An Updated Review of the Efficacy of Cupping Therapy

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Abstract

Background: Since 1950, traditional Chinese medicine (TCM) cupping therapy has been applied as a formal modality in hospitals throughout China and elsewhere in the world. Based on a previous systematic literature review of clinical studies on cupping therapy, this study presents a thorough review of randomized controlled trials (RCTs) to evaluate the therapeutic effect of cupping therapy.

Method: Six databases were searched for articles published through 2010. RCTs on cupping therapy for various diseases were included. Studies on cupping therapy combined with other TCM treatments versus non-TCM therapies were excluded.

Results: 135 RCTs published from 1992 through 2010 were identified. The studies were generally of low methodological quality. Diseases for which cupping therapy was commonly applied were herpes zoster, facial paralysis (Bell palsy), cough and dyspnea, acne, lumbar disc herniation, and cervical spondylitis. Wet cupping was used in most trials, followed by retained cupping, moving cupping, and flash cupping. Meta-analysis showed cupping therapy combined with other TCM treatments was significantly superior to other treatments alone in increasing the number of cured patients with herpes zoster, facial paralysis, acne, and cervical spondylitis. No serious adverse effects were reported in the trials.

Conclusions: Numerous RCTs on cupping therapy have been conducted and published during the past decades. This review showed that cupping has potential effect in the treatment of herpes zoster and other specific conditions. However, further rigorously designed trials on its use for other conditions are warranted.

Introduction

Cupping is a traditional Chinese medicine (TCM) therapy dating back at least 2,000 years. Types of cupping include retained cupping, flash cupping, moving cupping, wet cupping, medicinal cupping, and needling cupping [1]. The actual cup can be made of materials such as bamboo, glass, or earthenware. The mechanism of cupping therapy is not clear, but some researchers suggest that placement of cups on selected acupoints on the skin produces hyperemia or hemostasis, which results in a therapeutic effect [2].

In our previous study, we conducted a systematic literature review based on available clinical studies published from 1958 through 2008 [3]. We concluded that the majority of the 550 included studies showed that cupping is of potential benefit for pain conditions, herpes zoster, and cough and dyspnea. Five other systematic reviews [4–8] on cupping therapy have also been published, focusing on pain conditions, stroke rehabilitation, hypertension, and herpes zoster, respectively. The numbers of included trials in these reviews were quite small (between 1 and 8 trials). Lee et al. [9] conducted an overview of these five reviews and concluded that cupping is only effective as a treatment for pain, and even for this indication doubts remain. Extensive search did not find further related reviews.

Though the quality of included randomized controlled trials (RCTs) in the aforementioned reviews was generally poor according to the Cochrane risk of bias tool, we felt that it was still worth conducting an overview systematic review to further evaluate the therapeutic effect of cupping therapy for specific disease/conditions due to the paucity of evidence in this subject.

Methods

The flow diagram for this review and supporting CONSORT checklist are available as supporting information; see Checklist S1 and Protocol S1.

Inclusion Criteria

Eligible studies were randomized controlled trials (RCTs) that examined the therapeutic effect of cupping therapy, including one or more types of cupping methods, compared with no treatment, placebo, or conventional medication. Cupping combined with other interventions and compared with other interventions alone were also included. Studies that looked at cupping therapy combined with other TCM therapies, such as acupuncture, compared with non-TCM therapies were excluded. Multiple
publications reporting the same patient data set were also excluded. There was no restriction on language and publication type.

Identification and Selection of Studies

Based on our previous review [3], an updated search of publications was performed using China Network Knowledge Infrastructure (CNKI) (2009 through 2010), Chinese Scientific Journal Database (VIP) (2009 through 2010), Chinese Biomedical Database (CBM) (2009 through 2010), Wanfang Database (2009 through 2010), PubMed (1966 through 2010), and the Cochrane Central Register of Controlled Trials (CENTRAL, 1800 through 2010). All searches ended at December 2010. The search terms included cupping therapy, bleeding cupping, wet cupping, dry cupping, flash cupping, herbal cupping, moving cupping, needling cupping and retained cupping. Two authors (HC and XL) independently identified and checked each study against the inclusion criteria.

Data Extraction and Quality Assessment

Two authors (HC and XL) independently extracted the data from the included trials. The extracted data included authors and title of study, year of publication, type of disease, study size, age and gender of participants, and methodological information. Other extracted data included type of cupping therapy, treatment process, control interventions, outcomes (for example, overall efficacy rate), and adverse effects.

Quality of included trials was evaluated. Methodological quality of RCTs was assessed using criteria from the Cochrane Handbook for Systematic Reviews of Interventions [10]. Trials were appraised according to the risk of bias for each important outcome, including adequacy of generation of the random allocation sequence, allocation concealment, blinding, and outcome reporting. Quality of each trial was categorized into low/unclear/high risk of bias. Trials that met all criteria were categorized into low risk of bias, trials that met none of the criteria were categorized into high risk of bias, and the remaining trials were categorized into unclear risk of bias if there was insufficient information to make a judgment.

Data Analysis and Statistical Methods

Data were extracted using Microsoft Access and transferred into Microsoft Excel spreadsheets to be calculated for frequency. Outcome data were summarized using risk ratio (RR) with 95% confidence intervals (CI) for binary outcomes or mean difference (MD) with 95% CI for continuous outcomes. RevMan 5.0.20 software was used for data analyses. Meta-analysis was used if the trials had good homogeneity, which was assessed by examining $I^2$ (an index that describes the percentage of variation across studies that is due to heterogeneity rather than chance), on study design, participants, interventions, control, and outcome measures. Funnel plot analysis was done to determine publication bias.

Results

Basic Information of Studies

Searches of six databases identified 1,294 citations, the majority of which were deemed ineligible from reading title and abstract (Protocol S1). Full-text papers of 108 trials were retrieved. In addition to the 73 trials from our previous review, 62 new trials were included in this study. Of the 135 included trials [11–145], 132 were published in Chinese, including 3 unpublished dissertations [16,27,72]. The remaining 3 trials [69,73,86] were published in English. All included studies were published from 1992 through 2010, with more than half from 2008 through 2010 (Table S1).

Description of Interventions

Among the included trials, 78 (57.78%) used wet cupping as the main intervention, 23 (17.04%) used retained cupping, 12 (8.9%) used moving cupping, 10 trials (7.40%) used flash cupping, 6 (4.44%) used medicinal cupping, and 1 (0.74%) used...
Table 1. Reporting of quality components in 135 included randomized clinical trials on cupping therapy.

