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"Despite all the available modern paraclinical investigations,
the Babinski sign will forever remain
a relevant clinical test in neurological specialties"

Prof. Alexandru Vlad Ciurea, MD, PhD, MSc.

REMEMBER: 160 YEARS SINCE THE BIRTH OF JOSEPH BABINSKI (1857–1932)

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The personality of neurologist Joseph Babinski (1857–1932) is a reference point for world neurology. He discovered the pathological form of the plantar reflex, which became an essential element of diagnosis of corticospinal tract damage. This neurological sign, known as the Babinski Sign, has completely changed the level of understanding of all neurological and neurosurgical pathology. Joseph Babinski also contributed to describing a number of highly complex neurological disorders based primarily on the collection of clinical data from the patient.
Materials and methods. The authors present the exciting history of Joseph Babinski following along his steps in training: from the famous school of Professor Jean Martin Charcot and all the way to his independent work and collaborations at the Neurology Clinic at Pitié-Salpêtrière Hospital. The authors review many of Joseph Babinski`s publications and the many neurological syndromes that have improved the diagnosis in multiple affections of the nervous system. Babinski was interested in cultural activities such as theatre, classical music, opera and ballet.
Conclusions. Josesph Babinski was a genius of neurological semiology who, during the 19th century relied very little on paraclinical investigations, succeeded in highlighting a series of signs and syndromes, one of which – the Babinski sign -remained immortalized throughout the neurosurgical pathology.

Keywords: history, Babinski sign, Charcot, neurology.

INTRODUCTION

Joseph[1] Jules François Félix Babinski (1857–1932) (Fig. 1), a French neurologist of Polish origin, is historically renowned for his discovery of the plantar reflex and its two presentations[1,2,3].

One of the forms is physiological and the other represents a sign of corticospinal tract damage and is known as the Babinski sign[4,5]. His publishing of the pathological form of plantar reflex in 1896 has completely changed the level of understanding of neurological pathology[6,7]. Also, Joseph Babinski, through his deep understanding of neurological semiology with various clinical manifestations, has succeeded in describing multiple affections recognized in pathology over time[1,2,5,8,9,10].

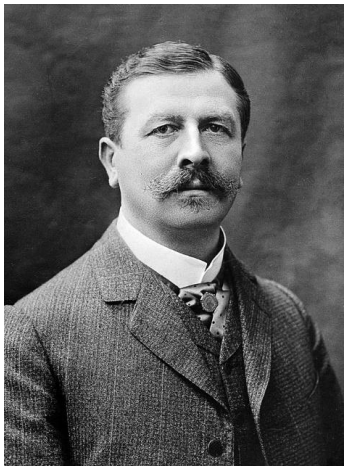


Figure 1. 'Joseph Babinski. Photograph by Eug. Pirou, Paris.' by E. Pirou, circa 1910.
Credit: Wellcome Collection (Public Domain).

HISTORY OF JOSEPH BABINSKI (LIFE AND EDUCATION)

The Babinski Family, composed of officer Aleksander Babinski (1824–1889) and Henryeta Weren Babinska (1819–1897) was originally from Warsaw. They were not the first nor the last Polish family to emigrate to France in 1848 due to the Tsarist reign of terror, which was meant to stop or at least delay the Polish people from achieving independence from the Russian Empire[3,11,12].

Joseph Babinski was born in Paris on November 17th, 1857. He studied medicine at the Paris University of Medicine and graduated from it in 1884. Afterwards, he continued his medical career under the guidance of Professor Jean-Martin Charcot (1825–1893) (Fig. 2) at Salpêtrière Hospital (Figure 3) in the French capital[3,5,12].

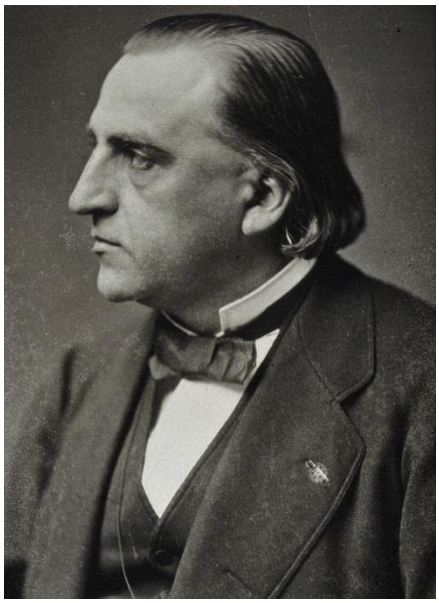


Figure 2. 'Jean Martin Charcot. Photograph by Pierre Petit.'. Credit: Wellcome Collection (Public Domain).

