



# MEASURING QI 氣

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"Unlocking the mysteries of Qi: Measurement beyond the boundaries of science"

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## BACKGROUND

In traditional Chinese medicine (TCM), it is believed that there is the **system of life energy**, known as *Qi*

Qigong, a modality of TCM believed to be over 5000 years old, believes that the **human body contains a network of energy pathways** through which **vital energy circulates** known as meridians

**Qigong aims to achieve a harmonious flow** of such energy in the body through regulated breathing, mindful meditation, and gentle movements

Researchers continue to have different conceptualization in ways to measure Qi. TCM holds that the **Qi itself cannot be seen** and is intangible, **whereas the effects of Qi may be seen in the changes of the meridians** in western science



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# EXPLORATORY METHODS TO MEASURE QI

## INTERNAL QI

Internal Qigong practice of exercises performed with the **intent of enhancing inner Qi**

## EXTERNAL QI

A trained medical Qigong therapist diagnoses patients according to the principles of TCM and **uses “emitted Qi” to foster healing and unblock Qi**

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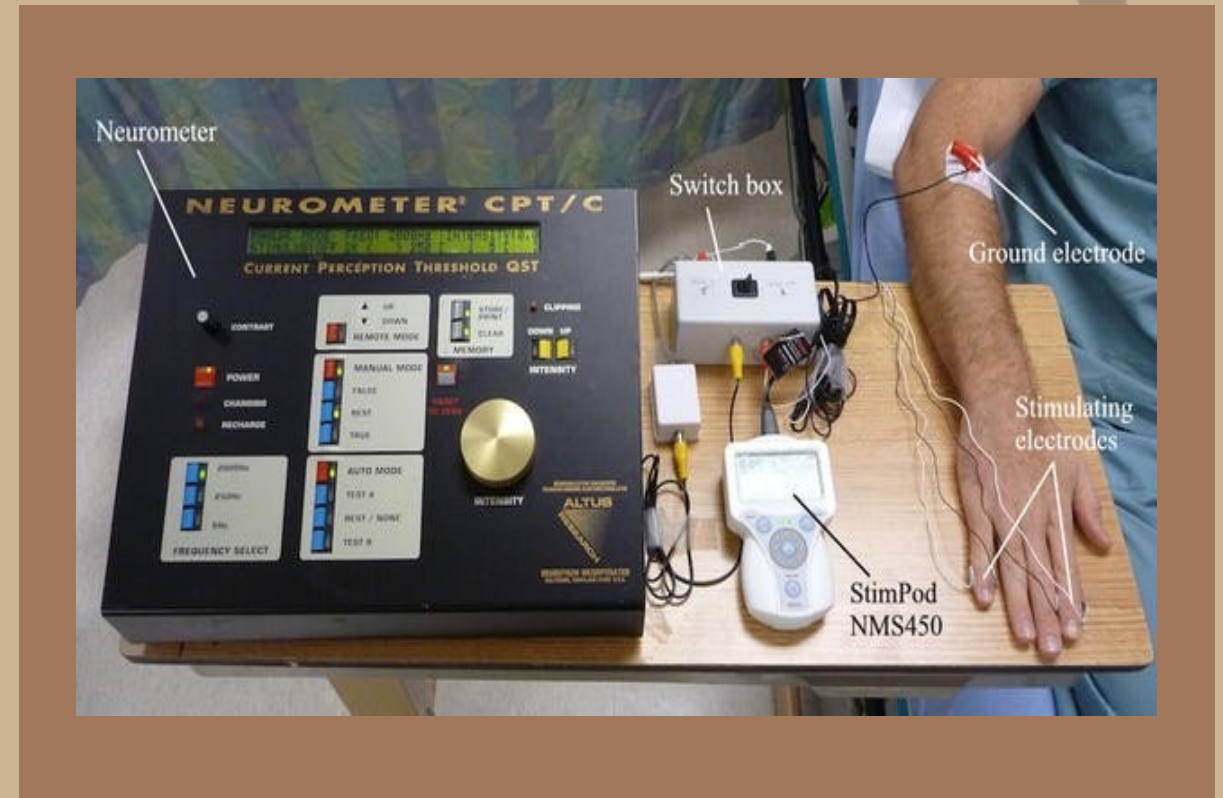
Internal Qigong Physical Signal Detectors		External Qigong Physical Signal Detectors	
Infrared Thermography	Two successful pilot-studies about Qigong	Infrared Thermography	Successful, Temperature of patient warmer after Qi-master treatment
Magnetism	“SQUIDS” have become important tools in clinical medicine for measuring the biomagnetic fields of the heart and brain	Magnetism	Questionable success, expensive technology and expertise needed
Electrodermal Measurement	Successful studies in Qigong and yoga	Lab-Based Animals/ Organisms	Successful, but may be out of our expertise
MRI/EEG	Successful, many studies (~10), different brain regions light up, very expensive	Water	pH of water, water molecules,

