

Piezoelectricity and the Piezo Pen



Piezoelectric and the Piezo Pen

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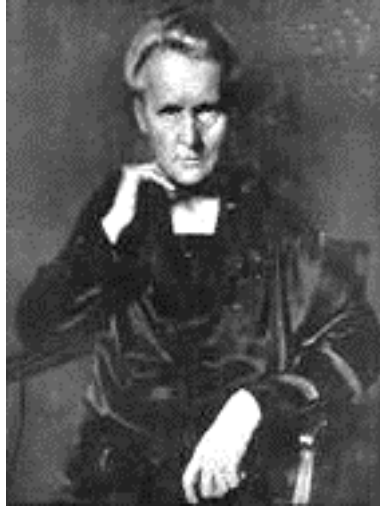
Introduction to Piezoelectricity

We should have a good working knowledge of what piezoelectricity is and how we can best use it to service our patients. To do this I will first layout a reasonable connection between piezoelectric and acupuncture Point theory.

To fully grasp the idea of piezoelectricity as a therapy it's essential we understand the concept of electric conductivity of the acupuncture points.

The key to successfully implementing piezoelectric into your acupuncture practice. It will also help service you when you inform your patients of this remarkable therapy.

The Discovery of Piezoelectricity



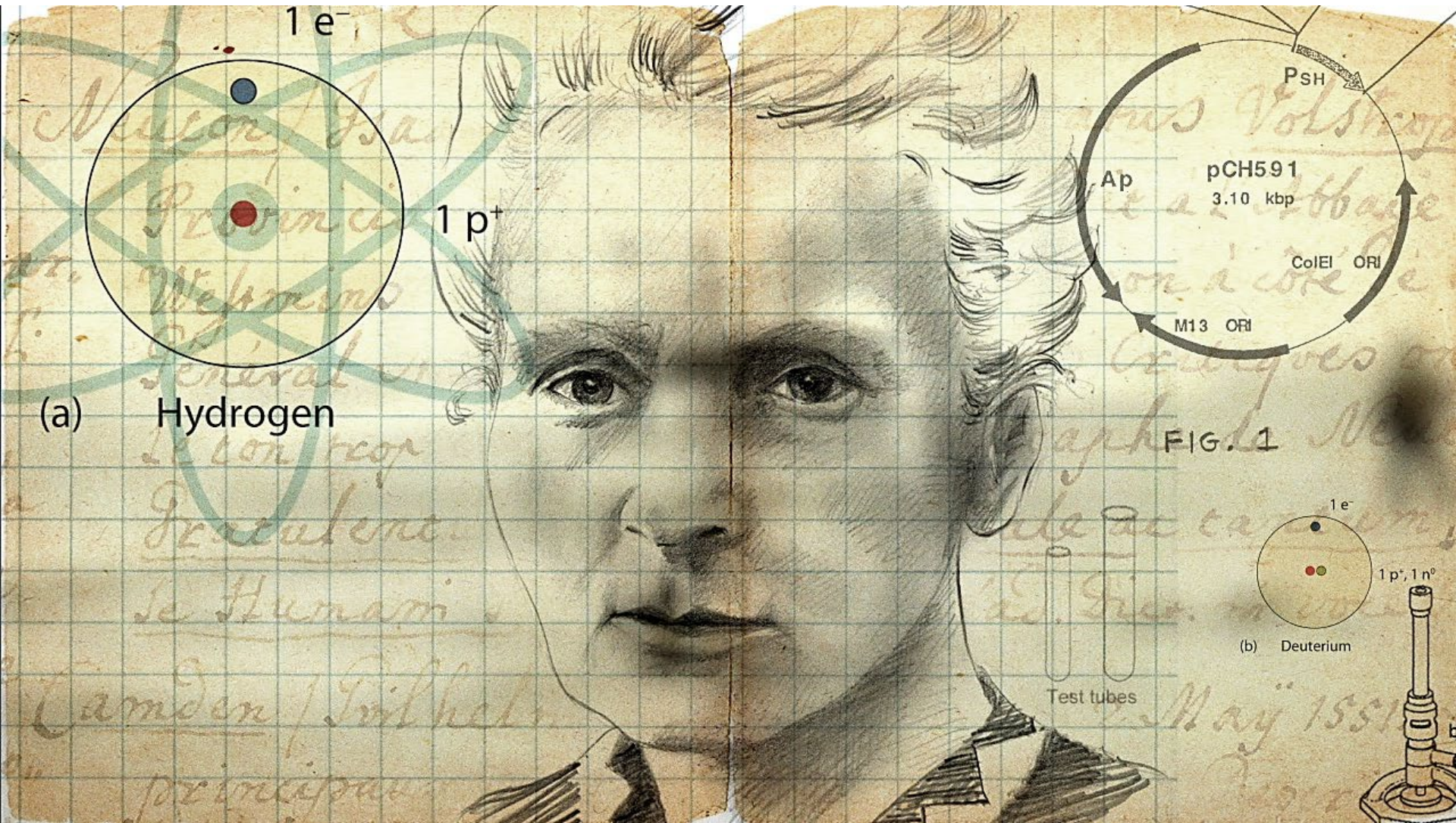
Jacques Curie (1856 –1941)