| Year published | No. of Randomized controlled trials | Adequate sequence generation (%) | Adequate allocation concealment (%) | Blinding method reported (%) | Incomplete outcome data (yes, %) | Selective outcome reporting (yes, %) | Comparability of baseline (yes, %) | Sample size estimation (yes, %) | Inclusive criteria (yes, %) | Exclusive criteria (yes, %) | Diagnostic standard (yes, %) |
|----------------|------------------------------------|----------------------------------|------------------------------------|-----------------------------|----------------------------------|------------------------------------|----------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 1992           | 2                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 0                           | 0                           | 0                           |
| 1993           | 1                                  | 1 (100%)                         | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 0                           | 0                           | 0                           |
| 1994           | 1                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 0                           | 0                           | 0                           |
| 1995           | -                                  | -                                | -                                  | -                           | -                                | -                                  | -                                | -                           | -                           | -                           | -                           |
| 1996           | -                                  | -                                | -                                  | -                           | -                                | -                                  | -                                | -                           | -                           | -                           | -                           |
| 1997           | 2                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 0                           | 0                           | 0                           |
| 1998           | 1                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 0                           | 0                           | 0                           |
| 1999           | 2                                  | 0                                | 0                                  | 0                           | 0 (100%)                        | 0                                  | 0 (100%)                        | 0                           | 0                           | 0                           | 1 (100%)                        |
| 2000           | 2                                  | 0                                | 0                                  | 0                           | 0 (100%)                        | 0                                  | 0 (100%)                        | 0                           | 0                           | 0                           | 1 (100%)                        |
| 2001           | -                                  | -                                | -                                  | -                           | -                                | -                                  | -                                | -                           | -                           | -                           | -                           |
| 2002           | -                                  | -                                | -                                  | -                           | -                                | -                                  | -                                | -                           | -                           | -                           | -                           |
| 2003           | 7                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 2 (28.57%)                   | 0                           | 0                           |
| 2004           | 8                                  | 0                                | 0                                  | 0                           | 0                                | 0                                  | 0                                | 0                           | 9 (75%)                      | 3 (37.5%)                    | 1 (12.5%)                    |
| 2005           | 10                                 | 2 (20%)                          | 0                                  | 1 (10%)                      | 0                                | 0                                  | 7 (70%)                         | 0                           | 6 (60%)                      | 3 (30%)                      | 3 (30%)                      |
| 2006           | 19                                 | 5 (26.32%)                       | 0                                  | 1 (5.26%)                    | 1 (5.26%)                       | 0                                  | 14 (73.68%)                     | 1 (5.26%)                   | 4 (21.05%)                   | 4 (21.05%)                   | 15 (78.95%)                  |
| 2007           | 11                                 | 4 (36.37%)                       | 0                                  | 0                            | 2 (18.19%)                      | 0                                  | 11 (100%)                       | 0                           | 3 (27.27%)                    | 3 (27.27%)                    | 7 (63.64%)                   |
| 2008           | 12                                 | 5 (41.67%)                       | 0                                  | 1 (8.63%)                    | 0                                | 0                                  | 10 (69.33%)                     | 0                           | 4 (33.33%)                    | 4 (33.33%)                    | 10 (69.33%)                  |
| 2009           | 28                                 | 5 (17.86%)                       | 0                                  | 3 (10.71%)                   | 1 (3.57%)                       | 1 (3.57%)                         | 24 (85.71%)                     | 2 (7.14%)                   | 11 (39.29%)                   | 12 (42.86%)                   | 25 (89.29%)                  |
| 2010           | 29                                 | 3 (10.34%)                       | 0                                  | 3 (10.34%)                   | 1 (3.45%)                       | 0                                  | 25 (86.21%)                     | 0                           | 9 (31.03%)                    | 7 (24.14%)                    | 25 (86.21%)                  |
| **Total**      | 135                                | 25 (18.52%)                      | 3 (2.22%)                         | 4 (2.96%)                    | 5 (3.70%)                       | 1 (0.74%)                         | 101 (74.81%)                    | 3 (2.22%)                   | 42 (31.11%)                   | 40 (29.63%)                   | 101 (74.81%)                 |
Table 2. Effect of estimates of wet cupping treatment for herpes zoster in 15 RCTs.

| Trials                                                                 | Comparisons                                                                 | Effect estimates ([95%CI]) | P        |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------|----------|
| **Numbers of cured patients**                                         |                                                                              |                             |          |
| Wet cupping plus other interventions versus other interventions alone |                                                                              |                             |          |
| Guo L 2006 [32]                                                       | Wet cupping plus aciclovir, VitB₁, VitB₁₂ versus aciclovir, VitB₁, VitB₁₂   | RR 1.48 [1.05, 2.09]        |          |
| Liu L 2003 [61]                                                       | Wet cupping plus aciclovir, VitB₁, VitB₁₂ and aciclovir cream versus aciclovir, VitB₁, VitB₁₂ and aciclovir cream | RR 3.83 [2.07, 7.06]        |          |
| Long W 2003 [64]                                                      | Wet cupping plus ultraviolet radiation versus ultraviolet radiation alone    | RR 1.30 [1.06, 1.59]        |          |
| Xu L 2004 [104]                                                       | Wet cupping plus aciclovir cream, aciclovir 0.5 g and glucose 250 ml intravenous drip versus aciclovir cream, aciclovir 0.5 g and glucose 250 ml intravenous drip | RR 1.35 [0.93, 1.97]        |          |
| Zhang Q 2008 [126]                                                    | Wet cupping and bloodletting on ear apex plus aciclovir and acupuncture versus aciclovir and acupuncture | RR 4.17 [1.92, 9.05]        |          |
| **Subgroup**                                                          |                                                                              |                             |          |
| Wet cupping plus acupuncture versus acupuncture alone                 |                                                                              |                             |          |
| Huang J 2008 [37]                                                     | Wet cupping plus acupuncture versus acupuncture alone                         | RR 2.38 [1.10, 5.13]        |          |
| Zhang H 2009 [122]                                                    | Wet cupping plus electroacupuncture versus electroacupuncture alone          | RR 1.29 [0.95, 1.76]        |          |
| Zuo R 2010 [145]                                                      | Wet cupping plus electroacupuncture versus electroacupuncture alone          | RR 1.91 [1.07, 3.42]        |          |
| **Subgroup**                                                          |                                                                              |                             |          |
| **Overall (Random, $I^2=76\%$)**                                      |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| Ci H 2010 [20]                                                        | Wet cupping versus aciclovir                                                | RR 1.60 [1.24, 2.06]        |          |
| Jin M 2008 [45]                                                       | Wet cupping versus aciclovir, cimetidine, indomethacin, mecobalamin, calamine, and aciclovir cream | RR 2.15 [1.54, 3.00]        |          |
| Liu L 2003 [61]                                                       | Wet cupping versus aciclovir, VitB₁, VitB₁₂ and aciclovir cream             | RR 2.83 [1.47, 5.46]        |          |
| Liu Q 2004 [63]                                                       | Wet cupping versus aciclovir and poly I-C injection                         | RR 2.90 [1.71, 4.91]        |          |
| Wang Y 2009 [94]                                                      | Wet cupping versus valaciclovir                                              | RR 2.34 [1.66, 3.30]        |          |
| **Overall (Fixed, $I^2=43\%$)**                                      |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| Jin M 2008 [45]                                                       | Wet cupping versus aciclovir, cimetidine, indomethacin, mecobalamin, 23acyclovir, and aciclovir cream | RR 0.09 [0.01, 1.60]        |          |
| Liu L 2003 [61]                                                       | Wet cupping versus aciclovir, VitB₁, VitB₁₂ and aciclovir cream             | RR 0.06 [0.00, 1.09]        |          |
| Wang Y 2009 [94]                                                      | Wet cupping versus valaciclovir                                              | RR 0.23 [0.08, 0.64]        |          |
| Xiong Z 2007 [103]                                                    | Wet cupping versus aciclovir plus normal saline 250 ml intravenous drip     | RR 0.05 [0.01, 0.36]        |          |
| **Overall (Fixed, $I^2=0\%$)**                                       |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| **Numbers of patients with postherpetic neuralgia after treatment**   |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| Jin M 2008 [45]                                                       | Wet cupping versus aciclovir, cimetidine, indomethacin, mecobalamin, 23acyclovir, and aciclovir cream | RR 0.09 [0.01, 1.60]        |          |
| Liu L 2003 [61]                                                       | Wet cupping versus aciclovir, VitB₁, VitB₁₂ and aciclovir cream             | RR 0.06 [0.00, 1.09]        |          |
| Wang Y 2009 [94]                                                      | Wet cupping versus valaciclovir                                              | RR 0.23 [0.08, 0.64]        |          |
| Xiong Z 2007 [103]                                                    | Wet cupping versus aciclovir plus normal saline 250 ml intravenous drip     | RR 0.05 [0.01, 0.36]        |          |
| **Overall (Fixed, $I^2=0\%$)**                                       |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| **Numbers of patients with effective symptoms after treatment**       |                                                                              |                             |          |
| Wet cupping plus other interventions versus other interventions alone  |                                                                              |                             |          |
| Guo L 2006 [32]                                                       | Wet cupping plus aciclovir, VitB₁, VitB₁₂ versus aciclovir, VitB₁, VitB₁₂  | RR 1.00 [0.92, 1.08]        |          |
| Liu L 2003 [61]                                                       | Wet cupping plus aciclovir, VitB₁, VitB₁₂ and aciclovir cream versus aciclovir, VitB₁, VitB₁₂ and aciclovir cream | RR 1.00 [0.95, 1.05]        |          |
| Xu L 2004 [104]                                                       | Wet cupping plus aciclovir cream, aciclovir 0.5 g and glucose 250 ml intravenous drip versus aciclovir cream, aciclovir 0.5 g and glucose 250 ml intravenous drip | RR 1.00 [0.95, 1.05]        |          |
| Zhang Q 2008 [126]                                                    | Wet cupping and bloodletting on auditory apex plus aciclovir and acupuncture versus aciclovir and acupuncture | RR 1.00 [0.95, 1.05]        |          |
| **Subgroup**                                                          |                                                                              |                             |          |
| Wet cupping plus acupuncture versus acupuncture alone                 |                                                                              |                             |          |
| Huang J 2008 [37]                                                     | Wet cupping plus acupuncture versus acupuncture alone                         | RR 1.09 [0.83, 1.43]        |          |
| Zhang H 2009 [122]                                                    | Wet cupping plus electroacupuncture versus electroacupuncture alone          | RR 1.20 [0.97, 1.48]        |          |
| Zuo R 2010 [145]                                                      | Wet cupping plus electroacupuncture versus electroacupuncture alone          | RR 1.11 [0.98, 1.27]        |          |
| **Subgroup**                                                          |                                                                              |                             |          |
| **Overall (Random, $I^2=52\%$)**                                      |                                                                              |                             |          |
| Wet cupping versus medications                                        |                                                                              |                             |          |
| **Overall (Random, $I^2=0\%$)**                                       |                                                                              |                             |          |
Distribution of Diseases/Conditions

