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ABSTRACT

Aim: The paper evaluates effectiveness and safety of acupressure (AP) in the comprehensive treatment and rehabilitation of patients with uncomplicated peptic ulcer disease (PUD).

Materials and Methods: The study retrospectively assessed the effectiveness of treating 24 PUD patients, who received AP session following the author's protocol based on Houston F.M. recommendations. The statistical analysis of the results employed the algorithm for qualitative data analysis applying the MedCalc 2023 software package. We analyzed the frequency of clinical syndrome manifestations before and after treatment, calculating the interval estimate of this measure (95% confidence interval (CI)). The study formulated null and alternative statistical hypotheses applying the McNemar test to check the null hypothesis for paired samples. When evaluating the risk of AP side effects, we determined 95% CI for proportion, considering binomial distribution of the feature ("presence-absence of complications").

Results: After completing the treatment course and observing the absence of endoscopic signs of peptic gastropathy, we detected statistically significant changes in the frequency of all clinical syndrome manifestations (p -value < 0.0001 , based on the McNemar test). AP rapidly and effectively alleviated the main clinical manifestations in patients with PUD. The tolerability of acupressure was good, without side effects. The study determined with 95% probability, that the risk of adverse effects did not exceed 15%.

Conclusions: AP is easy to use, non-invasive adjunctive therapy and alternative medical practice during the rehabilitation stage for PUD patients. It proves to be effective, safe, and inexpensive non-pharmacological method of treatment and rehabilitation, aligning with the alternative statistical hypothesis.

KEY WORDS: complementary and alternative medicine, acupressure, peptic ulcer disease, rehabilitation

INTRODUCTION

Peptic ulcer disease of the stomach and duodenum remains a topical issue in gastroenterology in many countries worldwide. Its high prevalence across all age groups of the population, including working-age individuals, the elderly, children, and adolescents, highlights the medical and social importance of this problem [1]. In the United States, PUD affects approximately 4.6 million people annually, and in Western countries, the prevalence of this condition ranges from 6% to 15%. In Ukraine, the proportion of PUD cases in the overall gastrointestinal disorders reaches 13.3% [1, 2].

Complementary and alternative medicine (CAM) is becoming increasingly popular and the fastest-growing methods of treatment worldwide [3]. Acupressure is one of the well-known CAM medical practices originated more than 3000 years ago in China. Acupressure (*from Latin acus – point + pressura – pressure*) is a variation of acupuncture (*needle puncture*) without needles, accurately described by F.M. Houston [4]. As an integral part of ancient Eastern medicine, known as finger "zhēn" in China and "shiatsu" in

Japan, acupressure (AP) has proven its effectiveness over the centuries and remains significant to this day [4-6].

AP works with the same points and meridians as acupuncture. Practitioners can activate acupuncture points with their fingers or various handheld devices for therapeutic massage [3]. Applying pressure to these effective point, one can produce effect similar to those of acupuncture [7], which in many cases is no less effective than traditional needle acupuncture [5]. Meridians are channels within the human body that assist in maintaining Qi (life energy) and, thus, promoting the stability of health state [3]. Both finger acupressure and acupuncture are based on the same fundamental principle of activating acupuncture points through meridians, which correct Qi imbalance [3]. The only difference between two approaches is that acupressure stimulates the biologically active points (BAP) through finger pressure, rather than applying thin needles. Compared to needle acupuncture, finger acupressure is technically simpler [6], as it does not require special equipment or instruments [4, 5, 8-11], and it is non-invasive, painless, and eliminates the risk of bleeding or infection associated with needle insertion [3].

Therefore, acupressure stands as one of the promising non-pharmacological therapeutic technique for improving patients' well-being and quality of life, as well as being an effective medical rehabilitation technique.

AP can be applied at all stages of rehabilitation and treatment and is widely used in various medical fields. In pediatrics, AP stands as one of the primary methods of reflexotherapy. Clearly, AP has numerous advantages, including its non-invasive, safe, accessible, and effective nature. It is employed both independently and in combination with acupuncture, physiotherapeutic procedures, therapeutic exercises, and conventional medication. The well-considered selection of AP points and successful integration of AP as adjunctive therapy with medication, make it possible to minimize the need for drugs, avoiding polypharmacy [9-11]. It should be noted that AP can also be applied for emergency assistance [3-9]. Applying pressure to specific AP points enables the provision of first aid during shock, revives unconscious or collapsed patients, alleviates or eliminates pain, stops bleeding, and more [5, 6, 10, 11].

