

# **PRACTICAL (1)**

# **REFLEXES**

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# THE REFLEX ACTION

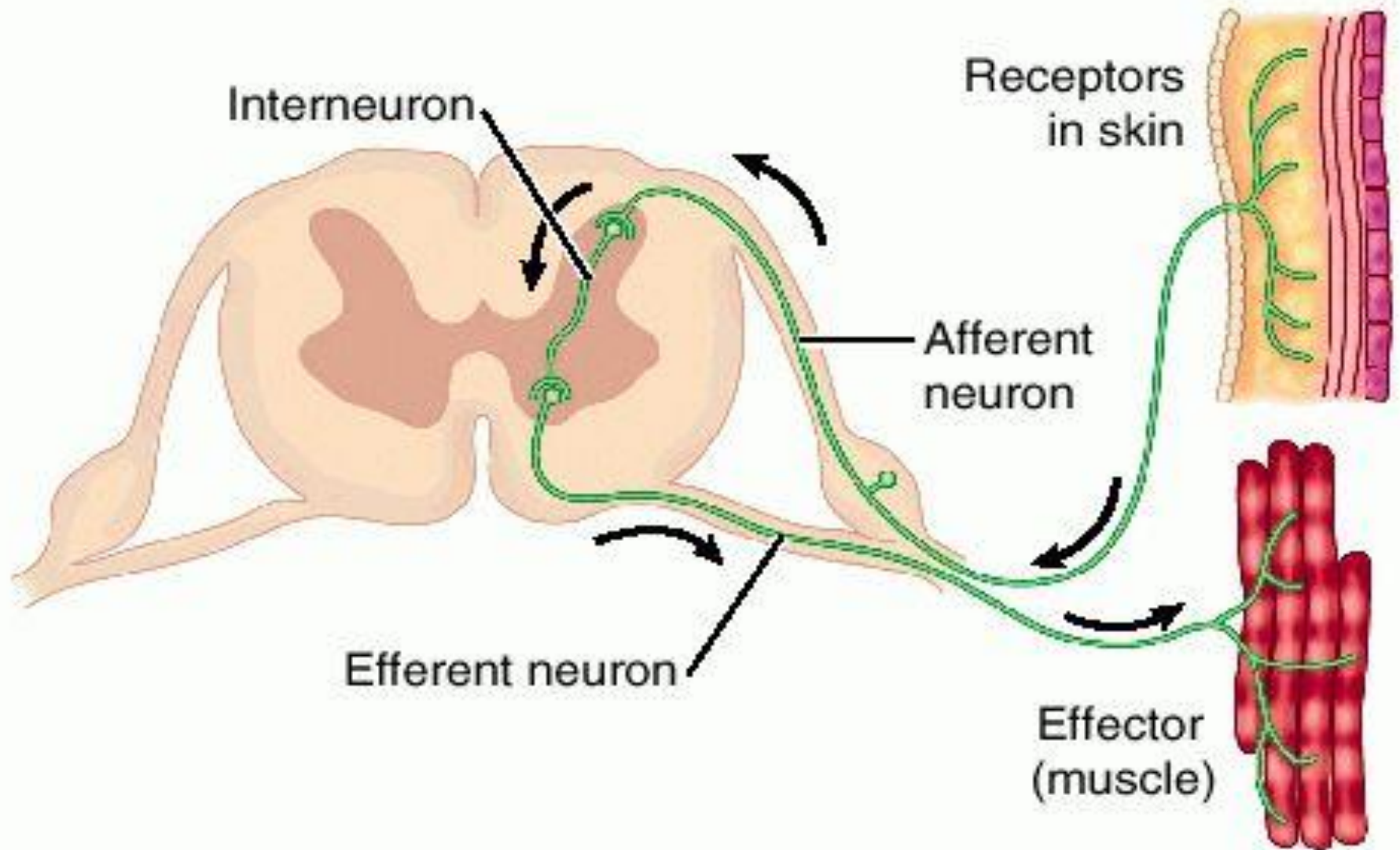
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The reflex action is the physiological (functional) unit of the nervous system.