In the included trials, 56 diseases or symptoms were treated by cupping therapy. Diagnostic criteria varied, some authors used international criteria, such as ICD-10, others used Chinese criteria, such as those issued by government health agencies, or criteria from Chinese language medical textbooks. Some authors did not report any sources for their diagnostic criteria. The 6 most common diseases/conditions for which cupping was applied were herpes zoster (17 trials), facial paralysis (Bell palsy) (17 trials), cough and dyspnea (8 trials), acne (6 trials), lumbar disc herniation (6 trials) and cervical spondylosis (6 trials) (Table 1).

Meta-analyses were conducted on 4 diseases/conditions – herpes zoster, facial paralysis (Bell palsy), acne and cervical spondylosis (characteristics of the RCTs involving these 4 diseases are presented in Tables S2, S3, S4 and S5). Due to the heterogeneity of the RCTs of the remaining 2 diseases/conditions – lumbar disc herniation and cough and dyspnea – meta-analyses could not be completed.

Of the 6 diseases/conditions, 3 were related to pain, including herpes zoster, an inflammatory pain of the nerve; and lumbar disc herniation and cervical spondylosis, pain caused by nerve compression. Relieving pain was the main purpose of cupping therapy in these studies. Retained cupping or wet cupping was typically applied.

Facial paralysis (Bell palsy) falls under nerve, nerve root, and plexus disorders. In the studies we reviewed, flash cupping and moving cupping were commonly applied.

Respiratory diseases, such as pneumonia, bronchitis, and asthma, for which the main purpose of treatment is to alleviate the symptoms of cough and dyspnea are also treated by cupping therapy. Retained cupping or wet cupping therapy on EX-B1, a so-called extra acupoint (acupuncture point not located on one of the traditional channels), was mostly used in the studies for treating cough and dyspnea symptoms.

Acne is a skin condition that affects the face, neck, shoulders, chest, and back. In the studies we evaluated, wet cupping was primarily used to relieve the skin breakouts.

The remaining 50 diseases/conditions are presented in Table S1.

Methodological Quality of RCTs

According to our pre-defined methodological quality criteria, none of the 135 trials were low risk of bias and the majority was high risk of bias (Table 1). Three trials [23,69,73] reported sample size calculations, 25 trials [11,14,17,23,26,32,35,41,48,57,60,69,70,72,73,79,81,85,88,94,97,99,107,111,116] described randomization procedures (such as random number table or computer-generated random numbers), with only 2 [23,73] of the 25 trials using sealed envelope allocation concealment. Four trials [17,48,94,99] mentioned blinding, of which only 2 [48,94] reported that they blinded outcome assessors, the other 2 trials did not report who were blinded. Five trials [11,39,72,80,116] reported the number of dropouts, but none of these used intention-to-treat analysis.

There were 101 (74.81%) trials that reported comparability of baseline data, 42 (31.11%) trials specified the inclusion criteria, 40 (29.63%) trials specified the exclusion criteria, and 101 (74.81%) trials described diagnostic criteria. Efficacy standard was reported in 126 (93.33%) trials, but 110 of them used composite outcome measures, which categorized treatment efficacy into four grades (cured, markedly effective, effective, and ineffective) according to change in symptoms, the other 16 trials used single outcome measure for therapeutic effect. Symptoms were commonly used as outcome measures.

Estimate Effects of RCTs with Cupping

Due to insufficient number of RCTs and the variations in study quality, participants, intervention, variable control, and outcome measures, results of most of the studies could not be synthesized by quantitative methods. Though 133 of the 135 included studies showed that cupping therapy as well as cupping combined with other treatment were significantly
effective for certain diseases (Table S6), interpretation of the positive findings from the individual studies needs to be incorporated with the clinical characteristics of the included studies and evidence power. Therefore, the beneficial effect of cupping therapy needs to be confirmed through large and rigorously-designed RCTs.

We conducted meta-analyses to evaluate therapeutic effect of cupping therapies for herpes zoster, facial paralysis, acne, and cervical spondylosis (Tables 2–5).

Table 3. Effect of estimates of cupping for facial paralysis in 15 RCTs.

