Bioresonance therapy for allergies, atopic dermatitis, non-organic gastrointestinal complaints, pain and rheumatic diseases

Systematic Review

Ludwig Boltzmann Institut
Health Technology Assessment

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1 Bioresonance therapy for allergy, atopic dermatitis, non-organic gastrointestinal complaints, pain and rheumatic diseases

1.1 Background

developed in the 70's

Bioresonance therapy was developed in the 1970's by the physician Franz Morell in cooperation with the electrical engineer Erich Rasche. Bioresonance therapy (BRT), or also called biophysical information therapy (BIT) derives from the electro-dermal testing according to Voll. BRT, as an alternative medical method is used for diagnosis and treatment of several diseases like allergy, acute or chronic pain, rheumatic diseases and psychosomatic disorders [1].

BRT is based on the theory that bioelectro-magnetic fields exist, which cause oscillations and waves at a low frequency [2]. Furthermore, it is estimated that these oscillations and waves are part of the information transmitting system within the human body [3]. Only hypothetical explanations exist for these physical and physiological interactions.

based on the thesis that BRT gives impulses to spontaneous healing

According to the proponents of the theory, the main purpose of BRT is to identify pathological waves within the human body and to give a strong impulse to spontaneous healing energies of the body for self-regulation [2]. BRT is based on the assumption that atopic diseases disturb the normal electromagnetic fields of the body and that, through application of BRT/ BIT, these disturbances can be reversed [2].

However, sceptics say that BRT is pure placebo, and that any effect must be caused by placebo or other non-specific effects [2, 4].

1.2 Description of treatment

BRT is supported by apparatus that reverses/"corrects" pathological waves to healthy waves

During the therapy there is a direct connection via two electrodes between the BRT apparatus and the patient. Depending on the purpose of the therapy different forms of electrodes like cylinder, container, ball etc. are used. One of those two electrodes serves as the inline-electrode (or brass-electrode) which takes up waves and oscillations from one part of the body and transmits them to the apparatus. Within the BRT machine there is a so-called "separator" which analyses the information from the brass-electrode and distinguishes supposedly between healthy and pathological waves. Then the separator reverses or "corrects" the pathological waves and oscillations into healthy ones and then they are transmitted back to the body via the second-electrode, the "exit-electrode". Usually the electrodes are connected with the extremities of the patient – either left or right side for the brass-electrode and the other one for the exit-electrode.

for therapy or diagnosis

The most widely used "bioresonance apparatuses" are the commercially available BICOM, MORA or Vegaselect machines [3].

Besides therapy, BRT is also used for diagnostic purposes, especially for diagnosis of allergies. There are up to 600 different allergens available for al-

lergy-testing. These allergens are either as biological active substances in ampoules or as software, where the information of the biological substances is digitally saved – also called electronic homeopathy [5] – obtainable [4]. The diagnostic procedure is similar to the therapy. Usually a cylindrical brass container electrode (inline electrode) is used to capture magnetic waves which are allegedly produced by allergens or other substances which might cause atopy and are then transferred through the BRT apparatus into the human body [2-3, 5].

1.3 Indication and therapeutic aim

allergy, atopic dermatitis, non-organic gastrointestinal complaints, pain and rheumatic diseases

The indications covered in this review are pain, rheumatic diseases, atopic dermatitis, non-organic gastrointestinal complaints and allergies.

The therapeutic aim is the alleviation or cure of these conditions.

1.4 Treatment costs

costs not reported

The costs of bioresonance treatment and diagnosis are not reported anywhere in the literature included in this review.

2 Literature search and selection

2.1 PICO question

Is bioresonance therapy effective in reducing pain, healing rheumatic diseases, atopic dermatitis and allergies and in improving non-organic gastrointestinal complaints, in comparison to placebo or standard therapy?

BRT effective in comparison to placebo or standard

Is bioresonance therapy safe?

