

Safe Needling Depth of Acupuncture Points

Pei-Chi Chou, MD, MS,¹ Heng-Yi Chu, MD,² and Jaung-Geng Lin, MD, PhD¹

Abstract

Objectives: The objective of this review is to investigate the existing scientific information on the safe needling depth of acupuncture points.

Methods: The PubMed, EMBASE, Cochrane, AMED (Allied and Complementary Medicine), NCCAM (The National Center for Complementary and Alternative Medicine), and CNKI (China National Knowledge Infrastructure) databases were searched to identify relevant monographs from 1991 to 2009. Additional articles were also identified from the reference list of identified articles. Chinese journals that we thought might be relevant to our study were hand searched.

Results: Thirty-three (33) studies were recruited into the review. Each research study was analyzed for study design, investigated acupuncture points, definition of safe depth, measuring methods, subject number, and for discussion of *de qi*. Factors that would affect the measured depth such as gender, age, body sizes, right or left side of limb, if using *Ton Shen Cun* for comparison, and needling angles were also reviewed. Needling depth of each point was revealed as well.

Conclusions: There is great inconsistency in terms of safe needling depths measured from different subject groups and measuring methods. There is suitable justification for a well-designed clinical trial to investigate the real needling depth for each acupuncture points to avoid adverse effects or complications.

Introduction

ACUPUNCTURE IS A PART OF Traditional Chinese Medicine and has been used for thousands of years to treat various clinical disorders based on ancient Chinese philosophy. In recent years, acupuncture has also been the most commonly used alternative treatment in Western society. Fisher et al. found that 12%–19% of individuals in a European population had received acupuncture treatment.¹ Maclennan et al. also reported that the cost of alternative medicine including acupuncture has been increasing.² Xue et al. indicated that 68.9% of the Australian population had used complementary and alternative medicine, with 9.2% of individuals having used acupuncture.³ Burke et al. also found that 4.1% of the respondents reported lifetime use, and 1.1% reported recent use of acupuncture in a national survey in the United States.⁴

Acupuncture points are known as specific locations of the body that are needled during acupuncture treatment. Acupuncture points are located along meridians that have been defined by ancient writings of Chinese medicine since thousands of years ago. Traditionally, acupuncture points are localized using *cun* (or *Tong Shen Cun*) as proportional measurement. Ancient writings of acupuncture guidelines

also refer to anatomical landmarks to help localize the needling position. For example, the individual interscapular distance measures 6 *cun*. Several research reports have discussed the anatomy and physiology of acupuncture points in order to understand the therapeutic mechanism of acupuncture.^{5–8} However, the mechanism by which acupuncture works remains controversial. The majority of these studies have been of an experimental nature or *in vitro* cadaver studies and lack issues regarding needling depth.

Acupuncture is generally known to be a safe therapy. Most reported adverse events were minor complications such as needling pain, hematoma, nausea, vomiting, and fainting. Ancient Chinese literature and historical texts have documented the adverse effects of acupuncture. One of the earliest and most well known is *Huangdi Neijing*. The possible adverse effects of deep insertion at the acupuncture point *Qupen* (ST12) may include dyspnea, cough, and collapse of the lung. White meta-analyzed reports of adverse effects associated with acupuncture and concluded that the risk of serious events occurring in association with acupuncture is very low, less than that of many common medical treatments. The range of adverse events reported is wide and some events, specifically trauma and some episodes of

¹School of Chinese Medicine, College of Chinese Medicine, China Medical University, Taichung, Taiwan.

