

## Extensor Toe Reflex: Is Still Time for a New Maneuver Description?

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### Abstract

Neurology, is a discipline characterized by the power of observation as an important skill in the richness of the semiology and the acuity of the neurological diagnosis. Since original description of Babinski sign, other maneuvers has been described. In this brief communication, I am describing a new maneuver to elicited the extensor big toe in response to compression of the interphalangeal joint of the first toe that is consistently seem in patients with acute or chronic pyramidal tract injury. So, is still time for a new maneuver description?

### 1. Introduction

Since the time of Jean-Martin Charcot, widely regarding as the founding father of neurology, this discipline has been based on the power of observation [1], as a skill and basic tool in the practice of neurologist, and continues to be fundamentals in the learning and the diagnosis of patient with neurological diseases.

In 1896, Joseph Babinski, describe and interprets the meaning of the sign that bears his name. This sign is characterized by dorsiflexion of the big toe and recruitment of the extensor hallucis longus muscle, on stimulation of the sole of the foot [2], with or without a fan opening of the remaining fingers, and withdrawal of the leg. It is obtained with the stimulation of the sole of the foot with the hammer handle, scratching its outer side from the heel towards the metatarsal, and the following it to its inner edge, with light to moderate pressure. The sign presence, indicates structural or functional dysfunction of the pyramidal tract, what results from a failure in the integration of the flexion and extension components of the normal defense reflex [3].

### 2. Discussion

In the history of neurology, recognized neurologist have described multiple substitutes for the Babinski sign; the best known are the Oppenheim sign, the Schäffer sign, the Gordon sign, and the Chaddock sign, among others [2,3]; but at least 12

maneuvers are recognized to evoke this reflex; and, although few recognized and used-according to this authors-after the Babinski reflex, the maneuvers of Gonda-Allen and Allen-Cleckley are the most sensitive [4].

Similar to the above, there are other maneuvers that have not yet been recognized as variants of the Babinski reflex, but that should be subjected to evaluation to define their true value; as the “Crossed Upgoing Toe Sign” that is elicited asking to the patient to raise the contralateral leg in a 45 degree angle, and watching a extensor plantar response in the paretic limb [5]; and the “kinaesthetic extensor plantar response” seen in advanced pyramidal dysfunction, especially in chronic myelopathy, and evoked like the exploration of the tone in the lower limbs by the rolling method [6].

Finally, although there are not variants of the Babinski sign, some studies confirm that according to the location of the pyramidal tract lesion: sub-cortical or cortical; there is recruitment of the other toes [7]. The physiology and pathophysiology of the Babinski reflex, are not yet fully clarified; but according to electrophysiological studies, the final effector for this sign, is the extensor hallucis longus muscle, and non the flexor hallucis brevis muscle that is responsible for the physiological flexor response of the big toe [8]; and the skin area is supplied by L5 dermatome [9].

In the following text, I report a maneuver that-according to the review of the available literature-apparently has not been previously described: this is the extension of the big toe in response to the intense compression on the interphalangeal joint of the affected foot, in L5 dermatome distribution, as shown in FIG. 1 and 2. This response is consistently elicited in patients with pyramidal tract injuries as acute stroke (FIG. 1), or chronic spinal cord disease (FIG. 2).



**FIG. 1. Vigorous compression of the interphalangeal joint, and consequent extension of the big toe, in a patient with acute stroke.**



**FIG. 2. Vigorous compression of the interphalangeal joint, and consequent extension of the big toe, in a patient with chronic rachiostenosis and secondary myelopathy.**

Some variants of Babinski sign, similar to the just described, are the Throckmorton sign, the Pierre Marie-Fox sign, and the Grossman sign; but this differ in the maneuver to obtain the extensor plantar reflex: the Throckmorton sign, is elicited by striking the dorsal aspect of the metatarsophalangeal joint of the first toe, medial to the tendon of the Long Extensor Hallux muscle with the hammer head [10]; the reflex of Pierre Marie-Fox, is elicited by the stimulation of the sole of the foot, or also, can be obtained by pinching the back of the foot or leg, or doing a flexion-extension movement of the first toe, and the response, is a triple flexion phenomenon, which is a synergistic movement of the foot on the leg, the leg on the thigh, and the thigh on the pelvis. There is also an extension of the first toe; and is caused by pyramidal tract injury, especially in spinal cord injury. And finally, the Grossman sign is elicited by compressing the fifth toe, causing a thumb extension [3].

In my point of view, this contribution will be useful for many neurologist or general practitioner; and in contraposition of classic Babinski's sign does not have an associated triple flexor leg reflex, and is more time effective in emergency room among others settings of daily practice.

### 3. Conclusion

In conclusion, in an era of great technological development; the power of observation, a logical anamnesis, and methodic physical examination, continues to be the basis in clinical neurology and still the best way to an accurate neurological diagnosis. This Babinski variant sign, obtained in this way, could be a new contribution in the neurology semiology; is easy to elicited, have less associated findings, and is faster to perform.

### REFERENCES

1. Hinman J. The Power of Observation in Neurology Then and Now-Notes From Charcot's Library. *JAMA Neurol.* 2019.
2. Kumar SP, Ramasubramanian D. The Babinski Sign-A Reappraisal. *Neurol India.* 2000;48(4):314-8.
3. Fustinoni O. *Semiología del Sistema Nervioso.* 15th edn. Ciudad Autónoma de Buenos Aires: El Ateneo, Argentina; 2014.
4. Debabrata G, Sunil P. "Extensor Toe Sign" by Various Methods in Spastic Children with Cerebral Palsy. *J Child Neurol.* 1998;13(5):216-20.
5. Willoughby E, Eason R. The Crossed Upgoing Sign: A Clinical Study. *Ann Neurol.* 1983;14(4):480-842.
6. Kuruvilla A, Wattamwar P. Kinaesthetic ipsilateral and crossed extensor plantar response: A new way to elicited upgoing toe sign (Babinski response)? *Ann Indian Acad Neurol.* 2011;14(3):198-9.
7. Ting Deng et al. Cortical vs non-cortical lesions affect expression of Babinski sign. *Neurol Sci.* 2013;34(6):855-9.
8. Van Gijn. Babinski response: stimulus and effector. *J Neurol Neurosurg Psychiatry.* 1975;38(2):180-3.
9. Fig. 3-39, Snell-Neuroanatomy. 7th edn. 2010.
10. Throckmorton TB. A new method for eliciting the extensor toe reflex. *JAMA.* 1911;56(18):1311-2.