Cochrane
Library

Cochrane Database of Systematic Reviews

Acupuncture for mumps in children (Review)

He J, Jia P, Zheng M, Zhang M, Jiang H

He J, Jia P, Zheng M, Zhang M, Jiang H.
Acupuncture for mumps in children.
Cochrane Database of Systematic Reviews 2015, Issue 2. Art. No.: CD008400.
DOI: [10.1002/14651858.CD008400.pub3](https://doi.org/10.1002/14651858.CD008400.pub3).

www.cochranelibrary.com

TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
OBJECTIVES	3
METHODS	4
RESULTS	5
DISCUSSION	6
AUTHORS' CONCLUSIONS	6
ACKNOWLEDGEMENTS	6
REFERENCES	8
CHARACTERISTICS OF STUDIES	9
APPENDICES	11
FEEDBACK	12
WHAT'S NEW	13
HISTORY	13
CONTRIBUTIONS OF AUTHORS	14
DECLARATIONS OF INTEREST	14
SOURCES OF SUPPORT	14
INDEX TERMS	14

[Intervention Review]

Acupuncture for mumps in children

Jing He¹, Pengli Jia², Min Zheng³, Mingming Zhang⁴, Hua Jiang¹

¹Rehabilitation and Acupuncture Centre, West China Hospital, Sichuan University, Chengdu, China. ²Chinese Evidence-Based Medicine Centre, West China Hospital, Sichuan University, Chengdu, China. ³West China School of Public Health, Sichuan University, Chengdu, China. ⁴Chinese Cochrane Centre, Chinese Evidence-Based Medicine Centre, West China Hospital, Sichuan University, Chengdu, China

Contact address: Mingming Zhang, Chinese Cochrane Centre, Chinese Evidence-Based Medicine Centre, West China Hospital, Sichuan University, No. 37, Guo Xue Xiang, Chengdu, Sichuan, 610041, China. mingming-zhang@163.com, ChiCC86@hotmail.com.

Editorial group: Cochrane Acute Respiratory Infections Group.

Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 2, 2015.

Citation: He J, Jia P, Zheng M, Zhang M, Jiang H. Acupuncture for mumps in children. *Cochrane Database of Systematic Reviews* 2015, Issue 2. Art. No.: CD008400. DOI: [10.1002/14651858.CD008400.pub3](https://doi.org/10.1002/14651858.CD008400.pub3).

Copyright © 2015 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Mumps is an acute, viral illness transmitted by respiratory droplets and saliva. A number of studies published in China have suggested that acupuncture is beneficial for children with mumps but the literature reporting the benefits or harms of acupuncture for mumps has not been systematically reviewed.

Objectives

To determine the efficacy and safety of acupuncture for children with mumps.

Search methods

We searched CENTRAL (2014, Issue 11), MEDLINE (1950 to November week 3, 2014), EMBASE (1974 to December 2014), CINAHL (1981 to December 2014), AMED (1985 to December 2014), the Chinese BioMedical Literature Database (CBM) (1979 to November 2014), China National Knowledge Infrastructure (CNKI) (1979 to November 2014), Chinese Technology Periodical Database (CTPD) (1989 to November 2014) and Wanfang database (1982 to November 2014). We also handsearched a number of journals (from first issue to current issue).

Selection criteria

Randomised controlled trials comparing acupuncture with placebo acupuncture, no management, Chinese medication, Western medication or other treatments for mumps. Acupuncture included either traditional acupuncture or contemporary acupuncture, regardless of the source of stimulation (body, electro, scalp, fire, hand, fine needle, moxibustion).

Data collection and analysis

Two review authors independently extracted data. We identified no trials for inclusion in this updated review.

Main results

No study met our inclusion criteria.

Authors' conclusions

We could not reach any conclusion about the efficacy and safety of acupuncture as we identified no trials for inclusion in this review. More high-quality research is needed.

PLAIN LANGUAGE SUMMARY

Acupuncture for mumps in children

Review question

We aimed to determine the effectiveness and safety of using acupuncture to treat mumps in children.

Background

Acupuncture has been used to treat children with mumps for hundreds of years in China. Benefits attributed to acupuncture include decreased swelling and pain, and shortening of the disease duration. According to traditional Chinese medicine, health is achieved by maintaining an uninterrupted flow of Qi, or energy, along 14 meridians. Mumps is caused by 'wind warmth evil' (epidemic heat) and 'pyretic toxicity' accumulated in the Shaoyang and Yangming meridians, thus the flow of Qi, sputum and 'heat evil' stagnate in and around the ears and the cheeks. Acupuncture can help expel 'wind warmth evil', clear pathogenic heat, remove toxic substances, act as an anti-inflammatory, alleviate pain and re-establish the normal flow of Qi, thus restoring internal balance.

Study characteristics

No trials met our inclusion criteria.

Key results

This update aimed to systematically review all randomised controlled trials (RCTs) that examined the efficacy and safety of acupuncture for children with mumps. The evidence is current to December 2014. Although acupuncture has been widely used in China for children with mumps and quite a number of trials claiming to be RCTs have been published, we identified no eligible trials. Although no trials were included, we reviewed the studies we found and there were no reports of adverse events with acupuncture as a treatment for children with mumps. Therefore, we cannot draw any definite conclusions about the efficacy and safety of acupuncture for children with mumps.

BACKGROUND

Description of the condition

Mumps (epidemic parotitis) is an acute, vaccine-preventable viral illness transmitted by respiratory droplets and saliva, which is caused by an organism called a paramyxovirus (Kaye 2008). Mumps is transmitted via the mouth by tiny drops of saliva from talking, sneezing, sharing drinks, kissing or coughing. Mumps manifests with painful swellings in or around the neck, ear or cheek and is accompanied by fever, chills, headache, sore throat, loss of appetite and weakness (Govoni 2006; Sullivan 1985). Approximately 1765 cases of mumps were reported to the Iowa Department of Public Health, USA in 2006 (Campos 2006).