2.2 Inclusion criteria

Table 2.2-1: Inclusion criteria

Population	✪ Patients with pain. ✪ Patients with rheumatic diseases. ✪ Patients with non-organic gastrointestinal complaints. ✪ Patients with allergies. ✪ Patients with atopic dermatitis.
Intervention	Bioresonance therapy and/ or diagnosis.
Comparison	Placebo or standard therapy.
Outcomes	Reducing and healing: ✪ Allergy ✪ Atopic dermatitis ✪ Non-organic gastrointestinal complaints ✪ Pain ✪ Rheumatic diseases.
Study design	All prospective studies with a control group.

2.3 Literature search

search in 4 databases

The systematic literature search was carried out on 08.01.2009 in the following databases:

- Medline via Ovid
- Embase
- Cochrane library
- CRD

The search was limited to English and German language literature and covered the entire time span of the databases.

After removal of duplicates, 56 bibliographical references were available. The exact strategy can be requested at the LBI for HTA.

57 references found, 6 selected

By means of a hand search, 1 additional reference was identified, which raised the overall number of hits to 57.

The selection of the literature was carried out by two reviewers, independently of each other. Conflicting views were settled by means of discussion and consensus, or through the involvement of a third person.

2.4 Literature selection

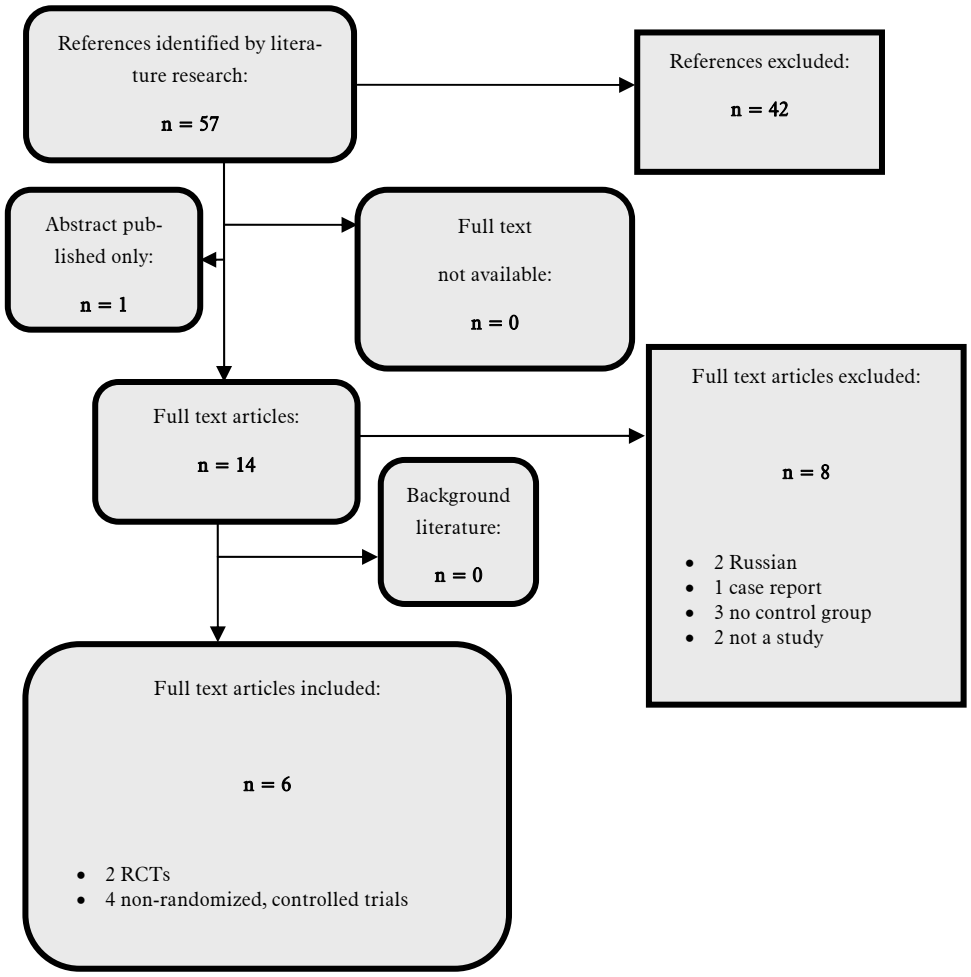

Figure 2.4-1: Depiction of the selection process (QUORUM tree)

