

# **Ryodoraku History and Research**

**By**

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### Ryodoraku History:

In 1950, Yoshio Nakatani M.D., Ph.D. was measuring electrical resistance of the skin in an edematous patient with nephritis, when he found a line, similar to the kidney meridian of acupuncture, that had a series of points at which increased electrical conductance was measured on the surface of the skin. He carefully checked this phenomenon in 10 other patients with kidney disease and found it present in all, while it was never present in healthy subjects. Because this line offered increased electrical conductance, and seemed to follow the traditional kidney meridian, he named this line, the kidney “ryodoraku” (ryo=good, ‘do=(electro) conductive, ‘raku=line.) (5). A better English translation might be, “good electrical pathway.”

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Upon further research, Dr. Nakatani found other ryodoraku lines, corresponding to organ disorders, and following the classical Chinese meridian pathways. He named the lines for their origins either on the hands or feet, designated “H” or “F.” Thus H1-H6 are the 6 ryodoraku of the arm, which begin or end on the hand, and F1-F6 are the 6 ryodoraku of the leg, which begin or end on the foot. Often, these designations are used interchangeably with the classical Chinese meridian organ names. Thus, H1 is the lung meridian, H2 is the pericardium meridian, and so on. A complete list of these correlations is given in Table 1.

As the ryodoraku lines were investigated further, it was discovered that excessive resistance, and consequent poor electrical conduction, also followed the ryodoraku lines. Thus, the lines were capable of both excessive and deficient electrical conductance. These measurements were correlated with patient symptoms, and various symptoms charts resulted. See Table 1.

The hand and foot meridians were measured at points on the wrists and ankles. These points are commonly known in traditional Chinese acupuncture as “Source” points or “Yuan” points. Today, these points are also known as “Nakatani” points in honor of Dr. Nakatani.

Source (Yuan) points are the most energetically active points on the meridians, with 4-6 times more energetic activity than other points. The source points are most associated with the internal organs and with the general energetic state of the meridians. These points are therefore extremely effective for measuring levels of meridian energy, or Qi.

Dr. Nakatani refined his procedures to encompass both diagnosis and treatment. Diagnosis was performed with an electrical instrument that measured electrical conductivity of the skin. By measuring the conductivity of each meridian, energetic excesses and deficiencies could be located and charted. Treatment consisted of stimulating specific acupuncture points to either “tonify” a deficient meridian, or “sedate” an excessive meridian. An additional set of acupuncture points was used to balance meridians that showed significant energetic differences between the right and left sides of the body. These imbalances, referred to as “split” meridians, were treated with a set of acupuncture points called “Luo” points in Chinese acupuncture.

Because all patients have different electrical conductivity potentials, measurements were never absolute, but rather were taken relative to all other measurements on the same patient. Thus, the deviation from the average measurement was far more important than the actual measurement itself. Deviation was determined by plotting the ryodoraku measurements on a chart and looking for outliers from the mean. To assist in locating outliers, the practitioner drew two lines designed to encompass the majority of measurements, in an area known as the “physiological corridor.” The measurements outside the lines were deemed abnormal, and treatment was applied to restore balance to these abnormal meridians. This was the beginning of meridian graphing. See Figure 1 for illustration.

### Electroacupuncture:

Meanwhile, another researcher, Dr. Kobei Akabane developed a novel way to measure meridian energies using the Jing-well (Tsing) points at the finger tips and toe tips. Dr. Akabane counted the number of strokes of burning wood across the Jing-well point required to produce the sensory perception of heat. The number of strokes required was inversely correlated with the energy level in the meridian.