| Trials | Comparisons | Effect Estimates ([95%CI]) | P |
|--------|-------------|----------------------------|---|
| Numbers of cured patients |  |  |  |
| Cupping plus other interventions versus other interventions alone |  |  |  |
| Flash cupping plus acupuncture versus acupuncture alone |  |  |  |
| Cao R 2009 [12] | Flash cupping plus acupuncture versus acupuncture alone | RR 2.00 [1.09, 3.66] |  |
| Fu C 2004 [25] | Flash cupping plus acupuncture versus acupuncture alone | RR 1.73 [1.30, 2.30] |  |
| Huang L 2009 [39] | Flash cupping plus acupuncture versus acupuncture alone | RR 1.33 [0.95, 1.86] |  |
| Li K 2009 [49] | Flash cupping plus acupuncture versus acupuncture alone | RR 1.50 [1.02, 2.21] |  |
| Zhao N 2010 [133] | Flash cupping plus acupuncture versus acupuncture alone | RR 1.33 [1.04, 1.68] |  |
| Subgroup |  | RR 1.51 [1.29, 1.76] | <0.00001 |
| Wet cupping plus acupuncture versus acupuncture alone |  |  |  |
| Gao B 2010 [28] | Wet cupping plus acupuncture and mecobalamin versus acupuncture and mecobalamin alone | RR 1.68 [0.62, 4.53] |  |
| Huang L 2010 [40] | Wet cupping plus acupuncture versus acupuncture alone | RR 1.60 [0.79, 3.23] |  |
| Liu J 2010 [71] | Wet cupping plus acupuncture versus acupuncture alone | RR 1.29 [0.95, 1.76] |  |
| Ren Y 2006 [77] | Wet cupping plus acupuncture versus acupuncture alone | RR 1.91 [1.32, 2.76] |  |
| Sun H 2010 [80] | Wet cupping plus acupuncture versus acupuncture alone | RR 1.71 [1.23, 2.36] |  |
| Wang L 2010 [89] | Wet cupping plus acupuncture versus acupuncture alone | RR 1.41 [0.85, 2.35] |  |
| Subgroup |  | RR 1.60 [1.33, 1.93] | <0.0001 |
| Medicinal cupping plus medication versus medications |  |  |  |
| Qiu J 2003 [76] | Medicinal cupping plus neurotrophic drugs versus neurotrophic drugs alone | RR 1.44 [1.11, 1.87] |  |
| Subgroup |  | RR 1.44 [1.11, 1.87] | 0.006 |
| Wet cupping plus TDP and medications versus TDP and medications |  |  |  |
| Li W 2005 [51] | Wet cupping plus TDP, antivirus and neurotrophic drugs versus TDP and drugs alone | RR 1.18 [0.89, 1.57] |  |
| Subgroup |  | RR 1.18 [0.89, 1.57] | 0.25 |
| Flash cupping plus herbal medicine and acupuncture versus herbal medicine and acupuncture |  |  |  |
| Ou X 2009 [75] | Flash cupping plus herbal decoction and acupuncture versus herbal decoction and acupuncture | RR 1.37 [1.05, 1.80] |  |
| Subgroup |  | RR 1.37 [1.05, 1.80] | 0.02 |
| Overall (Fixed, I²=0%) |  | RR 1.49 [1.35, 1.65] | <0.00001 |
| Wet cupping versus medications |  |  |  |
| Zhu F 2009 [141] | Wet cupping versus antivirus and neurotrophic drugs | RR 1.33 [0.83, 2.14] |  |
| Overall |  | RR 1.33 [0.83, 2.14] | 0.23 |

doi:10.1371/journal.pone.0031793.t003

Meta-analysis of 15 RCTs [20,29,32,37,45,61,63,64,94,102–104,122,126,145] to evaluate the efficacy of wet cupping therapy for herpes zoster (2 trials [13,123] were excluded due to insufficient data), wet cupping was found to be superior to pharmaceutical medications, such as antiviral, in effecting a cure (RR 2.07, 95%CI 1.77 to 2.43, p<0.00001, 5 trials, random model) (Figure 2), and in lowering the incidence rate of post-herpetic neuralgia (RR 0.12, 95%CI 0.06 to 0.28, p<0.00001, 4 trials, fixed model). But no difference was identified in the number...
of patients with improved symptoms (RR 1.11, 95%CI 1.00 to 1.23, \(p=0.06\), 5 trials, random model). Wet cupping in combination with pharmaceutical medications was significantly better than medications alone in effecting a cure (RR 1.93, 95%CI 1.23 to 3.04, \(p=0.005\), 5 trials, random model), but no difference in symptom improvement was observed (RR 1.00, 95%CI 0.97 to 1.03, \(p=0.99\), 4 trials, random model) (Figure 3). Wet cupping combined with acupuncture was superior to acupuncture alone both in effecting a cure (RR 1.65, 95%CI 1.08 to 2.53, \(p=0.02\), 3 trials, random model) (Figure 3) and in improving symptoms (RR 1.13, 95%CI 1.02 to 1.25, \(p=0.02\), 3 trials, random model).

There were 17 RCTs \([12,15,39,40,47,49–51,71,75–77,80,89,133,141]\) that assessed the therapeutic effect of cupping therapy for facial paralysis. Two of the trials \([47,50]\) were excluded from the meta-analysis due to the incomparability between treatment and control groups. Six trials used flash cupping therapy, 8 trials used wet cupping, and 1 trial used medicinal cupping as the main intervention. Meta-analysis showed that flash cupping combined with acupuncture (RR 1.51, 95%CI 1.29 to 1.76, \(p<0.0001\), 5 trials, fixed model) and wet cupping combined with acupuncture (RR 1.60, 95%CI 1.33 to 1.93, \(p<0.0001\), 6 trials, fixed model) were markedly better than acupuncture alone in effecting a cure (Figure 4). In addition, cupping in combination with medications, such as neurotrophic drugs, was superior to medications alone in reducing average cure time (MD \(-6.05\), 95%CI \(-9.83\) to \(-2.27\), \(p=0.002\), 2 trials, random model).

Six trials \([38,59,91,95,97,125]\) evaluated the efficacy of cupping therapy for acne. Meta-analysis showed that, for improving the cure rate, wet cupping therapy was significantly better than medications, such as tanshinone, tetracycline, and ketokonazole (RR 2.14, 95%CI 1.42 to 3.22, \(p=0.0003\), 3 trials, fixed model). Furthermore, cupping therapy combined with other interventions was superior to other interventions alone (RR 1.93, 95%CI 1.40 to 2.63, \(p<0.0001\), 3 trials, fixed model). As each comparison had less than five trials, it was not meaningful to conduct a funnel plot analysis.

For cervical spondylosis, 6 trials \([79,86,90,93,116,117]\) evaluated the efficacy of cupping therapy on this condition. Cupping therapy, especially wet cupping on GV-14 and Ashi points, combined with other treatment, including acupuncture and traction, was better than other treatments alone in effecting a cure (RR 1.52, 95%CI 1.20 to 1.92, \(p=0.0005\), 5 trials, fixed model) and in ameliorating symptoms (RR 3.84, 95%CI 2.19 to 6.73, \(p<0.0001\), 6 trials, fixed model). One trial \([117]\) compared wet cupping with flunarizine for symptom improvement, and found no difference between the two groups (RR 1.18, 95%CI 0.60 to 2.32, \(p=0.63\), 1 trial).

A funnel plot analysis of 39 trials was performed to examine outcome for the number of cured patients irrespective of disease. The result showed potential asymmetry (Figure 5).

Serious adverse effects were not reported in any of the 135 included trials.
Discussion

In our previous review [3], we focused on the characteristics of the RCTs on cupping therapy. This review aimed to ascertain whether or not cupping therapy is efficacious for several conditions, especially when combined with other treatments. With this review, we expanded our search to include articles published from 2008 through 2010. The 62 new studies indicate that the ancient TCM practice of cupping remains an important therapeutic modality in China and is gaining recognition elsewhere. For diseases/conditions that are commonly treated by cupping, we conducted meta-analyses by synthesizing data from homogeneous studies to assess the therapeutic effect of cupping in treating these diseases/conditions. For studies whose data were inappropriate for synthesis, we used qualitative methods to evaluate their findings. This is the first instance that quantitative
and qualitative methods were used in a systematic review to evaluate the efficacy of cupping therapy. Despite the large number of studies on cupping therapy, including the 62 new ones, there remains a lack of well-designed investigations. Of the 135 RCTs included in this review, 84.44% were high risk of bias. One issue is adherence to the Consolidated Standards of Reporting Trials (CONSORT) in which randomization methods should be clearly described and fully reported. Another issue is blinding, which continues to be a challenge for studies involving manual healing therapies, such as acupuncture, massage, and cupping therapy. Lee et al. report developing a sham cupping device with a tiny opening that in effect reduces the negative pressure in the cup once it is attached to the skin. The RCT they conducted showed that the device appears to be tenable as a control for actual cupping, though confirmatory studies are needed. While blinding during studies on cupping therapy may be difficult to achieve, at the very least, blinding of outcome assessors and statistics should be attempted to minimize performance and assessment biases. Another area that researchers should be attentive to is adapting STRICTA standards when designing and reporting studies. Similar to acupuncture, cupping therapy is based on energy channels (meridians) and acupoints. Therefore, methodology details should be reported, including types of cups, acupoints used and their TCM rationale, practitioner background, number of treatment sessions and frequency, among other STRICOTA-recommended information. Standardization can also be achieved by registering with and following the protocol of international organizations, such as WHO International Clinical Trials Registry Platform (ICTRP).

