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Medicine in Stamps

Josef Leopold Auenbrugger (1722 - 1809): father of percussion

S Y Tan, MD, JD and M Hu*

Professor of Medicine

Adjunct Professor of Law, University of Hawaii

** Senior medical student at the University of Hawaii, John A. Burn's School of Medicine*

All medical students learn percussion as an integral part of the physical examination. They quickly grasp the concept because of its logic and simplicity. Yet the discovery of percussion, and its acceptance, did not come about easily. Eighteenth-century Europe sported influential bedside teachers like Boerhaave and Van Swieten, but history-taking and inspection were still the main tools of diagnosis, and the physical examination consisted of counting respiration and pulse. Measuring body temperature was just introduced and not yet standard practice. And there was no stethoscope to listen with.

Percussionist: It was Auenbrugger, a kind, charitable and nature-loving Austrian physician, who gave the profession the art of percussion. Growing up in his father's inn, he learned to tap along the sides of wine barrels to check how much wine remained. Long before he thumped on any human chest, he was already familiar with the hollow sound of air and the dull sound of fluid. Coupled with his interest in pulmonary diseases and a musical talent, he conceived of a way to view the thorax through his ears and fingers.

Born Leopold Auenbrugger in Graz, Austria, he later gained the name Josef after being knighted by Emperor Franz Joseph II. He studied under Gerhard Van Swieten, the man who had adopted Hermann Boerhaave's method of bedside teaching and made the University of Vienna famous. Learning from his father's altruism, Auenbrugger worked for many years without pay, helping poor students and patients. Although he wrote on diverse topics such as suicide, the use of camphor in mania, dysentery and influenza, his main devotion was the study of lung diseases.

At the time of his discovery, Auenbrugger was a volunteer medical attendant at the Spanish military hospital where he encountered innumerable cases of lung disease especially tuberculosis, brought about by crowded living conditions and poor sanitation. At autopsy, he found that many of his patients had fatal fluids in their lungs. Which sparked the vital question – could this have been diagnosed while the patients were still alive? Was the human thorax a living wine barrel that would offer up sounds to indicate its fluid level? The curious doctor, with his fingertips gently striking his patients' chests, tapped out sounds that were music to his ears. He termed his drumming technique "percussion."

The young researcher was right; the thorax did resemble the barrel, just more complex with varying degrees of dullness and resonance. He learned that the healthy lung "resembles the stifled sound of a drum covered with a thick woolen cloth," whereas in the diseased lung it "yields a sound duller than natural." He further noted that "the duller the sound, and the more nearly approaching that of a fleshy limb stricken, the more severe the disease." This dull sound is known as the Schenkelton, the thigh sound. Students today are still taught to percuss the thigh as an example of dullness or flatness.

The encouraging results of his discovery fueled seven years of perseverance. He would percuss the thoraces of cadavers, fill them with water, and compare the different sounds. Injecting water into the cadaveric pleural space, he practiced searching for its fluid level. To confirm the effectiveness of his percussion he would regularly predict the patient's condition during life, and then compare it with the autopsy findings.

In 1761, Leopold Auenbrugger published his results in a 95-page paper entitled *Inventum Novum* (New Discovery). In modern print it would correlate to approximately 24 pages, short in comparison to other writings of his day. He realised the importance of his work and introduced it with the following preface:

"I here present . . . a new sign I have discovered for detecting diseases of the chest. This consists in the percussion of the human thorax, whereby . . . an opinion is formed of the internal state of the cavity . . . Perhaps also, the same observation and experience may lead to the discovery of other truths . . . in the diagnosis, prognosis and cure of thoracic affections."

Rejection: Auenbrugger gave the world a gem but was repaid with criticism and disregard. The medical community was skeptical that thumping the exterior chest could reveal information about its elusive interior, and promptly rejected his discovery.

His idea was so poorly received that he was forced to resign from the Spanish military hospital. Whether he was a pessimist or an extreme realist, he had anticipated the difficulty he would encounter:

"I have not been unconscious of the dangers I must encounter; since it has always been the fate of those who have illustrated or improved the arts and sciences by their discoveries, to be beset by envy, malice, hatred, detraction, and calumny."