Mumps can result in a variety of complications such as meningitis, encephalitis, arthralgia, orchitis, mastitis, oophoritis and pancreatitis (Govoni 2006; Kanra 2004). In high-income countries mumps is less common because of large-scale vaccination programmes (Dayan 2008; Kaye 2008). Isolation of mumps cases is a good way to prevent spreading in the community (Kaye 2008; MacDonald 2007). Prior to the introduction of the vaccine in 1967, mumps mainly occurred in children aged five to nine years (Behrman 2003). Routine vaccination has proven highly effective in reducing the incidence of mumps and is currently used in most high-income countries. However, there have been outbreaks of mumps in vaccinated populations (Hviid 2008). Mumps is particularly prevalent in low-income countries where vaccination programmes are inconsistent and the morbidity is high. For example, the Harbin study in China showed that the average incidence of mumps was 36.85/100,000. The proportion of mumps cases in children aged 6 to 15 years was 76% (Xu 2008).

The incubation period for mumps is usually 16 to 18 days but it can range from 12 to 25 days. A person is infectious from two days before symptoms start to nine days after symptoms have resolved (Campos 2006). In general, mumps is not a serious illness but some children suffer complications such as meningitis, encephalitis, arthralgia, orchitis, mastitis, oophoritis and pancreatitis (Govoni 2006; Kanra 2004). Deafness can also occur (Tsubota 2008). In 1981, during an outbreak of mumps in a middle school in Ohio, USA, in those affected 100% had parotitis, 81.1% had fever, 61.8% had headache, 44.6% had earache, 9.1% had orchitis (boys and men ≥ 12 years old) and 3.8% had oophoritis (girls and women ≥ 12 years old) (Kevin 1985). There has been a recent increase in mumps orchitis among pubertal and postpubertal males (Davis 2010).

Description of the intervention

Acupuncture has been used to treat children with mumps for hundreds of years in China (Zhao 2003). From the perspective of traditional Chinese medicine (TCM), mumps is called 'Zhasai' in the Song Dynasty. Benefits attributed to acupuncture include decreasing swelling and pain, and shortening of the duration of the disease (Zhao 2003). It has been reported that many types of acupuncture, including body acupuncture, ear acupuncture, electroacupuncture, three-edged needle (prick acupoints to cause bleeding), moxibustion with rush pith (a special moxibustion) and moxibustion with moxa, may be beneficial in the treatment of mumps. Whether single or integrated acupuncture is applied, some relevant studies have indicated that this type of treatment is easy, safe and affordable for patients, and that the rate of effectiveness is as high as 90% to 100% (Chi 2001; Wei 2008; Zhao 2003).

Acupuncture and Chinese medicinal herbs are popular treatments for mumps in China. Chinese physicians and acupuncturists generally believe that herbs and acupuncture are more effective than Western medicines in alleviating symptoms and shorten the duration of mumps with fewer side effects (Shu 2012; Zhao 2003).

There are other treatments designed to alleviate mumps symptoms and prevent complications (Chen 1983; Hviid 2008). Conventional treatments include antipyretics and antiviral medicines taken during febrile periods to relieve pain. These drugs can also shorten and reduce the duration and morbidity of complications in epidemic parotitis (Liu 1997; Liu 2006; Tortorec 2008). However, some drugs including interferon or glucocorticosteroids may have serious side effects and are more expensive than other antiviral drugs, such as moroxydine hydrochloride (Zhao 2003). In China, practitioners consider antivirals and antipyretics including moroxydine hydrochloride and Kang san xian yan zhu she ye (anti-parotid injection) as conventional treatments to alleviate symptoms and these drugs have been widely used to treat mumps (BDS 2010; Xue 2005; Zhang 2010; Zhao 2003).

How the intervention might work

Acupuncture is based on a complex theoretical framework (Zhang 1988). According to traditional Chinese medicine (TCM), health is achieved by maintaining an uninterrupted flow of Qi, or energy, along 14 meridians. Mumps is caused by a kind of special 'evil' - 'wind warmth evil' (pestilent toxicity). The evil Qi is liable to invade the Shaoyang meridian (shallow meridian) and Yangming meridian (deeper meridian), thus the flow of Qi, sputum and 'heat toxicity' stagnate in and around the ears and the cheeks (Han 2008). Acupuncture can help expel 'wind warmth evil', clear pathogenic heat, remove toxic substances, act as an anti-inflammatory, alleviate pain and re-establish the normal flow of Qi, thus restoring internal balance (Lu 2008). In China, a number of studies have shown that acupuncture is the sole treatment for mumps in clinical practice (Gui 1995; Long 2000; Song 1989). The mechanism of acupuncture in the treatment of mumps remains unknown but it is thought that acupuncture affects the immune response (Guo 2006), and could improve the microcirculation of blood to affected areas (Liu 2004).

Why it is important to do this review

Acupuncture is a relatively simple, inexpensive and safe treatment compared to other conventional interventions. Acupuncture is well accepted by Chinese patients and is widely used to alleviate the symptoms of mumps (Zhao 2003). Studies have shown that acupuncture can significantly reduce the degree of parotid gland swelling within two to three days, reduce body temperature back to normal within two days and reduce complications including meningitis, encephalitis, arthralgia, orchitis, mastitis, oophoritis and pancreatitis (Chi 2001; Lu 2008). To our knowledge, this is the first systematic review to examine empirical evidence of the efficacy and safety of acupuncture for mumps.