3 Assessment of the quality of the studies

The evaluation of the quality of the studies was carried out by two reviewers, independently of each other. Conflicting views were settled by means of discussion and consensus, or through the involvement of a third person. An exact list of the criteria that were used for the evaluation of the internal validity of the studies can be found in the internal manual of the LBI-HTA [6].

assessment of quality of studies carried out by two reviewers

4 Data extraction

The extraction of data was carried out by one person. A second person checked the completeness and accuracy of the data.

extraction of data by one person

4.1 Presentation of the study results

Two RCTs and four non-randomized, controlled trials were included to answer the question as to whether BRT is effective in reducing or healing allergy, atopic dermatitis, non-organic gastrointestinal complaints, pain and rheumatic diseases and whether it is safe.

two RCTs and four non randomized trials included for review

Table 4.1-1: Study results

Author, Year, Reference number	Kofler, H. et al. 1996 [4]	Schöni, M H. et al. 1997 [2]	Nienhaus, J. and Galle, M. 2006 [3]	Schuller, J. and Galle, M. 2007 [5]	Bonetti, M. et al. 2007 [7]	Arena, M. et al. 2008 [8]
Country	Innsbruck, Austria	Switzerland	Germany	Austria	Italy	Italy
Sponsor	Firma Medtronic, Friesenheim, Germany	supported by a grant provided by VOLG's program "best friends", Switzerland	not reported	not reported	not reported	not reported
Study design	non-randomized, controlled trial	RCT, sham-controlled, double-blind	RCT, placebo controlled, single-blind patients (pts)	non-randomized, placebo controlled trial, single-blind (pts)	non-randomized controlled trial	non-randomized, controlled trial
Study quality	good	good	moderate	moderate	fair	fair
Number of patients	74 (intervention (I): 54, control (C): 20)	36 (I: 16, C: 16)	21 (I: 10, C: 10)	30 (not reported)	490 (I: 196, C: 294)	549 (A: 135, B: 139, C: 137, D: 139)
Lost to follow up	23	4	1	9	not reported	not reported
Study population	pts diagnosed with hay fever who refused treatment with a specific hypo-sensitization therapy	children with atopic dermatitis	pts with non-organic gastro-intestinal complaints	pts with rheumatic diseases	pts with chronic unilateral or bilateral low back pain	pts with degenerative articular disease of the lumbar rachis with functional insufficiency of the vertebral motor unit
Ø Patient age (years)	not reported	range 1.5-16.8	45.5 (range 13-82)	57.2 (range 40-82)	68 (range 55-87)	range 50-75
Indication for BRT	hay fever, pollinosis	atopic dermatitis	non-organic gastro-intestinal complaints	rheumatic disease	chronic low back pain	chronic low back pain
Intervention	biophysical allergy treatment with MORA bioresonance apparatus	supplementary to conventional medication 2 treatment sessions weekly for at least 4 weeks with bioresonance apparatus BICOM II	supplementary to conventional medication treatment with MORA bioresonance apparatus	treatment with MORA bioresonance apparatus	4 weekly paravertebral injections (10 cc of O_2-O_3 gas mixture at 25 µg/ml; outpatient). BRT was given – supplementary – the month after infiltration	comparison of 4 combinations of interventions in back pain: A. TENS electro-stimulation and psychosomatic postural rehabilitation B. magneto-therapy of