The nervous pathway of the reflex action is called the *reflex arc* which consists of:

- ✗ -receptors
- ✗ -afferent neuron
- ✗ -center
- ✗ -efferent neuron
- ✗ -effector organ & response

# REFLEX ARC



# TYPES OF REFLEXES

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- ✘ -According to the **number of synapses** the *reflex arcs* are classified into:

## 1- Monosynaptic reflex arc:

- ✘ The afferent neuron synapses with the efferent neuron without interneuron in between. e.g. **stretch reflex.**

## 2- Polysynaptic reflex arc:

- ✘ In which **interneurons** are present between the afferent and efferent neurons.

# TYPES OF SPINAL REFLEXES

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## *a-superficial reflexes*

receptors lie in the skin .

## *b- Deep reflexes*

receptors lie in the deep structures as muscles, ligaments

## *c- Visceral reflexes*

receptors lie in the viscera e.g. micturition, defecation

# (A) SUPERFICIAL REFLEXES

## *1- Abdominal reflexes*

✦ **Center:** ( **T7 – T12** )

**Procedure:** light stroking or touching the skin of the abdomen from the periphery inwards.

**Normal:** contraction of underlying abdominal muscle and deviation of umbilicus towards the stimulated side.



## ***2- Cremastic reflex***

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**Center : L1**

**Procedure :** gentle stroking of a medial side of the thigh

**Normal:** contraction of cremasteric muscle  
and retraction of the testicle of same side

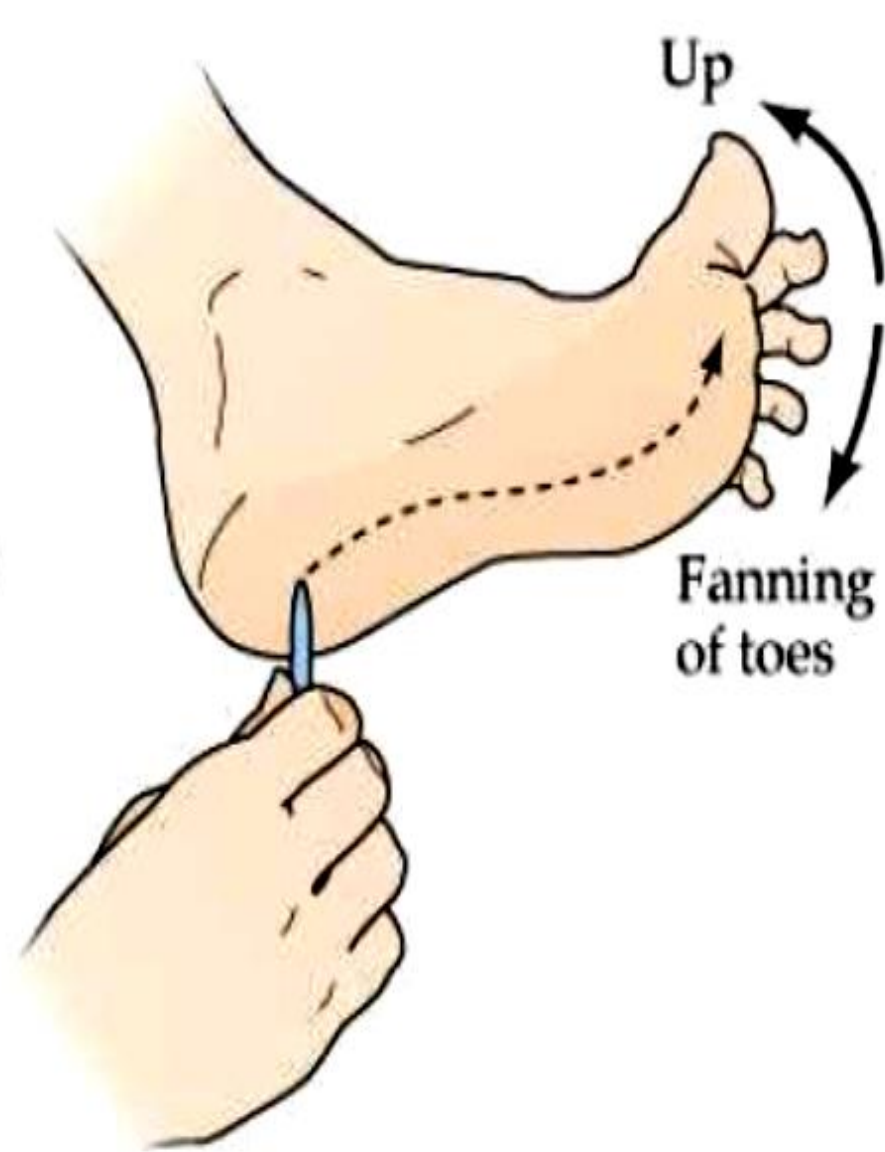
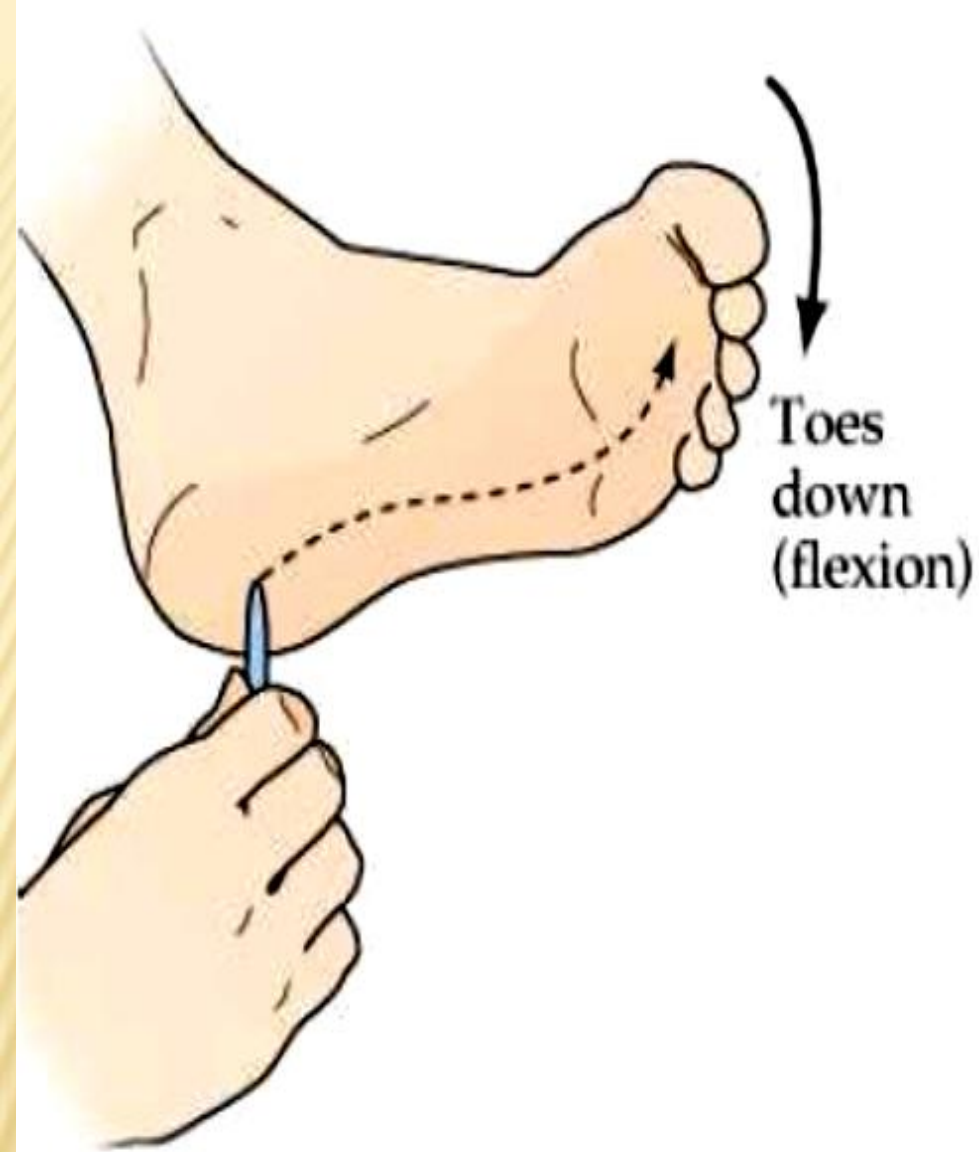
## ***3- Planter reflex***