OBJECTIVES

To determine the efficacy and safety of acupuncture for children with mumps. We intended to test the following hypotheses.

1. Acupuncture improves the symptoms of mumps. Symptoms included swelling, pain in or around the neck, ears and cheeks and elevated body temperature.

2. Acupuncture shortens the duration of mumps.
3. Acupuncture reduces complications of mumps (meningitis, encephalitis, arthralgia, orchitis, mastitis, oophoritis and pancreatitis).

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) comparing acupuncture with no treatment, sham acupuncture or Western medicine. We excluded quasi-RCTs or controlled trials using any other non-random allocation methods.

Types of participants

Children aged one to 15 years, with typical mumps symptoms. Mumps must have been diagnosed according to the following criteria:

1. participants with typical symptoms: acute unilateral or bilateral swelling of parotid or other salivary glands;
2. participants infected by other mump patients or in epidemic areas or during an epidemic season; and
3. participants diagnosed according to laboratory tests.

We excluded the following:

1. participants with serious skin infections;
2. suppurative parotitis;
3. other kinds of cardiac, lung, liver or kidney diseases; and
4. non-epidemic parotitis.

Types of interventions

Studies evaluating all forms of acupuncture therapy, including body acupuncture, ear acupuncture, acupressure, laser acupuncture, phonopuncture, electroacupuncture and moxibustion (including moxibustion with rush pith).

We included both traditional acupuncture along classical meridian points and contemporary acupuncture in non-meridian or trigger points, regardless of the source or methods of stimulation (for example, hand, needle, laser or electrical stimulation). Acupuncture can be given on its own, or as part of a comprehensive regimen involving a number of different strategies. Comprehensive methods refer to acupoint pressing, acupoint injection, moxibustion, medicine for internal use and/or the external application of medicines such as herbs (Yin 2008; Zhao 2003).

The control interventions included no treatment, sham acupuncture or Western medicine alone. The treatment comparisons to be investigated included:

1. acupuncture alone compared with no treatment;
2. acupuncture alone compared with sham acupuncture;
3. acupuncture alone compared with baseline medication; and
4. acupuncture plus baseline medication compared with baseline medication alone.

We excluded trials that only compared different manipulation methods or different acupoints of acupuncture.

Types of outcome measures

Primary outcomes

1. Swelling and pain in the parotid gland area.
2. Time until the body temperature returns to normal.
3. Number of days absent from school.

Secondary outcomes

1. Incidence of complications including meningitis, encephalitis, arthralgia, orchitis, mastitis, oophoritis, pancreatitis, etc.
2. Number of adverse effects, including dizziness, bleeding, difficulty in tolerating the discomfort associated with needling and infection, which were presumed to be caused by acupuncture.

Search methods for identification of studies

Electronic searches

For this 2014 update of the review we searched the Cochrane Central Register of Controlled Trials (CENTRAL 2014, Issue 11) (accessed 4 December 2014), which includes the Acute Respiratory Infections Group's Specialised Register, MEDLINE (January 2012 to November week 3, 2014), EMBASE (January 2012 to December 2014), CINAHL (2011 to December 2014), AMED (2011 to December 2014), the Chinese BioMedical Literature Database (CBM) (2012 to November 2014), China National Knowledge Infrastructure (CNKI) (2012 to November 2014), Chinese Technology Periodical Database (CTPD) (2012 to November 2014) and Wanfang database (2012 to November 2014). We handsearched a number of journals (from first issue to current issue).

Previously we searched the Cochrane Central Register of Controlled Trials (CENTRAL 2012, Issue 4) (accessed 8 May 2012), which includes the Acute Respiratory Infections Group's Specialised Register, MEDLINE (1950 to April week 4, 2012), EMBASE (1974 to May 2012), CINAHL (1981 to May 2012), AMED (1985 to May 2012), the Chinese BioMedical Literature Database (CBM) (1979 to May 2012), China National Knowledge Infrastructure (CNKI) (1979 to May 2012), Chinese Technology Periodical Database (CTPD) (1989 to May 2012) and Wanfang database (1982 to May 2012).

We used the search strategy described in [Appendix 1](#) to search MEDLINE and CENTRAL. We did not use a filter to identify randomised trials as there were too few results. We adapted the search strategy for EMBASE ([Appendix 2](#)); CINAHL ([Appendix 3](#)); AMED ([Appendix 4](#)); Chinese BioMedical Literature Database ([Appendix 5](#)); CNKI ([Appendix 6](#)); CTPD ([Appendix 7](#)) and Wanfang ([Appendix 8](#)).

Searching other resources

We screened the reference lists of the identified studies and reviews for additional references. We contacted trial authors about the effectiveness of acupuncture in mumps patients by mailing and asking them for any additional unpublished studies relevant to this systematic review. We asked authors of abstracts of possible eligible studies for full reports. We also handsearched some major Chinese medical journals relevant to acupuncture (from the first issue to current issue), including the following journals:

- *Shanghai Journal of Acupuncture and Moxibustion*;
- *Acupuncture Research*;
- *Journal of Clinical Acupuncture and Moxibustion*;
- *Chinese Acupuncture and Moxibustion*.

Data collection and analysis

Selection of studies

Two review authors (JH, PLJ) independently checked the titles and abstracts of trials identified by the search for inclusion in the review, based on the selection criteria outlined above. We retrieved the full-text articles if there was any doubt as to whether the article should be excluded. A third review author (ZMM) reviewed the information to decide on inclusion or exclusion of a trial or through discussion in cases of disagreement between the two review authors.

Data extraction and management

At least two review authors (JH, PLJ) independently extracted information on participants, methods, interventions, outcomes and results by using a specially designed data extraction form and entered information into Review Manager 5.3 for statistical analysis ([RevMan 2014](#)). We contacted trial authors for any missing data.