Pierre Curie (1859-1906)
Nobel Prize in Physics, 1903

Piezoelectricity was discovered in 1880 by French physicists Jacques and Pierre Curie. The word Piezo (pie zoe) is derived from the Greek word for “pressure.” The French brothers Jacques and Pierre Curie discovered that pressure applied to a quartz crystal created an electrical charge. This was called the “Piezo Effect.”

The Noble Prize Family



Marie Curie (Pierre Curie wife) is only one of two people to ever win two Nobel Prizes in different fields (physics 1903, chemistry 1911)

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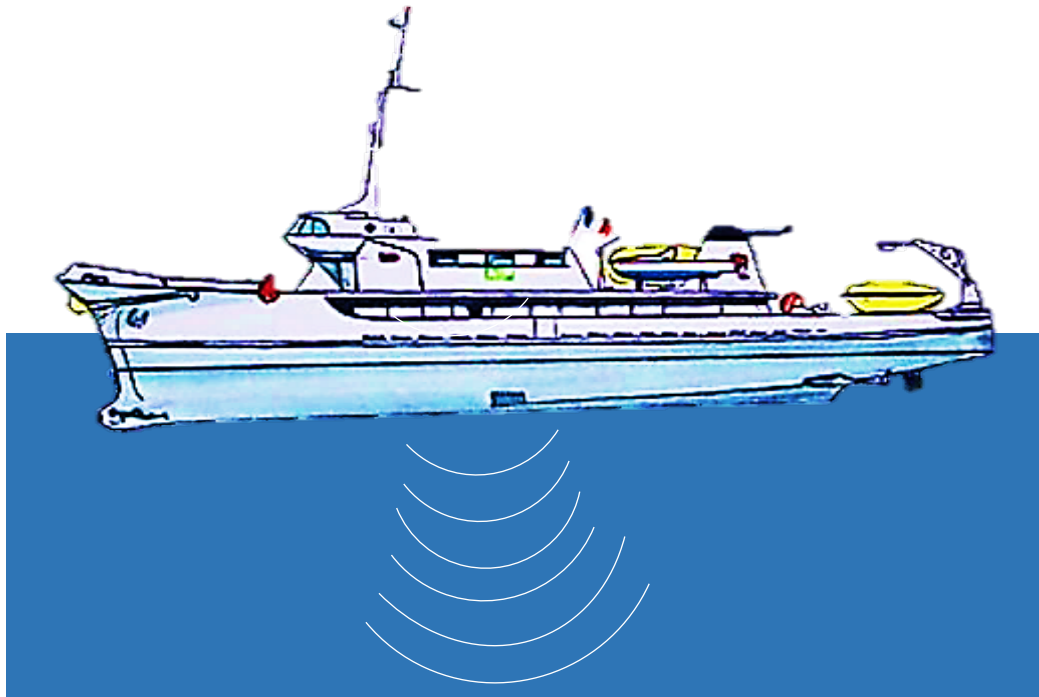
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The Earliest use of Piezoelectricity



Though the Curie brother had only discovered Piezoelectricity two years prior, in 1882 Piezoelectricity was put to use. European scientific community found it useful in thermodynamics and quantifying complex relationships among mechanical, thermal and electrical variables.