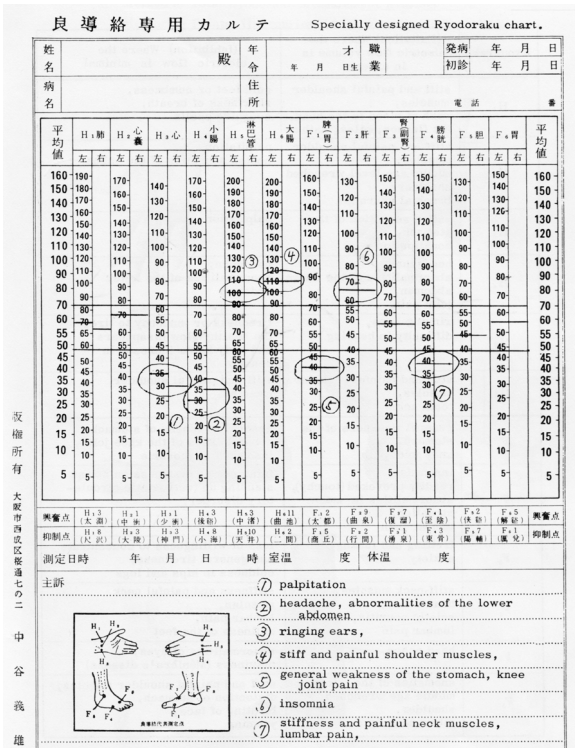


Figure 1: Ryodoraku Chart (Source: Nakatani 1972)

Since then, Dr. Akabane's methods were adapted to electronic measurement, with good results. Jing-well (Tsing) point graphs measure the general energetic balance of the meridians, as do Source (Yuan) point graphs. The Jing-well points, because they are the connection points to the musculotendino meridians, may tend to reveal imbalances associated with musculoskeletal complaints, as well as more chronic conditions. Tsing point graphs do not show as much variability as source point graphs, but the variability they show is clinically important.

In addition to merely "sedating" excessive meridians, or "tonifying" deficient meridians, the methods employed by AcuGraph harness the power of the 5-elements model, using control points to most effectively move energy from excess to deficiency—resulting in clinically superior results with fewer treatment points.

### Studies and Effectiveness

Since the original work of these pioneers, a variety of research studies have sought to further the body of knowledge about ryodoraku diagnosis and treatment and the electrical characteristics of the acupuncture meridians. The result is that there can be no doubt the acupuncture meridians are electrically active, and that ryodoraku therapy is an effective way to locate energy imbalances,

determine potential pathology, and make energetic corrections to restore balance.

Numerous studies have verified increased electrical conductance and propagation along acupuncture meridians and at acupuncture points. (6,7) Furthermore, a preliminary study of 12 subjects has shown indications that the inductive capacitance inherent in the acupuncture meridian system shows a preferential resonance at certain frequencies commonly occurring in other natural phenomena, including interactions between the earth and the ionosphere, and those frequencies commonly seen in EEG studies. (8) In other words, the meridians not only conduct electricity, they likely also resonate with the earth's electromagnetic frequencies and with human brainwaves.

Because ryodoraku diagnosis consists of measuring skin electrical conductance, much research has focused on the reliability and clinical value of these measurements. Numerous studies have been performed in this area, and the most notable will be discussed here.

At the basic level, the surface electrical resistance of living human skin is measurable at between 500 Ω and 9 MΩ. (9) A trio of Chinese skin resistance studies showed that acupuncture meridians can be located with a precision of 5mm using skin resistance measurements alone, (10,11, 12) which will vary by a factor of 2x-6x from surrounding skin. These measurements have been shown to be reliable across a variety of measurement voltages and procedures. It is notable that these measurements become unreliable at measurement voltages exceeding 65 volts, with the meridians showing the same resistance as surrounding skin above this voltage. (13) Numerous devices are available to take these measurements, ranging from hand-held probes to computer-controlled systems. (14) All of these devices use similar instrumentation and procedures, consisting of a direct current voltage source supplying regulated voltage at a probe, a ground contacting the patient remotely from the measurement site, and a voltmeter in the circuit to measure the voltage drop from the source to the ground. Ohm's law is used to calculate the resistance from the voltage drop. Measurements taken in this way have been shown to be reliable across variables of pressure applied to the skin with the electrode, duration of measurement, and repetition of measurement. (15)

Changes in skin resistance have been noted during acupuncture needle treatment. A study of 12 patients showed significant decrease in skin impedance on the pericardium meridian during needling, with no corresponding change in control points. (16) The decrease appears quite rapidly; skin resistance can be expected to change as much as 60% within 6 seconds of needle insertion. (17) Specific meridian electrical changes have also been correlated with duration of facial nerve neuritis, with early, middle, and late stages of the disorder manifesting as different electrical characteristics of the skin. (18)