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## ELECTRODERMAL MEASUREMENT

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- In 1947, a Japanese doctor Yoshio Nakatani M.D., Ph.D. was measuring the electrical resistance of the skin in his kidney patients, when he found a series **of points at which increased electrical conductance** was measured on the surface of the skin
- He later realised that these **points made a line**, which was almost identical to the kidney meridian of acupuncture in TCM. He named this line, **“ryodoraku”** (English translation: good electrical pathway)
- Upon further research, Dr. Nakatani found other **ryodoraku lines, corresponding to organ disorders**, and these lines also followed the classical Chinese meridian pathways which are also used for acupuncture to unblock Qi



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# ELECTRODERMAL MEASUREMENT



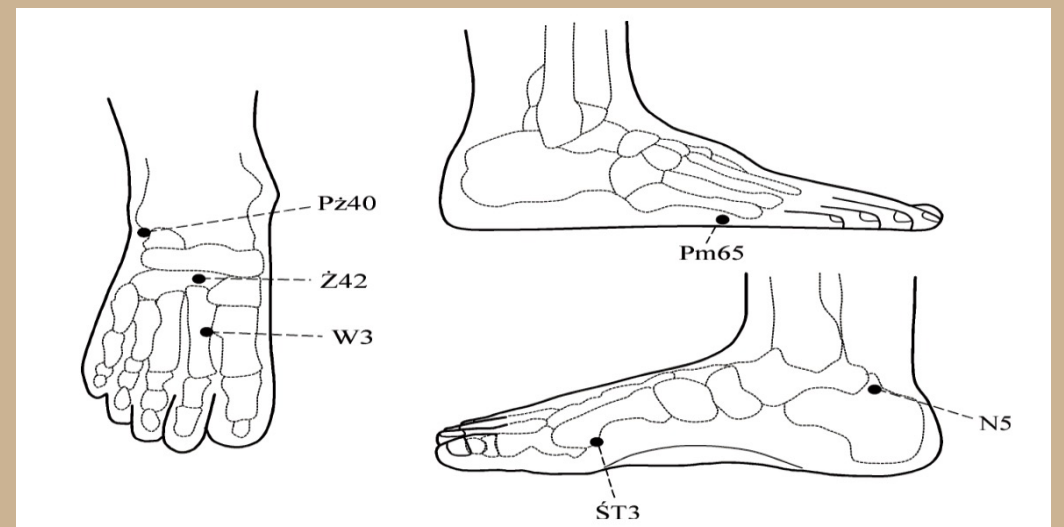
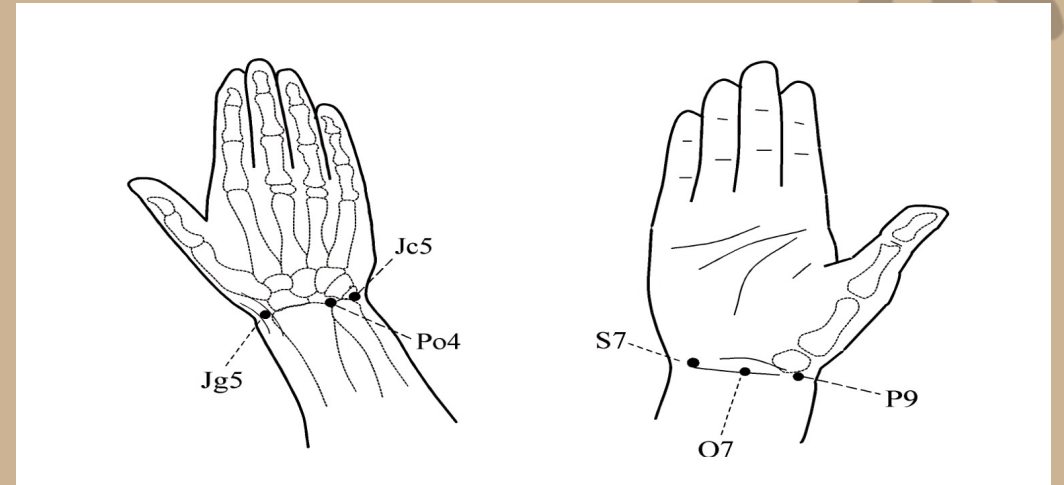
Dr. Nakatani used an electrical instrument that measured electrical conductivity of the skin, known as the **Neurometer**