Assessment of risk of bias in included studies

Two review authors (JH, PLJ) independently assessed the validity and methodological quality of studies according to the 'Risk of bias' tool developed by The Cochrane Collaboration ([Higgins 2011](#)):

1. random sequence generation;
2. allocation concealment;
3. blinding of participants and personnel;
4. blinding of outcome assessment;
5. incomplete outcome data;
6. selective reporting; and
7. other bias.

A third author (ZMM) resolved disagreements as required.

Measures of treatment effect

No study met our inclusion criteria.

Unit of analysis issues

No study met our inclusion criteria.

Dealing with missing data

No study met our inclusion criteria.

Assessment of heterogeneity

No study met our inclusion criteria, therefore we could not assess clinical heterogeneity.

Assessment of reporting biases

No study met our inclusion criteria.

Data synthesis

No study met our inclusion criteria, so we could not perform data synthesis.

Subgroup analysis and investigation of heterogeneity

No study met our inclusion criteria, so we could not conduct a subgroup analysis and investigate heterogeneity.

Sensitivity analysis

No study met our inclusion criteria, so we could not conduct a sensitivity analysis.

RESULTS

Description of studies

Results of the search

See: [Characteristics of excluded studies](#) and [Studies awaiting classification](#) tables.

We retrieved a total of 86 trials (79 for our first published review in 2012 and seven trials for this 2014 update) involving mumps and acupuncture therapy through electronic searching and handsearching. After excluding all duplicates, we retrieved 30 citations from the electronic searches. After reading the titles and abstracts, we excluded 17 citations because they were not randomised controlled trials (RCTs) or did not relate to this review. The remaining nine studies claimed to be RCTs ([Chi 2001](#); [Guo 2006](#); [He 1994](#); [Jin 2006](#); [Liu 2004](#); [Lu 2008](#); [Shan 2001](#); [Si 2001](#); [Yu 1999](#)). We examined these nine studies in detail and contacted the trial authors by telephone or e-mail for confirmation of the methodological process. None of the studies met our inclusion criteria. In this 2014 updated review, we were unable to contact the author of the [Jin 2006](#) study to confirm whether it was a real RCT and therefore we placed it in the [Studies awaiting classification](#) section.

Included studies

No study met our inclusion criteria.

Excluded studies

In the first publication of this review ([He 2012](#)), we excluded three studies after contacting the trial authors who confirmed that the study designs were not true RCTs ([Chi 2001](#); [He 1994](#); [Liu 2004](#)). No baseline data were described in one study ([Shan 2001](#)). Acupuncture was used in all groups in one trial ([Yu 1999](#)), and two trials included participants who were over 15 years of age ([Lu 2008](#); [Si 2001](#)). In this 2014 update review we also excluded [Guo 2006](#), which had been included in the first publication of this review. The reason for this exclusion was that we agreed with the comments of a feedback submitter, who suggested that it was doubtful that a random number sequence generator was used ([Feedback 1](#)).

Studies awaiting classification

One study is awaiting classification as we have been unable to contact the trial authors to obtain information regarding the study design at the time of updating this review ([Jin 2006](#)).

Ongoing studies

We are not aware of any ongoing studies.

Risk of bias in included studies

We could not carry out a 'Risk of bias' assessment as no trials were eligible for inclusion.

Effects of interventions

We did not identify any trial that fulfilled our inclusion criteria.

DISCUSSION

Acupuncture has been widely used in China to treat children with mumps and a number of trials claiming to be randomised controlled trials (RCTs) have been published. However, there is a lack of well-designed, methodologically sound trials and most of the studies we identified had been inadequately reported. We did not identify any RCTs for inclusion. Evidence from excluded trials suggested that acupuncture may improve the swelling and pain of the parotid gland and return the body temperature to normal within three to five days after treatment. The recovery rate in the acupuncture group suggests a trend towards better outcomes. However, the acupuncture group had a longer time to cure than the Western medicine group. The possible reason is that acupuncture stimulates the body's immune system and needs more time to produce an anti-inflammatory effect, while Western medicine results in direct antiviral activity and an anti-inflammatory effect (Zhao 2003). The result was that the control group experienced a reduced fever more quickly than the acupuncture group (BDS 2010; Zhang 2010). Current evidence is limited and no firm conclusions can be made on the efficacy and safety of acupuncture for children with mumps, and so these results may not be generalised to clinical practice.

Although we did not identify any good quality randomised, double-blind, controlled trials of acupuncture for the treatment of children with mumps, and most of the purported RCTs reported comparable baseline data including age, duration of disease and the timing of interventions, there was no clear distinction between inclusion and exclusion criteria, no standard efficacy criteria and no specific description of primary and secondary outcomes that would have an impact on the results. No adverse effects from acupuncture were reported during treatment or after long-term follow-up, which is an important issue. Future studies should have a follow-up time of at least three months to measure clinically important outcomes. In addition, we also suggest that reducing the incidence of complications, particularly male sterility, should be considered as an important outcome in the treatment of mumps.

Reporting of the excluded studies did not fully comply with the Consolidated Standards of Reporting Trials (CONSORT) statement (Wang 2011). There was no clear information about the methods of allocation concealment, sequence generation or blinding in the trials. The baseline characteristics of the acupuncture and control groups were not reported separately. We think that it is important to compare the key baseline characteristics of the two groups to evaluate the success of randomisation, especially for trials with a small number of participants. The effect size and its precision were not summarised by commonly used measurements, such as risk ratio. Additionally, the excluded studies did not fully follow the reporting guidelines of the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICIA) criteria (Fei 2007). There was also poor reporting of the needle type. The studies did not specify the practitioner's background, which the STRICIA criteria suggest should be reported as the providers' training and experience will influence the effects of acupuncture.