As in our previous review, we continue to emphasize the importance of using standard outcome measures for specific diseases/conditions. As mentioned, 80.74% of the included trials used composite outcome measures, which categorized treatment efficacy into four grades. The classifications of “cure,” “markedly effective,” “effective,” and “ineffective” are not internationally recognized with their exact meaning open to interpretation. This can increase clinical heterogeneity. We suggest that researchers comply with international standards.

### Figure 2. Effect of estimates of wet cupping versus medication on numbers of cured patients with herpes zoster.
doi:10.1371/journal.pone.0031793.g002

| Study     | Intervention Events | Control Events | Total Events | Weight | Risk Ratio M.H. Fixed, 95% CI | Risk Ratio M.H. Random, 95% CI |
|-----------|---------------------|----------------|-------------|--------|-------------------------------|--------------------------------|
| Liu L 2003| 20                  | 10             | 30          | 24.2%  | 1.30 [1.06, 1.59]             |                                 |
| Liu Q 2004| 29                  | 12             | 41          | 17.4%  | 2.83 [2.07, 7.06]             |                                 |
| Jin M 2008| 43                  | 20             | 63          | 21.6%  | 1.35 [0.93, 1.97]             |                                 |
| Wang Y 2009| 50                 | 21             | 71          | 22.2%  | 1.49 [1.05, 2.09]             |                                 |
| CI H 2010 | 76                  | 42             | 118         | 14.6%  | 4.17 [1.92, 9.05]             |                                 |
| Total     | 266                 | 257            | 523         | 100.0% | 2.07 [1.77, 2.43]             |                                 |

Heterogeneity: Chi² = 7.01, df = 4 (P = 0.14), I² = 43%
Test for overall effect: Z = 8.90 (P < 0.0001)

### Figure 3. Effect of estimates of combination of wet cupping and other interventions versus other interventions alone on numbers of cured patients of herpes zoster.
doi:10.1371/journal.pone.0031793.g003

| Study or Subgroup | Intervention Total | Control Total | Total | Weight | Risk Ratio M.H. Random, 95% CI | Risk Ratio M.H. Random, 95% CI |
|-------------------|--------------------|---------------|-------|--------|-------------------------------|--------------------------------|
| 1.1 wet cupping therapy plus medication versus medications alone | 35 | 23 | 58 | 24.2% | 1.30 [1.06, 1.59] |                                 |
| Long W 2003       | 34                 | 22             | 56          | 17.4%  | 2.83 [2.07, 7.06]             |                                 |
| Liu L 2003        | 45                 | 30             | 75          | 21.6%  | 1.35 [0.93, 1.97]             |                                 |
| Xu L 2004         | 27                 | 20             | 47          | 22.2%  | 1.49 [1.05, 2.09]             |                                 |
| Guo L 2006        | 29                 | 19             | 48          | 14.6%  | 4.17 [1.92, 9.05]             |                                 |
| Zhang Q 2008      | 25                 | 16             | 41          | 100.0% | 1.93 [1.23, 3.04]             |                                 |
| Subtotal (95% CI) | 200                | 179            | 379         |       |                               |                                 |
| Total events      | 160                | 76             | 236         |       |                               |                                 |

Heterogeneity: Tau² = 0.21; Chi² = 26.45, df = 4 (P = 0.0001); I² = 95%
Test for overall effect: Z = 2.84 (P = 0.005)

| 1.1.2 wet cupping therapy plus acupuncture versus acupuncture alone | 19 | 6 | 25 | 20.9% | 2.39 [1.10, 5.13] |                                 |
| Huang J 2008       | 22                 | 17             | 39          | 49.5%  | 1.29 [0.95, 1.76]             |                                 |
| Zhang H 2009       | 21                 | 11             | 32          | 29.6%  | 1.91 [1.07, 3.42]             |                                 |
| Zou R 2010         | 22                 | 11             | 33          | 29.0%  | 1.95 [1.08, 3.53]             |                                 |
| Subtotal (95% CI)  | 101                | 92             | 193         |       |                               |                                 |
| Total events       | 62                 | 34             | 96          |       |                               |                                 |

Heterogeneity: Tau² = 0.07; Chi² = 3.95, df = 2 (P = 0.14); I² = 49%
Test for overall effect: Z = 2.30 (P = 0.02)

Test for subarous differences: Chi² = 0.25, df = 1 (P = 0.62); I² = 0%
such as the House Brackmann score for facial nerve paralysis (Bell palsy), in the evaluation of treatment efficacy to give credibility to their work.

The potential asymmetry of the overall funnel plot test (Figure 5) of 39 RCTs that examined the outcome of the number of cured patients for 4 diseases (herpes zoster, facial paralysis, acne, and cervical spondylosis) may be caused by small study effects, or even heterogeneity in intervention effects. Furthermore, as we did not include unpublished studies, there is high potential that our review may have publication bias. We strongly recommend that researchers plan their sample size for randomized controlled trials to ensure adequate statistical power. Furthermore, sample size calculation and analysis of outcomes should be based on the principle of intention-to-treat.

Finally, our meta-analysis revealed that cupping therapy combined with other treatments, such as acupuncture or medications, showed significant benefit over other treatments alone in effecting a cure for herpes zoster, acne, facial paralysis, and cervical spondylosis. This appears to support the common practice in China of combining TCM therapeutic modalities, either TCM with TCM, or TCM with routine western medicine, to enhance efficacy. The effect of cupping therapy over time is not known, but use of cupping is generally safe based on long-term clinical application and outcomes reported in the reviewed trials.

In conclusion, the results of this systematic review suggest that cupping therapy appears to be effective for various diseases/conditions, in particular herpes zoster, acne, facial paralysis, and cervical spondylosis. However, the main limitation of our analysis was that nearly all included trials were evaluated as high risk of bias. As such, it is necessary to conduct further RCTs that are of high quality and larger sample sizes in order to draw a definitive conclusion.
Supporting Information

Table S1 Mapping of diseases/conditions reported in cupping trials (1992–2010).

Table S2 Characteristics of 15 included trials on cupping for herpes zoster.

Table S3 Characteristics of 15 included trials on cupping for facial paralysis (Bell palsy).

Table S4 Characteristics of 6 included trials on cupping for acne.

Table S5 Characteristics of 6 included trials on cupping for cervical spondylosis.

Table S6 Characteristics of randomized controlled trials outside meta-analysis.

Checklist S1 CONSORT checklist.

Protocol S1 Flow chart of search strategy for inclusion and exclusion of studies.

Acknowledgments

The authors thank Nissi S. Wang, MSc, for assisting with the English editing of this manuscript.

Author Contributions

Conceived and designed the experiments: HC JL. Analyzed the data: HC XL. Wrote the paper: HC XL JL.