Underwater Communication (Sonar)



In 1917, P. Langevin and his French co-workers made a transducer that was a mosaic of thin quartz crystals glued between two steel plates (the composite having a resonant frequency of about 50 KHz) today we know this as sonar. The piezoelectricity is discharged and an acoustic wave is bounced off the ocean floor. The wave then bounces back to vessel with data on what the acoustic wave picked up..

The First Commercial uses of Piezoelectricity



The second-generation applications with piezoelectric (1940 – 1965) saw its first commercial use. In 1951 the Japanese successfully tested the world's first fish-finder. This was the first of many commercial uses of piezoelectricity. Today you can find piezoelectricity in use from the hospital or to city sidewalks just to name a few. More information on these uses coming.

Paris, the City of Piezoelectricity



The 37th running of the Paris marathon saw Kenya's 🇰🇪 Peter Some ran to victory in a time of 2:05:35 (4:47 per mile). Peter and his follow 37,000 runners took part in a truly historic event. As the runners approached the finish line the course was the course was Covered with about 176 special tiles, these tiles generated electricity as the runners passed over them.

Running = Piezoelectricity



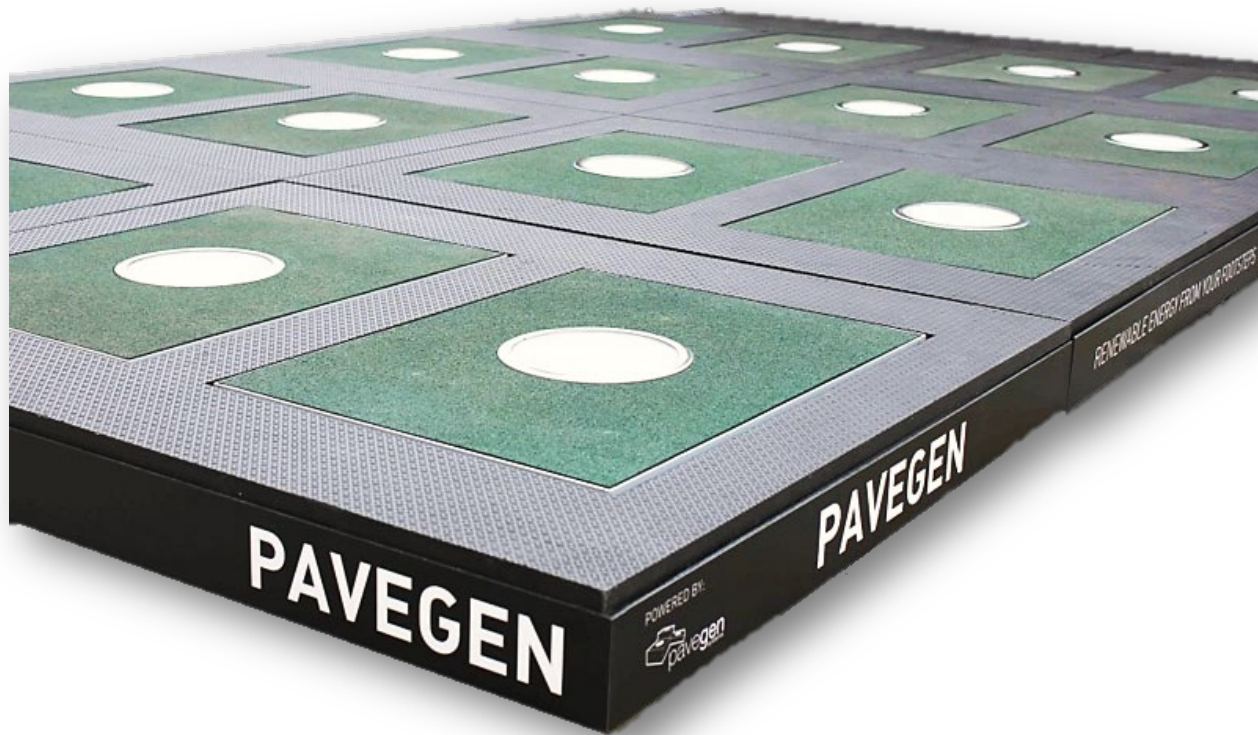
The 2013 edition of the Paris Marathon lived up to its nickname, the “city of lights”. 176 special piezo tiles lined the final 25 meters of the Paris race. When the 38690 runners in the race ran over the piezo mats it generated a total of 4.7 kilowatt-hours of energy.