Summary of main results

Currently no evidence is available to assess the efficacy and safety of acupuncture in the treatment of mumps in children. The excluded studies suggest that acupuncture may improve swelling and pain of the parotid gland and assist the body temperature to drop or return to normal at days three to five after treatment. However, because of the poor methodological quality of the trials, we cannot draw any conclusions about the efficacy and safety of acupuncture. More high-quality research is needed.

Overall completeness and applicability of evidence

The evidence is inadequate to allow any conclusion about the efficacy and safety of acupuncture.

Quality of the evidence

The quality of the evidence is poor.

Potential biases in the review process

We attempted to retrieve all RCTs of acupuncture for treating mumps in children. However, we only found nine trials in Chinese and one of these is awaiting classification. Our review does not include data from unpublished trials, hence it is possible that some negative results might have been missed.

Agreements and disagreements with other studies or reviews

We did not identify any other trials reviewing acupuncture for mumps in children.

AUTHORS' CONCLUSIONS

Implications for practice

There is no evidence to determine the efficacy and safety of acupuncture in the treatment of children with mumps, although the excluded studies suggest that acupuncture is effective in improving swelling and pain of the parotid gland and assisting the body temperature to return to normal. We cannot make any recommendations for practice and nor can the results be generalised to clinical practice.

Implications for research

We need randomised controlled trials (RCTs) to evaluate the effectiveness of acupuncture in the treatment of children with mumps. These trials should pay greater attention to methodological design, including randomisation, blinding of participants, other care providers and outcome assessors, and clarification of standard control treatment, and should use valid and reliable outcome measures to minimise performance and assessment bias (although blinding of acupuncturists is difficult). Future trials need to improve the quality of reporting and should report adverse effects of acupuncture and long-term follow-up in order to measure the incidence of complications in mumps.

ACKNOWLEDGEMENTS

Thanks again to Huang Lijun, Vice-Professor, Department of Foreign Languages, Sichuan University for assistance with English grammar. Thanks to Sarah Thorning of the Cochrane Acute Respiratory Infections Group for searching support. We wish to

thank the following people for commenting on the draft protocol: Ann Fonfa, Yusra Badr, Liu Xuemei, Cun-Zhi Liu, Nelcy Rodriguez and Nick Matheson. Thanks to Peter Fisher, Philip Vanderzeil,

Ann Fonfa and Sree for their helpful comments on this review. Finally, we also express our thanks for Liz Dooley who helped us to finalise this review.

REFERENCES

References to studies excluded from this review

Chi 2001 {published data only}

Chi X, Xie SF. Clinical observation of chuanfuling combined with moxibustion on treatment of 60 cases of mumps. *Journal of Handan Medical College* 2001;**14**(2):129-30.

Guo 2006 {published data only}

Guo SN, Liu HL, Li GL. Clinical observation of acupuncture on treatment of 120 cases of mumps. *Chinese Community Doctor* 2006;**22**(20):42.

He 1994 {published data only}

He MQ, Shen Y, Li LC, et al. Observation on the treatment of mumps by acupuncture combined with Chinese herbs with clinical analysis of 125 cases. *Chinese Acupuncture and Moxibustion* 1994;**1**(Suppl):112.

Liu 2004 {published data only}

Liu ZH. The clinical study of acupuncture on treatment of mumps. *Chinese Practical Journal of Rural Doctors* 2004;**11**(10):4.

Lu 2008 {published data only}

Lu YB, Chen JJ. Clinical observation of electro-acupuncture on treatment of mumps. *Journal of Hubei Traditional Chinese Medicine* 2008;**30**(3):53.

Shan 2001 {published data only}

Shan WQ. Ear-bleeding on treatment of mumps. *Zhejiang Journal of Integrated Traditional Chinese and Western Medicine* 2001;**11**(9):579.

Si 2001 {published data only}

Si XS. Auricular-acupuncture on treatment of 38 cases of mumps. *Journal of Modern Integrated Chinese and Western Medicine* 2001;**10**(24):2395.

Yu 1999 {published data only}

Yu P, Gao SJ. Chinese herbs combined with cupping on treatment of mumps. *Hubei Journal of Traditional Chinese Medicine* 1999;**22**(2):86.

References to studies awaiting assessment

Jin 2006 {published data only}

Jin MZ. Clinical observation of acupoint-bleeding on treatment of mumps. *Jiangxi Journal of Traditional Chinese Medicine* 2006;**12**:60.

Additional references

BDS 2010

Kang sai xian yan zhu she ye. Beijing Drug Standards 2010; Vol. 20:20-133.

Behrman 2003

Behrman RE, Kliegman RM, Jenson HB. Mumps. Nelson Textbook of Pediatrics. 17th Edition. Saunders, 2003:1306-8.

Campos 2006

Campos D. Mumps epidemic in 2006: are you prepared to detect and prevent it?. *Journal of Family Practice* 2006;**55**(6):500-2.

Chen 1983

Chen JM. Mumps. Beijing: People Medical Publishing House, 1983.

Davis 2010

Davis NF, McGuire BB, Mahon JA, Smyth AE. The increasing incidence of mumps orchitis: a comprehensive review. *BJU International* 2010;**105**(8):1060-5.

Dayan 2008

Dayan GH, Rubin S. Mumps outbreaks in vaccinated populations: are available mumps vaccines effective enough to prevent outbreaks?. *Clinical Infectious Diseases* 2008;**47**(11):1458-7.

Fei 2007

Fei YT, Liu JP. Reporting interventions in controlled trials of acupuncture. *Journal of Traditional Chinese Medicine* 2007;**48**(11):983-5.

