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Title: Chuzhen Therapy— A Non-Invasive External Therapy of Traditional Chinese Medicine for Non-specific Low Back Pain

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Author Questionnaire

- 1. Microscopy:** Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **No**
- 2. Software:** Does the part of your protocol being filmed include step-by-step descriptions of software usage?
- 3. Filming location:** Will the filming need to take place in multiple locations?
- 4. Testimonials (optional):** Would you be open to filming two short testimonial statements **live during your JoVE shoot**? These will **not appear in your JoVE video** but may be used in JoVE's promotional materials. **NO**

Current Protocol Length

Number of Steps: 31

Number of Shots: 42

Interviews

Videographer: Obtain headshots for all authors available at the filming location.

INTRODUCTION:

~~REQUIRED: Summarize your research focus and the main questions it aims to answer.~~

- 1.1. **Leiming Jiang:** We standardized Chuzhen therapy and evaluated its effectiveness in relieving low back pain.
 - 1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the research gap or limitation in existing methods and how this protocol addresses them.~~

- 1.2. **Leiming Jiang:** Techniques such as Tuina can differ from one therapist to another; however, our Chuzhen protocol ensures consistent and standardized stimulation.
 - 1.2.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

CONCLUSION:

~~What does this protocol allow researchers to study or measure?~~

- 1.3. **Leiming Jiang:** This protocol allows researchers to measure pain, assess lumbar function, and evaluate patients' quality of life.
 - 1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the most important consideration or challenge when performing this protocol.~~

- 1.4. **Leiming Jiang:** The key consideration while following this protocol is to adhere to the fixed manipulation sequence and properly adjust the stimulation.
 - 1.4.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~How can future studies build on this work? Describe the questions or research directions that can be investigated next.~~

- 1.5. **Leiming Jiang:** Future studies can build on this work by conducting large-scale randomized controlled trials and investigating the underlying analgesic mechanisms of Chuzhen therapy.
- 1.5.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

Videographer: Obtain headshots for all authors available at the filming location.

Ethics Title Card

This research has been approved by the ethics committee of the Hospital of Chengdu
University of Traditional Chinese Medicine

Protocol

***Videographer:** Please always record an audio slate while filming each shot mentioned in the shotlist.*

2. Equipment and Patient Preparation

Demonstrator: Leiming Jiang

- 2.1. To begin, assemble the standardized four-instrument Chuzhen set consisting of Qiyao Hunyuan Chuzhen, Wuxing Santai Chuzhen, Jingang Chuzhen, and Kuixing Pen [1].
 - 2.1.1. WIDE: Talent assembling the standardized four-instrument Chuzhen set on the bench.
- 2.2. Inspect all instrument heads and handles for cracks, burrs, and surface contamination before each use [1].
 - 2.2.1. Talent inspecting the instrument heads and handles for cracks, burrs, and surface contamination.
- 2.3. Confirm that the participant ate a light meal within the last 2 hours. If they have fasted for over 4 hours, reschedule the treatment to avoid hypoglycemic dizziness [3].
 - 2.3.1. Talent talking to the participant's recent light meal intake.
- 2.4. Guide the participant into a standard prone position on the treatment bed [1]. Align the spinal column in a neutral position and relax the upper and lower limbs in a natural neutral resting posture [2].
 - 2.4.1. Talent guiding the participant into the prone position on the treatment bed.
 - 2.4.2. Talent aligning the spinal column and positioning the limbs in a neutral resting posture.
- 2.5. Then, remove all waistbands, belts, and thick clothing covering the lumbar region [1]. Expose the full treatment zone spanning the tenth thoracic vertebra to the upper gluteal fold [2].
 - 2.5.1. Talent removing the waistbands, belts, and thick clothing from the lumbar region.
 - 2.5.2. Talent exposing the treatment zone from the tenth thoracic vertebra to the upper gluteal fold.
- 2.6. Select either 5% povidone-iodine or 75% ethanol for skin disinfection per treatment session [1] and wipe the exposed lumbar and gluteal skin evenly with disinfectant wipes [2].
 - 2.6.1. Talent selecting either 5 percent povidone-iodine or 75 percent ethanol for skin

disinfection.