²From the Department of Rehabilitation, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan.

infection, are likely to be avoidable.⁹ McPherson reported the type and frequency of short-term reactions associated with a single acupuncture and showed that “positive” reactions to acupuncture treatment were very common. Tiredness, drowsiness, and a range of “negative” reactions were also frequently reported. Almost all patients were willing to experience these reactions again.¹⁰ Complications in acupuncture practice may result from violations of sterile procedure and/or negligence of the practitioners. The complications included infectious disease transmission, pneumothorax, organ injuries, local infection, and dermatitis. Lao reported 165 cases of acupuncture complications over a 30-year period (1965–1995). There were 21 cases of pneumothorax, 9 cases of spinal cord injury, 11 cases of other organ or tissue injuries, 86 cases of hepatitis, 6 cases of contact dermatitis, and the rest were other infections.¹¹ Norheim also indicated that mechanical organ injuries such as pneumothorax and medulla spinalis injury were very common in addition to hepatitis. Pneumothorax could even be lethal. Injuries of nerve and vessel were also reported.^{12,13} Rarely noted complications such as pneumoperitonium were also reported.¹⁴

Most adverse events from acupuncture are avoidable with better understanding of the anatomy of the human body and appropriate antiseptic practice. In order to prevent organ and tissue injuries, the appropriate depth of needle insertion is important. In this article, we provide a descriptive and critical review of the current research available on safe depth of acupuncture points as well as the therapeutic depth. The objective of this article is to determine the consistency in each point.

Materials and Methods

A comprehensive search of literature that was published from 1991 to 2009 was undertaken using the following key words: acupuncture, acupoint, needling depth, safety depth, de qi. These terms were used to search the following databases: PubMed, EMBASE, Cochrane, AME (Allied and Complementary Medicine), NCCAM (The National Center for Complementary and Alternative Medicine) and CNKI (China National Knowledge Infrastructure) databases. Additional articles were also identified from the reference list of identified articles. Chinese journals that we thought might be relevant to our study were hand searched.

Results

Each article was reviewed and 33 studies from 1991 to 2009 were recruited into the review. As there are not many research articles specific for depth of acupuncture points, we tried to include as many articles as possible.

Language used for the studies

Most of the studies were carried out in Chinese and thus most of the studies were written in Chinese. Five (5) studies in this review were in English.^{15–19} English abstracts can be found for most of the studies in Chinese.

Study design

Given the nature of the study objective, most of the studies were retrospective, nonrandomized clinical trials without a control group.

Acupuncture points researched

Many studies lack standards in the localization of acupuncture points or needle manipulation. Most of the research in Chinese used the following guideline: Location of Points (GB-12346-90, general administration of quality supervision, inspection and quarantine of the People’s Republic of China) rather than WHO Standard Acupuncture Point Locations.²⁰ This fact can lead to discrepancies in the safe depth measured for the same acupuncture point.

Table 1 describes all the points researched in these studies. Most of the points studied were points or area associated with possible mechanical injury, such as the neck, chest, back, and abdominal region. One (1) study discussed the acupoint around the eye (i.e., BL1).²¹ Some light was also shed into limbs such as wrist (PC6)¹⁶ and leg (ST36).²² In studies with less than 5 points, GV 14^{23–25} and GV16^{21,26,27} were the points with most appearances followed by GV15.^{26,27} In terms of specific meridian researched, the bladder meridian (BL) at the back was the single meridian of which the most points were investigated.^{15,19,21,28–37} The govern and/or conception vessels (GV and CV) also contained acupoints studied frequently.^{17,18,23–27,30,31,38–40} Only two studies were specifically addressed for acupuncture points of children aged 7–15 years.^{17,18} Three (3) research studies addressed specific diseases. One (1) was for patients with herniated intervertebral disc of the cervical spine²³ and the others for patients with low-back pain.^{19,23}

The definition of safe/dangerous depth

A few studies defined the safe depth and dangerous depth for needling, respectively. For example, Yan et al. suggested that the safe depth of GV15, GV16, GB20, and BL1 should be 80% of the measured depth.²⁶ However, Yang et al. thought that 75% of the measured depth should be the safe needling depth for GV16.⁴¹ Li et al.²⁴ defined the safe depths to be within 75% of the measured depths because they used *in vivo* CT images, which should be greater than ones from cadavers. One (1) study defined the T/S ratio (therapeutic depth over safety depth). The therapeutic depth is defined as the depth at which the needle is in the muscular layer. Chen suggested that the T/S ratios were between 0.67 (SP-15) and 0.88 (CV-6, CV-10).¹⁸ The therapeutic depths for acupoints reported in most textbooks of acupuncture range from a few millimeters to as much as several centimeters.^{42–44} Most of the authors chose 75% or 80% from their clinical experience. As a result, there is no universal definition of dangerous depth, safe depth, or therapeutic depth.