AIM

The paper evaluates the effectiveness and safety of implementing AP in the comprehensive treatment and rehabilitation of patients with uncomplicated peptic ulcer disease of the stomach and duodenum. It aimed at analyzing AP effect on the clinical course, tolerability and side effects in these patients. The primary endpoint during the treatment and rehabilitation period was the complete absence or significant alleviation of symptoms at the end of the treatment, leading to improved well-being and enhanced quality of life [10, 11].

MATERIALS AND METHODS

The study is based on a retrospective analysis of examination and treatment results of 24 outpatients with uncomplicated PUD associated with *H. pylori* infection: 4 patients with gastric ulcers and 20 with duodenal ulcers. It included 10 (41.7%) male patients and 14 (58.3%) female. The inclusion criteria for the study involved adults aged between 22 and 60 years, presenting clinical manifestations of abdominal and/or dyspeptic, as well as asthenoneurotic syndromes, with varying degrees of severity.

The study excluded individuals with "anxiety" symptoms, severe comorbid pathologies, adolescents, individuals over 60 years old, cancer patients, pregnant women, and patients with alcohol or drug abuse. Persons who had undergone surgical interventions (including stomach resection, cholecystectomy, etc.) were also not included in the study. AP was not administered to patients after meals and in the presence of fever or acute inflammatory processes, skin inflammation, scars, or rashes.

The diagnosis verification was based on general clinical data, findings of physical examinations, fibroesophagogastroduodenoscopy (FEGD), pH-metry, presence of *H. pylori* infection, and, if necessary, histopathological examination, as well as abdominal ultrasound, etc. FEGD findings (prior to AP application)

detected that all patients presented with ulcerative defect and inflammatory-dystrophic changes in the gastroduodenal mucosa.

When achieving the objective specified, all patients received AP session following the protocol developed by the authors and based on Houston F.M. recommendations. The developed AP protocol encompassed both local (abdominal) and distant acupressure points (located on the trunk, chest, head and hands) associated with the stomach and duodenum [4]. The procedure for AP administering was documented in detail in the authors' patent in Ukraine [11]. The treatment duration ranged from 12 to 20 days, comprising 6-8 acupressure sessions, considering the severity of the clinical symptoms.

In 16 (66.7%) patients, we used AP as adjunctive therapy alongside the conventional 10 or 14-day session of triple-component anti-*Helicobacter pylori* therapy. Typically, *H. pylori* infection causes 90% of duodenal ulcers and 70%-90% of gastric ulcers [12]. However, 8 (33.3%) patients did not receive anti-*Helicobacter pylori* therapy, since they had already undergone it previously as part of a comprehensive anti-ulcer treatment, without experiencing significant therapeutic improvement afterward. These patients presented with various degrees of clinical symptoms and syndromes, indicating the need for further rehabilitation applying AP as adjunctive therapy to facilitate optimal recovery.

We assessed AP effectiveness based on the criteria which included speed of pain relief, speed of resolution of major clinical manifestations regarding dyspeptic and asthenoneurotic syndromes, disappearance of endoscopic signs of ulcerative changes in the mucosa considering the follow-up FEGD findings after adjunctive or alternative therapy.

When performing statistical analysis of the observational findings obtained, we followed the algorithm for qualitative data analysis, description and presentation of dichotomous qualitative variables [13-15], applying the MedCalc Statistical Software version 22.009 (MedCalc Software Ltd, Ostend, Belgium, 2023) [16].

The assessment of AP efficacy in PUD patients comprised identification of existing symptoms before and after AP application. The analysis included the occurrence frequency of various qualitative indicators (clinical syndromes before and after treatment, side effects risk caused by AP application), with the variable attribute having values "yes/no", "presence/absence of side effects" and etc. Qualitative variables analyzed in medical research with only two possible values, are referred to as binary or dichotomous variables [13, 14].

The study provided the absolute value and the feature percentage in the structure of entire totality (point estimate of the feature frequency), when describing binary qualitative variables, along with the calculation of the interval estimate – 95% confidence interval (95% CI) [13, 14].

The evaluation of the AP effect on the frequency change in major clinical syndromes against the background of disappearance of endoscopic signs of ulcerative gastropathy was performed with the non-parametric McNemar test for two paired (dependent) observation groups, with patients

acting as their own control or a “before and after” type research [13-16].

We conducted the assessment of the side effects risk caused by AP based on determining 95% CI level for the proportion, considering the binomial distribution of the feature (“presence-absence of complications”) [15].