2.6.2. Talent wiping the exposed lumbar and gluteal skin evenly with disinfection wipes.

2.7. Air-dry the disinfected skin surface for at least 90 seconds before starting Chuzhen manipulation. Do not proceed if residual disinfectant remains [1].

2.7.1. Shot of the disinfected skin surface after complete air-drying.

3. ~~Participant Standard Prone Positioning~~ NOTE: This step is redundant, not filmed

~~3.1. Instruct the participant to lie prone on the padded treatment bed [1].~~

~~3.1.1. WIDE: Talent instructing the participant to lie prone on the padded treatment bed.~~

~~3.2. Place a thin soft pillow under the anterior lower chest to maintain the physiological lumbar lordosis without spinal torsion [1]. Rest both upper limbs alongside the torso and relax both lower limbs naturally without hip rotation [2].~~

~~3.2.1. Talent placing a thin soft pillow under the participant's anterior lower chest.~~

~~3.2.2. Talent positioning the participant's upper limbs alongside the torso and lower limbs in a natural resting position.~~

~~3.3. Confirm the full exposure of the thoracolumbar and lumbosacral region from the tenth thoracic vertebra to the upper gluteal region [1].~~

~~3.3.1. Talent exposes the thoracolumbar and lumbosacral region from the tenth thoracic vertebra to the upper gluteal region.~~

4. Standardized Localization and Marking of Acupoints and Treatment Regions

4.1. Locate and mark the core local lumbar treatment zones, including the Minmen Bazhen array and the full Heche Road meridian pathway [1].

4.1.1. WIDE: Talent marking the Minmen Bazhen array and the full Heche Road meridian pathway on the participant.

4.2. Locate and mark all distal limb acupoints according to the GB/T (G-B over T) 12346-2021 (One-Two-Three-Four-Six-Two-Thousand-Twenty-One) meridian acupoint nomenclature standards, including Weizhong, Kunlun, Chengshan, Taixi, and Huantiao GB-30 [1].

4.2.1. Talent locating and marking the distal limb acupoints on the participant.

4.3. Confirm all marked acupoint coordinates against the monograph *Therapeutics of Chuzhen* before initiating the manipulation [1].

4.3.1. LAB MEDIA: figure 2

4.4. Then, apply the primary stimulation to the lumbar local zones for direct pain relief [1] and the secondary stimulation to the distal limb acupoints to regulate the systemic meridian qi-blood circulation [2].

4.4.1. Talent applying the primary stimulation to the lumbar local treatment zones.

4.4.2. Talent applying the secondary stimulation to the distal limb acupoints.

5. Number 3 Chuzhen Tapping Manipulation on Minmen Bazhen

5.1. Grasp the Number 3 Jingang Chuzhen instrument [1]. Maintain the instrument at a 90-degree angle between the instrument tip and the participant's skin surface [2].

5.1.1. WIDE: Talent grasping the Number 3 Jingang Chuzhen instrument.

5.1.2. Talent positioning the instrument at a 90 degree angle to the participant's skin surface.

5.2. Apply light, rhythmic tapping to the superficial subcutaneous tissue only while avoiding deep pressure into the muscle fascia [1]. Maintain a tapping frequency of 49 taps per minute across the entire marked Minmen Bazhen array, adjusting stimulation pressure according to clinical criteria [2].

5.2.1. Talent delivering a light rhythmic tapping stimulation over the marked treatment area.

5.2.2. Talent performing rhythmic tapping across the full Minmen Bazhen array.

5.3. Stop tapping after 5 minutes or when uniform mild erythema develops across the entire Minmen Bazhen zone, whichever occurs first [1].

5.3.1. Talent completing the tapping manipulation on the Minmen Bazhen array.

6. Number 2 Chuzhen Separating Manipulation Along Heche Road

6.1. Use the Number 2 Wuxing Santai Chuzhen along the full Heche Road trajectory spanning Minmen to Yaoshu [1].

6.1.1. WIDE: Talent positioning the Number 2 Wuxing Santai Chuzhen along the full Heche Road trajectory from Minmen to Yaoshu.

6.2. Maintain continuous instrument contact with the skin throughout the manipulation, avoid lifting the instrument during the procedure [1].

6.2.1. Close-up of the instrument remaining in continuous contact with the skin throughout the manipulation.

6.3. Perform alternating horizontal and longitudinal gliding motions with consistent gentle

compression while maintaining a manipulation frequency of 35 movement cycles per minute [1].