**Center : S1**

**Procedure:** stroke the outer edge of the sole of the foot from heel up ward by a blunt object (key) then curve inward across the transverse arch.

**Normal:** planter flexion of big toe and adduction and planter flexion of other toes

normal response means intact **pyramidal and extrapyramidal** systems.



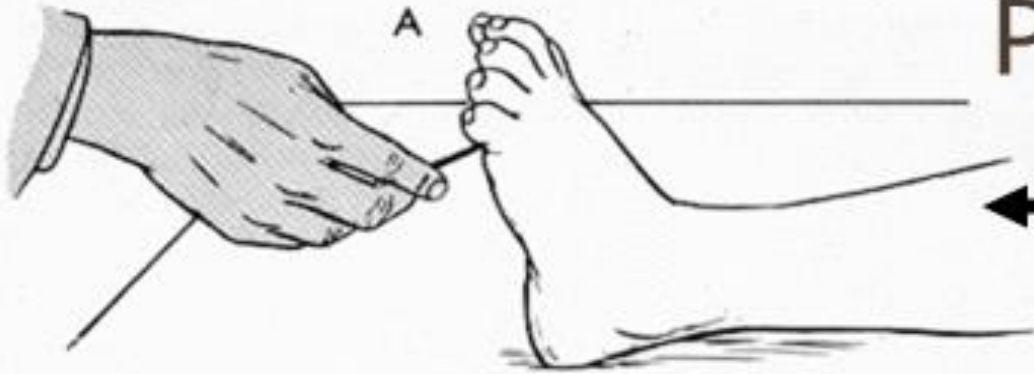
Normal plantar response

(Babinski sign)

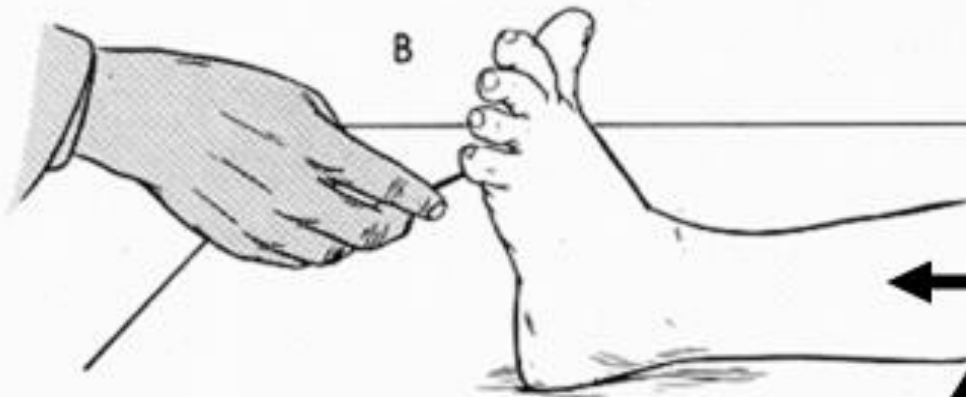


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- ✘ Abnormal response in planter reflex is called "**Babiniski's sign**" dorsiflexion of the big toe (indicates pyramidal lesion) with fanning in other toes (indicates extra pyramidal lesion).
  - ✘ **Babiniski** sign may occur **normally** in a newly born due to lack of myelination of the tracts, deep sleep, Coma and during anesthesia.