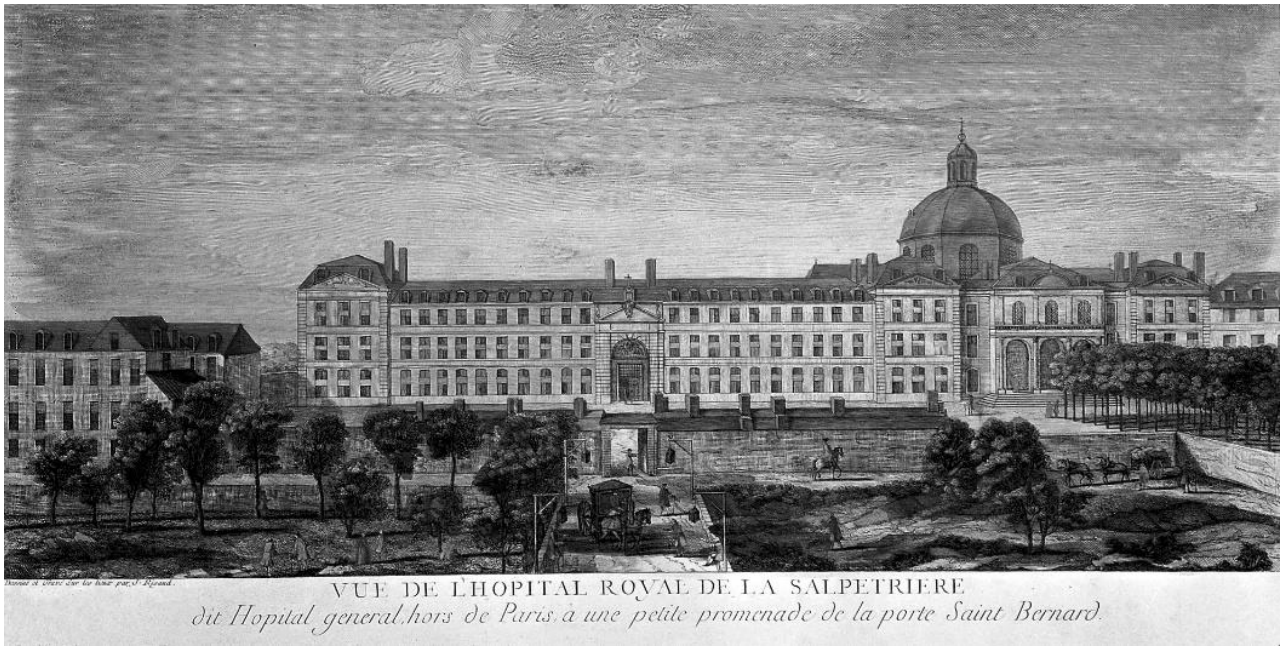


Figure 3. 'Hôpital de la Salpêtrière, Paris: showing St. Bernard's doorway and grounds. Coloured line engraving by J. Rigaud after himself.' by Jacques Rigaud. Credit: Wellcome Collection (Public Domain).

