

Babinski's hand sign: many have tried...

O sinal de Babinski na mão: muitos têm tentado...

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ABSTRACT

Recognizing the semiologic importance of the second, and most famous, sign described by Joseph Babinski – the extension of the hallux after stimulation of the plantar region in order to differentiate organic from pithiatic paralysis– several authors have tried to find a comparable signal in the hand. After 122 years, no one has succeeded.

Keywords: Reflex, Babinski sign; motor disorders.

RESUMO

Reconhecida a importância semiológica do segundo e mais famoso sinal descrito por Joseph Babinski - a extensão do hálux após estímulo plantar visando diferenciar a paralisia orgânica da pitiática - diversos autores vêm tentando encontrar um sinal equiparável na mão. Após 122 anos ninguém conseguiu obter sucesso.

Palavras-chave: Reflexo; sinal de Babinski; transtornos motores.

On February 22nd, 1896, it was a cold Parisian Saturday. The temperature ranged from -0.3°C to 7.6°C but it was not raining¹. In a lively meeting at the *Société de Biologie*, the 38-year-old French-naturalized Polish neurologist, Joseph Jules François Felix Babinski, read a 28-line text named “Le réflexe cutané plantaire dans certaines affections du système nerveux central”². In this lecture, Babinski presented, for the first time, an objective sign “that allows the distinction between organic neurologic disorders and those of functional or hysteric origin”³. In the more than 120 years that followed this day, several neurologists have attempted to find an equivalent sign in the fingers⁴. The purpose of this manuscript is to highlight some of these attempts.

Carpometacarpal reflex – von Bekhterev

In 1903, the Russian, Vladimir Mikhailovich von Bekhterev (1857-1927), emphasized that his upper limb test, a stimulus made to the tendons covering the back of the hand in the carpus and the beginning of the metacarpal area, promoting a flexor response of the fingers⁵, also indicated – as Babinski had done in relation to the hallux – the differentiation between an organic versus functional paralysis⁶ (Figure 1).

In 1908, Louis Jacobsohn-Lask (1863-1941), a German neurologist (Figure 2), described a similar reflex to von Bekhterev, and considered:

“...similar to Babinski's... the finger flexion reflex appears rather constantly in cases of spastic paralysis of the upper limb of a cerebral character...”⁷

Due the great similarity with the von Bekhterev method, the two-finger flexion reflex began to be called the Bekhterev-Jacobsohn reflex.

Hoffmann's reflex phenomenon – the Hoffmann sign

Around 1910, Johann Hoffmann (1857-1919) was honored by his pupil, Hans Curschmann (1875-1942), when he quoted Hoffmann's name in a method of investigating the fingers flexor reflex – “Hoffmann's Sign” or “Hoffmann's Reflex”. In the technique to elicit this, the examiner holds the median phalanx of the examined middle finger between his own second and third fingers and promotes a rapid and forced stimulation – flicking and sudden release – of the flexed terminal phalanx of the retained finger (Figure 3)⁸. This reflex is present when the patient's other fingers – including the thumb – flex.

The Hoffmann reflex acquired enormous popularity among American neurologists. For the sake of truth, Curschmann did not think it had significance as the “Babinski's upper extremity” sign⁹. However, many textbooks and articles have come to consider it as a clear sign of injury to the pyramidal path, “with the same significance as Babinski's sign”⁸.

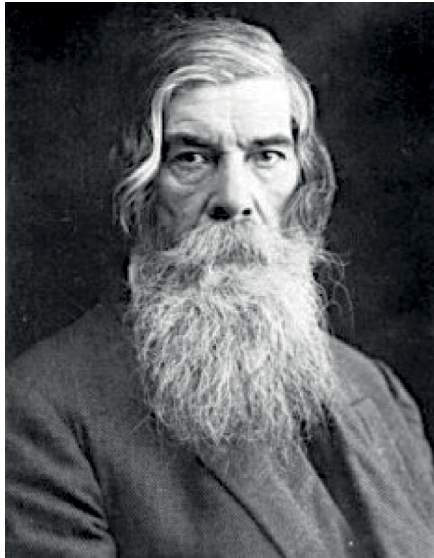
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Aus diesem Grunde empfiehlt es sich, nicht unmittelbar das Acromion zu beklopfen, sondern den Percussionshammer durch das Plessimeter hindurch wirken zu lassen.