By **measuring the electrical conductivity** of each meridian, energetic excesses and deficiencies could be located and charted, and is assumed to provide **information about the balance of Qi** in the body



Measurements are made at **24 energy points** that lay along the **12 principal meridians**, according to TCM

Six points are located on each wrist and six are located on each foot



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# ELECTRODERMAL MEASUREMENT

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Since the 1950's, the Ryodoraku instrument has been **used widely for diagnosis and therapy**, especially in Japan; however, most of the reports remain in Japanese

One translated Japanese study of the effects of three different forms of Qigong (tantoukou, hachidankin and suwaishou), concluded that the **electrical conductivity** of the measurement points and the **heart rates** were found to **increase when experienced subjects performed Qigong but to decrease or remain unchanged for an inexperienced subject practicing Qigong** (Yoshida et al., 1999)

Another study used electrodermal measurements to show that **self-qigong practice for about 10 to 15 min** helped **balance the meridians** and organ functions of the body (Sancier 1994)

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# ELECTRODERMAL MEASUREMENT

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- 10 years later - A study by the American College of Traditional Chinese Medicine held a **2-day qigong workshop**
- The subjects (n=29, age 23-79 y) **practiced qigong 5 h each day**. The subjects also had previous experience with Qigong or yoga
- They were **measured** using the Ryodoraku measurement in the **morning and night** (before and after workshop) for both days
- Results: The skin measurement responses were **more positive in the afternoons (top curves) than in the mornings (bottom curves)** on both days, and the standard deviations were smaller in the afternoon representing a better balance along the meridians in the afternoons
- The authors claim that the statistically significant increase in electrical conductivity, coupled by lower standard deviations of conductivity across the skin measurement points shows **better energy balance after Qigong sessions**

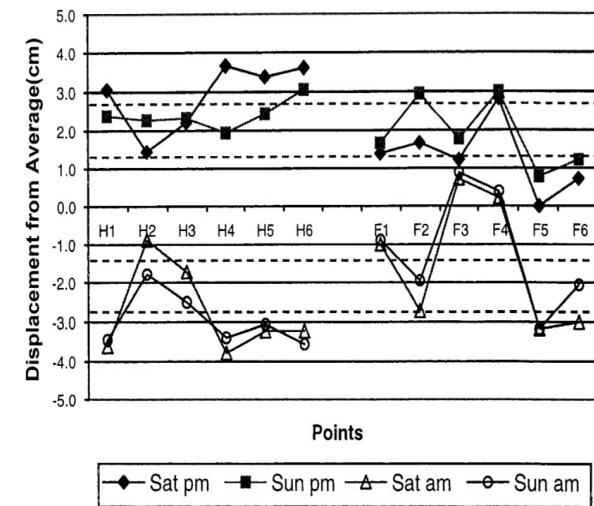


FIG. 2. The Ryodoraku displacements of the responses from the average of all readings for subject #12 as measured on four occasions during the workshop. For the above figure, only the values from the right hand and feet were averaged. Pairs of horizontal dashed lines define the acceptable physiologic range; one pair centered around the average value of 2.2 cm for the afternoon readings and the other approximately -0.21 cm for the morning readings.