His greatest sadness was probably the rejection of his work by his teacher, Van Swieten, for whom he had dedicated one of his books. Van Swieten was himself involved in the study of pulmonary diseases, yet he entirely ignored his pupil's methods. Another physician, Rudolf Vogel, unkindly commented that Auenbrugger's proposal was nothing new, and that it had already been discovered during Hippocrates' time.

Revival: Auenbrugger's publication was not a total failure. It caught the attention of a few physicians, especially Maximilian Stoll, the director of the Spanish military hospital. Dr. Stoll employed percussion as an aid to find the appropriate level for performing thoracentesis, and his students continued his work and later published it, acknowledging the use of percussion and its applications. A copy of this book eventually made its way into the hands of the famous French physician Corvisart who was Napoleon's personal physician.

Corvisart was trained in surgery but could not find a reputable job because he refused to wear a wig. He then turned to the field of internal medicine and headed for the renowned University of Vienna. Fate brought him upon Stoll's work on percussion. Practicing on his patients, he realised its value, and even used it to assess Napoleon Bonaparte's cough. In 1808, after twenty years of practicing percussion, Corvisart translated the *Inventum Novum* into French and with his own commentaries, expanded it to 440 pages. His introduction started with the following acknowledgement: "it is he (von Auenbrugg) and the beautiful invention which of right belongs to him, that I desire to call to life." Published a year before Auenbrugger's death, it remains unknown whether Auenbrugger was aware of the recognition gained.

Influence of Percussion: The percussion method sparked passionate debates over the use of light and heavy techniques, and the advocacy of daily wrist exercises! Many tried to improve on the technique. Auenbrugger had used immediate percussion whereby he tapped directly on the patient's chest with his fingers. A physician named Piorry introduced mediate percussion by using a pleximeter – a small piece of ivory that was interposed between the chest and the finger. Other types of pleximeters, hammers, and rods were soon invented, but it was the visitors of Piorry's clinic who gave us the modern technique of using the digits of the non-striking hand as pleximeters.

Inventum Novum detailed 14 observations, two of which concerned the heart. When the technique gained popularity, cardiologists used it extensively. They soon expanded on Auenbrugger's observations, mapping out the borders of the heart, measuring diameters, and differentiating cardiomegaly from pericardial effusions. Some even claimed to be able to locate calcified valves.

Auenbrugger died from a fatal pneumonia. Legend has it that he predicted his own death: "Shortly before noon of the day of his death, he surveyed his condition and looking at the clock, stated that when 2 pm arrived he would have passed on." He was 87 years old.

Today's hospital wards still resonate with tapping sounds as the percussion technique is first introduced to students. How disappointing that as the years ensue, this drumming would fade, to be replaced by more sophisticated but costly medical technology.

BIBLIOGRAPHY

1. Anonymous. Who follow a gleam: Leopold Auenbrugger. Minn Med 1970; 4:386.
2. Bedford, DE. Auenbrugger's contribution to cardiology. Br Med J 1971; 33:817-21.
3. Bloch, H. The fathers of percussion. J Fam Prac1993; 36:232.
4. Clendening L. Source Book of Medical History. Mineola: Dover Publications, 1942.
5. Furukawa A. Medical History through Postage Stamps. St Louis: Ishiyaku EuroAmerica, 1994.
6. Josef Leopold Auenbrugger [online]. Available at: http://www.whonamedit.com/doctor.cfm/309.html. Accessed December 11, 2003.
7. Nuland SB. Doctors: The Biography of Medicine. New York: Vintage, Reissue edition, 1988.
8. O'Neal, JC. Auenbrugger, Corvisart, and the perception of disease. Eighteenth-Century Studies 1998; 31:473-489.
9. Rate, RG. Leopold Auenbrugger and "The Inventum Novum." J Kans Med Soc 1966; 1:30-3.
10. Schorn, D. Percussion: Von Auenbrugger and Corvisart. S Afr Med J 1972; 46:1697-8.
11. Sigerist HE. The Great Doctors. New York: Doubleday Anchor Books, 1958.