Piezoelectricity By the Numbers



4.7 watts of energy will power the following (time); a 5-watt LED light for 940 hours. If the entire course was lined with this matts it would have powered that 5-watt light for 181 years, or 1,585,560 hours

Piezoelectricity Floor Generating Tiles



This piezo electric street tiles are made in the UK. The body of the tiles is made of recycled polymer materials. While the surface of the tiles are made from recycled truck tires.

I ♥ NY



New York City's Time Square sidewalk gets roughly 350,000 pedestrians every day, equal to around 650 million steps per day. Multiplying this by the number of steps total for one day and then for one year, the amount of energy produced for one year is 1,105GJ. This is equal to about 307,000 kWh per year of electricity produced. Installing these tiles would save NYC \$46,042 per year. Unfortunately, each tile costs well over \$100 per tile. Needing around 236,000 of them, it would cost upwards of \$23 million dollars for the tiles.

Structural Health Monitoring



Piezoelectricity is used in (SHM), where the integrity of mechanical structures (such as an airplane) is checked while in use. This is highly relevant where safety is an important issue e.g. transport structures, infrastructure and building structures

Piezoelectricity is All Around Us

You can find piezoelectricity in air bag sensor, audible alarms, keyless door entry, seat belt buzzers, knock sensors, Disc drives, inkjet printers Cigarette lighters, depth finders, fish finders, sonar, humidifiers, jewelry cleaners, musical instruments, speakers, telephones Disposable patient monitors, fetal heart monitors, ultrasonic imaging. Depth sounders, guidance systems, hydrophones, guitar pick-ups, smoke detectors, alarms etc..

Piezoelectricity and the Piezo Pen

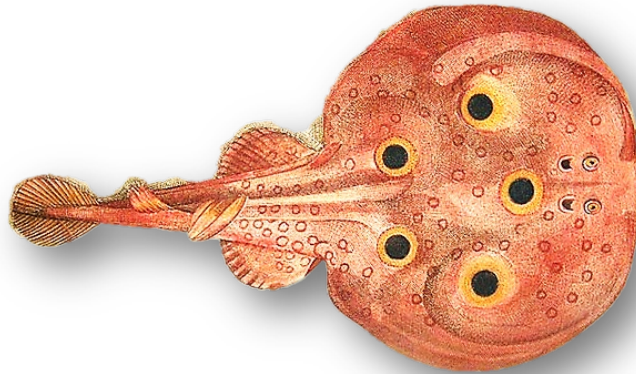
Now that we understand the concepts and discovery of piezoelectricity we can now proceed. knowing the many practical uses of piezoelectricity will aide us in using this natural energy as a form of therapy.

Before we get to the piezo pen protocols, I must first lay the groundwork that will allow us to properly and safely use it on our patients. This knowledge will also help to service well when your patients question you about the therapy.

This line of therapy is not suited for everyone, I will discuss this in detail in the up coming pages

Electricity as a Medical Treatment

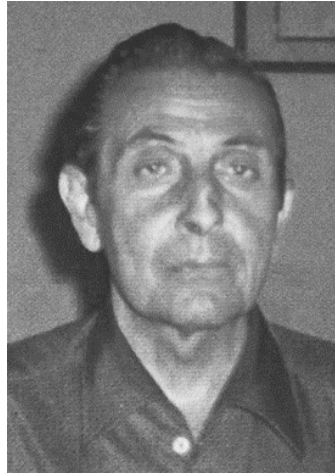
Rudimentary forms of electricity have been used as medical treatments by ancient Greeks and Egyptians physicians with a family of electric rays known as Torpediniformes.