References

1. Chirali IZ (1999) The cupping procedure. In:, Chirali IZ (1999) Traditional Chinese Medicine Cupping Therapy. London: Churchill Livingstone. pp 73–86.
2. Gao LW (2004) Practical Cupping Therapy [in Chinese]. Beijing: Academy Press.
3. Cao HJ, Han M, Li X, Dong SJ, Shang YM, et al. (2010) Clinical research evidence of cupping therapy in China: A systematic literature review. BMC Complementary and Alternative Medicine 10: 70–79.
4. Cao HJ, Zhu CQ, Liu JP (2010) Wet cupping therapy for treatment of herpes zoster: A systematic review of randomized controlled trials. Altern Ther Health Med 16: 48–54.
5. Kim JL, Lee MN, Lee DH, Boddy K, Ernst E (2011) Cupping for treating pain: a systematic review. Evid Based Complement Altern Med doi: 10.1093/ebcam/ Nep035.
6. Kwon YD, Cho HJ (2007) Systematic review of cupping including bloodletting therapy for musculoskeletal diseases in Korea. Korean J Oriental Physiol Pathol 21: 789–793.
7. Lee MS, Choi TY, Shin BC, Han CH, Ernst E (2010) Cupping for stroke rehabilitation: A systematic review. J Neurol Sci 294: 70–73.
8. Lee MS, Choi TY, Shin BC, Nam SS (2010) Cupping for hypertension: A systematic review. Clin Exp Hypertens 32: 423–425.
9. Lee MS, Kim JI, Ernst E (2011) Is cupping an effective treatment? An overview of systematic reviews. J of Acupunct Meridian Stud 4(1): 1–4.
10. Higgins JPT, Green S, eds (2009) Cochrane handbook for systematic reviews of interventions (version 5.0.2). The Cochrane Collaboration.
11. Bu TW, Tian XL, Wang SJ, Liu W, Li XL, et al. (2007) Comparison and analysis of therapeutic effects of different therapies on simple obesity [in Chinese]. Chinese Acupuncture & Moxibustion 27: 337–340.
12. Cao RL, Huang LP, Bi YF (2009) Combination of flash cupping therapy and acupuncture in treating 48 patients with peripheral facial paralysis [in Chinese]. Shanxi Journal of Traditional Chinese Medicine 30(1): 789–793.
13. Chen JJ (2009) Clinical observation of therapeutic effect of combination of electroacupuncture and wet cupping therapy for capitohumeral periartthritis [in Chinese]. JCAM 25(1): 27–28.
14. Chen LA (2010) Zhi Zhi Heng Tui massage in treating 150 cases with strain of lumbar muscles by syndrome differentiation [in Chinese]. Jiangxi Journal of Traditional Chinese Medicine 41(328): 62–63.
15. Chen MX, Huang DJ (2000) Clinical study on combination of cupping therapy and moxibustion for treatment of asthenic splenonephro-yang type of colitis.
Clinical Research Evidence of Cupping Therapy

gravis [in Chinese] (Master’s thesis). Chengu University of Traditional Chinese Medicine.

17. Chen YL, Liu XL, Xia JZ (2008) Clinical observation of wet cupping combined with acupuncture, tuina and traction on 30 patients with blood stasis type of prolapse of lumbar intervertebral disc [in Chinese]. Journal of Traditional Chinese Medicine 40(4): 47–48.

18. Cheng G (2000) Clinical report of observation of cupping therapy on lumbar disc prolapse caused by degenerative spondylolisthesis [in Chinese]. Journal of Acupuncture and Moxibustion 6(7): 23–34.

19. Chi FL, Liu GL (1987) Clinical observation of therapeutic effect of cupping therapy on wound healing [in Chinese]. Chinese Primary Health Care 1(9): 24–25.

20. Cai JF (2010) Clinical observation of therapeutic effect of combination of acupuncture and cupping therapy on 104 cases with acute herpes zoster [in Chinese]. Modern Medicine & Health 26: 1530–1531.

21. Dai JY, Shao J, Wang YH, Wang L, Yin XZ (2006) Clinical comparative observations on acupuncture treatment of 200 simple obesity patients by simulating 30 cases with diabetes mellitus [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 25(10): 13–15.

22. Fang X, Jin Y (2006) Clinical observation of medicinal cupping therapy on indirectly induced injuries of temporomandibular joint [in Chinese]. Modern Journal of Integrated Traditional Chinese and Western Medicine 15: 734.

23. Farhadi K, Schiwebel DC, Saeb M, Choubsaz M, Mohammadi R, et al. (2009) Observation of the efficacy of acupuncture plus pricking-bloodletting in treating postparalytic shoulder-hand syndrome [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 28: 132–134.

24. Fu Y, Jin JL (2005) Clinical observation of therapeutic effect of moving cupping therapy combined with herbal medicine for perineuroma syndrome [in Chinese] (Master’s thesis). Tianjin University of Traditional Chinese Medicine.

25. Fu CA, Bai ZQ (2004) Clinical observation of comparison of acupuncture and cupping therapy combined with cupping therapy on facial paralysis [in Chinese]. Journal of Yinan University (Medical Science) 2(3): 59.

26. Fu L, Liu WA, Wu QM, Li XR, Li DD, et al. (2009) Observation on the efficacy of acupuncture plus pricking-bloodletting in treating postparalytic shoulder-hand syndrome [in Chinese]. Chinese Journal of Acupuncture & Moxibustion 28(1): 247–253.

27. Gu XL, Wang XJ, Zuo WY (1992) Clinical observation of pricking-cupping bloodletting therapy on herpes zoster [in Chinese]. Journal of Traditional Chinese Medicine 15(3): 122.

28. Guo GM (2009) Observation of therapeutic effect of pricking bloodletting therapy on herpes zoster [in Chinese]. Shandong Journal of Traditional Chinese Medicine 16(2): 74.

29. Guo JL (2009) Clinical observation of therapeutic effect of pricking cupping bloodletting therapy on herpes zoster [in Chinese]. Shandong Journal of Traditional Chinese Medicine 22(3): 41.

30. Guo LX (2006) Clinical observation of therapeutic effect of pricking bloodletting therapy on musculospinal pain caused by wind-pathogen [in Chinese]. Zhen Jiu Xue Bao [vol unknown] 15: 449–453.

31. Guo YF, Wu JX, Wang B, Li H, He YC (2006) The effect of moving cupping therapy on nonspecific low back pain [in Chinese]. Chinese Journal of Rehabilitation Medicine 21: 340–343.

32. Huang GQ, Li FY, Huang Y (2008) Clinical observation on therapeutic effect of moving cupping therapy on wind-cold type of common cold [in Chinese]. Chinese Journal of Current Clinical Chinese Medicine 2: 1680–1681.

33. Huang J, Li WJ (2008) Clinical observation on acute posterior ganglioneuroma by method of surrounding puncture method and percutaneous puncture combined with cupping cup [in Chinese]. Journal of Liaoning University of Traditional Chinese Medicine 10: 168–169.

34. Huang J, Wei D, Wu JD (2010) Venection and cupping treating acetabulum in 76 cases [in Chinese]. China Bio-Beauty 1: 19–21.

35. Huang LP, Gao RL, Cao GL, Zhang XX (2008) Wet cupping therapy on Yangfeng (SI7) for 38 cases with acute peripheral facial paralysis [in Chinese]. Shaxiu Journal of Traditional Chinese Medicine 30: 597–599.

36. Huang LP, Gao RL, Zhang XX (2010) Wet cupping therapy on Yifeng (SI7) for 38 cases with acute peripheral facial paralysis [in Chinese]. Shaxiu Journal of Traditional Chinese Medicine 31: 473–474.

37. Huang ZF, Li LZ, Zhang ZJ, Tan ZQ, Chen C, et al. (2006) Observation on the efficacy of cupping for treating 30 cases of herpetic fever with cause pain [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 25(3): 14–15.

38. Ji J (1992) Observation on clinical effect of vitiligo treated with medicinal cupping [in Chinese]. Chinese Acupuncture & Moxibustion 12(3): 1–12.

39. Jiang H, Hu D, Chen HY (2006) Observation and nursing for cupping along the channels of TCM to treatment chronic bronchitis with acute pulmonary infection [in Chinese]. Journal of Nursing Science 21(1): 48–49.

40. Jiang XY, Zhao R (2000) Therapeutic effect of blood-letting puncture and cupping on upper-limb stiffness after mastectomy for breast cancer [in Chinese]. Journal of Nursing Science 23(5 Surgery Edition): 37–38.