6.3.1. Talent performing alternating horizontal and longitudinal gliding motions.

6.4. Apply a uniform stimulation force evenly across the full length of the seven parallel paravertebral Heche Road lines [1].

6.4.1. Talent applying a uniform stimulation force across the seven parallel paravertebral Heche Road lines.

7. Number 1 Chuzhen Organizing and Releasing Manipulation Along Heche Road

7.1. Apply the Number 1 Qiyao Hunyuan Chuzhen to the Minmen to Yaoshu Heche Road pathway [1].

7.1.1. WIDE: Talent positioning the Number 1 Qiyao Hunyuan Chuzhen on the Minmen to Yaoshu Heche Road pathway.

7.2. Execute smooth, continuous longitudinal gliding strokes along the marked meridian lines while maintaining a rhythm of 49 longitudinal manipulations per minute [1].

7.2.1. Talent performing continuous longitudinal gliding strokes.

8. Number 3 Chuzhen Rotating Manipulation on Minmen Bazhen and Heche Road

8.1. Utilize the cylindrical tail of the Number 3 Jingang Chuzhen for circular stimulation [1]. Alternate clockwise and counterclockwise motions with mild compression at a steady speed of 35 cycles per minute for both the Minmen Bazhen array and the Heche Road trajectory [2].

8.1.1. WIDE: Talent positioning the cylindrical main tail of the Number 3 Jingang Chuzhen on the treatment area.

8.1.2. Talent performing alternating clockwise and counterclockwise circular motions over the Minmen Bazhen array and the Heche Road trajectory

9. Number 4 Chuzhen Opening-and-Closing Manipulation on Distal Limb Acupoints

9.1. Use the Number 4 Kuixing Pen to target each pre-marked distal acupoint, including Weizhong, Kunlun, Chengshan, Taixi, and Huantiao [1].

9.1.1. WIDE: Talent positioning the Number 4 Kuixing Pen on each pre-marked distal acupoint.

- 9.2. Deliver rapid vertical pressure-release cycles at a standardized frequency of 70 cycles per minute [1].
- 9.2.1. Talent performing rapid vertical pressure-release cycles with the Number 4 Kuixing Pen.
- 9.3. Stop the compression immediately if the participant reports a Visual Analog Scale or VAS (*Vas*) pain score of 4 or higher at any distal acupoint [1] [2].
- 9.3.1. Talent stopping the compression after the participant reports a Visual Analog Scale pain score of 4 or higher. *Video editor: Use split screen to show this information side by side*
- 9.3.2. TEXT ON A PLAIN BACKGROUND
- Repeat the complete manipulation sequence 5x/treatment session.
 - Maximum session duration: 30 min
 - Treatment schedule: 1 session/day, 5 days/week, followed by a 2-day rest; 10 sessions total over 2 weeks

10. Post-Session Instrument Cleaning, Disinfection, and Storage

- 10.1. Wipe all residual skin secretions and disinfectant residue from every Chuzhen instrument surface using dry disposable medical wipes immediately after the patient treatment concludes [1].
- 10.1.1. WIDE: Talent wipes all Chuzhen instrument surfaces with dry disposable medical wipes.
- 10.2. Saturate fresh wipes with a 75 percent ethanol solution [1]. Fully wipe all instrument working heads, handles, and lateral surfaces for complete high-level disinfection [2].
- 10.2.1. Talent saturating fresh wipes with a 75 percent ethanol solution.
- 10.2.2. Talent wipes the instrument working heads, handles, and lateral surfaces with the saturated wipes.
- 10.3. Place the disinfected instruments on a sterile tray and let them air-dry at room temperature for at least 15 minutes, without using fans or heat sources [1].
- 10.3.1. Talent placing the disinfected instruments on a clean, sterile tray.
- 10.4. Transfer the fully dry instruments into a sealed, dustproof, dedicated storage container [1]. Store the sealed instrument container in a cool, ventilated cabinet shielded from direct sunlight and airborne dust [2-TXT].
- 10.4.1. Talent transfers the fully dry instruments into a sealed, dustproof storage container.