Torpedo Fish (Electric ray)

Piezoelectricity is a new discovery dating back to 1880. Though its s fairly-new, piezoelectricity can be observed today in use from sidewalks to the most modern operating rooms in the world, to just name a few of it uses.

Enter Jacques Niboyet



Jacques-Emile Henri Niboyet, M.D. (1913-1986)

The French doctor, Jacques-Emile Henri Niboyet Pioneer's work on the electrically conductive acupuncture points helped give creditability to the practice of acupuncture.

Niboyet used a sensitive instrument known as a galvanometer to detect and measure the electric current of the skin. During his experiments Niboyet noticed a difference in the skin over acupuncture point versus the surrounding skin. He observed that the skin over acupuncture points had a significantly lower electrical resistance than the surrounding skin.

Confirmation of Niboyet's Work



Pierre Rabischong



Jean Bossy (1929-2009)

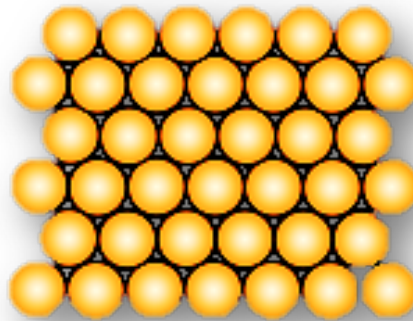
Rabischong and Bossy separately reproduced Niboyet's studies in 1975 and found that Points of lowered electrical resistance could be identified in fresh or embalmed cadavers, But not on completely dry cadavers. In moist cadavers preserved in glycerin, an Electrical detectors using a one square-millimeter contact reacted at acupuncture points Located on all regions of the body's surface. Bossy's studies suggested that transmission Of acupuncture electrical activity is not entirely dependent on an intact nervous system, and That moisture and electrolytes appear to be necessary vectors for transmission of electricity Between the points.

By Mechanical or Mental (stress) Stimuli

There are receptor connections between the outside and inside of the cell, linking to signaling pathways that convey mechanical stimuli information to the nucleus. Receptors are able to convert mechanical energy into chemical stimuli that can be conducted inside the cell. Past soft tissue articles in this journal have given evidence of pressure on tendons causing a proliferation of fibroblasts and initiation of an inflammatory cascade, resulting in the laying down of new collagen along the normal lines of stress. An often-overlooked benefit of soft tissue loading is the piezoelectric effect. Stress in the body produced by mechanical or mental stimuli will create piezoelectricity.

Human Tissue and Piezoelectricity

Proteins, nucleic acids and mucopolysaccharides, which compose all living tissue in the human body, exhibit piezoelectric properties. This piezoelectric induced current activates the healing processes in the stimulated area. Thus, this mechanically induced electrical energy has great regulatory effect on the cellular and molecular levels.



Crystalline arrangement

Crystalline arrangements are the rule in living tissue, not the exception. These crystals are piezoelectric, meaning they generate electric fields when compressed or stretched. When a bone or cartilage is compressed, or a tendon or ligament stretched, or when skin is stretched, electric pulsations are created.

My (*Anal o gy*) of the Piezo Pen

How does the piezo pen work? I have no scientific proof as to how it works, nor could I find any one who did. After seeing it work many times in my option its more then chance, coincidence or placebo. My analogy (***definition***; comparison between two things, typically on the basis of their structure and for the purpose of explanation or clarification) draws off of two facts.

First, acupuncture points have a significantly lower electrical resistance then the surrounding skin (Niboyet 1956). Second, piezoelectricity is natural produced in our bodies. It's with these to ideas that I base my analogy as a possible means to the piezo pens results as a therapy.