Measuring tools

The mainstream of measuring methods used images from CT scans (12 studies)^{15,17–19,24,29,31,32,36,37,38,41} and direct needle insertion on dissected specimens (18 studies).^{15,28,21,22,25–27,33,34,39,40,45–51} Two (2) studies used ultrasound^{16,35} and one used epidural puncture in patients with herniated intervertebral disc of the cervical spine.²³ There were two studies in which the depth was acquired when performing acupuncture in real patients.^{30,32}

There were only six *in vivo* research studies from our review.^{16,19,23,30,32,35}

TABLE 1. SUMMARY OF RESEARCH JOURNAL ARTICLES IDENTIFIED

| <i>Authors and year, ref. no.</i> | <i>Sample size</i> | <i>Acupuncture points researched and their location/ meridians</i> | <i>Measuring tool</i> | <i>Parameters</i> | <i>Results and conclusions</i> |
|-----------------------------------|--------------------|--|-----------------------|------------------------------------|--|
| Lin et al. 1991 ³ | 240 | 22 points in the back; 28 points in the chest | CT | G BW BL | 1. Significant differences in each point with different body sizes 2. Female chest points have greater depths 3. The results should be more accurate than cadaver study |
| Lin 1991 ³⁷ | 107 | Acupoints in the chest and back | RP | G BW BL | 1. Overweight group has the greatest <i>de qi</i> depth 2. Female chest points had greater depth than male 3. No correlations between the <i>de qi</i> depth and electric resistance |
| Sheu and Lin 1992 ³⁸ | 120 | 28 points in the chest | CT | G BW BL | 1. Differences in body chest points within the same sex exist 2. Significant differences for each point exist for different body sizes |
| Lin et al. 1994 ³⁰ | 300 | Total of 75 acupoints in head, neck, trunk, and lower limb | RP | G BW | 1. Depth of <i>de qi</i> was greater in males and people with greater body weight 2. The depth of neck was more superficial than that of trunk, upper and lower limb |
| Lian 1995 ³⁵ | 89 | From BL11 to BL21 (11 points) | USD | G BW BL S disease type | 1. Depths ranged from 12 to 40 mm 2. Depth was not affected by age, BW and disease type 3. Points of male subjects and right side of the body had greater depths 4. Depths measured were shorter than ancient writings |
| Yan et al. 1996 ²⁶ | 51 | GV16, GV15, GB20, BL1 | DS | G S | 1. The safe depths = 80% of the measured depths 2. GV16: 40.08 mm, GV15: 38.10 mm, GB20: 39.77 mm, BL1: 34.25 mm |
| Lin 1997 ¹⁵ | 320 | All back bladder meridian points and chest points | DS CT RP | G BW BL S TSC | 1. Depths were greater than ancient writings 2. Depths highly correlated with BL and TSC in adults 3. <i>De qi</i> depth related to therapeutic effect 4. <i>De qi</i> depth of chest points were greater in females but not in back points |
| Zhang et al. 1998 ⁴⁹ | 51 | 23 chest points | DS | G S | 1. KI27 had the greatest dangerous depth up to 26 mm 2. Others ranged from 11.87 to 17.64 mm 3. Safe depth should be less than 70% of dangerous depth |
| Zhang et al. 1998 ³³ | 51 | Total of 28 acupoints in back and lumbar region | DS | G S | 1. No side difference except BL17 and BL18 for male and BL17 for female 2. BL points closer to the spine had greater depths |
| Ge 1998 ²⁷ | 16 | GV15, GV16 | DS | TSC | Safe depth of GV15 (42.46–55.86 mm) and GV16 (43.46–57.42 mm) correlate with thumb TSC |
| Chen et al. 1998 ²⁸ | 20 | BL40 | DS | S | Safe depth (from skin to tibial nerve): 15 mm for left side and 16 mm for right side, less than the depth from current textbook |
| Piao et al. 2001 ⁴⁷ | 6s | B2 (lumbar levels) | DS | Different lumbar vertebrae: L1–L5 | The depths ranged from 4.2 to 5.75 cm in different lumbar levels with greater depths in lower lumbar levels |
| Zhang et al. 2001 ⁴⁵ | 57 | ST12 | DS | — | 1. The mean dangerous depth for perpendicular insertion downward is 38.34 mm 2. Safety depth is within 26.83 mm (70% of the dangerous depth) |
| Zhang et al. 2001 ⁴⁸ | 51 | 17 acupoints of abdomen | DS | G S | 1. Dangerous depths of most abdominal points were similar and within 11–17 mm 2. KI11 had the greatest depth up to 25 mm |