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# ELECTRODERMAL MEASUREMENT

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- A follow-up study used a new type of technology based on Ryodoraku device, known as the **AcuGraph3** (new research approved AccuGraph's reliability)
- The authors recruited 33 novice yoga instructors and 20 experienced yoga instructors (18-55 y old). **The intervention was a 3-week intensive yoga training and lifestyle** (i.e., vegetarian diet, group meetings and meditation practices). They were **measured pre-and-post intervention**
- Results: Females showed almost **2 x increase in meridian energy levels** compared to males after the 3 weeks. Furthermore, the energy levels in the post readings of the novice group were comparable to those of the long-term yoga-lifestyle program participants, but **their variability was far higher** (showing experienced yoga instructors are still more balanced)
- More studies have been conducted in yoga, taekwondo and exercise using electrodermal measurements of acupuncture points which is **improving its use-case as a measurement tool**

Original Article

**Can yoga practices benefit health by improving organism regulation? Evidence from electrodermal measures of acupuncture meridians**





## Assessment of Qigong-related effects by infrared thermography: a case study

Luís C. Matos<sup>1</sup>, Mário J. Goncalves<sup>1,2,3</sup>, António R. Silva<sup>4</sup>, Joaquim G. Mendes<sup>4</sup>, Jorge P. Machado<sup>1</sup>, Henry J. Greten<sup>1,2,3</sup>

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- A new study confirms change during Qigong demonstrate the flow
- Interestingly, the effects observed when experienced a special state of awareness follows the intent (TCM) during Qigong
- Not only does the electricity change in the body during Qigong practice, but the **temperature of the body** too. Similar to the electrical activity of the skin, the temperature rises only when the individual reports the subjective feeling of Qi
- **Thermography allows visualizing** the effects of the microcirculation on the hands' temperature during Qigong practice. TCM holds that the "mind - Yi" guides the "Qi" which guides the "xue" (blood)
- \*Figure shows a 37-y male with 3-years Qigong practice, doing the **White Ball exercise**

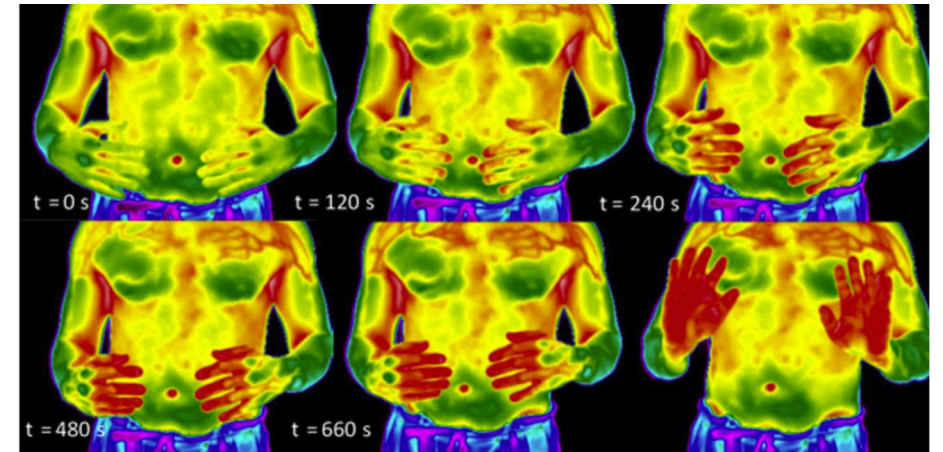


Fig. 1. Infrared thermography measurements during Qigong practice (adapted from (Matos et al., 2012)).