Author, Year, Reference number	Kofler, H. et al. 1996 [4]	Schöni, M H. et al. 1997 [2]	Nienhaus, J. and Galle, M. 2006 [3]	Schuller, J. and Galle, M. 2007 [5]	Bonetti, M. et al. 2007 [7]	Arena, M. et al. 2008 [8]
Control	placebo	placebo	placebo	placebo	4 weekly paravertebral injections (10 cc of O_2-O_3 gas mixture at 25 µg/ml; outpatient) only	bioresonance, TENS electro-stimulation and psychosomatic postural rehabilitation C. percutaneous paravertebral infiltration of O_2-O_3, TENS electro-stimulation, psychosomatics postural rehabilitation D. percutaneous paravertebral infiltration of O_2-O_3, TENS electro- stimulation, psychosomatic postural rehabilitation, magneto-therapy of bioresonance
Duration of treatment	4-6 weeks	4 weeks	3-6 weeks (6 treatment sessions per patient; 1-2 per week)	placebo: 2 weeks intervention: 4 weeks	18 months	11 weeks (15 sessions each – first eight sessions had a twice weekly schedule and weekly for the following 7 sessions
Main outcome measures	congruence of conventional allergological diagnostic and diagnostic with bioresonance; rhinomanometry and nasal provocation tests; individual calendar of complaints (duration of complaints in eyes, nose, bronchi)	*short term:* clinical and skin scores (skin lesions/ Costa score/ itching/ pruritus score, sleep quality/ sleep score), blood cell activation marker	pts' and physicians' estimation of the intensity and frequency of gastrointestinal disorders; examination results recorded by the physician: stomach pain by palpation, meteorism by percussion and intestinal noise by auscultation assessed pre and post treatment.	EAP(electro acupuncture)-40 value, subjective/ perceived state of health, biochemical, physicochemical cellular parameters of blood	modified MacNab Method: *Excellent:* resolution of pain and return to regular daily activity before pain onset *good or satisfactory:* more than 50% reduction of pain *mediocre or poor:* partial reduction of pain below 70%	scores of the VAS (Visual Analogic Scale) – pain evaluation scale (0-10; 0 = "no pain" and 10 = "the utmost pain") Assessment times: prior/ after treatment, after 11 weeks of treatment & 1, 6 and 12 months, respectively.

Author, Year, Reference number	Kofler, H. et al. 1996 [4]	Schöni, M H. et al. 1997 [2]	Nienhaus, J. and Galle, M. 2006 [3]	Schuller, J. and Galle, M. 2007 [5]	Bonetti, M. et al. 2007 [7]	Arena, M. et al. 2008 [8]
Results	congruence only in 22%; repeated tests of rhinomanometry and nasal provocation could not demonstrate any beneficial effect compared to placebo	change between scores prior treatment and after 4 weeks (total Costa Score): I: 39.8 ± 14.6 →27.3 ± 13.1; C: 35.3 ± 16.4 →26.6 ± 15.7; mean change I: 12.5 ± 12.6; C: 6.7 ± 8.2. none of the differences between the groups was significant	prior/ after treatment: significant changes in both groups (I:C) in all outcomes *intensity/ frequency (pts' estimation)* I: 4.30 ± 0.30 → 2.20 ± 1.05/ 4.40 ± 0.43 → 2.50 ± 0.94 vs. C: 3.70 ± 0.59 → 3.40 ± 0.52/ 4.20 ± 0.64 → 3.80 ± 0.49 (statistically significant changes between groups, Mann-Whitney-U-Test, p<0.05); *intensity/ frequency (physicians' estimation)* I: 3.30 ± 0.30 → 1.60 ± 0.78/ 3.20 ± 0.49 → 1.70 ± 0.83 vs. C: 3.60 ± 0.32 → 3.30 ± 0.42/ 3.70 ± 0.42 → 3.60 ± 0.32 (statistically significant changes between groups, Mann-Whitney-U-Test, p<0,01); significant changes also for stomach pain & meteorism, but not for intestinal complaints	EAP-changes prior/ after treatment: I: mean change of EAP-40 -6.2 SkT (significant; p<0,05), C: -1.2 SkT (not significant; p<0.05) improvements in subjective outcomes	I: 60%/ 21% (excellent or good) vs. C: 52%/ 21% (excellent or good) I: after period of improvement 21% partial return of pain	week 11: A-B: group A had more improvements than group B; B-C: group C maintained better therapeutic effects compared to group B; C-D: group C and D are closely comparable; singular effects of BRT were not measured
Adverse events	not reported	none	none	not reported	symptoms worsened in 9 pts	not reported