(continued)

TABLE 1. (CONTINUED)

| Authors and year, ref. no. | Sample size | Acupuncture points researched and their location/meridians | Measuring tool | Parameters | Results and conclusions |
|--|-------------|--|----------------|-------------------------------|--|
| He et al. 2004 ²³ | 40 | GV14 | RP | BW BL | 1. Depth ranged from 36 to 75 mm (mean: 54.6 mm) 2. The safe depth should be within 36 mm, which is greater than ancient writings |
| Yan et al. 2004 ⁵¹ | 51 | 74 points from neck, chest, back, and abdomen | DS | Ang | 1. Safe depths should be less than 70% of dangerous depths 2. Needling angles were suggested, such as 65° rather than perpendicular insertion for points in the bladder meridian |
| Li et al. 2004 ³⁶ | 42 | 7 points from bladder meridian (1st side line) | DS CT RP | RI S Ang | 1. Depths from <i>in vivo</i> CT were greater than ones from cadavers 2. Safe depths should be less than 70% of dangerous depths 3. Safe needling angle should be 10° less than dangerous angle |
| Dong et al. 2004 ³⁷ | 42 | 7 points from bladder meridian (2nd side line) | DS CT RP | RI S | 1. Depths from <i>in vivo</i> CT images were greater than ones from cadavers 2. Safe depths should be less than 70% of dangerous depths |
| Li et al. 2005 ²⁴ | 32 | GV14, SI15, GV5, and GV4 | CT | RI | The safe depths (75% of dangerous depths) were different for different somatotypes |
| Chen et al. 2006 ³⁹ | 46 | CV22, ST11, ST12, GB21, EX-B1, BL11 | DS | — | 1. Risk of pleural injury may exist with perpendicular needling 2. Divergence existed such as 22.5–61.3 mm for ST12 |
| Lou et al. 2006 ²² | 80 | ST36 | DS | G | Ideal depth is 21.22 cm and the maximum depth is 41.42 cm for oblique needling of ST36 |
| Xu et al. 2006 ²¹ | 48 a | BL1 | DS | — | 1. Mean depth to anterior ethmoidal artery is 18.25 ± 4.45 mm (needling at 12.5 ± 5.5°) 2. Mean depth to optic nerve tunnel is 43.37 ± 7.84 mm 3. Needling depth should not exceed 30.36 mm (70% of measured depth) to avoid injury of the optic nerve |
| Xie et al. 2006 ³⁴ | 46 | BL12, BL13 | DS | G Ang | 1. Mean dangerous depth for perpendicular insertion was 49.51 mm for BL12 and 44.88 mm for BL13 2. Safe for oblique insertion toward the medial of chest with an angle exceed 20° |
| Xie et al. 2006 ⁴⁶ | 46 | ST12 | DS | G S | 1. Mean dangerous depth of male is 34.97 mm and female 31.41 mm 2. The depth for perpendicular needling of SI12 is within 22.50 mm |
| Chern et al. 2006 ²⁹ | 32 | BL13 | CT | RI S | 1. Right side seems to be deeper, especially in people with RI <1.2 2. Safety depth should be within 75% of the measured distance: i.e., 34, 25, and 23 mm |
| Chen et al. 2007 ⁴⁰ | 46 | CV22, ST11 | DS | — | 1. The safety depth of ST11 ranges from 23.7 to 52.8 mm 2. Easy to injure the upper pleural cavity, the big blood vessel, vagus nerve, and cervical roots |
| Streitberger et al. 2007 ¹⁶ | 50 | PC6 | USD RP | Nerve penetrated or contacted | 1. The mean distance from the needle tip to the nerve was 1.8 mm 2. No association between the number of nerve contacts and <i>de qi</i> was found |
| Xie et al. 2007 ²⁵ | 46 | SI14 and GV14 | DS | G | 1. Mean dangerous depth for perpendicular insertion was 60.60 mm for SI14 and 55.93 mm for GV14 2. The depth for perpendicular needling of SI14 and GV14 is within 42 mm |