# INFRARED THERMOGRAPHY

- A follow up study shows how children after Qigong training can also replicate these findings
- A group of 10-12 year olds from a music class which suffer from pre-stage anxiety (**Lampenfieber; i.e., cold hands, high heart rate**) were taught by a Qigong master the exercise “White Ball” – which children imagine holding a ball in front of their abdomen to induce a sensation of qi. **The training was 30 minutes x 2 weekly over 7 weeks**
- The figure shows how the **children were able to increase the temperature of their hands after the training through Qigong**, and they reduced their heart rates significantly
- The “White Ball” exercise is simple and short (6-min), easy to learn, that does not require much space, with **positive effects on anxiety and stress management**
- Outcome: children can warm their hands and reduce stage anxiety before performance if they practice Qigong

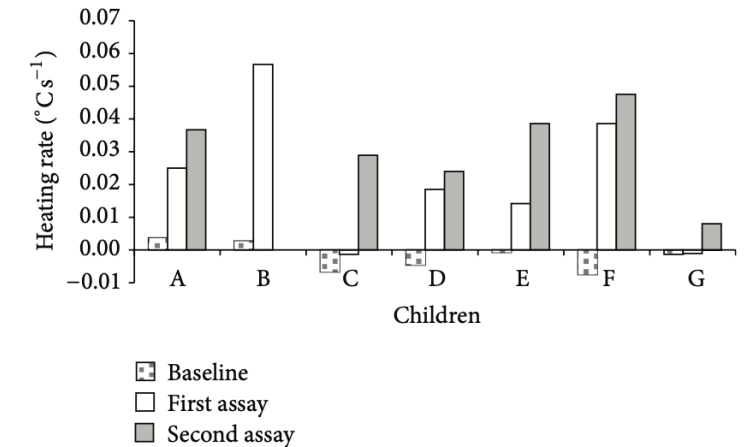


FIGURE 5: Heating rate for each child (A to G) in the baseline assay and at the beginning and end of the *Qigong* training program.

Measurement	Beginning	End
Mean Heart Rate (SD)	102.9 (20.5) beats per minute	92.0 (17.2) beats per minute

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# ASSESSING THERAPEUTIC BENEFITS OF QIGONG



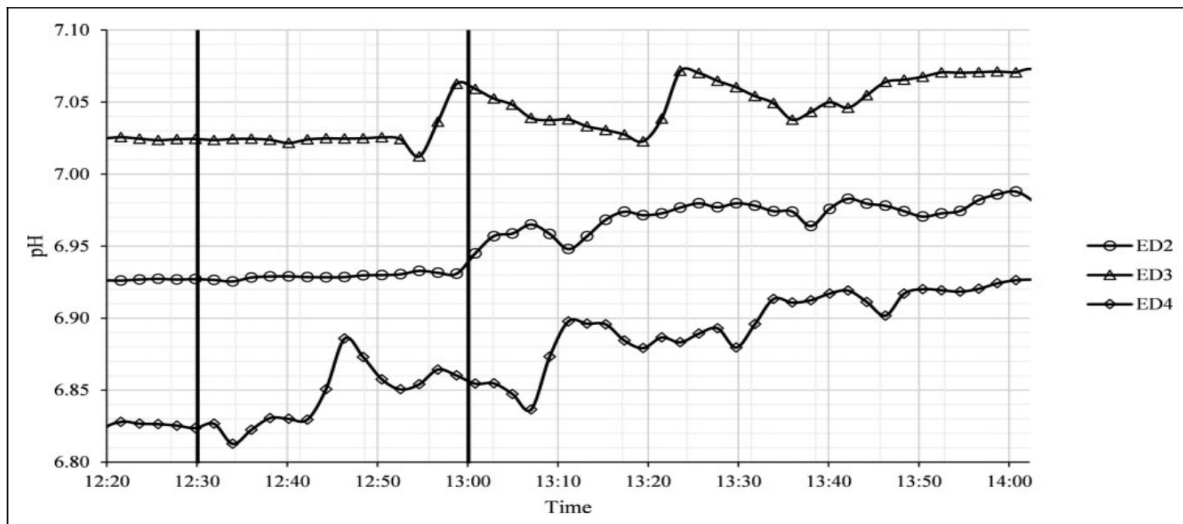
MEASUREMENT	THERAPEUTIC OUTCOMES
Heart Rate (increase/decrease; variability) (many studies)	HR decreases, HRV increases
Blood pressure (many studies)	BP decreases
Blood lipids (few studies)	TG, HDL-C & LDL-C, cholesterol improved
Body Mass Index (many studies)	Decrease BMI, reducing obesity
Glucose (few studies)	Fasting and plasma glucose improved *new study idea- glucose sensors during Qigong/ pre post qigong interventions
Hormones (few studies)	Lack of research in hormonal (especially stress hormones) effects of Qigong
Falls and Balance (most research in Tai Chi rather than Qigong)	Improved strength and flexibility, balance standing on one leg
Quality of Life (many studies)	Improved perceived physical, psychological and social health, both in healthy and chronically ill patients
Psychological (many studies)	Decrease anxiety, depression, stress; Improved mood, self-esteem
Sleep (few studies)	Improved subjective sleep (but not any objective measures of sleep)
Coherence (i.e., EmWave)	-