10.4.2. Talent placing the sealed instrument container into a cool, ventilated storage cabinet. **TXT: See the text for Standardized Modification Framework**

Video editor: Insert a title card to show the following information

- **Post-Procedure Monitoring**
 - Monitor pain and skin reactions continuously during treatment
 - Adjust or stop stimulation if excessive pain or adverse reactions occur
 - Manage inadequate erythema by gradually increasing stimulation pressure
 - Treat skin irritation or abrasion with saline and 5% povidone-iodine.
 - Observe participants for 15–20 min after treatment
- **Data Collection**
 - Assess VAS, ODI, and SF-36 at baseline, post-treatment, and 1-month follow-up
 - Use independent blinded researchers for data recording
 - Analyze data using SPSS and paired-samples t-tests ($p < 0.05$)
 - Power analysis: $n = 16$, Cohen's $d = 2.42$, power > 0.99 .

Results

11. Results

11.1. Within-group comparisons showed significant improvements across all measured outcomes [1].

11.1.1. LAB MEDIA: Table 2.

11.2. Patients exhibited a mean reduction in VAS pain score of 3.25 points, exceeding the minimal clinically important difference of 2 points and representing more than 50% pain relief [1].

11.2.1. LAB MEDIA: Table 2. *Video editor: Highlight the row labeled 'VAS' and the values '3.25 (2.41~4.09)'.*

11.3. Oswestry Disability Index scores decreased by 8.88 points, indicating a transition from moderate to minimal disability according to Oswestry criteria [1].

11.3.1. LAB MEDIA: Table 2. *Video editor: Highlight the row labeled 'ODI' and the values '8.88 (7.09~10.66)'.*

11.4. SF-36 scores increased by 14.06 points, far surpassing the 5-point minimal clinically important difference threshold [1].

11.4.1. LAB MEDIA: Table 2. *Video editor: Highlight the row labeled 'SF-36' and the values '14.06 (19.64~8.49)'.*

1. Chuzhen
Pronunciation link: No confirmed link found
IPA: /'tʃuːˌdʒɛn/
Phonetic Spelling: CHOO·jen
2. Qiyao
Pronunciation link: No confirmed link found
IPA: /'tʃiːˌjao/
Phonetic Spelling: CHEE·yow
3. Hunyuan
Pronunciation link: No confirmed link found
IPA: /'xwənˌjwɛn/
Phonetic Spelling: hwuhn·ywen
4. Wuxing
Pronunciation link: No confirmed link found
IPA: /'wuːˌʃɪŋ/
Phonetic Spelling: WOO·shing

5. Santai
Pronunciation link: No confirmed link found
IPA: /'sɑ:n,tai/
Phonetic Spelling: SAHN·tye
6. Jingang
Pronunciation link: No confirmed link found
IPA: /'dʒɪŋ,ɡɑ:ŋ/
Phonetic Spelling: JEEN·gahng
7. Kuixing
Pronunciation link: No confirmed link found
IPA: /'kwei,ʃɪŋ/
Phonetic Spelling: KWAY·shing
8. Hypoglycemic
Pronunciation link: <https://www.merriam-webster.com/medical/hypoglycemic>
IPA: /,hɑpəʊglər'si:mɪk/
Phonetic Spelling: hy·poh·gly·SEE·mik
9. Lumbar
Pronunciation link: <https://www.merriam-webster.com/dictionary/lumbar>
IPA: /'lʌmbər/
Phonetic Spelling: LUM·ber
10. Thoracic
Pronunciation link: <https://www.merriam-webster.com/dictionary/thoracic>
IPA: /θə'ræsɪk/
Phonetic Spelling: tuh·RASS·ik
11. Vertebra
Pronunciation link: <https://www.merriam-webster.com/dictionary/vertebra>
IPA: /'vɜ:təbrə/
Phonetic Spelling: VER·tuh·bruh
12. Gluteal
Pronunciation link: <https://www.merriam-webster.com/dictionary/gluteal>
IPA: /'glu:tiəl/, /glu:'ti:əl/
Phonetic Spelling: GLOO·tee·uhl / gloo·TEE·uhl
13. Povidone-iodine
Pronunciation link: <https://www.merriam-webster.com/medical/povidone-iodine>
IPA: /'pəʊvɪ,doʊn 'aɪə,dam/
Phonetic Spelling: POH·vih·dohn EYE·uh·dyne
14. Ethanol
Pronunciation link: <https://www.merriam-webster.com/dictionary/ethanol>
IPA: /'εθə,nɔ:l/, /'εθə,nɔʊl/
Phonetic Spelling: ETH·uh·nawl / ETH·uh·nohl
15. Minmen
Pronunciation link: No confirmed link found
IPA: /'mɪn,mən/
Phonetic Spelling: MEEN·men