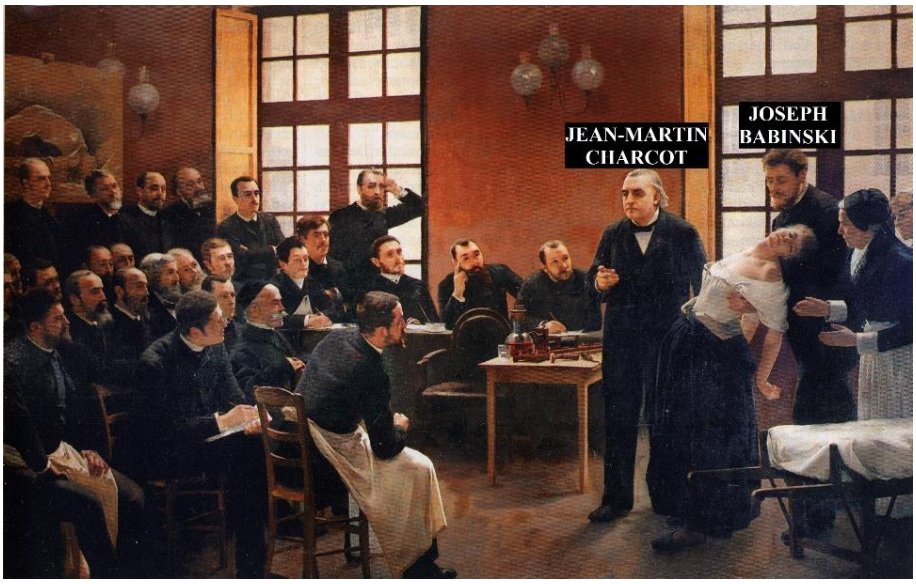


Figure 4. Joseph Babinski holding Marrie "Blanche" Wittmann next to Jean-Martin Charcot giving a clinical demonstration to his students at Salpêtrière Hospital, Paris
Original painting: "Un Leçon Clinique à la Salpêtrière" by André Brouillet
Current location: Université René Descartes, Paris.

Known as the "Napoleon of neuroses", Prof. Jean-Martin Charcot founded the world-renown Paris medical school[13]. Amongst his students were Sigmund Freud (1856–1939), Gheorghe Marinescu (1863-1938), Pierre Marie (1853–1940), Alfred Binet (1857–1911), Pierre Janet (1859–1947), Charles-Joseph Bouchard (1837–1915), Georges Gilles de la Tourette (1857–1904) etc.

As a disciple of Charcot, the great neurologist and psychologist, Babinski had the opportunity of obtaining an exceptional medical education, in an era famous for its great neurological and psychological discoveries[12,14] (Fig. 4).

Unlike his mentor, Joseph Babinski was not interested in the intrigues and politics of academic appointments and promotion, which were well known in the 19th-century France. For this reason, after working under his tutelage for 33 years, the death of Prof. Charcot in 1893, leaves him exposed to Charcot`s ambitious and ruthless former student, Charles Bouchard, who was seeking to make a name and school of his own. Without support and uninterested in a university career as much as he was interested in science, Joseph Babinski dedicated himself to studying clinical neurology at Pitié Hospital in Paris[3,5,14,15]. As an exceptional clinician who studied in a great medical school, he dedicated a vast majority of his time and energy to the thorough study of semiology and neurology and was minimally interested in neuropathological and paraclinical examinations.

His participation in the French Military Health Service in The First World War offers him the possibility of treating numerous patients with neurologic injuries of traumatic origin.

Babinski also showed a special interest in "hysteria", its pathology and the way in which the associated phenomena emerged, being the first neurologist who presented an acceptable differential diagnosis, separating hysteria from organic diseases and coining the term pithiatism (a form of hysteria which can be treated through persuasive suggestion)[3,5,9,16].

"BABINSKI SIGN"

At a meeting of the French Biology Society in 1896, Babinski presented a 26 lines-long work on "phenomène des orteils" ("phenomenon of toes"), a description of a pathological plantar reflex: an isolated extension of the hallux that occurs in the case of a damaged pyramidal tract (later referred to as the "Babinski sign") (Figure 5)[4,6,7,9,17,18,19].

The plantar reflex occurs when the arch of the foot is stimulated with a blunt instrument. In the case of a healthy patient, there is a flexion of the hallux. The extension of the hallux is considered a sign of corticospinal tract damage, namely the central motor neuron. This anomaly was discovered by neurologist Joseph Babinski.

