# BABINSKI SIGN

What is Babinski's sign and what does it indicate?

Babinski sign occurs **when stimulation of the lateral plantar aspect of the foot leads to extension (dorsiflexion or upward movement) of the big toe (hallux)**.

Also, there may be fanning of the other toes.

**This suggests that there is been spread of the sensory input beyond the S1 myotome to L4 and L5.**

Why Babinski sign is positive in corticospinal lesion?

The purpose of the reflex is to cause the withdrawal of the area of the skin from the stimulus. When the corticospinal tract is not functioning properly, the result is that the **receptive field of the normal toe extensor reflex** enlarges at the expense of the receptive field for toe flexion.

HISTORY

It was on February 22, 1896, that Joseph Francois Felix Babinski published his first report on ‘reflexe cutane plantaire’ [cutaneous plantar reflex] which became the sign that bears his name: ‘the Babinski sign’.

He referred to the sign as “phénomène des orteils” (toes phenomenon) but is now usually referred to eponymously as the “Babinski sign” or descriptively as the extensor plantar response.


Babinski

METHOD

Fixate the foot by grasping the ankle or medial surface with the examiner's hand that will be closest to the midline of the patient: examiner's left hand when the patient's left foot is being tested, and vice versa with the right foot.

The first line to be stroked begins a few centimeters distal to the heel and is situated at the junction of the dorsal and plantar surfaces of the foot. The line extends to a point just behind the toes and then turns medially across the transverse arch of the foot. Stroke slowly, taking 5 or 6 seconds to complete the motion.

**Do not dig into the sole, but stroke.**

NEUROPHYSIOLOGY

The neurophysiology of this reflex has not been completely elucidated.

- Each area of the skin of the body appears to have a specific reflex response to noxious stimuli. The purpose of the reflex is to cause the withdrawal of the area of the skin from the stimulus.
- This reflex is mediated by the spinal cord, but influenced by higher centres. The area of skin from which the reflex can be obtained is known as the receptive field of the reflex.

- The abnormal plantar reflex, or Babinski reflex, is the elicitation of toe extension from the "wrong" receptive field, that is, the sole of the foot.
- Thus a noxious stimulus to the sole of the foot produces extension of the great toe instead of the normal flexion response.
- The essential phenomenon appears to be recruitment of the extensor hallucis longus, with consequent overpowering of the toe flexors. The movements of the other joints remain the same.
- The corticospinal tract influences the segmental reflex in the spinal cord. When the corticospinal tract is not functioning properly, the result is that the receptive field of the normal toe extensor reflex enlarges at the expense of the receptive field for toe flexion. Toe extension is consequently elicited from what is normally the receptive field for toe flexion.
- The maintenance of territorial integrity of the receptive fields is apparently one way in which the cortex exerts its influence under normal conditions.

FALSE INTERPRETATIONOF BABINSKI – RATHER RIGT TO SAY THAT BABINSKI IS NOT THE HALMARK OF AN UPPER MOTOR SIGN.IT CAN BE ALSO POITIVE IN THE FOLLOWNG:

- In children upto the age of 1 year
- Deep sleep
- Coma
- General anaesthesia
- Electroconvulsive therapy
- Post-ictal stage of epilepsy
- Apnoeic phase of Cheyne Stockes breathing

- Narcosis
- Alcohol intoxication
- Hypoglycemia
- Hypnosis
- Physical exhaustion and marathon walking
- Drugs-scopalamine, barbiturates

PITFALLS

Is Babinski reflex always present in ALS?

Pyramidal signs (hyperreflexia, spasticity, Babinski sign) are essential for the diagnosis of amyotrophic lateral sclerosis (ALS). However, these *signs are not always present at onset* and may vary over time, besides which their role in disease evolution is controversial.

Substitutes for Babinski sign

**Chaddock's sign** (stroking the skin beneath the lateral malleolus), Chaddock's sign is present when stroking of the lateral malleolus causes extension of the great toe

**Oppenheim's sign** - Using either the opposite end of a reflex hammer or thumbnail, the examiner uses his/her other hand to scratch along the crest of the patient's tibia in a downward motion

**Gordon's sign** - The patient is positioned in supine lying, with legs extended and relaxed.

Procedure: The examiner lifts the patient's leg at the ankle with one hand, and with the other hand grasps the patient's calf. • Next, the examiner squeezes the patient's calf muscle tightly, while monitoring the toes.

Response:

• A normal (negative) response is no reaction at the toes • An abnormal (positive) response is an ipsilateral extensor plantar reflex - extension of the hallux with fanning of the other toes

OTHER METHODS OF ELICITING PLANTAR REFLEX

Schäffer's sign - Apply deep pressure on the tendo-Achilles

Throckmorton - hitting the dorsal aspect of metatarsophalangeal joint of the big toe

Bing sign – Flexion on pricking the dorsum of foot with a disposable pin.

Moniz sign - Forceful passive plantar flexion of the ankle

Cornell sign - Scratching the dorsum of the foot along the inner side of the extensor tendon of the great toe

Stumpell sign - Application of forceful pressure over anterior tibial region.

Gonda's sign - pressing the 4th toe downwards and then releasing it with a snap.

ALTERNATIVES OF BABINSKI

To undersand this one must know all the components of the Babinski sign.

- The upward movement of the great toe

- Associated with contraction of other (physiological) flexor muscles in the leg: tibialis anterior muscle (A, tendon just lateral to the shin),
- The knee flexors or hamstring muscles (B, tendons palpable at the back of the knee),
- Tensor fasciae latae muscle (C, dimpling under the skin of the lateral thigh)
- **Not all these muscles can always be seen to contract; the activity of the tensor fasciae latae muscle is often the most obvious**

So all these are part of Babinski.

*In case the regular Babinski cannot be performed, these can all be of help as in the above circumstance where the patient has amputed limbs.*