Govoni 2006

Govoni M. Mumps: back from the past. *Registered Dental Hygienist Magazine* 2006;**26**(7):61-2.

Gui 1995

Gui RD, Yi Z, Yong XY. Bilateral Taichong and Hegu in treatment of mumps: an observation of 108 cases. *International Journal of Clinical Acupuncture* 1995;**6**:65-6.

Han 2008

Han XM, Wang SC, Yu S, Zhao X, Yong DQ. Traditional Chinese medicine clinical guide in the treatment of mumps. *Journal Pediatrics of Traditional Chinese Medicine* 2008;**4**(5):1-3.

Higgins 2011

Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Hviid 2008

Hviid A, Rubin S, Mühlemann K. Mumps. *Lancet* 2008;**371**(9616):932-44.

Kanra 2004

Kanra G, Isik P, Kara A, Cengiz AB, Secmeer G, Ceyhan M. Complementary findings in clinical and epidemiologic features of mumps and mumps meningoencephalitis in children without mumps vaccination. *Pediatrics International* 2004;**46**(6):663-8.

Kaye 2008

Kaye D. Recommended isolation period revised for patients with mumps. *Clinical Infectious Diseases* 2008;**47**(11):2-3.

Kevin 1985

Kevin M, Thomas J, James S. Mumps disease and its health impact. *Pediatrics* 1985;**76**(4):533-6.

Liu 1997

Liu ZW, Zhang CW. Mumps research progress. *Journal of Clinical Medicine* 1997;**14**(4):174-5.

Liu 2006

Liu WC, Yue XP, Yu XQ. The effect of glucocorticosteroid on epidemic parotitis. *Practical Clinical Medicine* 2006;**7**(3):142-4.

Long 2000

Long WJ, Zhang QM, Wang SM. Ear acupuncture of epidemic parotitis: analysis of 362 cases. *International Journal of Clinical Acupuncture* 2000;**4**:335-8.

MacDonald 2007

MacDonald N, Flegel K. Mumps in young adults: the canary in the coal mine. *Canadian Medical Association Journal* 2007;**177**(2):121.

RevMan 2014 [Computer program]

The Nordic Cochrane Centre, The Cochrane Collaboration. Review Manager (RevMan). Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014.

Shu 2012

Shu M, Zhang YQ, Li Z, Liu GJ, Evertsen JM, Wan C. Chinese medicinal herbs for mumps. *Cochrane Database of Systematic Reviews* 2012, Issue 9. [DOI: [10.1002/14651858.CD008578.pub2](https://doi.org/10.1002/14651858.CD008578.pub2)]

Song 1989

Song GY. 1000 cases of mumps treated with ear needling on Pingjian point. *Journal of Traditional Chinese Medicine* 1989;**14**:9.

Sullivan 1985

Sullivan KM, Halpin TJ, Kim-Farley R, Marks JS. Mumps disease and its health impact: an outbreak-based report. *Pediatrics* 1985;**76**(4):4.

Tortorec 2008

Tortorec AL, Denis H, Satie AP, Patard JJ, Ruffault A, Jégou B, et al. Antiviral responses of human Leydig cells to mumps virus infection or poly I:C stimulation. *Human Reproduction* 2008;**23**(9):2095.

Tsubota 2008

Tsubota M, Shojaku H, Ishimaru H, Fujisaka M, Watanabe Y. Mumps virus may damage the vestibular nerve as well as the inner ear. *Acta Oto-Laryngologica* 2008;**128**(6):644-7.

Wang 2011

Wang MY. 2010 New CONSORT Statement. *Chinese Journal of Scientific and Technical Periodicals* 2011;**22**(2):309-10.

Wei 2008

Wei L, Zhu FJ, Liu CS, Hu YP. Research progress of acupuncture on treatment of mumps. *Shanxi Journal of Traditional Chinese Medicine* 2008;**24**(11):58-60.

Xu 2008

Xu H, Li Y, Liang SG, Zhang DF, Li J, Chen FD. Epidemic characteristic analysis of mumps in Harbin in 2007. *Chinese Primary Health Care* 2008;**22**(7):49-50.

Xue 2005

Xue YZ. Practical Drug Handbook. Third Edition. Vol. 1, Zhengzhou, China: Henan Scientific and Technical Press, 2005:187-8.

Yin 2008

Yin DQ, Han XM, Wang SC, Wang J. The result and analysis of the second round of questionnaires of clinics guide for mumps of traditional Chinese medicine and integrated medicine based on Delphi method. *Journal of Pediatrics of Traditional Chinese Medicine* 2008;**4**(3):53-7.

Zhang 1988

Zhang EQ. Chinese Acupuncture and Moxibustion. Shanghai: Publishing House of Shanghai College of TCM, 1988:1-20.

Zhang 2010

Zhang SZ, Li YL, Zhang Y. Effect of anti-virus mixture on treating mumps. *Nei Mongol Journal of Traditional Chinese Medicine* 2010;**2**(6):12-4.

Zhao 2003

Zhao Y. The literature study of mumps. Master's thesis of Shandong Traditional Chinese Medicine University 2003:4-12.