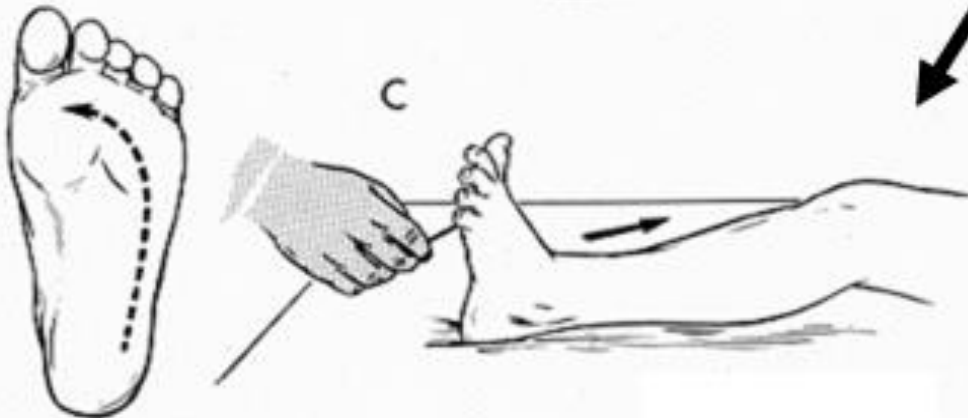
# Plantar Reflex



Normal



Abnormal  
(Babinski's)



# TENDON JERK

sudden tap on a tendon of any muscle (Dynamic phase of stretch reflex )



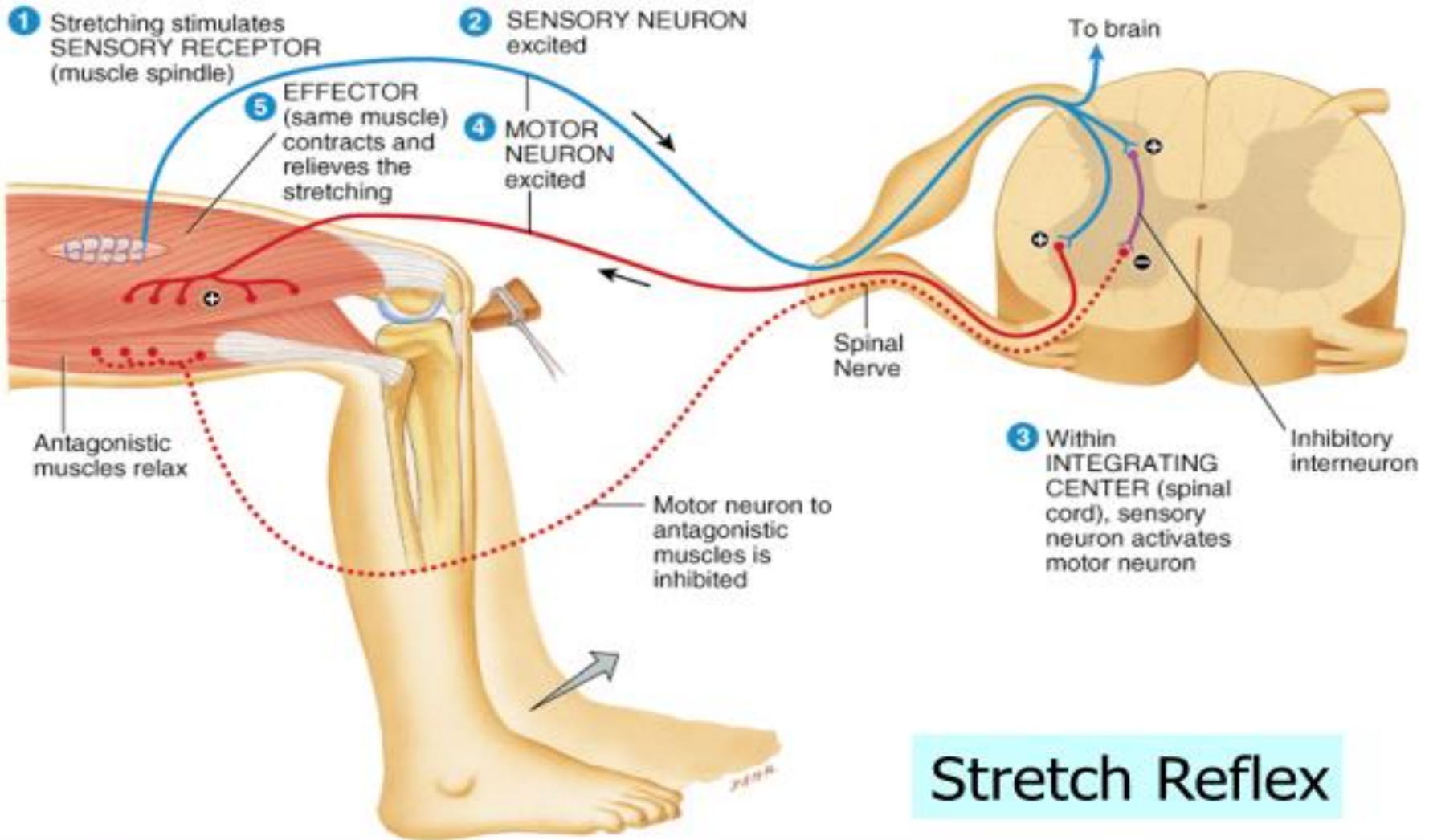
sudden stretch which stimulate deep receptors "the muscle spindle"



