The neurologist's hammer

O martelo do neurologista

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ABSTRACT

From the obscurity of 18th century wineries to the hands of the greatest neurologists in history, the percussion hammer has a fascinating history. The first famous percussion hammer was created in 1841 by the German physician Max Wintrich and was initially used for thoracic percussion. In 1875, Erb and Westphal both published simultaneous articles with the results from research that they had conducted separately, from which they confirmed that percussive objects were useful for stimulating deep tendon reflexes, especially patellar reflexes. The percussion hammer, however, was not yet ideal. It was designed to strike the thorax rather than the tendons, so it did not have the right weight or ideal length, and even its shape was not practical. New modified versions of the instrument subsequently emerged, and the hammer became the characteristic symbol of the neurologist.

Keywords: Hammer; Neurology; History; Reflexes.

RESUMO

Da obscuridade das adegas do século XVIII às mãos dos maiores neurologistas da história, o martelo de percussão tem uma história fascinante. O primeiro martelo de percussão a ganhar notoriedade foi criado em 1841 pelo médico alemão Max Wintrich, sendo inicialmente usado para percussão torácica. Em 1875 Erb e Westphal publicaram em conjunto um artigo com os resultados de suas pesquisas, que foram realizadas separadamente, confirmando o uso dos objetos de percussão para o estímulo dos reflexos tendíneos profundos, em especial o patelar. O martelo de percussão, contudo, ainda não era o ideal. Por ter sido desenvolvido para percutir o tórax e não os tendões, ele não tinha o peso certo, o comprimento ideal e nem mesmo um formato prático. Novas versões modificadas do instrumento foram surgindo até que o martelo se tornasse o símbolo característico do médico neurologista.

Descritores: Martelo; Neurologia; História; Reflexos.

Headache is one of the neurological complaints that leads a patient to seek urgent care more often. Although it seems a common issue the patient should be submitted through a very careful and detailed physical examination (including neurological examination) so redflag symptoms and secondary causes of headache can be excluded.

For that matter the percussion hammer is an indispensable tool for the neurologist and general practitioner.

Percussion is an aid to medical diagnosis. The delicate percussion hammer neurologists use daily has its origins in the dark wine cellars of 18th century Austria, where young Leopold Auenbrugger routinely struck casks of wine in order to check the level of fluid [1]. As a music admirer, he had sensitive ears and wrote the axiom "the thorax of a healthy person sounds, when struck". Auenbrugger favored thumping his patients' chest directly with his own fingers, as most doctors still do today [1].

The first percussion hammer for medical use was created by Max Wintrich, in 1841. This German doctor presented the scientific world with his gadget made of steel and rubber, for use in thoracic percussion (Fig 1) [2]. However, it was only in 1875, when Carl Westphal was the Editor of Archiv für Psychiatrie

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Received: December 12, 2019.
Accepted: December 20, 2019.