Author, Year, Reference number	Kofler, H. et al. 1996 [4]	Schöni, M H. et al. 1997 [2]	Nienhaus, J. and Galle, M. 2006 [3]	Schuller, J. and Galle, M. 2007 [5]	Bonetti, M. et al. 2007 [7]	Arena, M. et al. 2008 [8]
Conclusion of authors	no significant differences between intervention-group and placebo-group were found; the mean length of hay fever complaints were less in the placebo-group; the trial gives evidence that bioresonance is NOT suitable for diagnosis or treatment of pollinosis; the potential for placebo-effects is substantial; these placebo effects can be used – on an individual basis – as reasonable accompanying measures	scientific background of BRT seems to be rather shaky, for medical and ethical reasons, not possible to renounce conventional medicine, only additional, no significant influence on atopic dermatitis, no side effects, but unethical to promise success	BRT has significant mean effects, but big variances in individuals' reactions: pts react individually to an "all or nothing" principle; results of this trial confirm results of other trials when this effect (big variances in reactions) were observed	limited number of pts involved, intervention and control group differed for ethical reasons, different length of treatment, therefore placebo effect likely to be underestimated, single-blinded placebo administration a "subtle form of suggestion" can not be out ruled; objectivity, reliability and validity of EAP is under discussion	preliminary findings show association with BRT, for pts with contraindications to drug treatment or in addition to medication, since no side effects are likely to occur caused by BRT	the multi-disciplinary approach showed improvements in nearly all groups; the integration of TENS, bioresonance, postural rehabilitation guarantees a better maintenance over time

Fair: placebo effect and reporting bias likely

Moderate: some trial data not reported, outcome measures imprecise/ subjective

Good: all patient data pre-/ post treatment reported, significant bias unlikely

4.2 Efficacy

5 indication groups

The populations that can be treated with BRT/ BIT vary. This is reflected in the very different indications treated in the trials included in this review. In the following paragraphs the efficacy of BRT/ BIT is evaluated for all of the 5 indications listed in the PICO question – allergy, atopic dermatitis, non-organic gastrointestinal complaints, rheumatic diseases and chronic low back pain. Altogether, the trials included 1210 patients.

4.2.1 Efficacy of bioresonance therapy in diagnosis and treatment of allergy

allergies

One [4] non-randomized, controlled-trial of good quality (n=74) reported on the efficacy of bioresonance therapy compared to standard care in diagnosis and treatment of allergy. Pollinosis was the type of allergy of interest in this placebo-controlled trial. Kofler et al. (1996) observed that only 22% of the results of conventional allergic diagnostic and diagnostic with bioresonance match. To measure the efficacy of bioresonance therapy rhinomanometry and nasal provocation tests were used. After the bioresonance treatment neither a significant difference to the start of the therapy nor between the experimental and the placebo group could be found considering these outcomes.

diagnosis in only 22% congruence with conventional test

no difference prior/ after therapy, nor between groups

Based on the big variances within the results Kofler et al. (1996) concluded that bioresonance therapy is not superior to placebo and therefore not adequate for diagnosis and treatment of allergic illnesses. Although, the methodological quality of the trial is good the strength of evidence is rated moderate, due to the small number of trials.

BRT not effective

4.2.2 Efficacy of bioresonance therapy in atopic dermatitis

atopic dermatitis in children

One RCT [2] of good quality (n=36) reported on the efficacy of bioresonance therapy in children with atopic dermatitis. The trial was sham-controlled and double-blind. Whereas the skin lesions (costa score) improved significantly in both groups after 36 days, Schöni et al. (1997) found no significant difference between the experimental group and the placebo group. Similarly, the analysis of specific blood cell activation markers after the treatment period and the results of the questionnaire to assess long-term clinical outcomes 8 month after the therapy showed no significant changes in both groups.

mean: no difference; wide ranges between individuals

BRT only additional

small number of patients

Further RCTs of good quality are required to establish the effect of BRT in atopic dermatitis, thus, although the quality of the study is good, the strength of evidence is rated moderate, due to small number of trials.