41. Jin MZ, Xie ZQ, Chen XW, Chen DX, Chen DP (2008) Observations on the efficacy of blood-letting puncture and cupping in treating middle-aged and senile herpes zoster [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 27(3): 20–21.

42. Kang HQ, Li M (2005) Clinical observation of wet cupping on 48 patients with erysipelas [in Chinese]. Journal of Emergency Traditional Chinese Medicine 14(1): 51.

43. Li HT, Liu JH (2005) Clinical observation on treatment of peripheral facial paralys with acupuncture and picking-cupping therapy [in Chinese]. Journal of Chinese Integrated Medicine 3(1): 18, 69.

44. Li JC, Fan YS (2008) Clinical observations on sub-health with acupuncture and moxibustion plus moving cupping on the back [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 27(2): 8–9.

45. Li KZ (2009) Clinical observation on treatment of 80 cases of peripheral facial paralys with acupuncture and flash cupping therapy [in Chinese]. Modern Journal of Chinese Medicine 26: 702–703.

46. Liang SY (2009) Wet cupping therapy plus massage on treatment of 50 cases with pivot joint disturbance vertigo [in Chinese]. Fujian Journal of Traditional Chinese Medicine 20: 47–49.

47. Liang YL, Lu HQ, Yang XQ, Liang JL (2009) Clinical observation of wet cupping therapy plus acupuncture on treatment of insomnia [in Chinese]. Nursing Practice and Research 6(6): 79–80.

48. Liao FR (2009) Observations on the efficacy of pricking bloodletting plus cupping in treating cervical vertigo [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 28: 399–400.

49. Liu SX (2005) Observations of wet cupping combined with electroacupuncture on 52 patients with prolapse of lumbar intervertebral disc [in Chinese]. Chinese Acupuncture & Moxibustion 25: 181(1): 47–49.

50. Liu BX, XU M, Huang CJ, Ma LS, Lou YM, et al. (2008) Therapeutic effect of balance cupping therapy on non-specific low back pain [in Chinese]. Journal of Journal of Traditional Chinese Medicine 25: 409–10.

51. Liu BX, XU M, Huang CJ, Ma LS, Lou YM, et al. (2010) Clinical observation on the treatment of lower hemural epicondyliitis using self-made herbal decoction cupping therapy [in Chinese]. Journal of Zhejiang University of Traditional Chinese Medicine 34: 409–10.

52. Liu HH, Liao Z, He JB, Zhang Q (2009) Clinical observation of therapeutic effect of acupuncture combined with flash cupping for acral vulgaris [in Chinese]. Liaoning Journal of Traditional Chinese Medicine 36: 1395–1397.

53. Liu J, Zhao Y, Zeng R, Kennedy J (2005) Randomized controlled trial on observation of wet cuppping on sore pain of knee of African people [in Chinese]. Chinese Journal of Clinical Rehabilitation 9(47): 135–136.

54. Liu K, Li ZL (2003) Curative effect observation on treating herpes zoster by Zhiong Xi Medicine [in Chinese]. Chinese Journal of the Practical Chinese with Modern Medicine 3: 1089–1099.

55. Liu L, Li WL, Man W (2006) Clinical observation of wet cupping combined with auricular therapy on chloasma [in Chinese]. Journal of Hebei Traditional Chinese Medicine and Pharmacology 21(2): 30–51.

56. Liu QW, Zhang HS (2004) Integrative Chinese and western medicine for herpes zoster [in Chinese]. Journal of External Therapy of Traditional Chinese Medicine 13(3): 53.

57. Long WH, Liu H (2003) 34 cases of observation combined therapy for herpes zoster [in Chinese]. Journal of Medical Therapy and Practice 16: 1170.

58. Liu YZ, Liu JR, Liu LS, Zhou LH (2008) Observational study of Wang Yan Xing medical cupping therapy for cerebral infarction. China Foreign Medical Treatment 2: 113–114.

59. Lu HM, Ding S (2009) Clinical observation of therapeutic effect of combination of electroacupuncture and wet cupping therapy for shoulder-hand syndrome [in Chinese]. Journal of Journal of Chinese Integrated Medicine 25: 320–321.

60. Lu J, Wang Y (2007) Acupuncture combined with wet cupping therapy on 63 cases of prolapse of lumbar intervertebral disc [in Chinese]. Journal of Clinical Acupuncture and Moxibustion 23(3): 16–17.

61. Lu ZX, Jin HL, Zhang P (2009) Cupping for preventing nausea and vomiting after laparoscopic gallbladder resection [in Chinese]. Journal of Zhejiang College of Traditional Chinese Medicine 3: 862–93.

62. Lutke R, Albrecht U, Stange R, Uehleke B (2006) Brachialgia paraesthetica nocturna can be relieved by “wet cupping” – results of a randomized pilot study. Complementary Therapies in Medicine 14: 247–53.
Clinical Research Evidence of Cupping Therapy