- 16. Bazhen**
Pronunciation link: No confirmed link found
IPA: /'pɑːtʃən/
Phonetic Spelling: BAH·jen
- 17. Meridian**
Pronunciation link: <https://www.merriam-webster.com/dictionary/meridian>
IPA: /mə'riːdiən/
Phonetic Spelling: muh·RID·ee·uhn
- 18. Acupoint**
Pronunciation link: No confirmed link found
IPA: /'ækjuː.pɔɪnt/
Phonetic Spelling: AK·yoo·point
- 19. Weizhong**
Pronunciation link: No confirmed link found
IPA: /'weɪtʃʊŋ/
Phonetic Spelling: WAY·jong
- 20. Kunlun**
Pronunciation link: No confirmed link found
IPA: /'kwən.lwən/
Phonetic Spelling: KWOON·lwuhn
- 21. Chengshan**
Pronunciation link: No confirmed link found
IPA: /'tʃʰəŋ.ʃɑːn/
Phonetic Spelling: CHUNG·shahn
- 22. Taixi**
Pronunciation link: No confirmed link found
IPA: /'taɪ.ʃiː/
Phonetic Spelling: TYE·shee
- 23. Huantiao**
Pronunciation link: No confirmed link found
IPA: /'xwɑːn.tjɑʊ/
Phonetic Spelling: hwahn·tyow
- 24. Subcutaneous**
Pronunciation link: <https://www.merriam-webster.com/dictionary/subcutaneous>
IPA: /,sʌb.kjuː'teɪ.ni.əs/
Phonetic Spelling: sub·kyoo·TAY·nee·uhs
- 25. Fascia**
Pronunciation link: <https://www.merriam-webster.com/dictionary/fascia>
IPA: /'fæʃiə/, /'fæʃə/
Phonetic Spelling: FASH·ee·uh / FASH·uh
- 26. Erythema**
Pronunciation link: <https://www.merriam-webster.com/dictionary/erythema>
IPA: /,erə'thiːmə/
Phonetic Spelling: air·uh·THEE·muh

- 27. Yaoshu**
Pronunciation link: No confirmed link found
IPA: /'jaʊ,ʃuː/
Phonetic Spelling: YOW·shoo
- 28. Paravertebral**
Pronunciation link: <https://www.merriam-webster.com/medical/paravertebral>
IPA: /,pærəvɜː'tiːbrəl/
Phonetic Spelling: pair·uh·ver·TEE·bruhl
- 29. Thoracolumbar**
Pronunciation link: No confirmed link found
IPA: /θɔːrəkoʊ'lʌmbər/
Phonetic Spelling: thor·uh·koh·LUM·ber
- 30. Lumbosacral**
Pronunciation link: No confirmed link found
IPA: /,lʌmbəʊ'seɪkrəl/
Phonetic Spelling: lum·boh·SAY·kruhl
- 31. Lordosis**
Pronunciation link: <https://www.merriam-webster.com/dictionary/lordosis>
IPA: /lɔːr'doʊsɪs/
Phonetic Spelling: lor·DOH·sis
- 32. Oswestry**
Pronunciation link: No confirmed link found
IPA: /'ɑːzwɛstri/
Phonetic Spelling: OZ·wuh·stree
- 33. Cohen's**
Pronunciation link: <https://www.merriam-webster.com/dictionary/Cohen>
IPA: /'koʊənz/
Phonetic Spelling: KOH·uhnz
- 34. Disinfection**
Pronunciation link: <https://www.merriam-webster.com/dictionary/disinfection>
IPA: /,dɪsɪn'fɛkʃən/
Phonetic Spelling: dis·in·FEK·shuhn
- 35. Nomenclature**
Pronunciation link: <https://www.merriam-webster.com/dictionary/nomenclature>
IPA: /'noʊmən,kleɪtʃər/
Phonetic Spelling: NOH·muhn·klay·cher