The application of statistical analysis allowed confirming or rejecting the decision adopted and formulating statistical hypotheses. We have formulated the null hypothesis H_0 [13, 14], suggesting that the proposed treatment and rehabilitation method for PUD patients, involving AP sessions, is not effective and safe. Accordingly, the alternative hypothesis H_a [13, 14] has asserted that the proposed treatment and rehabilitation approach for PUD patients, including AP sessions is effective and safe, and it is accepted in case of rejecting the null hypothesis. To test the null hypothesis, we employed the McNemar criterion (for related groups to analyze the research results based on paired observations – “before and after”) [13, 14, 16].

Based on the results of the examination, the Committee on Ethical Issues and Biomedical Ethics of Poltava State Medical University believes that the work meets the requirements of the Helsinki Declaration on Human Rights.

RESULTS

The clinical presentation of all 24 (100%) patients with peptic ulcers included varying degrees of abdominal pain syndrome, depending on the ulcer location and the active phase duration of the pathological process, which were dominant. The majority of patients experienced abdominal pain accompanied by dyspeptic disorders such as heartburn, belching, nausea, vomiting, bloating, appetite disturbances, constipation, etc., as well as asthenoneurotic symptoms, including fatigue, irritability, increased excitability and anxiety, reduced work capacity, emotional instability and even aggression, adynamia, passivity, drowsiness, apathy, depression, and sensitivity to weather changes, etc.

The frequency of manifestations of the major clinical syndromes was assessed before and after AP application. Before AP administration, 19 patients ($79.17 \pm 8.29\%$; 95% CI 47.66-123.63%) presented with dyspeptic syndrome manifestations, and 18 patients ($75.0 \pm 8.84\%$; 95% CI 44.45-118.53%) experienced asthenoneurotic syndrome. After

treatment with AP application, pain and asthenoneurotic syndromes persisted in 4 patients ($16.67 \pm 7.61\%$; 95% CI 4.54-42.67%), while 3 patients ($12.5 \pm 6.75\%$; 95% CI 2.58-36.53%) experienced residual symptoms of dyspeptic syndrome.

While determining the AP effect on changes in the frequency of the major clinical syndromes, we used the McNemar test for two related (dependent) observation groups (case of paired observations) with the calculation of the exact probability value for the binomial distribution. The data of calculations are presented in Table 1.

All patients tolerated AP well. No adverse effects were observed in any of the patients when applying AP. Calculations based on a normal distribution of the sample indicate that both the assessment of side effects risk and 95% CI equal zero [15]. However, this contradicts common sense. Therefore, we performed additional calculations of 95% CI for the proportion based on the binomial distribution [15], which provided a more accurate assessment of the side effects risk associated with AP.

For this purpose, one should start with locating the point which corresponds to the sample proportion p (in this case, zero) on the horizontal axis. Then, draw a perpendicular line from this point, intersecting with a pair of curves corresponding to the sample size. The vertical coordinates of these intersection points represent the boundaries of 95% CI. In our study with a sample size $n = 24$, the lower CI boundary is 0, and the upper CI boundary is approximately 0.15. Therefore, with 95% confidence, we can conclude that the risk of experiencing side effects caused by AP does not exceed 15%.

DISCUSSION

Over the past few decades, CAM has attracted the interest of healthcare professionals and patients worldwide owing to its simplicity of application, effectiveness, economic aspects and various other reasons [3]. It refers to the use of treatment and rehabilitation methods that typically fall outside the realm of traditional medical model. Complementary and alternative medicine (also referred to as “non-orthodox, “unconventional, “holistic”, and “integrative” medicine) comprises a heterogeneous array of interventions, from acupuncture to spinal manipulation and from herbal medicine to homeopathy [17].

Table 1. Changes in the frequency of manifestations of abdominal, dyspeptic and asthenoneurotic syndromes in patients with peptic ulcer disease during treatment and the main criteria for comparison

Stages of observation	Abdominal syndrome		Dyspeptic syndrome		Asthenoneurotic syndrome		totally
	present	absent	present	absent	present	absent	
Before treatment, n (%)	24 (100)	0 (0)	19 (79)	5 (21)	18(75)	6 (25)	24
After treatment, n (%)	4 (17)	20 (83)	3 (12)	21 (88)	4 (17)	20 (83)	24
McNemar criterion, %	– 83, 33		– 66, 67		– 58, 33		
95% CI	From –98, 2 to –68, 4		From –85, 5 to –47, 8		From –78, 1 to –38, 6		
Significance (p)	< 0, 0001		< 0, 0001		< 0, 0001		

AP is a form of acupuncture that involves applying constant pressure instead of inserting needles. It stands as one of the oldest treatment methods, mentioned in ancient Eastern texts alongside descriptions of zhen-jiu therapy (acupuncture and moxibustion) and herbal medicine [18].