4.2.3 Efficacy of bioresonance therapy in non-organic gastrointestinal complaints

non-organic gastro-intestinal complaints

One RCT [3] of moderate quality (n=21) reported on the efficacy of bioresonance therapy in patients with non-organic gastrointestinal complaints. The trial was placebo-controlled and patients were blinded. In six out of seven main outcome parameters significant changes were observed in both groups prior/ after bioresonance therapy. The mean differences between experimental and placebo group were statistically significant.

significant changes in both groups, but also between groups

However, considerable variances within the intervention group were observed, which reflects the results of other trials that patients react very individually on the therapy.

wide range between individual reactions

Further RCTs of good quality are needed to determine, whether BRT is effective in the treatment of non-organic gastrointestinal complaints. The strength of evidence is low, due to the small number of trials.

10 patients received BRT

4.2.4 Efficacy of bioresonance therapy in rheumatic diseases

rheumatic diseases

One [5] non-randomized, placebo-controlled, single-blind trial of moderate quality (n=30) reported on the efficacy of bioresonance therapy in rheumatic diseases. The main outcome measure was the EAP (electro acupuncture)-40 value. Schuller & Galle (2007) found a significant improvement of the EAP-40 value in the intervention group (mean change -6.2 SkT) but not in the control group (-1.2 SkT).

significant differences between the groups

Although, the size of effect was high (0.69; possible values: 0-1) considerable variances between patients in the intervention group led to a very low stability (0.16; possible values: 0-1) of the results within the group, which supports the findings of Nienhaus & Galle (2006). However, Schuller & Galle (2007) concluded that BRT is effective in the treatment of rheumatic diseases.

wide range between individual reactions

Due to flaws in the methodological quality, like different duration of therapy between placebo and experimental group of the study, results cannot be generalised. The strength of evidence is low, thus further RCTs of good quality are necessary to support the findings of this trial.

small number of patients – strength of evidence is low

4.2.5 Efficacy of bioresonance therapy in chronic low back pain

Two [7-8] non-randomized, controlled-trials, both of fair quality (n=1039) and both conducted in Italy reported on the efficacy of BRT in chronic low back pain. Bonetti et al. (2007) and Arena et al. (2008) found the addition of BRT to therapy of chronic low back pain more effective than pain therapy alone.

chronic low back pain

Bonetti et al. (2007) showed that the combination therapy of O_2-O_3 paravertebral infiltration and BRT (experimental group) is more effective in treating chronic low back pain (81% excellent or good) compared to the control group (only oxygen-ozone therapy; 73% excellent or good).

BRT shows additional effects but difference of questionable clinical relevance

Arena et al. (2008) compared four different combinations of treatment options: percutaneous paravertebral infiltration of O_2-O_3, magneto-therapy of bioresonance (BRT), transcutaneous electrical nerve stimulation (TENS) and psychosomatic postural rehabilitation. Results of group D (combination therapy of all four treatment options – including BRT) were closely comparable to the results of group C (not including BRT), which were both significantly better than the results of group A and group B. Twelve month after the therapy the increasing pain was evaluated, thus group D (36.63% any-vague; 27.72% considerable-grave) was superior to group C (28.57%; 43.88% respectively).

The strength of evidence is low, thus further RCTs of good quality are needed to support the findings of Arena et al. (2008) and Bonetti et al. (2007).

4.3 Safety

side effects are not mentioned as did not occur

Three [4-5, 8] out of the six included trials failed to make reference to the safety of BRT and two mentioned that no serious side effects occurred [2-3]. Bonetti et al. (2007) reported that the bioresonance therapy was generally well tolerated, whereas in nine patients symptoms worsened. Therefore they reduced the intensity of the treatment and concluded that the principle greater intensity results in greater efficacy is not always applicable in BRT.

According to Nienhaus et al. (2006) up to now no serious side effects were reported in published human trials [3].