(continued)

TABLE 1. (CONTINUED)

| Authors and year, ref. no. | Sample size | Acupuncture points researched and their location/ meridians | Measuring tool | Parameters | Results and conclusions |
|---------------------------------------|-------------|--|----------------|-----------------------------|--|
| Chen et al. 2008 ¹⁷ | 219 | 12 acupoints along the conception vessel (CV): CV-2 to CV-7 and CV-9 to CV-14 | CT | BW G A Waist girth | 1. Safe depths significantly increases with age, body weight, and waist girth in pediatric patients aged 7–15 years 2. There were large variations of the 12 points among different age and body weight groups |
| Yang et al. 2008 ⁴¹ | 41 | GV16 | CT | RI | 1. The safe needling depth should be less than 75% of the dangerous depth 2. Safe depths of GV16 were different for persons of different somatotypes ranging from 27.73 to 33.39 mm |
| Chen et al. 2009 ¹⁸ | 204 | 12 abdominal acupuncture points CV-3, CV-4, CV-6, CV-10, CV-12, CV-14, KI-12, ST-24, ST-25, SP-15 LV-13 and LV-4 | CT | BW G A Waist girth | 1. The T/S ratio of these 12 acupuncture points ranged from 0.67 to 0.88 and increased significantly with body weight, age, and waist girth 2. The therapeutic depth of abdominal acupoints is closer to the safe depth in overweight and in older children aged 7–15 years old |
| Wang et al. 2009 ⁵⁰ | 15 | ST7, SI18 | DS | S | Mean inserting depths of ST7 and SI18 to sphenopalatine ganglion are 49.9 and 46.6 mm |
| Groenemeyer et al. 2009 ¹⁹ | 58 | BL25, BL26 | CT RP | BMI | 1. Association between <i>de qi</i> and needle location exists 2. Distance between BL25 and BL6 to the vertebral line was 3.49 ± 0.58 cm and 3.32 ± 0.53 cm 3. There was a significant correlation between the interscapular distance and the thickness of the soft-tissue layer with the BMI at both acupuncture points |

CT, acupoints were measured directly on the CT images; RP, real patients; DS, measured on dissected specimens; USD, ultrasound; G, gender; BW, body weight, BL, body length; S, side; TSC, *Tong Shen Cun*; A, age; RI, Rohrer index; BMI, body-mass index; Ang, angle of needling.