Modern studies confirm the use of AP in providing painless treatment for a wide range of conditions, spanning from immune disorders to emotional disturbances. It serves as adjunctive treatment method which effectively alleviates various types of pain while concurrently managing multiple symptoms in different patients. The non-invasive and needle-free nature of AP makes it more acceptable to individuals, contributing to its widespread appeal [3].

AP method is based on applying pressure with the fingertips on specific acupoints or reflex zones involving widely accepted techniques energetically related to various internal organs and systems. It has been determined that AP transmits pleasant impulses to the brain at a speed four times faster than pain stimuli [3].

There are over 360 acupuncture points located along 14 meridian channels which encompass the body in interconnected matrix [19]. Moreover, each acupuncture point is recognized to have a specific therapeutic effect; however, combinations of acupuncture points are often stimulated to produce a therapeutic effect [19].

It is commonly known that AP effectiveness relies on the ability to find and target the correct AP points, skillfully combine them, and select appropriate techniques and methods for stimulation. The careful selection and activation of specific acupuncture points, along with the appropriate pressure applied, play the important role in the success of treatment [3]. It is evident that the intensity of pressure should be regulated appropriately: high-intensity pressure can potentially harm any part of the body, while insufficient pressure may be ineffective in alleviating pain [3]. Murphy et al. (2019) reported four minor side effects associated with AP application, all of which were related to excessive pressure applied to acupuncture points [20].

In all cases, determining the appropriate stimulation dosage for BAP depends on the patient's clinical condition and reactivity. Assessing the patient's reactivity can be challenging, requiring the experience and intuition of practitioner. Moreover, the time of day and seasonal factors should also be considered. The same person may exhibit higher reactivity in the morning than in the evening, while in winter individuals tend to be less sensitive to stimulation. It is important to bear in mind that excessive duration or intensity of AP can trigger a negative response from the body, potentially leading to deterioration of the patient's overall condition.

The vasomotor response of the skin can be used for appropriate dosing, namely, the appearance of hyperemia in the area of AP application [18]. The presence of red spot on the skin indicates correctly performed acupressure and its sufficient duration. Therefore, the approach to each patient should be tailored to their individual characteristics, since the intensity and force of the massage stimulation are crucial factors in achieving the desired effect.

The correctly applied pressure to the body active points ("life points") causes a phenomenon of predictable sensations and specific sequence of effects on the body, similar to inserting acupuncture needles [18]. During acupressure, the patient experiences a combination of specific sensations (pain, warmth or coolness, feeling of electrical current, etc.), which radiate in particular directions. Our practical experience supplemented this list of sensations: "dropping" the stomach or internal organs, warmth dispersing like rays of the setting sun. According to ancient medical practitioners, the absence of these expected sensations may indicate a lack of therapeutic effect [18]. It is worth noting that not all patients experience these sensations. In 5-10% of cases, they are absent, which can complicate the intervention, since it becomes challenging to monitor the therapeutic process. However, the emergence of predictable sensations serves as a significant psychological factor for physician, while also having a positive psychotherapeutic effect on patient. The presence of these sensations indicates that the point is detected correctly and works, which is a key factor in achieving a rapid and positive therapeutic effect when applying AP. Furthermore, the first AP session holds great significance, since it allows the practitioner to assess the patient's response to BAP stimulation, thereby predicting the effectiveness of intervention in advance. Practical experience with AP reveals that in some patients, even in the absence of expected sensations, a positive therapeutic effect can still be achieved. The treatment outcomes mainly depend on the accurate selection of points, the method of stimulation employed and the appropriate dosage of pressure applied.

Usually, even after the first AP session, most patients primary experienced relief from abdominal pain and reduction in dyspeptic syndrome manifestations. Simple finger pressure on specific AP points, following AP protocol, not only alleviates pain within the first 15-30 minutes of the intervention but also greatly improves the patient's overall well-being. Consolidation of treatment results and patient's recovery include repeated intervention sessions daily for the next 2-3 days, followed by intervals of 2, and eventually 3-4 days.