5 Strength of the Evidence

GRADE system

The GRADE system is used to evaluate the strength of the evidence. GRADE uses the following classifications and definitions to evaluate the strength of the evidence (see [9]).

- High: further research is very unlikely to change our confidence in the estimate of effect
- Moderate: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate
- Low: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
- Very low: any estimate of effect is very uncertain

Table 5-1: Evidence profile of bioresonance therapy

Number of studies/ patients	Design	Methodological quality	Consistency of results	Directness	Size of effect	Other modificatory factors	Strength of the collective evidence
Outcome: allergy – pollinosis (hay fever)							
1/74	non-randomized, controlled trial	good	not applicable*	yes	congruence of diagnosis in 22%; as the therapy is based on the diagnosis, the use of BRT cannot be effective	none	moderate
Outcome: atopic dermatitis in children							
1/36	RCT, sham-controlled, double-blind	good	not applicable	yes	9.6 ± 10.8 (Wilcoxon signed rank test; p<0.001) mean reduction in Costa score, no significant differences between treatment and placebo	none	moderate
Outcome: non-organic gastrointestinal problems							
1/21	RCT, placebo-controlled, single-blind (pts)	moderate	not applicable	yes	significant changes prior/ after treatment in both groups (pts' estimation I: 4.30 ± 0.30 → 2.20 ± 1.05 vs. C: 3.7 ± 0.59 → 3.40 ± 0.52); statistically (Mann-Whitney-U-Test) significant difference between groups, but of questionable clinical relevance	none	low
Outcome: rheumatic disease							
1/30	non-randomized, placebo-controlled trial, single-blind (pts)	moderate	not applicable	yes	I: -6.2 SkT mean reduction with very low stability between pts (range 3.8-18.4 SkT); statistically significant (p<0.05) C: -1.2 SkT mean reduction; statistically not significant (p<0.05)	none	low
Outcome: chronic low back pain							
2/1039	non-randomized, controlled trial	fair	yes	yes	BRT in addition to other non-drug therapies shows additional benefit	none	low

**applicable only if more than one study*

6 BICOM – commissioned report

Additionally to the in Chapter 3 analysed trials we received two reports [10-11] summarizing trials evaluating the effectiveness of BRT. Most of the included trials are published in Chinese language, were a conference presentation or a research report in a language other than German or English, which didn't make it possible for us to critically appraise the originally published study reports.

additional source: BICOM commissioned report including mostly Chinese publications

Both reports on the clinical effectiveness of BRT were conducted as a commissioned work from Regumed GmbH, the producer of the BICOM bioresonance apparatus, by the biometrician Dr. Volker W. Ralphs (2005) and V. W. Ralphs in cooperation with the physician Dr. med. Andreas Rozehnal (2006). Their analysis included 15 trials provided to them by the company Regumed. They graded the "Level of evidence" according to the scheme of the American Heart Association (modified according to Dick 2000).

As our systematic review only included prospective and controlled trials we will only summarize the result of studies graded "evidence level 1-3" (8 evidence levels; 1=highest, 8=lowest).

only two controlled trials

Thus, we took the following five trials into consideration:

- Yang J and Zhang L., 2004 [12]. They examined whether treatment of asthmatic patients with BRT is superior to conventional treatment with corticoids and antiallergics. Therefore, they designed a prospective and controlled trial with 300 patients (children) (I: 213; C: 87) and compared the outcomes differentiating between "healing", "improvement", "effective", "not effective" after six month. Whereas 43.8% of the intervention group reported "healing", 42.5% of the control group did so; "improvement" (I: 31.9%; C: 19.5%); "effective" (I: 11%; C: 13.8%) and "not effective" (I: 13.3%; C: 24.2%).