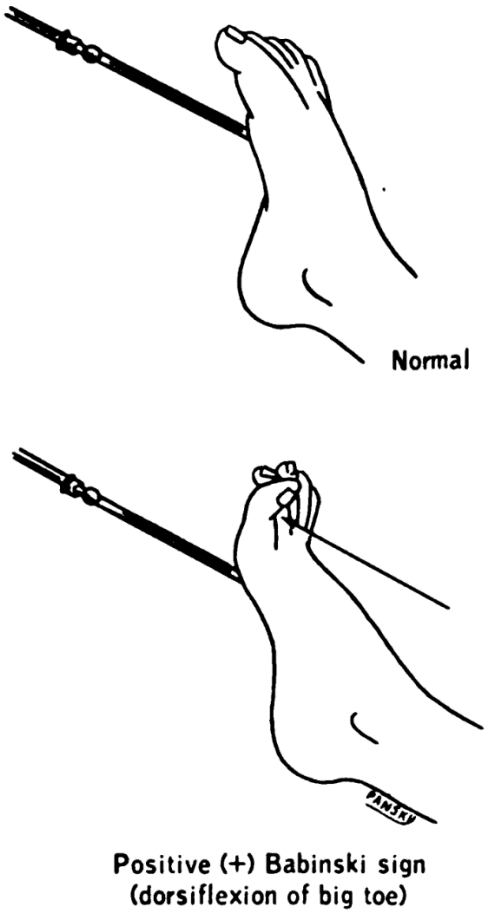


Figure 5. Top image physiological plantar reflex; Bottom image positive Babinski sign Credit: Earl Lawrence House, Ben Pansky (Public Domain).

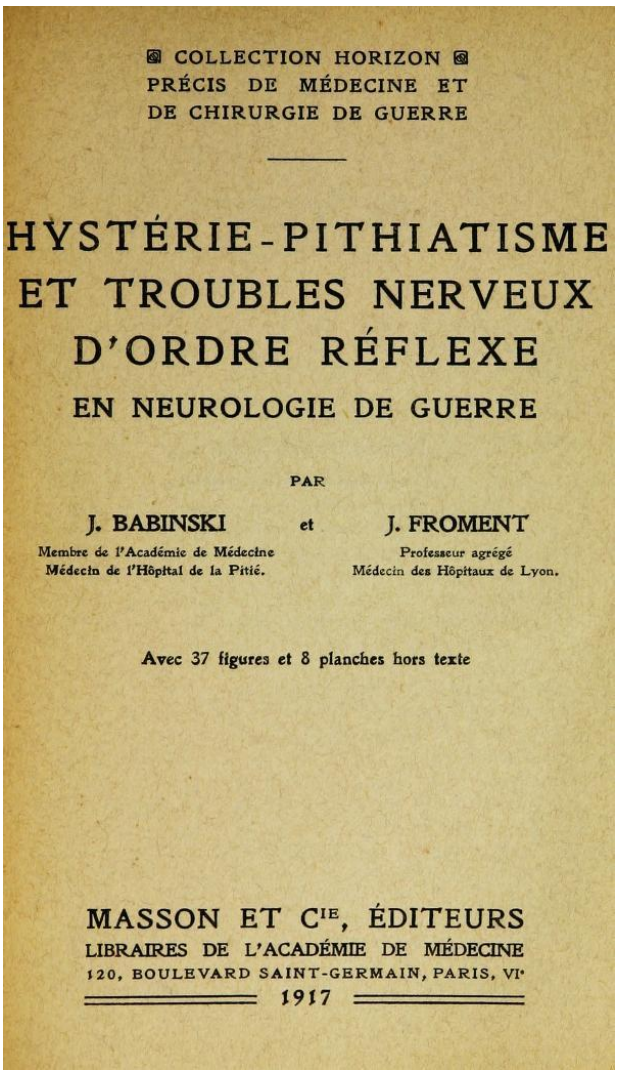
This clinical test is so frequently used in modern clinical medicine that the normal plantar reflex is usually referred to as a negative Babinski sign.

A patient may have a neural tract injury but also a false negative Babinski sign if he or she was walking for a long time before the examination or in the case of children under 12 months-old when their nerve tracts are not completely myelinated at this age[1,2,4,9,20].

A positive Babinski sign is often the first and only clinical sign that occurs in an examination, and when it is observed it immediately leads to the request of a specialist consultation and paraclinical examinations, such as cerebral MRI, to confirm the diagnosis.

SCIENTIFIC ACTIVITY

Regarding his university career, Joseph Babinski never received a university professor seat nor a PhD in medicine. He wrote over 200 scientific papers on neurological diseases[21]. Continuing his mentor`s work, Prof. Charcot, he studied intensely the neurological pathology in general and hysteria in particular[5]. Together with Jules Froment (1878–1946) he published "Hystérie-pithiatisme et troubles nerveux d'ordre réflexe en neurologie de guerre" (1917), which was translated in English by Sir H. Rolleston one year later, thus his scientific contributions were acknowledged outside of the French borders (Fig. 6)[22].