The results obtained regarding the rapid pain relief align with the literature data, since pain is widely recognized as a primary indication for treatment, and AP ranks among the most commonly employed methods for pain reduction [3, 21-24]. According to the literary sources, the rapid and significant effect of AP application is observed in painful conditions [3-11, 18, 20-24]. Notably, applying continuous pressure for around one minute on specific hyperalgesic points helps to effectively reduce both local and widespread pain [3]. Furthermore, employing acupressure on acupuncture points can alleviate or completely eliminate abdominal pain of various nature [8].

After completing the two-week treatment course, clinical manifestations of abdominal and asthenovegetative syndromes completely disappeared in 83% of patients (20 out of 24), while symptoms of dyspeptic syndrome – in 87.5% (21 out of 24) correspondingly. Only 4 patients experienced occasional

painful sensations, mild discomfort in the epigastric region, or heaviness in the stomach. The treatment was assessed as highly effective, with 83% of patients experiencing very positive outcomes (complete absence of symptoms), and the remaining 17% reported good results (significant reduction in symptoms). The patients' condition showed significant improvement, confirmed by the absence of ulcerative defects based on the follow-up EGD data after 3-4 weeks of treatment. Moreover, the eradication control data demonstrated the successful elimination of *H. pylori* within 1-1.5 months. These positive outcomes contributed to a stable and long-term remission of the disease.

When assessing the treatment effect on changes in the frequency of syndrome manifestations, we employed the non-parametric McNemar test for paired samples (pre- and post-treatment study) [13, 14, 16]. After completing AP treatment in patients with uncomplicated ulcer disease, we observed statistically significant changes in the frequency of all three clinical syndromes (two-sided p-values < 0.0001 according to the McNemar test). This provides evidence of a substantial difference between these two proportions [14, 16].

The statistical analysis conducted indicates AP effectiveness, which allows for a rapid and productive alleviation of the major clinical manifestations in patients with uncomplicated gastric and duodenal peptic ulcers. Therefore, the null hypothesis,

suggesting no clinical effect of AP application, is rejected and the alternative hypothesis is accepted [13, 14]: the proposed rehabilitation and treatment approach for patients with peptic ulcers, including AP sessions, is effective.

The tolerability of AP in all patients was excellent. No side effects of acupressure were observed in the patients. With 95% confidence level, we can assert that the risk of developing side effects from AP application does not exceed 15%, which is consistent with the safety data presented in the literature [3-6, 19, 21]. Only some authors have reported minimal side effects associated with the use of excessive pressure [20].

CONCLUSIONS

AP serves as easy to use, non-invasive adjunctive therapy and alternative medical practice in the rehabilitation of patients with uncomplicated gastric and duodenal peptic ulcers.

AP can be a cost-effective non-pharmacological approach to rehabilitation and treatment of peptic ulcers due to its efficacy, safety and low risk of side effects.

The findings of the study presented contribute to the knowledge base concerning medical practices for the treatment and rehabilitation of uncomplicated gastric and duodenal peptic ulcers.