A (unknown) World of Endless Possibilities



The Piezo pen is growing in popularity among acupuncturist who treat patients that are needle phobic or just don't want needles. Unfortunately, there are not many articles or classes out there that teach you how and when to use the piezo pen. We can thank Takeyoshi Yamaguchi, MD of Japan for invention this phenomenal device

The goal of this guide is to help explain what piezoelectricity is and how it can help us, even if we are not a wear of it.

Procced with Causation

The practitioner (you) are part of the treatment. By touching the patient you will make a complete closed electorol circuit. Both you and your patients will feel the electorol correct. It feels the same as when you slide over a carpet and touch a metal object.

If you are energy sensitive?, Does you watch ever stop working, do you effect machines around i.e. computers. Do you wear crystals? Do you have more then 3 cats in your apartment? Have you ever caused a plane to crash? If you answered yes to any of these questions Then yes you are energy sensitive, Do not preform this technique.

If your patient are energy sensitive, they will tell you. If they are Do not use the piezo pen on them. If any one of the parties in this treatment is it will scatter their qi

Piezo Pen Basics

Important Considerations - *Is the patient a good candidate*

Clinical Application - *How to properly use the piezo pen*

Benefits - *What can the piezo pen treat*

Voltage and current - *Piezo pen discharges 6000 volts of electricity*

Waveform characteristics - *Delivers a chaotic wave pattern*

Safety Reliability - *The piezo pen is a medical device and should
ONLY be used for this purpose*

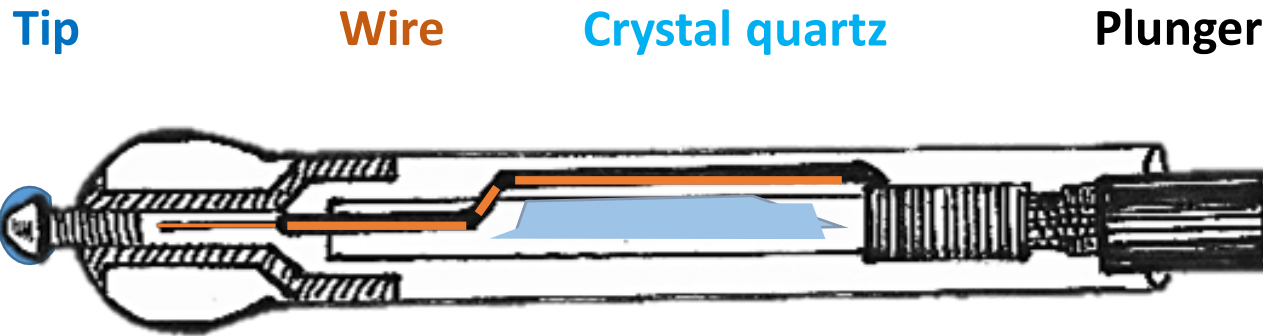
Piezo Pen Basics

Patients who have the following conditions should not be treated with the piezo pen implanted electronic devices, e.g. a pacemaker, insulin pump, or women who are pregnant.

The Piezo pen can last up to 10 years if it is properly cared for. Do not click the piezo pen in the air. Always make sure it is touching skin. If not, it will wear the crystal down very quickly.

Quartz Crystal (the crystal inside the piezo pen) is the second most abundant mineral found within the Earth's continental crust.