References to other published versions of this review

He 2010

He J, Zheng M, Zhang M, Jiang H. Acupuncture for mumps in children. *Cochrane Database of Systematic Reviews* 2010, Issue 3. [DOI: [10.1002/14651858.CD008400](https://doi.org/10.1002/14651858.CD008400)]

He 2012

He J, Zheng M, Zhang M, Jiang H. Acupuncture for mumps in children. *Cochrane Database of Systematic Reviews* 2012, Issue 9. [DOI: [10.1002/14651858.CD008400.pub2](https://doi.org/10.1002/14651858.CD008400.pub2)]

CHARACTERISTICS OF STUDIES

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
Chi 2001	Claimed to be a RCT but after contacting the trial authors we found the participants were divided into 2 groups according to the order of treatment: odd numbers for the treatment group, even numbers for the control group
Guo 2006	It is doubtful that a random number sequence could assign 135 boys to groups of 67 and 68, and 104 girls to groups of 52 each
He 1994	Acupuncture plus Chinese medication compared with Western medication plus Chinese medication
Liu 2004	The participants were divided into 2 groups according to the needs of the participants or their families. In addition, the participants in this study were aged 1 to 30 years
Lu 2008	Participants in this study were aged 2.5 to 30 years
Shan 2001	The participants were divided into 2 groups according to the order of treatment. In addition, no baseline data were described
Si 2001	The participants were divided into 2 groups according to a ballot combined with the needs of participants or their families. In addition, participants in this study were aged 5 to 21 years
Yu 1999	Acupuncture was applied in all groups

RCT: randomised controlled trial

Characteristics of studies awaiting assessment *[ordered by study ID]*

Jin 2006

Methods	Claimed to be a RCT
Participants	Demographics: aged 5 to 15 years; mean age: not given; 25 male, 20 female Baseline comparability: yes Diagnosis: according to the criteria for diagnosis and therapeutic effect of diseases and syndromes in traditional Chinese medicine Mumps duration: 1 to 5 days Number of participants: 45 (25/20)
Interventions	Trial group (25): blood letting therapy (Quick puncture: EX-HN6(both), L11 (both)) 1 times/day for 5 days Control group (20): Pu Ji Xiao Du decoction 3 times/1 dose/day for 5 days
Outcomes	Outcome reported after 5 days of treatment Duration of swelling and pain of the parotid gland, body temperature and complications 1. Recovery: no swelling and pain of the parotid gland, body temperature returns to normal and no complications after 5 days Trial group: 23/25; control group: 14/20 2. Effectiveness: improvement in swelling and pain of the parotid gland, body temperature drops and no complications after 5 days

Jin 2006 (Continued)

Trial group: 2/25; control group: 5/20

3. Invalidity: no changes before and after treatment

Trial group: 0/25; control group: 1/20

The trial group is more effective than the control group

Notes

We were unable to contact the trial author to confirm whether this was a real RCT

RCT: randomised controlled trial

APPENDICES

Appendix 1. MEDLINE (Ovid) search strategy

1 Mumps/
2 Mumps virus/
3 mumps.tw.
4 (paroti* adj2 (infect* or epidemic*)).tw.
5 or/1-4
6 Acupuncture/
7 acupunctur*.tw.
8 Acupressure/
9 acupressur*.tw.
10 exp Acupuncture Therapy/
11 Medicine, Chinese Traditional/
12 (moxibustion or electroacupuncture or needling or cupping or acupoint*).tw.
13 (shiatsu or tuina or tui na).tw.
14 or/6-13
15 5 and 14

Appendix 2. EMBASE.com search strategy

#9. #4 AND #8 9 8 Mar 2011
#8. #5 OR #6 OR #7 28,242 8 Mar 2011
#7. 'chinese medicine'/de AND [embase]/lim 11,204 8 Mar 2011
#6. acupunctur*:ab,it OR acupressur*:ab,it OR electroacupunctur*:ab,it OR moxibustion*:ab,it OR needling*:ab,ti OR cupping:ab,it OR acupoint*:ab,ti AND [embase]/lim 13,789 8 Mar 2011
#5. 'acupuncture'/de OR 'acupressure'/exp OR 'electroacupuncture'/de AND [embase]/lim 16,854 8 Mar 2011
#4. #1 OR #2 OR #3 6,234 8 Mar 2011
#3. ((epidemic* OR infect*) NEAR/2 paroti*):ab,ti AND [embase]/lim 171 8 Mar 2011
#2. mumps:ab,ti AND [embase]/lim 4,441 8 Mar 2011
#1. 'mumps'/de OR 'mumps virus'/de AND [embase]/lim 4,498 8 Mar 2011

Appendix 3. CINAHL (EBSCO) search strategy

S13 S5 and S12 0
S12 S6 or S7 or S8 or S9 or S10 or S11 9151
S11 TI (moxibustion or electroacupunctur* or needling or cupping or acupoint*) or AB (moxibustion or electroacupunctur* or needling or cupping or acupoint*) 854
S10 (MH "Medicine, Chinese Traditional") OR (MH "Medicine, Oriental Traditional") 2661
S9 TI acupressur* or AB acupressur* 309
S8 (MH "Acupressure+") 592
S7 TI acupunctur* or AB acupunctur* 4455
S6 (MH "Acupuncture+") 6058
S5 S1 or S2 or S3 or S4 669
S4 TI infect* N2 paroti* or AB infect* N2 paroti* 8
S3 TI epidemic* N2 paroti* or AB epidemic* N2 paroti* 1
S2 TI mumps or AB mumps 537

S1 (MH "Mumps") 295

Appendix 4. AMED (Ovid) search strategy

1 mumps.tw. (22)
2 (paroti* adj2 (epidemic* or infect*)).tw. (4)
3 1 or 2 (25)
4 acupuncture/ (3150)
5 acupunctur*.tw. (8190)
6 exp acupuncture therapy/ (6096)
7 (acupressur* or moxibustion or electroacupunctur* or needling or cupping or acupoint* or shiatsu or tuina or tui na).mp. [mp=abstract, heading words, title] (3700)
8 traditional medicine chinese/ (4325)
9 or/4-8 (11469)
10 3 and 9 (6)

Appendix 5. CBM search strategy

#1 TI mumps or TI zhasai (3694)
#2 TI needle or TI moxibustion or TI acupressure or TI cupping or TI bleeding and #1(19)

Appendix 6. CNKI search strategy

#1 AB needle or AB moxibustion or AB acupressure or AB cupping or AB bleeding or AB electroacupuncture or AB Acupoint (206339)
#2 #1 and mumps(272)
#3 #2 or zhasai (272)

Appendix 7. CTPD search strategy

#1 K,Ti needle or K,Ti moxibustion or K,Ti acupressure or K,Ti cupping or K,Ti bleeding or K,Ti acupoint(172049)
#2 #1 and Ti mumps(120)
#3 #2 or zhasai(120)

Appendix 8. WANFANG database

#1 TI mumps or zhasai (2178)
#2 #1 and AB acupuncture(85)

FEEDBACK

Acupuncture for mumps in children, 22 September 2013

Summary

Comment: I believe there was some discrepancy between the original publication of the only included clinical trial [1] in this review and the information presented.