DOI: 10.5935/2178-7468.20190032

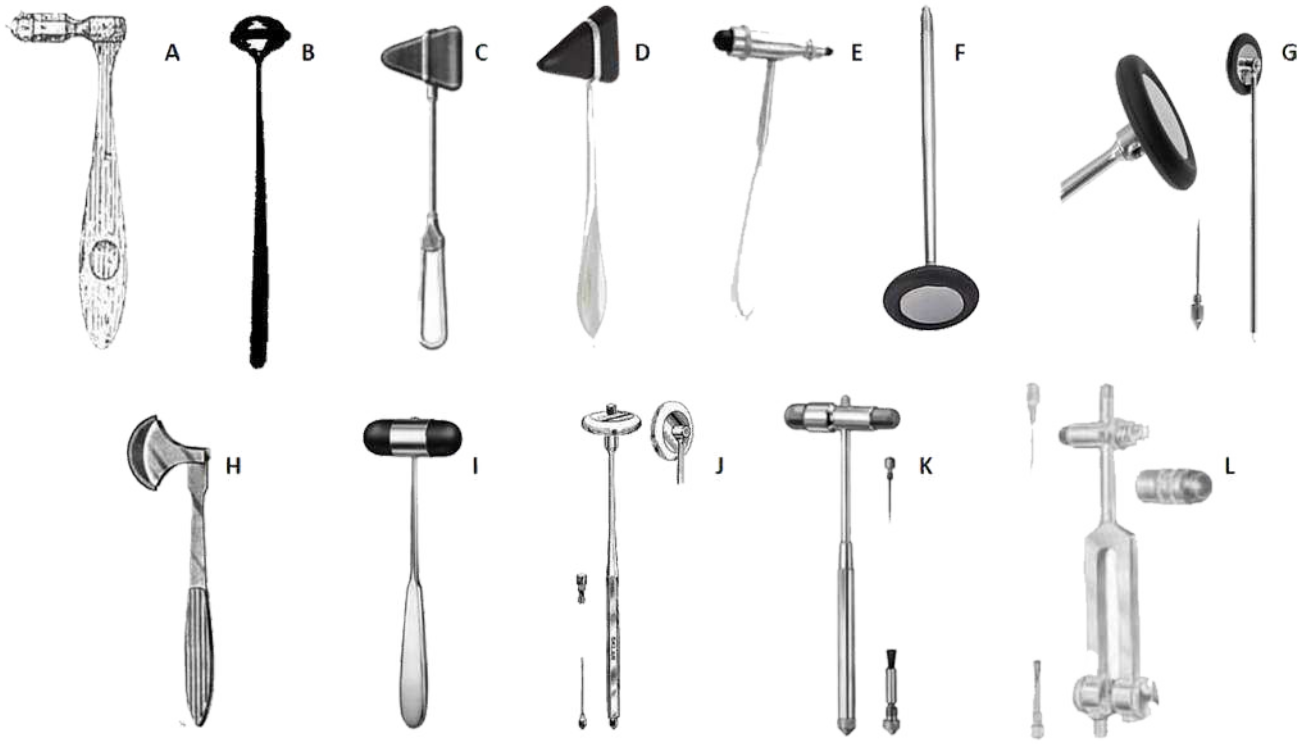


Figure 1. Drawings from different neurologist's hammers

und Nervenkrankheiten ("Archive for Psychiatry and Nerve Sickness"), that the hammer for eliciting reflexes was created. While reviewing a paper by his colleague Wilhelm Erb, Westphal was astonished to see that Erb had reached conclusions that were rather like his own. Separate articles from Erb and Westphal were published in the same issue of Archiv für Psychiatrie und Nervenkrankheiten [3, 4].

Erb wrote: "If one firmly holds and supports the leg to be examined, slightly bent at the hip and knee joint with all the muscles relaxed, and then lightly and elastically taps the region of the ligamentum patellae with the finger or with the percussion hammer [...] each tap is immediately followed by a slight but significant and evidently reflex contraction of the quadriceps; [...] and it is extremely difficult to suppress this reflex voluntarily". Westphal wrote that the idea of tendon percussion was given to him by one of his patients who said that when he sat on a chair and lightly tapped the area below the kneecap of the affected leg, it moved forwards with a sudden jerk. While Erb described in detail how to elicit the patellar reflex with a percussion hammer, Westphal described finger percussion, but mentioned that a precision hammer would be more effective in this maneuver [5].

Thus, Westphal and Erb started the history of the neurological percussion hammer. This history continued with the arrival of different models of this tool for neurological examinations. New modified versions of the instrument emerged over the course of the final years of the 19th century [6]. Schematic images of some percussion hammers are shown in 1.

Some of these hammers gained small gadgets like a needle with sharp and blunt points inserted into the handle, a small brush, or even a ruler or Wartenberg wheel. In 1888, John Taylor introduced the first reflex hammer with a triangular shaped head made of rubber circled by a metal band. It had a metal handle finishing in a loop and was manufactured to order by the Snowdon Brothers Instruments Company [7]. Around 1920, the loop was replaced by solid metal, giving this percussion hammer the shape that we all know so well.

In 1894, William Christopher Krauss devised a model that had two rounded pieces attached to a metal. The large piece was designed to be used for the knee jerk and the small one for the biceps jerk. The warm rubber handle, the cold metal head, the sharp and blunt pin heads and the brush would help in testing sensitivity [2]. Ernst LO Trömner introduced the metal handle tapering to a thin end, in order to test cutaneous reflexes as well. The Vernon hammer consisted of a rubber disk around a metal sphere.

The Queen Square Hospital and Babinski hammers followed, comprising a rubber disk around a flat metal disk [7]. The main difference between these lies in their ease of carrying, since Queen Square is rigid, while Babinski is smaller and telescopic, with a shorter handle. Even if some consider these to be similar, Queen Square is almost 150 grams heavier than Babinski [2]. The Queen Square Hospital hammer was developed by Miss Wintle, a nurse at the hospital.

The Rabiner hammer has a rubber disk that can be used in parallel with or perpendicular to the handle, as well as an inserted brush and needle for superficial reflexes

and sensitivity assessment. The history of the Rabiner hammer is quite peculiar. Babinski and Rabiner had an argument about the physiology behind the Babinski reflex. The argument occurred during a black-tie dinner in Vienna and the two neurologists became physical, pushing and shoving each other to the amazement of the dinner guests. The dispute was settled and, as a token of respect and apology, Babinski gave his own percussion hammer to Rabiner who returned to New York and modified its shape and appearance [2, 7].

With the rubber disk attached to the handle at 90 degrees, the Berliner hammer looks like a throwing axe. The Stookey hammer is collapsible and is accompanied by a camel hairbrush and two sharp pins for testing superficial sensitivity, including two-point discrimination. In addition, the Stookey hammer has a rough structure to test the plantar response [6, 8]. The five-in-one hammer includes a tuning fork and a Waterberg wheel. The Dejerine hammer features a hollow metal handle with inserted hick brush and needle, and a double rubber head. Imaginative improvements to this tool continue to be made. Neuropediatric wards nowadays have a variety of animal-shaped and colorful percussion hammers.

Although the hammer was initially developed for percussion of the thorax and abdomen in medical practice, it has now become the hallmark of the neurologist. Purists among the practitioners of the art of neurological examination will favor one hammer or another. The present authors have their favorite ones as well, but we do not feel like arguing about this. Use of a percussion hammer is a matter of personal taste and experience: one of these situations in which there is no right or wrong.

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