asthma in children

small effects in improvement

- Huang S. et al., 2005 [13]. Huang S. et al. conducted a RCT to find out whether BRT is effective in treating children with allergic asthma and allergic rhinitis. The 181 patients recruited were divided in 3 groups: (1) BICOM bioresonance treatment for children with first diagnosis of the disease, (2) BICOM bioresonance treatment in children who did not respond to prior medical treatment and (3, control group) children with first diagnosis, no prior treatment and medical treatment with glucocorticoids and antihistamine. After six month they evaluated the effectiveness with a three-point-scale: "considerably effective", "effective" and "ineffective". The clinical effectiveness of BRT in allergic rhinitis (considerably effective and effective) in group 1 (85.4%) and group 2 (81.9%) is not significantly better than conventional medical treatment (group 3: 78.1%) ($p>0.05$); comparable results for allergic asthma – (1) 86.4%, (2) 78.1% and (3) 76%. Although the authors conclude that this therapy is considerably suitable for patients with chronic disease because they are equally effective as conventional therapy and do not cause severe adverse effects like some medications.

asthma/ rhinitis

equally effective to conventional therapy

- Machowinski R. & Gerlach I., 1996 [14]. They examined whether BRT is clinically effective in treating patients with impairment of hepatocytes in comparison not to do anything. According to the

impairment of hepatocytes

significant differences between groups – no data available

commissioned report differences between groups were statistically significant and clinically relevant. Unfortunately, no data to support these findings are provided in the commissioned report.

overload syndrome in top athletes

BRT superior to ultrasound therapy

- Papez B. and Barovic, n.a.[15]. According to Papez and Barovic's research paper the purpose of the trial was to examine whether treatment with BRT (I: 12 pts) is superior to ultrasound therapy (C: 12 pts) in overload syndrome in top athletes. The main clinical outcome measure was the VAS-pain score (0-10). The means of the intervention group improved significantly prior/ after therapy. Further, BRT was statistically significant and clinically relevant superior to ultrasound therapy ($p<0.05$).

BICOM diagnosis vs. Prick-test

specificity and sensitivity

- Giannazo E. et al., 2002 [16]. This trial was conducted to validate the allergy-diagnosis procedure with the BICOM apparatus compared to the standard test – the "Prick-test". Each of the 31 patients included was tested in the same four indications with both methods. The sensitivity of the BICOM-test was found to be 0.84 (95% CI: 0.72-0.91) and the specificity was 0.66 (95% CI: 0.53-0.78). Sensitivity and specificity of the "Prick-test" were not reported. Giannazo et al. (2002) concluded that BRT diagnosis is clinically relevant because it is superior to "guessing".

BRT effective in treating allergy, impairment of hepatocytes and overload syndrome

Due to considerable methodological flaws two of the provided trials were excluded from the summary of the evidence by the authors. Ralphs and Rozhenal (2006) concluded based on the other six trials – Huang S. et al. (2005) level 1-2, Yang J. and Zhang L. (2004) level 2-3 and the remaining 4 were graded with level 5 – that these findings clearly show that BRT is effective in allergy. Further, Ralphs (2005) concluded that BRT is also clinically effective in treating impairment of hepatocytes and top athletes with overload syndrome.

7 Discussion and Conclusion

heterogeneous evidence

The evidence of Bioresonance therapy is very heterogeneous. Overall, trial results show big placebo effects and big variances between patients. Therefore, authors of the trials included suggest that BRT should only be provided additionally to standard of care and after detailed education on effectiveness of BRT of the patient.

high placebo effects and big variances between individuals

As therapy bases on the right diagnosis, BRT is not suitable for diagnosis and not for therapy of allergy in patients with pollinosis. The placebo-effect in the treatment of children with atopic dermatitis is estimated high as treatment and placebo group show significant improvements while the differences between the groups were not statistically significant. Although the difference between means of placebo and intervention group was statistically significant in non-organic gastrointestinal complaints and in rheumatic diseases, high placebo-effects are assumed due to wide ranges between individual reactions. Using BRT in combination with other treatment options for chronic low back pain showed additional effect in the improvement of symptoms.

Finally, providing BRT to patients and promising unforeseeable results is also an ethical question. The wide possible variances between individuals have to be communicated to the patients. Thus, further RCTs of good quality are needed to clarify how BRT works and in which indications it is effective.

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