Table 2. Randomised controlled trials of static magnets in the treatment of pain: study characteristics and results

Author	Design	Study quality* (x/5)	Diagnosis duration	Treatment n	Method	Control n	Method	Endpoint measure	Follow-up	Result
Collacott et al, 2000	Randomised double blind placebo controlled crossover	5	Stable low back pain mean duration 19 years	20	Real (300 gauss) and sham magnets applied alternate weeks, 6 hours per day, 3 days per week for 1 week.	20	As for treatment group. One week washout period between the 2 treatments	Pain VAS McGill questionnaire. Range of motion measurements of lumbo-sacral spine	No	No significant differences between groups in VAS (p=0.9) and ROM (p=0.66) and McGill (p=0.55)
Harper & Wright, 1977	Double blind	3	Pain thresholds to radiant heat applied to back of hand of healthy volunteers	8	Magnetic bracelet applied for 5 mins prior to pain stimulus application. Each subject tested 5 times with and without bracelet.	8	Placebo bracelet applied in a similar manner to active bracelet for 5 mins. Each subject tested 5 times with and without bracelet.	Pain quantification not described	No	T test (level not stated) showed no difference between the 2 groups in pain thresholds
Man et al, 1999	Randomised double blind	3	Post operative pain studied for 14 days	10	Suction lipectomy patients. Same surgeon. Magnetic patches (150 to 400 gauss) immediate post-op. Negative pole to skin. Pain by VAS assessed at days 1,2,3,4,7 and 14. Same observer.	10	Sham patches identical without magnetic power.	Pain by VAS, oedema, discoloration	No	Significant ($p<0.05$), decrease in pain at days 1, 2, 3 , 4 and 7 compared with control group. Day 14- $p< 0.09$. Decreased consumption of analgesics noted in magnet group.
Alfano et al, 2001	Randomised double blind	5	Fibromyalgia patients..Pain for at least 3 months and pain on palpation of at	67	2 treatment groups, 1 using 4000 gauss magnetic mattresses with magnets	44	2 placebo groups inactivated magnets in identical arrangement to	Pain by 11 point numeric rating scale of number of tender points and total summated	No	

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			least 11 of 18 specified sites		uniformly arranged with negative pole to the skin.Second group varied spacial and varied polarity of 750 gauss. Pain intensity to standard pressure over tender points assessed. Pain scores summed for all sites.		corresponding magnet groups. 5th group was usual care with no change to treatment over the study period.	tender point scores. 3 and 6 month assessment. Functional status also assessed		Significant reduction of pain at 6 months in treatment group 1 (p=0.03) and significant reduction in pain in treatment group 2 at 3 months (p=0.01)
Holcomb et al, 2000	Randomised double blind cross over	3	Chronic low back or knee pain from 3 months to 30 years.	41 back pain (30 musculoskeletal, 11 neuropathic) 13 treated for knee pain	2 centres. Pain assessment by VAS and VRS (verbal rating scale) at 1, 3 and 24 hours. 200mT magnet (2000 gauss)	As per treatment group	Sham magnets applied in same way and pain assessed at same times post application	Pain level as determined by VAS and VRS at 1, 3 and 24 hours	No	Significant reduction of pain in magnet group at 1 and 24 hours (p=0.032 and 0.03 respectively
Weintraub, 1999	Randomised double blind crossover	4	Painful peripheral neuropathy. 10 with stage 2 and 3 refractory diabetic, DPN, and 9 with non-DPN	19	4 phases. Active 475 gauss magnet insole in 1 foot. VAS twice a day over 4 months. Sham magnet in other foot. Application for 24 hours a day.	19	Phase 2 sham and control feet switched after 30 days. Phase 3 and 4 after 30 days 2 new active insoles both feet. Placebo response monitored first 2 months.	Pain levels as assessed by VAS scores. Secondary outcome measures – serial comparisons of neurological examination and electrodiagnostic studies.	No	90% diabetic group had significant reduction in pain cf 33% in N-DPN grp.
Segal et al, 2001	Randomised double blind		Active Rheumatoid arthritis of knee with minimum VAS pain	38	MagnaBloc 4 steep field magnets 4 x 190mT (1900 gauss)	26	MagnaBloc with 1 steep field magnet in situ and 3 aluminium	VAS pain assessment, ESR,CRP, ROM, assessment of		Significant reduction in pain scores cf baseline in both treatment and control groups