Subject

Lin et al. included 300 adults to investigate a total of 75 acupoints in the head, neck, trunk, and limb, which is known to be the research with the most subjects included.³⁰ Six (6) studies contained more than 100 subjects.^{17,18,30–32,38} Most of the subjects were adults/cadavers, but two studies were specifically for children aged 7–15 years^{17,18} and one research study included 30 newborns.¹⁵

Discussion on *de qi*

Lin in 1991 first discussed the *de qi* depth in acupoints in the chest and back in 107 adults and found it was related to body weight.³² Lin and Wang concluded that depth of *de qi* is greater in males and in people with greater body weight.³⁰ Lin also indicated that *de qi* depth correlated with therapeutic effect.¹⁵ Streitberger et al.¹⁶ found no association between median nerve contact and *de qi* during the acupuncture at PC610, while Groenemeyer et al. thought that there was an association between *de qi* and needle location in their study of BL25 and BL26.¹⁹ Chen et al. described another way for determining *de qi* depth (i.e., T/S ratio).¹⁸

Factors affecting the depth

Gender. Gender differences exist in some points. Lin indicated that chest points in females had greater depth than those in males.³² He also found that depth of *de qi* of acupoints in body and limb was greater in males.³⁰ *De qi* depth of chest points was greater in females but not in back points.¹⁵

Age. No significant difference in depth could be found in studies of adult subjects. However, in the two studies of pediatric subjects, the authors indicated that the safe depth and T/S ratio of 12 abdominal points significantly increased with age.^{17,18}

Body weight, body length, and body-mass index (BMI). Body weight and body length were documented in most of the research studies. Generally speaking, the safe depth correlated with body mass.^{15,17,18,23,30–32,38,51} No research mentioned the correlation between body length and the safe depth of each point. Five (5) research studies^{24,29,36,37,41} used the Rohrer index to divide subjects into

three groups (i.e., <1.2, 1.2–1.5, and >1.5). Subjects with a larger Rohrer index had deeper safe depth. Only one research study used BMI,¹⁹ and nearly all parameters correlated with the BMI for BL25 and BL26. There were also two studies that used waist girth as an index and found that the safe depth and T/S ratio of 12 abdominal points significantly increased with waist girth.^{17,18}

Right/left side points. Only two research studies mentioned the side difference.^{28,29} For example, Chern et al. indicated that right side BL13 points seems to be deeper, especially in people with Rohrer <1.2.²⁹

Tong Shen Cun. Lin in 1997 first studied the correlation between *Tong Shen Cun* and safe depth of acupoints at the chest and back. He found that the depth highly correlated with *Tong Shen Cun*. Lin also indicated that depths are deeper as compared to ancient writings, which is the only research addressing this issue.¹⁵ Ge also reported that a safe depth of GV15 and GV16 correlated with thumb *Tong Shen Cun*.²⁷

Direction and angle of needling. Most of the research studies involved perpendicular needling at the point, but there were five studies discussing the needling direction and angle.^{21,22,34,50,51} For example, Xie et al. found that it is safe to obliquely insert the needle at BL12 and BL13 toward the medial chest at an angle more than 20°. Yan et al. believed that perpendicular needling is more dangerous and suggested that the safe angle should be 10° less than the dangerous angle in some points.⁵¹

Using different measuring methods. There was great inconsistency among those depths measured by different methods. For example, the suggested safe depths for GV16 are 27.73–33.39 mm (using CT images),⁴¹ 40.08 mm (using dissected specimens),²⁶ and 43.46–57.42 mm (using dissected specimens).²⁷ The suggested safe depths for GV14 are within 36 mm (using epidural puncture *in vivo*),²³ within 42 mm (using dissected chest specimens),²⁵ and 32.86–47.93 mm (using CT images).²⁴

Discussion

To our knowledge, this is the first research to review all the studies regarding safe needling depth of acupuncture points.

From the review, we learn that many factors may influence the safe depth. For example, body size matters. It conforms to our basic understanding that the distance from skin surface to internal organ increases with greater body size. Body weight had been the single parameter used most frequently, but it lacks the concept of body fat distribution. BMI is the most widely used index to show the fat amount in the whole body but may not reliably reflect the body fat composition.⁵² Measurement of waist girth is a simple anthropometric measure and a good indicator of central obesity, which provides information about the distribution of body fat and may be useful for abdominal point measurement.

