R, Mackey AC, Nair N. Re: Brandt *et al.* – An evidence-based approach to the management of irritable bowel syndrome in North America. *Am J Gastroenterol* 2002; **97**(11 Suppl):S7–26.
- Read NW. Harnessing the patient's powers of recovery: the role of the psychotherapies in the irritable bowel syndrome. *Clin Gastroenterol* 1999; **13**:473–87.
- Teasdale JD, Scott J, Moore RG, Hayhurst H, Pope M, Paykel ES. How does cognitive therapy prevent relapse in residual depression? Evidence from a controlled trial. *J Consult Clin Psychol* 2001; **69**(3):347–57.
- Nash MR. The truth and the hype of hypnosis. *Sci Am* 2001; **285**:46–53.
- Rainville P, Hofbauer RK, Bushnell MC, Duncan GH, Price DD. Hypnosis modulates activity in brain structures involved in the regulation of consciousness. *J Cogn Neurosci* 2002; **14**(6):887–901.
- Botvinick M, Cohen J, Carter C. Conflict monitoring and anterior cingulate cortex: an update. *Trends Cogn Sci* 2004; **8**(12):539–46.
- Gevins A, Smith M, McEnvoy L, Yu D. High-resolution EEG mapping of cortical activation related to working memory: difficulty, types of processing, and practice. *Cereb Cortex* 1997; **7**:374–85.
- Mizuki Y, Suetsugi M, Imai T, Kai S, Kajimura N, Yamada M. A physiological marker for assessing anxiety level in humans: frontal midline theta activity. *Jpn J Psychiatry Neurol* 1989; **43**(4):619–26.
- Raz A, Shapiro T. Hypnosis and neuroscience. A cross-talk between clinical and cognitive research. *Arch Gen Psychiat* 2002; **59**:85–90.
- Maquet P, Faymonville ME, Degueldre C *et al.* Functional neuroanatomy of the hypnotic state. *Biol Psychiat* 1999; **45**:327–33.
- Rainville P, Hofbauer RK, Paus T, Duncan GH, Bushnell MC, Price DD. Cerebral mechanisms of hypnotic induction and suggestion. *J Cogn Neurosci* 1999; **11**:110–25.
- Barrios A. A theory of hypnosis based on principles of conditioning and inhibition. *Contemporary Hypnosis* 2001; **18**:163–203.

- 18 Gruzelier J. A working model of the neurophysiology of hypnosis: a review of the evidence. *Contemporary Hypnosis* 1998; **15**:13–21.
- 19 Hobson AR, Aziz Q. Brain imaging and functional gastrointestinal disorders: has it helped our understanding? *Gut* 2004; **54**:1198–206.
- 20 Williamson JW, McColl R, Mathews D, Mitchell JH, Raven PB, Morgan WP. Brain activation by central command during actual and imagined handgrip under hypnosis. *J Appl Physiol* 2002; **92**:1317–24.
- 21 Gruzelier J, Brow T. Psychophysiological evidence for a state theory of hypnosis and susceptibility. *J Psychosom Res* 1985; **29**:287–302.
- 22 Beaugerie L, Burger AJ, Cadranet JF, Lamy P, Gendre JP, Le Quintrec Y. Modulation of oro-caecal transit time by hypnosis. *Gut* 1991; **32**:393–4.
- 23 Whorwell PJ, Houghton LA, Taylor EE, Maxton DG. Physiological effects of emotion: assessment via hypnosis. *Lancet* 1992; **340**:69–72.
- 24 Prior A, Whorwell PJ. Changes in rectal sensitivity after hypnotherapy in patients with irritable bowel syndrome. *Gut* 1990; **31**:896–8.
- 25 Houghton LA, Calvert EL, Jackson NA, Cooper P, Whorwell PJ. Visceral sensation and emotion: a study using hypnosis. *Gut* 2002; **51**:701–4.
- 26 Lea R, Houghton LA, Calvert EL *et al*. Gut-focussed hypnotherapy normalises disordered rectal sensitivity in patients with irritable bowel syndrome. *Aliment Pharmacol Ther* 2003; **17**:635–42.
- 27 Simren M, Ringstrom G, Bjornsson ES, Abrahamsson H. Treatment with hypnotherapy reduces the sensory and motor component of the gastrocolonic response in irritable bowel syndrome. *Psychosom Med* 2004; **66**:233–8.
- 28 Proceedings of the 1st International Symposium on Visceral Perception in Gastroenterology. *Gut* 2002; **51**(Suppl 1):i1–96.
- 29 Visceral hypersensitivity *Gut* 2004; **53**(Suppl 2):ii1–ii25.
- 30 Palsson OS, Whitehead WE. The growing case for hypnosis as adjunctive therapy for functional gastrointestinal disorders. *Gastroenterology* 2002; **123**:2132–5.
- 31 Heap M, Aravind KK. *Hartland's Medical and Dental Hypnosis*. 4th ed. Edinburgh: Churchill Livingstone; 2001.
- 32 Whorwell PJ, Prior A, Faragher EB. Controlled trial of hypnotherapy in the treatment of severe irritable bowel syndrome. *Lancet* 1984; **2**:1232–4.
- 33 Whorwell PJ, Prior A, Colgan SM. Hypnotherapy in severe irritable bowel syndrome: further experience. *Gut* 1987; **28**:423–5.
- 34 Harvey RF, Hinton RA, Gunary RM, Barry RE. Individual and group hypnotherapy in treatment of refractory irritable bowel syndrome. *Lancet* 1989; **1**:424–5.
- 35 Galovski TE, Blanchard EB. The treatment of irritable bowel syndrome with hypnotherapy. *Appl Psychophysiol Biofeedback* 1998; **23**:219–22.
- 36 Vidakovic-Vukic, M. Hypnotherapy in the treatment of irritable bowel syndrome: methods and results in Amsterdam. *Scan J Gastroenterol Suppl* 1999; **230**:49–51.
- 37 Forbes A, MacAuley S, Chiotakakou-Faliakou E. Hypnotherapy and therapeutic audiotape: effective in previously unsuccessfully treated irritable bowel syndrome. *Int J Colorectal Dis* 2001; **15**:328–34.
- 38 Palsson OS, Turner MJ, Johnson DA, Burnelt CK, Whitehead WE. Hypnosis treatment for severe irritable bowel syndrome: investigation of mechanism and effect on symptoms. *Digest Dis Sci* 2002; **47**:2605–14.
- 39 Roberts R, Wilson S, Singh S, Roalfe A, Greenfield S. Gut-directed hypnotherapy for irritable bowel syndrome. *Br J Gen Pract* 2006; **56**:115–21.
- 40 Gonsalkorale WM, Miller V, Afzal A, Whorwell PJ. Long term benefits of hypnotherapy for irritable bowel syndrome. *Gut* 2003; **52**:1623–9.
- 41 Lea R, Whorwell PJ. Quality of life in irritable bowel syndrome. *Pharmacoeconomics* 2001; **19**:643–53.