2. Ueber den Carpometacarpalreflex.¹

Von Prof. Dr. W. v. Bekhterew in St. Petersburg.

Unter den Reflexen, die bei hochgradiger Steigerung der reflectorischen Erregbarkeit an der oberen Extremität hervortreten, ist besonders einer beachtenswerth, der vor allem in Fällen von Hemiparesen und Hemiplegien und überhaupt bei centralen Lähmungen der oberen Extremität zur Beobachtung kommt. Legt der Untersucher die der erkrankten Seite entsprechende Hand des Patienten auf die seinige mit dem Dorsum nach oben und frei herabhängenden zweiten und dritten Phalangen der Finger, und klopft er nun mit dem Percussionshammer auf den Carpus und die angrenzenden Theile des Metacarpus, zumal in deren lateralem Abschnitt, so erfolgen Flexionsbewegungen sämtlicher Fingerphalangen mit Ausnahme des Daumens.

In Fällen von sehr lebhafter Steigerung der Reflexerregbarkeit ist die gleiche Flexionsbewegung der Fingerphalangen auch auslösbar durch mechanische Reizung anderer Theile der Hand und u. a. von den Sehnen der Flexoren aus. Allein die constanteste und charakteristischste reflectorische Flexionsbewegung der Fingerphalangen bei cerebralen organischen Lähmungen der Oberextremität ist nach meinen Beobachtungen der Carpometacarpalreflex, der in den oben angegebenen Fällen relativ selten vermisst wird.

Der in Rede stehende Reflex besteht in Uebertragung des Reizes von den Sehnen, die das Dorsum manus im Gebiete des Carpus und des Anfangs des Metacarpus bedecken und auf die Flexoren der Fingerphalangen übergehen. Dem entsprechend verläuft der hinzugehörige Reflexbogen in Höhe der 1. Brust- und der unteren Halswirzeln.

Das Auftreten des Carpometacarpalreflexes deutet also auf Affection des centralen motorischen Neurons oberhalb der Halsanschwellung. Am häufigsten findet man ihn in Fällen von organischen Hemiparesen und Hemiplegien

Figure 1. VM Bekhterev and his carpometacarpal reflex article⁵.



Ueber den Fingerbeugereflex.

Von Priv.-Doz. Dr. L. Jacobsohn in Berlin.

Der von Babinski vor einigen Jahren gefundene Zehenreflex hat für die Diagnose bestimmter Nervenkrankheiten eine außerordentliche Bedeutung gewonnen, eine Bedeutung, die derjenigen des Westphalschen Zeichens, d. h. des Verlustes des Patellarreflexes, an Wert kaum nachsteht. Der Reflex ist so charakteristisch für Erkrankungen der Pyramidenbahn, daß er mit Recht als ein pathognomonisches Zeichen betrachtet wird.

Dieses Babinskische Zeichen oder der dorsale Zehenreflex besteht bekanntlich darin, daß bei Bestreichen der Fußsohle die Zehen, speziell die große Zehe, sich langsam dorsalwärts bewegen. Dieses Phänomen ist aber auch zu erzielen, wenn man z. B. die Streckseite des Fußes mit einer Nadel leicht strichförmig ritzt, oder wenn man am Schienbein einen stärkeren Druck ausübt (Oppenheim), oder auch zuweilen, wenn man mit dem Percussionshammer einen Schlag auf das Fußgelenk ausübt.

Figure 2. Louis Jacobsohn-Lask and the Fingerbeuge reflex article⁷.



Figure 3. Johann Hoffmann (left), Hans Curschmann, and the method of examination.