70. Luo XX, Ma LS (2010) Clinical observation of effect of balance cupping for acute strain of lumbar muscle [in Chinese]. Chinese Journal of Information on TCM 17(9): 75–76.
71. Lu JC (2010) Combination of electroacupuncture and wet cupping therapy for intractable facial paralysis accompanying with sensory disturbance of facial nerve [in Chinese]. China Higher Medical Education 10: 136–137.
72. Ma CT, Zhang J (2006) Clinical observation of moving cupping therapy on excess pattern depression [in Chinese] [Master’s thesis]. Beijing University of Chinese Medicine.
73. Michaleus A, Bock S, Ludwik R, Raampp T, Baeccker M, et al. (2009) Effects of traditional cupping therapy in patients with carpal tunnel syndrome: A randomized controlled trial. The Journal of Pain 10: 601–618.
74. Ni ML (2010) 40 cases clinical observation of acupuncture plus flash cupping therapy on treating facial paralysis [in Chinese]. Heilongjiang Medicine Journal 23: 453.
75. Ou XH, Xu SC (2009) Sixty cases of refractory facial paralysis treated with traditional Chinese medicine using acupuncture and flash back [in Chinese]. Journal of Chongqing University of Traditional Chinese Medicine 32(3): 37–38.
76. Qiu JZ, Fan CM, Wei FY, Gao CL (2003) Clinical observation of therapeutic effect of medicinal cupping on acute facial neuritis [in Chinese]. China Journal of Modern Medicine 13(21): 146.
77. Ren YJ (2006) Observation of wet cupping combined with acupuncture on 50 patients with facial paralysis [in Chinese]. Shanxi Journal of Traditional Chinese Medicine 27: 480–481.
78. Rui XG (2010) Observations on the efficacy of acupuncture plus cutaneous needle tapping in treating inflammation of superior chineal nerves [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 29: 515–516.
79. Shao M, Liu TY (2003) Clinical observations on the treatment of 93 cases of cervical spondylosis by Daohai blood-letting puncturing and cupping [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 22(3): 20–21.
80. Sun HW, Li L (2009) Observation of wet cupping therapy treating 40 cases with post-auricular pain after peripheral facial palsy [in Chinese]. China Journal of Guang Ming Chinese Medicine 25: 1674.
81. Sun LJ, Xu XD (2007) Clinical observation of therapeutic effect of moving cupping on back shu points combined with acupuncture on 30 patients with simple obesity [in Chinese]. China Practical Medicine 2(32): 138–139.
82. Sun SQ, Xu SX (2006) 67 cases suffered from erysipelas on lower legs cured by means of integration of traditional Chinese medicine and western medicine [in Chinese]. Journal of Chinese Practical Medicine 1(5): 109–110.
83. Tang CR (2000) Acupuncture combined with moving cupping therapy for diabetic peripheral neuropathy [in Chinese]. Sichuan Journal of Traditional Chinese Medicine 21(7): 89–90.
84. Tao Q, Lu HX (2007) Clinical observation of electroacupuncture combined with wet cupping therapy for lumbar aorta calcification related to lumbar intervertebral disc prolapse [in Chinese]. Journal of Clinical Acupuncture and Moxibustion 23(8): 46–47.
85. Wan XW (2003) Clinical observation on acupuncture combined with cupping therapy for treatment of ankylosing spondylitis [in Chinese]. Chinese Journal of Acupuncture and Moxibustion 23(5): 531–532.
86. Wan XW (2007) Clinical observation on treatment of cervical spondylosis with combined acupuncture and cupping therapies [in Chinese]. Journal of Acupuncture and Tuina Science 5: 345–347.
87. Wang CR (2010) Combination of acupuncture and moving cupping therapy for 42 cases with functional dyspepsia [in Chinese]. China Science and Technology Information 15: 176.
88. Wang L (2010) Clinical observation of flash cupping for treating chronic obstructive pulmonary disease in remission [in Chinese]. Chinese General Nursing 8: 1574–1575.
89. Wang LR, Liu HF, Li QY (2010) Observation on the clinical efficacy of meridian cupping plus acupuncture in treating 60 cases of acute peripheral facial paralysis. Sichuan Journal of Traditional Chinese Medicine 20(1): 110–112.
90. Wang PL (2010) Clinical observation on therapeutic effects of abdominal acupuncture combined with blood-letting acupuncture and cupping for treating nerve-root cervical spondylosis. Clinical Journal of Chinese Medicine 9(2): 15–17.
91. Wang QF, Wang GY (2007) Observation on the efficacy of acupuncture and moxibustion plus blood-letting puncture and moving cupping in treating acne [in Chinese]. Shanghai Journal of Acupuncture and Moxibustion 26(12): 20–21.
92. Wang QP (2009) Observation of cupping therapy in treating 62 cases of bronchial asthma [in Chinese]. Guiding Journal of Traditional Chinese Medicine and Pharmacology 15(10): 56.
93. Wang XM, Zhou ZX (2004) Electroacupuncture combined with wet cupping therapy on 66 patients with cervical spondylodiscitis [in Chinese]. Shanxi Journal of Traditional Chinese Medicine 25(1): 60–61.
94. Wang YH, Huang SX, Liu BY, Guo YF, Ding X, et al. (2009) Clinical observation of therapeutic effect of acupuncture for herpes zoster [in Chinese]. Chinese Journal of Basic Medicine in Traditional Chinese Medicine 15: 774–777.
95. Wu FF, Yang SQ, Zhang SJ (2010) Wet cupping therapy on back shu points on treatment of acne [in Chinese]. Journal of Qiqihar Medical College 31: 1596.
123. Zhang JW, Wang XL, Zhou SH (2004) Clinical observation of combination of acetylcholine and acupuncture in the treatment of 41 cases of herpes zoster [in Chinese]. Chinese General Practice 7: 1179–1180.
124. Zhang JX, Diao J, Yu SP (2007) Traditional cupping therapy with syndrome differentiation on insomnia [in Chinese]. Chinese Journal of Clinical Medicinal Research 13: 3444.
125. Zhang KX, Song SJ (2008) Clinical observation of wet cupping therapy on back shu points for acne [in Chinese]. World Health Digest 3: 193–194.
126. Zhang Q, Liang XS, Guo EZ, Li TN (2000) Observation on treatment of head-face herpes zoster [in Chinese]. Liaoning Journal of Traditional Chinese Medicine 35: 602.
127. Zhang QL, Fu XH (2009) Clinical observation of cupping therapy plus electroacupuncture on treatment of lumbar vertebral disc prolapse with blood stasis syndrome [in Chinese]. Acta Chinese Medicine and Pharmacology 17(5): 79–80.
128. Zhang XY (2009) Sixteen cases with refractory hiccup treated by moving cupping on back shu points [in Chinese]. Journal of the Chinese Acupuncture and Moxibustion 25(7): 45–46.
129. Zhang YB, Yan CY (2010) Clinical observation of medicinal cupping therapy on treating chronic gastritis. Guangxi Journal of Traditional Chinese Medicine 33(2): 17–18.
130. Zhang YC, Yan XY (2006) Clinical observation of and nursing care for the treatment of broncholithis by auxiliary glass cupping [in Chinese]. Journal of Qih Nursing 10(1): 28.
131. Zhang YD (2005) Observation of moving and retained cupping therapy on 30 pediatric cases with recurrent respiratory tract infection [in Chinese]. Journal of External Therapy of Traditional Chinese Medicine 14(6): 40–41.
132. Zhao J (2010) Combination of cupping therapy and antibiotic treatment of 220 pediatric cases with cough after acute upper respiratory infection [in Chinese]. Liaoning Journal of Traditional Chinese Medicine 32(2): 72–73.
133. Zhao NX, Shi HJ, Ren TY, Guo RL (2010) Observation of flash cupping therapy for acute peripheral facial neuritis [in Chinese]. Journal of Guanyang College of Traditional Chinese Medicine 32(2): 72–73.
134. Zhou JW, Wang XL, Zhou SH (2004) Clinical observation of combination of acupuncture and cupping in the treatment of osteoarthritis [in Chinese]. Chinese Journal of Traditional Medical Traumatology and Orthopedics 16(10): 27–28.
135. Zhu Y, Zhang FX (2009) Observation of wet cupping therapy plus auricular acupressure for chloasma [in Chinese]. Chinese Acupuncture and Moxibustion 25(7): 79–80.
136. Zhu F, Chen SJ, Feng DR, Xu QY (2009) Observation of wet cupping therapy on treatment of acute peripheral facial neuritis [in Chinese]. Journal of Emergency Traditional Chinese Medicine 10: 702–703.
137. Zhu Y, Zhang FX (2009) Observation of wet cupping therapy plus auricular acupressure for chloasma [in Chinese]. Chinese Medicine Modern Distance Education of China 7(3): 97.
138. Zhu Y (2010) Combination of acupuncture and wet cupping therapy for 50 cases of chloasma [in Chinese]. Shanxi Journal of Traditional Chinese Medicine 31: 476–478.
139. Zhou JW (2007) Moving cupping therapy on 45 cases of myofasciitis causing rigidity of the neck and back [in Chinese]. Clinical Journal of Traditional Chinese Medicine 19: 170–171.
140. Zhou Y, Wu RM, Cao Y (2010) Observation of cupping therapy for pneumonia [in Chinese]. Journal of Guanyang College of Traditional Chinese Medicine 32(4): 54–55.
141. Zhu Y (2010) Cupping therapy on treatment of 40 cases with acute lumbar muscle strain [in Chinese]. Henan Traditional Chinese Medicine 29: 802–803.
142. Zhu R, Zhang HX, Huang GF, Zhou L, Li X, et al. (2010) Analgesic effect of electroacupuncture at EX-B2 combined with press needles and ventouse for patients with herpes zoster [in Chinese]. Chinese Journal of Rehabilitation 25: 205–206.
143. The CONSORT Group. CONSORT Statement 2001-Checklist: Items to include when reporting a randomized trial. Available: http://www.consort-statement.org.
144. Lee MS, Kim JI, Kong JI, Lee DH, Shin BC (2010) Developing and validating a sham cupping device. Acupunct Med 28: 200–204.
145. MacPherson H, Altman DG, Hammerschlag R, Youping L, Taixiang W, et al. (2010) Revised STandards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA): Extending the CONSORT Statement. PLoS Med 7(6): e1000261. doi:10.1371/journal.pmed.1000261.
146. Laine C, Horton R, DeAngelis CD, Drazen J, Frizelle F, et al. (2007) Clinical trial registration looking back and moving ahead. N Engl J Med 356: 2734–2736.