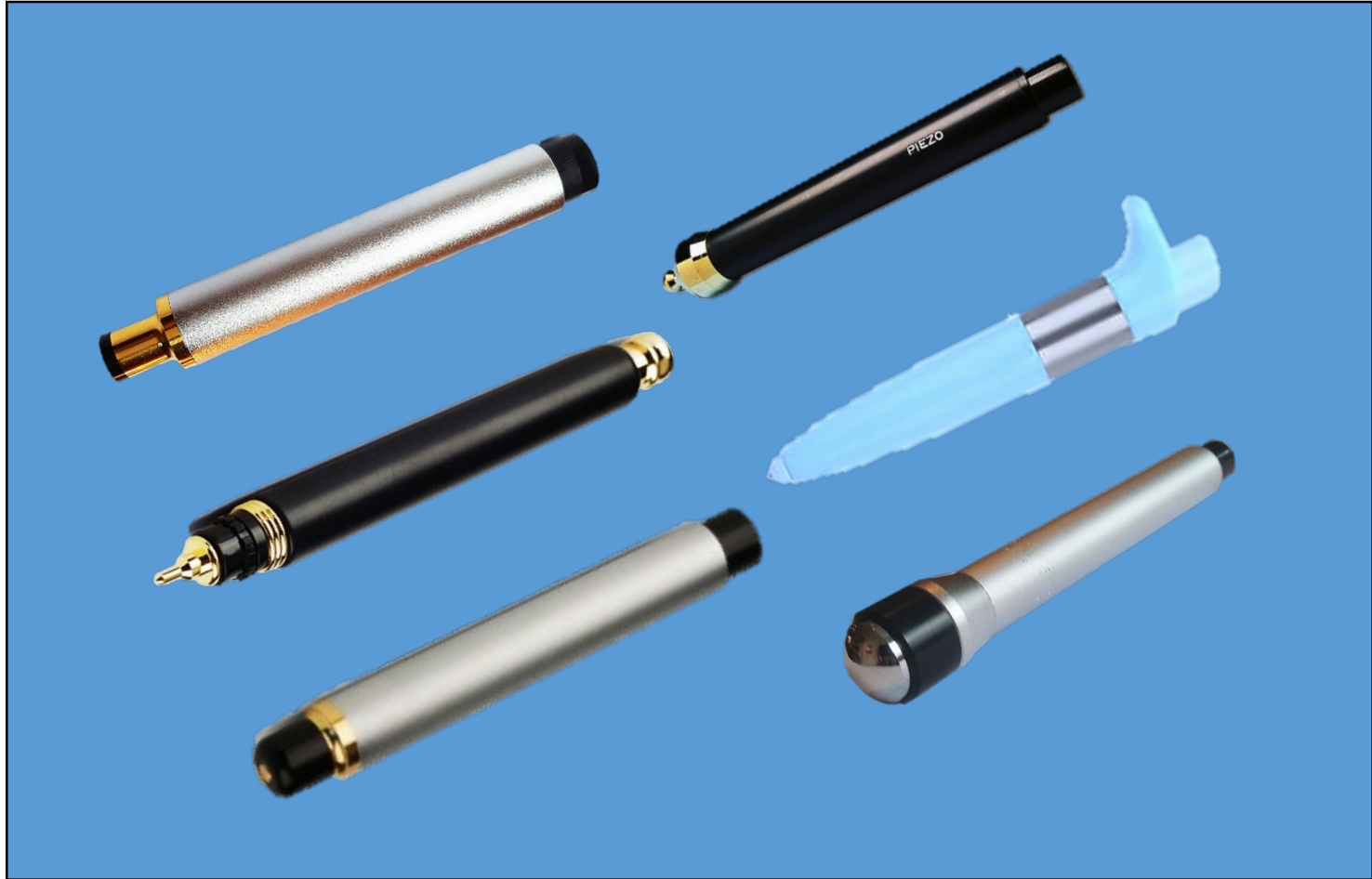
Anatomy of the Piezo Pen



When piezoelectricity is administered via a piezo pen. Each click of the plunger will send a stimulation lasting about a $1/10^{\text{th}}$ of a second. Every click of the piezo pen produces about 6000 volts with very little amp ridge with a chaotic wave pattern.

Clicking the plunger of the Piezo pen creates pressure that travels down the cylinder of the pen. This pressure passes over the crystal quartz causing a piezoelectric current. The current is transferred down the pen via a wire to the tip of the piezo pen.

Piezo Pens Come in Different Styles



How to Hold the Piezo Pen



Hold the piezo Pen in one hand with your thumb on the plunger at the back end of the pen. With your other hand place your index finger on the acupuncture point of your patient that you are treating, or the desired location you are going to treat.

Make sure your index finger or the piezo pen are touching the patient's skin. If any part of your finger/body or pen is touching any article of your clothes or your patient this will lessen the piezo effect