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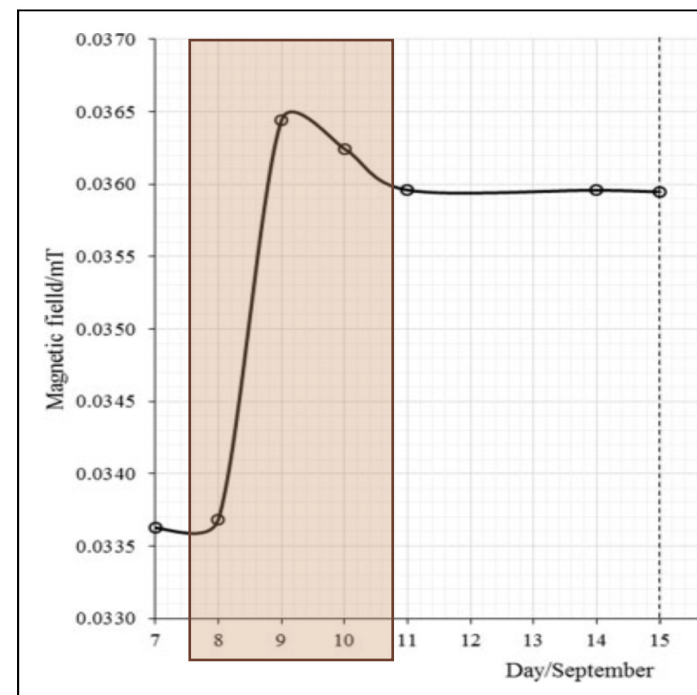
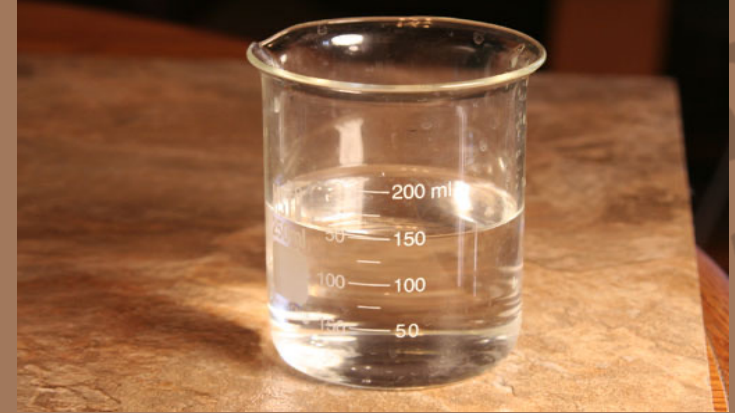
## Magnetic Field