1. The authors said the authors of the trial (i.e. Guo et al) were contacted and the randomization was done using a random numbers table (p.15). It was doubtful a random number sequence could assign 135 boys to groups of 67 and 68, and 104 girls to groups of 52 each. The probability as evaluated using Mathematica was 0.01 ($P = \text{Binomial}[135, 67] * (1/2)^{135} * 2 * \text{Binomial}[104, 52] * (1/2)^{104} = 0.01$).

2. The control group was not a reasonable control group because they received an antiviral drug and an injection of extract of a traditional Chinese medicine (Kang san xian yan injection which I believe was an incorrect translation of Kang sai xian yan injection). That was neither placebo nor current standard treatment. Mumps is a self limited viral disease that only needs supportive care. The treatment the control group received made the interpretation of effect difficult.

3. Guo et al described acupuncture and moxibustion was given 2 times/day but did not describe for how long each individual was treated. The results section described subjects were treated for 1 to 5 days but did not give a reason for the variation of treatment duration. The authors said acupuncture and moxibustion was given 2 times/day for 3-5 days (p.14) which contradicted the statement of the original work. Guo et al did describe application of moxibustion 3-5 times during each session of acupuncture but did not mention treatment duration of 3-5 days. Besides, Guo defined cure as symptoms free 7 days after treatment. It is unclear why the authors said Guo reported outcome 3-5 days after treatment (p.14).

4. There was some clue that the calculations given by Guo et al was not correct. For example, the average time to cure in the control group was mean 3.78 days, SD 0.42. Since less than half (44%) of this group were cured in 7 days. It seemed Guo just censored those not recovered in 7 days or the SD could not have been 0.42.

5. Though the authors considered "data were presented for every outcome assessed", it was not described how Kuo et al assessed pain in 3 year old children or objectively assessed swollen parotid glands to make the call of being cured. Even the average body temperature of the control group was not given (only the treated group).

For the above listed reasons, I believe part of the work was not presented correctly and the trial should also be excluded from the review.

Reference:

1. Guo SN, Liu HL, Li GL. Clinical observation of acupuncture on treatment of 120 cases of mumps. Chinese Community Doctor 2006;22(20):42.

I agree with the conflict of interest statement below:

I certify that I have no affiliations with or involvement in any organization or entity with a financial interest in the subject matter of my feedback.

Reply

1. We contacted the author again and asked the statistician in our Centre for help. We agree with the above comment.
2. We partially agree with the comment that "Mumps is a self limited viral disease that only needs supportive care", but providing some kind of antiviral drug can reduce some symptoms to some degree from a clinical perspective.
3. We think that there are some differences between 'treatment course' and 'observation course'. The original study defined the effective criteria as although symptoms free seven days after treatment, the actual treatment time will be more than or less than seven days. This is what the author Guo reported in his original study.
4. We agree that there is a calculation mistake in the original study.
5. Yes, we agree that the original data are incomplete.
6. Yes, we agree with this comment. We will exclude this study after reading it again; we will do this in our update of the review if possible. On the other hand, we initially included this study because of it is the only possible included study, compared with others that are inferior.

Contributors

Jih-I Yeh

Affiliation: Department of Family Medicine, Tzu-Chi General Hospital and Tzu-Chi University, Hualien, Taiwan

Role: Attending Physician and Assistant Professor

WHAT'S NEW

Date	Event	Description
4 December 2014	New search has been performed	Searches conducted. We identified no new trials for inclusion in this 2014 update. Based on feedback we received, we carefully reviewed the only included trial. We agree with the comments that the included trial should be excluded. The reasons for this have been explained in the updated review.
4 December 2014	New citation required but conclusions have not changed	A new review author, Pengli Jia, joined the team to help with this update. The results and conclusions remain unchanged.

HISTORY

Protocol first published: Issue 3, 2010

Review first published: Issue 9, 2012

Date	Event	Description
18 January 2014	Feedback has been incorporated	Feedback comment published.

CONTRIBUTIONS OF AUTHORS

Jing He (JH) drafted the review and data extraction.
Pengli Jia (PLJ) helped assess the validity of studies and made some revisions.
Min Zheng (MZ) provided statistical support.
Mingming Zhang (MMZ) revised the review and provided methodological support.
Hua Jiang (HJ) developed the search strategies and assessed the validity of studies.

DECLARATIONS OF INTEREST

Jing He: none known.
Pengli Jia: none known.
Min Zheng: none known.
Mingming Zhang: none known.
Hua Jiang: none known.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Cochrane Acute Respiratory Infections Group, Australia.

Sarah Thorning for the searching support and Liz Dooley helped us finalise the protocol and review.

INDEX TERMS

Medical Subject Headings (MeSH)

Acupuncture Therapy [*methods]; Drugs, Chinese Herbal [therapeutic use]; Fever [therapy]; Mumps [*therapy]

MeSH check words

Child; Humans