The fingers phenomenon – Gordon's sign

In 1911, Alfred Gordon described “Le phénomène des doigts” (the fingers phenomenon), republished in French the following year¹⁰. In hemiplegia and monoplegia of cerebral origin, the compression of the radial face of the pisiform bone

of the paralyzed segment promoted the extension of the fingers, sometimes in a fan (Figure 4).

According to Gordon, when there is impairment of the pyramidal pathway, this signal has the same connotation as the Babinski sign¹⁰.

Finger flexor phenomenon – the Trömner Sign

In 1912, Ernest Trömner (1868-1930), from Saxony, described a finger reflex which was named the “fingerbeugephänomen” (finger flexor phenomenon) (Figure 5). The patient keeps his fingers semi-flexed, and the examiner “taps” with his own fingers on the volar surface of the patient’s middle or index finger. The abnormal reflex is present when all fingers flex, including the thumb. Trömner himself stated that he only elicited this reflex in cases of spastic paralysis of the arm:

“... a pathognomonic finger reflex... a reflex of the arm, analogous to the Babinski, which is as pathognomonic

for motor conduction abnormalities above the spinal centers innervating the arm, as the Babinski phenomenon is for the leg...”¹¹

In 1926, Sterling¹², described a maneuver very similar to that of Trömner in pyramidal lesions, aiming at the same goal.

The upgoing thumb sign – Hachinski sign

In 1992, in a letter addressed to the Editor, Vladimir Hachinski, a neurologist of Ukraine origin, described “the upgoing thumb sign”¹⁴, considering it to be “Babinski’s equivalent of the hand”. In 2017, Hachinski et al. stated:

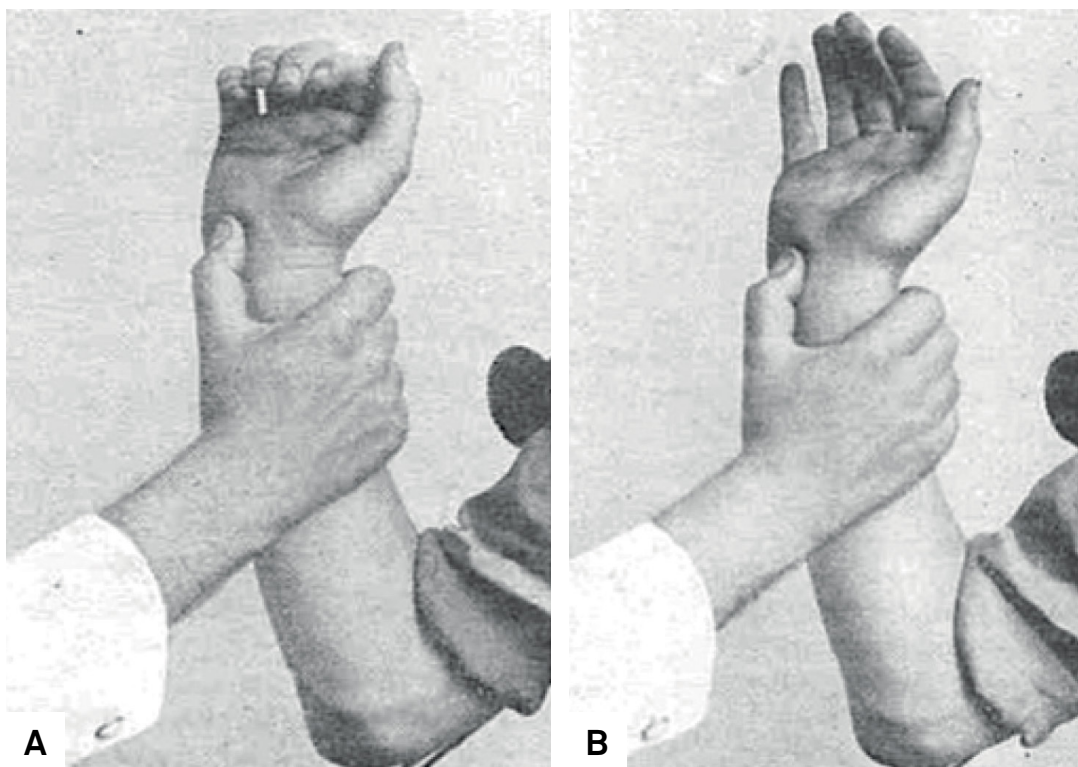


Figure 4. Sign of the fingers in patients with pyramidal pathway impairment. Compression of the projection of the radial side of the pisiform bone, avoiding compression of the dorsal side of the hand (A). The fingers extend, sometimes in a fan (B). The sensitivity of the signal increases when the test is repeated several times¹⁰.

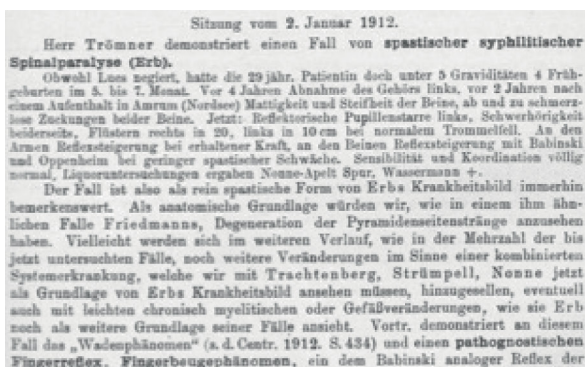
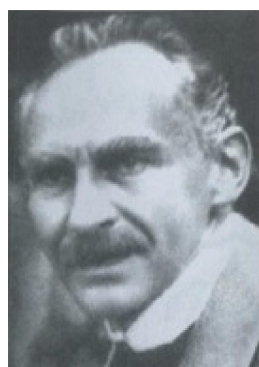


Figure 5. Ernest Trömner (left), “Fingerbeugephänomen” description, and the method of examination⁹.

“... In a considerable proportion of patients with neurologic diseases, the thumb contralateral to the hemisphere or brainstem side involved, showed an upgoing thumb while keeping the palm facing at the level of the shoulder, corresponding to an upgoing toe sign (Babinski sign)”¹⁵.

Several authors have expressed ambiguity in this respect. Tamm¹⁶, for example, suggested the name: Babinski-Hachinski sign, while Fuller et al.¹⁷, after evaluating 60 hands of normal individuals (hospital staff), found a positive upgoing thumb in 62% to 88% of the cases. This also generated a letter to the Editor entitled: *Babinski Yes, Hachinski No!*

DISCUSSION

Since Babinski, the lower extremity has been the most exploited anatomic region for the majority of reflex hunters. Until recently, some predictably directed their efforts toward the upper extremity in search of a reflex analogous to the hallux extension^{15,18}.

The plantar response to plantar stimuli is considered a superficial reflex, like the cremasteric reflex (described by M. Jastrowitz in 1875), and the abdominal reflex (described by Ottomar Rosenbach in 1876), all being affected by an upper motor neuron disorder (not necessarily a lesion). The Babinski sign is only a small fragment of the mass reflex (withdrawal reflex) of the leg, with which the animal reacts to stimuli of many kinds, when the pyramidal tract is impaired. The upgoing toe reflex is regarded anatomically as an extension of the big toe but physiologically it is part of a flexor reflex, apparently disinhibited by loss of upper motor neuron control, and its receptive field may extend, in some instances, to the leg or thigh¹⁹. The abnormal pyramidal tract reflexes in the upper extremities are less constant, more difficult to elicit, and less definitively diagnosed than those found in the lower extremities⁸. According to van Gijn²⁰, two aspects justify the impossibility of obtaining a finger sign like that found in the feet, with respect to impairment of the pyramidal pathway. There is no involuntary action in spinal flexion synergy comparable to the lower limbs, and besides, the thumb is far from being analogous to the big toe!

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