COLLECTION HORIZON
PRÉCIS DE MÉDECINE ET DE CHIRURGIE DE GUERRE

HYSTÉRIE-PITHIATISME ET TROUBLES NERVEUX D'ORDRE RÉFLEXE EN NEUROLOGIE DE GUERRE

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Médecin des Hôpitaux de Lyon.

Avec 37 figures et 8 planches hors texte

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1917

Figure 6. A scan of the first page from the original book "Hysterie, pithiatisme et troubles nerveux d'ordre reflexe en neurologie de guerre" (Public Domain).

Also, he invested a lot of time and effort in the study of multiple sclerosis, being one of the first neurologist to study this pathology[3,5,23].

Joseph Babinskihad an essential contribution in describing multiple neurological syndromes because

of his keen sense of observation[5,8]. In collaboration with specialists from different fields he defined numerous syndromes[11,15].

- Anton–Babinski syndrome described in collaboration with psychiatrist Gabriel Anton (1900)[24]
- Babinski–Fröhlich syndrome (1900–1901) or Adipo-genital syndrome, in collaboration with pharmacologist Alfred Fröhlich[25,26]
- Babinski–Froment syndrome, described in collaboration with neurologist Jules Froment[27]
- Babinski–Vaquez syndrome (1901), described in collaboration with hematologist Louis Henri Vaquez[28]
- Babinski–Nageotte syndrome (1902), described in collaboration with neurologist Jean Nageotte[29]
- Babinski–Jarkowski rule (1910), described in collaboration with Jean Jarkowski[30]
- Babinski–Weil test (1913), described in collaboration with ophthalmologist George Weill[31].

Despite his many great break-throughs in neurology and semiology, he confessed only 6 days prior to his death that his most important contribution to neurosciences was not the discovery of the sign which bears his name, but his achievement in "... indiqué la voie à Martel et à Vincent" (showing the way for Thierry de Martel and Clovis Vincent – the founders of French neurosurgery).[15]

JOSEPH BABINSKI – PERSONAL LIFE

Babinski never married, but adopted three girls who had been the daughters of a close friend. He lived together with his little brother, Henri (1855–1931)[1,2,11]. His brother studied civil engineering at the National School of Mines in France, but is better known as a famous cook[11]. His passion for cooking culminated with the publishing of a renowned cookbook under the alias "Ali-Bab" (Ali-Bab, *Gastronomie pratique. Etudes culinaires suivies du traitement de l'obésité des gourmands*, Ernest Flammarion, Paris, 1907)[11,21].

An interesting fact about his life outside his scientific work was only revealed in 1928, when one of his externs, Dr. André Breton (1896–1966), published an autobiographical work "Najda". In this book he refers to Joseph Babinski's friendship with actor Pierre Palau, with whom he wrote a theatre play, Joseph Babinski signing under the pseudonym of "Olaf". This play he wrote exposes not only his inclination towards the dramatic but also his experience and understanding of another medical field which studies the nervous system, but from another perspective – psychiatry[33].

The Drama "Les détraquées" presents a story at a girls' dorm room in Versailles, where is organized a party for the yearly award ceremony.After the mysterious disappearance of one of the girls an investigation is under way, which reveals that the director of the institution, Madame de Challens and her mistress, the dance teacher seduced, tortured, raped and killed the girl under the cover of the party. The show was first performed at Théâtre des Deux Masques on February 15, 1921.

Joseph Babinski died on October 29th, 1932, unfortunately because of a neurological pathology – Parkinson's disease[5]. 1932 was the same year two other great Polish neurologists died: Samuel Goldflam (1852–1932) and Edward Flatau (1868–1932)[3].

Babinski lived to see his achievements in French neurology internationally acclaimed[9,15]. He was honoured by Poland's Wilno University, by the American Neurological Society, and by other foreign societies[3,5].

CONCLUSIONS

Joseph Babinski, the neurology and neurological semiology genius, remained immortalized in history for his description and introduction of the test which bears his name and highlights clearly the lesion of the corticospinal tract.

With the passage of time and the better understanding of the Babinski sign, several other descriptions have been made about neurological signs, analogous to initial Babinski sign. Also, his quality of being a fine observer of neuropathology has made it possible to identify classic syndromes in neurological pathology.

Indeed, Babinski fully deserves to be called a genius of neurological semiology, because with much talent and patience he has succeeded in conquering and changing multiple concepts from classical current pathology.

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