Aside from the well-researched electrical characteristics of the meridians mentioned above, other meridian properties also deserve mention. For example, the meridians have been shown to store more electrical energy than surrounding skin. This potential to store electrical energy, known as “capacitance,” is approximately 5 times higher in skin over acupuncture meridians than it is in surrounding skin. (17) Aside from conducting and storing electrical energy, the meridians have also been shown to conduct light. When Russian researchers studied depth of penetration of light into the skin, they found that light penetrated deeper at locations of known acupuncture points and that light could be measured at remote points along the same meridian, but not in the surrounding tissue. (19) Prior to this light research, Kirlian photography had long been used to photograph and measure acupuncture points, and acupuncture points were known to be bioluminescent. (20) Acupuncture points also differ thermally from surrounding skin, producing more infrared emissions than surrounding skin. Techniques of infrared photography and observation can readily identify acupuncture channels. (21)

A summary of measurable surface attributes of acupuncture meridians is provided as follows: (17)

1. High electric potentials (up to 300 mV)
2. High electric capacitance values (0.1-1.0 mF)
3. Low electrical resistance
4. Increased skin perspiration

5. High local temperature
6. Spontaneous visible light emission from the jing-well (tsing) and yuan (source) points
7. Sound signals at the acupuncture points (2-15 Hz, amplitude 0.5-1mV, sharp or sine wave)

No anatomical structure of the meridian system has been definitively identified. Various explanations have been advanced, attributing the phenomena associated with meridians to various anatomic structures or physiologic features. (17) The most recent research available advances the theory that acupuncture energy actually travels in the fascia of the body, and that acupuncture points are actually areas of intersection of multiple fascial planes. The electrically conductive nature of the fascia correlates this theory with the electrical properties of the acupuncture meridians, and dissection studies provide good evidence in favor of this theory. Of course, much more research will be required to shed further light in this area. (22)

Of all the meridian attributes, the electrical attributes, and resistance specifically, is most easily measured, using AcuGraph®—the most readily available and technologically advanced equipment. Therefore, electrical evaluation of the meridian system is valid, well-researched, and readily available to the practitioner.

Furthermore, studies involving inter-examiner reliability, and inter-equipment reliability show a high reliability of ryodoraku measurements. (14,17)

Studies of ryodoraku in medical diagnosis are plentiful, and range from single case studies, to double-blind trials. Some of the more notable examples follow:

- A single-case study published in 1987 gave an example of early detection of cancer using ryodoraku. (23). The author is personally acquainted with a practitioner who detected his own metastatic renal cancer with ryodoraku measurement. The cancer was subsequently identified on both MRI and bone scan, and successfully treated.

- In a group of 132 patients with diagnosed pseudoarticular pain syndrome (57 patients) or evident sciatic neuralgia (75 patients) electrodermal measurement was used in conjunction with clinical and radiological evaluation. Statistically significant electrodermal conduction differences were found in the patients with sciatic neuralgia, as compared with patients with pseudoarticular pain syndrome. (2)
- A study of 12 patients with chronic renal insufficiency demonstrated that those patients who were responding well to treatment also showed improved ryodoraku parameters, while those patients who were not responding well showed deterioration of ryodoraku parameters. The study concluded that ryodoraku is a valid measure of autonomic nervous system activity, as related to kidney pathology. (3)
- A Russian study performed ryodoraku evaluation on 86 surgical patients during resuscitation. A significant correlation was found between positive ryodoraku evaluation and positive post-surgical recovery. (24)
- A study involving 40 laproscopic cholecystectomy patients against 55 healthy controls showed decreased sympathetic nervous system activity, as evidenced by ryodoraku examination, during surgery, vs. no change in the control group. The study concluded ryodoraku is a useful tool for evaluation of sympathetic nervous system activity. (25)
- In a study of 20 migraine headache patients treated with ryodoraku therapy, 15 of the 20 achieved good to excellent results. (4)

The above studies and many others have clearly established the electrical properties of the acupuncture system and the validity of ryodoraku measurements and treatment. AcuGraph has taken Ryodoraku to a whole new level of ease and effectiveness, giving acupuncture practitioners powerful new tools for helping patients achieve balance.

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