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- Goal: Team of physicists wanted to **measure “intention” of energy**
- Across 4 days at 1-2pm, 286 trained biofield practitioners (healing touch and *Reiki*) around the world were sent a photo of a glass of water that stood alone in a laboratory. They were asked to **“change the vibrational state of the water molecules contained in the flask”**
- Scientists measured the **magnetic field** in the laboratory room and the real-time **pH** value of the water



### Instrumental Measurements of Water and the Surrounding Space During a Randomized Blinded Controlled Trial of Focused Intention



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# LIMITATIONS MEASURING EXTERNAL QI



Noticeably, many researchers are obsessed with the traditional idea of a “signal”—that is, some form of subtle energy that passes between point A and point B, between healer and subject



When scientists use the term “External Qi” they imply that some actual form of energy that can be detected by instruments sensitive enough is flowing from the healer. However, research points to the fact that healing involves mostly the intention of the healer (*Yi*), meaning physical signals might not be detectable. Many researchers claim that it seems impractical to measure something supposed to be in a hidden dimension and which involves *Yi* or a mental state



Thus, what we can actually study in Qi research may be the effect of Qi - that is, what is changed during the process (pre-post studies). We will have measured outcomes (i.e., HRV, psychological health), not Qi or its mechanism

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# LIMITATIONS MEASURING EXTERNAL QI

Quotes from Kevin Chen (a leader in Qi Research)

*“To address the question frequently asked by scientific reviewers—How do we know that External Qi actually occurred?—my answer would be that we observe measurable changes after External Qi Therapy, and these changes cannot be explained by any other known factors. Given the appropriate equipment and sufficient funding, we might be able to measure some physical signals, although this might not be reliable. However, with careful design and creative manipulation, it is still possible to study External Qi and the effects of External Qi Therapy.”*

# LIMITATIONS MEASURING EXTERNAL QI

Quotes from Kevin Chen (a leader in Qi Research)

*“So far most published reports on Qigong practice have been on Qigong intervention alone or combined with other therapies to treat a specific health condition such as hypertension, pain, sleeping disorder, or anxiety, and focus on clinical outcomes for that condition during a specified period of study. However, most Qigong was not created as a therapy but as a daily wellness practice that helps practitioners achieve mind–body balance, harmony in life, or reach higher spirituality.*

*If you ask a Qigong practitioner why they practice Qigong daily and what they have gained from the practice, you will get answers such as a more relaxed, harmonious state of mind and body, noticeable reduction in prior alignments, reduction in stress, increased resistance to illness, heightened sensitivity to the body’s internal organs, and the ability to regulate health and vitality. **In other words, Qigong practice is more a prevention than an intervention and more a lifestyle than a clinical therapy.** If researchers start thinking of Qigong practice as a means of lifestyle change or a way of life that offers self-healing, Qigong research study design would be very different.”*

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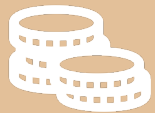
# MY RECOMMENDATIONS



We start with **achievable outcome measures** of Qigong



**Pre-post studies** with Qigong as the intervention (similar to the kindergarten or Prison work)



We choose outcome measures from the table listed which are **cost-friendly**



**Collaborate with the authors** who are leading Qigong research and **work together on new projects with more complex technology** (i.e., magnetic fields, thermal imaging, molecule changes)





# MY RECOMMENDED STUDY DESIGNS

## Coherence scores for people taking a course held by the Institute


- ✓ Coherence either pre-post course, or during the sessions
- ✓ Choose several other health-related outcomes (i.e., HR, psychological questionnaires etc.)
- ✓ Would need to buy more EmWaves for good sample size

## Infrared Thermography study

- ✓ Try to replicate findings from case study by Matos et al. 2012/2015
- ✓ Already in contact with Luís Matos, he is willing to collaborate with the institute
- ✓ May need to buy/rent thermal imaging camera (~1000 Euros)

## Measure skin conductivity using AccuGraph

- ✓ Pre-post study, how meridian energy balance improves with Qigong sessions over several weeks
- ✓ Research field is gaining attention, AcuGraph is reliable
- ✓ More technically difficult, as nobody is trained to measure Ryodoraku points



Thank you for your attention.