Author	Design	Study quality* (x/5)	Diagnosis duration	Treatment n	Method	Control n	Method	Endpoint measure	Follow-up	Result
			scores of 40/100		alternating polarity taped to knee for 1 week		blanks. Estimated field strength 72mT (720 gauss)	tenderness and physical function. RGADA, SGADA, MHAQ		(p<0.01)Difference between 2 groups not significant (p<0.23).
Kanai et al, 1998	Randomised double blind	3	Patients with low back pain. Duration not specified. Pain confirmed by thermal imaging.	85	180mT (1800 gauss) applied to painful region for 3 weeks. Pain assessed at 1,2 and 3 weeks by VAS and thermal imaging	22	Dummy magnet of 10mT (100 gauss) applied.	Pain assessment by VAS and thermal imaging at weekly intervals over 3 weeks.	Yes	Significant improvement after 1 week in active magnet group. Increased warming seen on thermal images at 2 an 3 weeks in active group.
Hong et al, 1982	Randomised double blind	4	Chronic neck and shoulder pain more than 1 year.	52	Magnetic necklace of 1300 gauss and non-magnetic necklaces randomly assigned to subjects with and without pain for 24 hr wear for 3 weeks.	49	Non-magnetic necklaces applied similarly. All subjects told they were receiving magnetic devices.	VAS of 0 to 4 used for subjective pain. Frequency and intensity of pain noted. Nerve conduction times at baseline and 3 weeks.	No	Significant placebo effect noted in reduced intensity and frequency of pain. 52% magnet group, 44% placebo group. Proximal conduction time in ulnar nerve reduced in non pain subjects.
Brown et al, 2000	Double blind	1	Chronic pelvic pain of non-specified duration.	14	500 gauss magnets worn 24 hr per day. 2 week double blinded. 2 week single blinded extension.	Unclear	Dummy magnets applied as per active group.	Pain as assessed by McGill pain Q and Pain disability index	No	60% of magnet group cf 33% of placebo group had 50% reduction in pain.
Vallabona et al, 1997	Randomised double blind	4	Post polio pain syndrome. Significant pain for at least 4 weeks	29	300-500 gauss magnetic pads applied to site of pain.	21	Non magnetised identical pads applied.	Pain assessed by McGill pain Q and VAS 0-10 for trigger points	No	Active group average pain decrease of 4.4 ±3.1 (p< 0.001).

Author	Design	Study quality* (x/5)	Diagnosis duration	Treatment n	Method	Control n	Method	Endpoint measure	Follow-up	Result
					Pain reassessed after 45 min magnet application by palpation of trigger points.					Placebo devices decrease of pain scores of 1.1 ± 1.6 ($p< 0.005$). 76% active group reported greater than placebo effect on pain ($p< 0.0001$)
RSSL study, 2001	Randomised double blind	2	Regular dysmenorrhoea	50	Application of device to pelvis at onset of pain.	50	Application identical to control group	5 point pain assessment scale completed 3 times a day during menses.	No	Small but significant reduction in pain on days 2 and 3 compared with placebo group.

Table 3. Jadad Scoring System to measure methodological quality

	Collacott et al, 2000	**Harper & Wright, 1977**	**Man et al, 1999**	**Alfano et al, 2001**	**Holcomb et al, 2000**	**Weintraub, 1999**	**Segal et al, 2001**	**Kanai et al, 1998**	**Hong et al, 1982**	**Brown et al, 2000**	**Vallbona et al, 1997**	**RSSL study,**
Study described as randomised (includes use of words such as random, randomly and randomised)	1	1	1	1	1	1	1	1	1	0	1	1
Study described as double blind	1	1	1	1	1	1	1	1	1	1	1	0
Description of withdrawls and dropouts	1	0	0	1	0	1	0	0	0	0	1	0
Method to generate sequence of randomisation described	1	0	0	1	0	0	1	0	1	0	0	0
Method of double blinding described and appropriate (identical placebo, active placebo, dummy etc)	1	1	1	1	1	1	1	1	1	0	1	1
Method to generate sequence of randomisation described and inappropriate (patients were allocated alternately or according to their date of birth or hospital number etc)	-	-	-	-	-	-	-	-	-	-	-	-
Method of double blinding described and inappropriate (e.g. comparison of tablet with injection etc)	-	-	-	-	-	-	-	-	-	-	-	-
Total Max of 5	5	3	3	5	3	4	4	3	4	1	4	2