Fat distribution can explain the results that some gender differences exist in some points.⁵³ The fact that male subjects have larger body sizes with greater depth can also be un-

derstood by the principle of sexual dimorphism of body composition⁵⁴ and anatomical gender difference in size-matched subjects.⁵⁵

Age was seldom considered as a parameter in these research studies of adults; however, it suggested that age is a significant factor in children compared to adults in acupuncture.^{17,18} Another interesting factor affecting the depth is which side of the limb the points were selected. It is difficult to understand the reason but may be attributed to the dominant hand or leg.

This review is not specifically about the therapeutic effect of each point, but the depth eliciting *de qi* is also discussed. *De qi* means a sensation that is often elicited to enhance the effect of acupuncture treatment.^{56,57} In the ancient acupuncture literature, *Huangdi Neijing*: chapter *Suwen* indicated that *de qi* may have the root in subcutaneous tissue, connective tissues, and muscle layers. Some practitioners of acupuncture refer to *de qi* as “needle grasp,” a biomechanical phenomenon characterized by an increase in the force necessary to pull the needle out of the tissue. The sensation of needle grasp may be due to the contraction of skeletal muscle⁵⁸ or winding of connective tissue around the needle during needle rotation.⁵⁹ The role of the nervous system in the effect of acupuncture has also been well described.⁶⁰ Because discrepancy in the definition, mechanism, and location of *de qi* still exists, the depth to elicit *de qi* in each point warrants further research.

CT scan is the tool used most frequently but does have limitations in the detailed evaluation of soft tissue, thus making it most suitable in detecting points in the chest, back, and abdominal region. Ultrasound is only suitable for points of the limbs due to the quality of the images. As for direct measure of specimen dissections of cadavers, concerns may arise because they are drier and smaller; thus, the depth measured would be inconsistent with the ones obtained from *in vivo* studies. Li et al.³⁶ and Dong et al.³⁷ compared the depths of seven points from the bladder meridian and found that depth measured by *in vivo* CT images were greater than ones from dissections of cadavers.

The limitations of the research articles in this review include their retrospective nature, the relatively small sample size, and the lack of randomization and control group.

In light of the fact that the measured safe depth is still different from the real depth, we hereby suggest our opinions on future research. First, factors such as gender, age, BMI (or other index to differentiate body sizes), right/left side of the limb, insertion angle, and *de qi* should be controlled as much as possible. Second, subjects (may be different races) should be as many as possible. Third, the depths can be compared with those documented on ancient writings. Fourth, *in vivo* research is better than retrospective images or specimen dissections. Magnetic resonance imaging (MRI) would be a better tool to obtain more detailed information about anatomical structures surrounding the acupuncture needle, especially the soft tissue. Moncayo et al. have been able to demonstrate the relation of acupuncture points to musculoskeletal structures *in vivo* using three-dimensional rendering of MRI data and have suggested a close relation of acupuncture points of the *Yang* and *Yin* motility vessels as well as of the *Dai mai* to tendinomuscular structures.⁶¹ Similar studies should be considered investigating the anatomical structures around the acupuncture

points as well as the safe depth of each point. We also suggest that multicenter collaboration be carried out to collect statistically valuable information that can be used to increase the safety of acupuncture. Difference among different measuring methods can be understood better.

Conclusions

From the critical review of the literature associated with safe needling depth of acupuncture points, there is great inconsistency in terms of safe needling depths measured in different subject groups and by different measuring methods. There is suitable justification for a well-designed clinical trial to investigate the real needling depth for each acupuncture point for safer acupuncture treatment.

Disclosure Statement

No competing financial interests exist.

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Address correspondence to:
 Jaung-Geng Lin, MD, PhD
 School of Chinese Medicine
 College of Chinese Medicine
 China Medical University
 No. 91, Xueshi Road
 North District
 Taichung City
 Taichung 404
 Taiwan

E-mail: b8830006@yahoo.com.tw