REFERENCES

- Stepanov YuM, Skyrda Ilyu, Petishko OP et al. Khvoroby orhaniv travlennia – aktualna problema klinichnoi medytsyny [Diseases of the digestive organs – an urgent problem of clinical medicine]. *Gastroenterologia*. 2019;53(1):1-6. doi:10.22141/2308-2097.53.1.2019.163450. (Ukrainian)
- Anand BS. Peptic Ulcer Disease. 2021. Medscape. <https://emedicine.medscape.com/article/181753-overview#a7> [date access 25.01.2023]
- Mehta P, Dhapte V, Kadam S et al. Contemporary acupressure therapy: Adroit cure for painless recovery of therapeutic ailments. *J Tradit Complement Med*. 2017; 7 (2): 251-263. doi:10.1016/j.jtcme.2016.06.004.
- Houston FM. Iscelenie s pomoshyu akupressury: akupunktura bez igolok. [The Healing Benefits of Acupressure: Acupuncture without needles]. Per s angl. A.G Fridlyand. Minsk: Santana. 1992, p.96. (Russian)
- Pervaya pomoshch' svoimi rukami. Yesli skoraya ne speshit. [First aid with your own hands. If the ambulance is not in a hurry]. «Al'pina Publisher». 2018, p.424. (Russian)
- Chzhu L. Rukovodstvo po sovremennoj chzhen-zyuterapii. Igloukalyvanie i prizhiganie. [Guide to modern zheng-ju therapy. Acupuncture and moxibustion]. Kochergina. Moskva: Medgiz. 1959, p.270. (Russian)
- Uorren F. Medicinskaya akupunktura [Medical acupuncture]. Kiev: Visha shkola. 1981, p.224. (Russian)
- Macheret EL, Samosyuk IZ. Rukovodstvo po refleksoterapii [Guide to Reflexology]. Kiev: Visha shkola. 1989, p.479. (Russian)
- Pak SC, Micalos PS, Maria SJ et al. Nonpharmacological interventions for pain management in paramedicine and the emergency setting: a review of the literature. *Evid Based Complement Alternat Med*. 2015;2015:873039. doi: 10.1155/2015/873039.
- Hutsalenko OO. Akupresura yak zasib usunennia boliu u khvorykh na vyrazkovu khvorobu dvanadtsiatypaloi kyshky [Acupressure as a means of pain relief in duodenal ulcer patients]. *Hastroenterolohiia*. 2001;32:416-420. (Ukrainian)
- Hutsalenko OO, Katerenchuk IP, Falko VP, Tsyhanenko IV. Sposib usunennia boliu u khvorykh na vyrazkovu khvorobu [A method of pain relief in patients with peptic ulcer disease]: deklaratsiinyi pat. 34857 A Ukrainy na vynakhid: MPK 6 A61R39/04. zaiavnyk i vlasnyk patentu Hutsalenko O.O.; zaiavl. 13.07.1999; opubl.15.03.2001, Biul. № 2. (Ukrainian)
- Malik TF, Gnanapandithan K, Singh K. Peptic Ulcer Disease. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. <https://www.ncbi.nlm.nih.gov/books/NBK534792/> [date access 25.01.2023]
- Rebrova OYu. Statisticheskij analiz medicinskih dannyh. Primenenie paketa prikladnyh programm STATISTICA [Statistical analysis of medical data. Application of the package of application programs STATISTICA]. Moskva: MediaSfera. 2006, p.184. (Russian)
- Hurianov VH, Liakh Yu, Parii VD et al. Posibnyk z biostatystyky. Analiz rezultativ medychnykh doslidzhen u paketi EZR (R–statistics). [Handbook of biostatistics. Analysis of medical research results in the EZR package (R–statistics)]. Kyiv: Vistka. 2018, p.80. (Ukrainian)
- Stenton Glanc Mediko-biologicheskaya statistika [Biomedical statistics]. Moskva: Praktika. 1998, p.216. (Russian)
- MedCalc Statistical Software version 22.009 (MedCalc Software Ltd, Ostend, Belgium. <https://www.medcalc.org;> 2023) [date access 25.01.2023]

17. Aronson JK. Complementary and alternative medicine. Meyler's Side Effects of Drugs (Sixteenth Edition), Elsevier. 2016, pp.560-578. doi:10.1016/B978-0-444-53717-1.00541-2.
18. Luvsan G. Tradicionnye i sovremennye aspekty vostochnoj refleksoterapii [Traditional and modern aspects of Eastern reflexology] Moskva: Nauka. 1990, p.576. (Russian)
19. Kaptchuk TJ. Acupuncture: theory, efficacy, and practice. *Annals Inter Med.* 2002;136(5):374-383. doi: 10.7326/0003-4819-136-5-200203050-00010.
20. Murphy SL, Harris RE, Keshavarzi NR et al. Self-Administered Acupressure for Chronic Low Back Pain: A Randomized Controlled Pilot Trial. *Pain Med.* 2019;20(12):2588-2597. doi: 10.1093/pm/pnz138.
21. Lee EJ, Frazier SK. The efficacy of acupressure for symptom management: a systematic review. *J Pain Symptom Manage.* 2011;42(4):589-603. doi:10.1016/j.jpainsymman.2011.01.007.
22. Atchison JW, Tolchin RB, Ross BS et al. 16 - Manipulation, Traction, and Massage, Editor(s): David X. Cifu, Braddom's Physical Medicine and Rehabilitation (Sixth Edition), Elsevier. 2021, p. 316-337.e7. doi:10.1016/B978-0-323-62539-5.00016-3.
23. Godley E, Smith MA. Efficacy of acupressure for chronic low back pain: A systematic review. *Complement Ther Clin Pract.* 2020;39:101146. doi: 10.1016/j.ctcp.2020.101146.
24. Mertz MJ, Earl CJ. Chapter 52 - Labor Pain Management, Editor(s): David Rakel, Integrative Medicine (Fourth Edition), Elsevier. 2018, p. 526-534.e3. doi:10.1016/B978-0-323-35868-2.00052-9.

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CONFLICT OF INTEREST

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