sudden visible reflex contraction

"tendon jerk".





# Stretch Reflex

## ✘ Types of tendon jerk

### ✘ *1- In the upper limb:*

#### ✘ *1) Biceps reflex Center : (C 5,6)*

#### ✘ **Procedure :-**

✘ Tap the biceps tendon indirectly i.e the tap is done on the index finger placed over the tendon .The forearm is semi flexed till the elbow is at 120°.

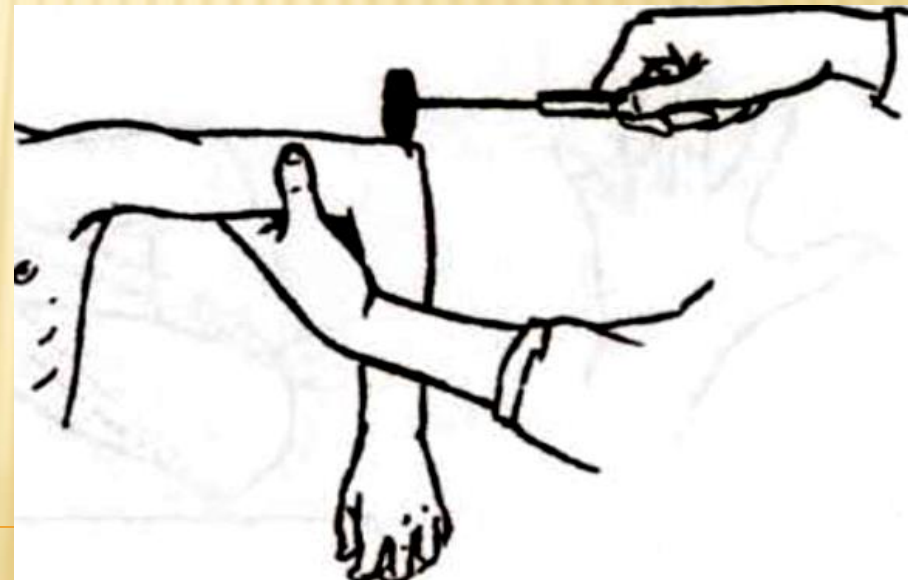
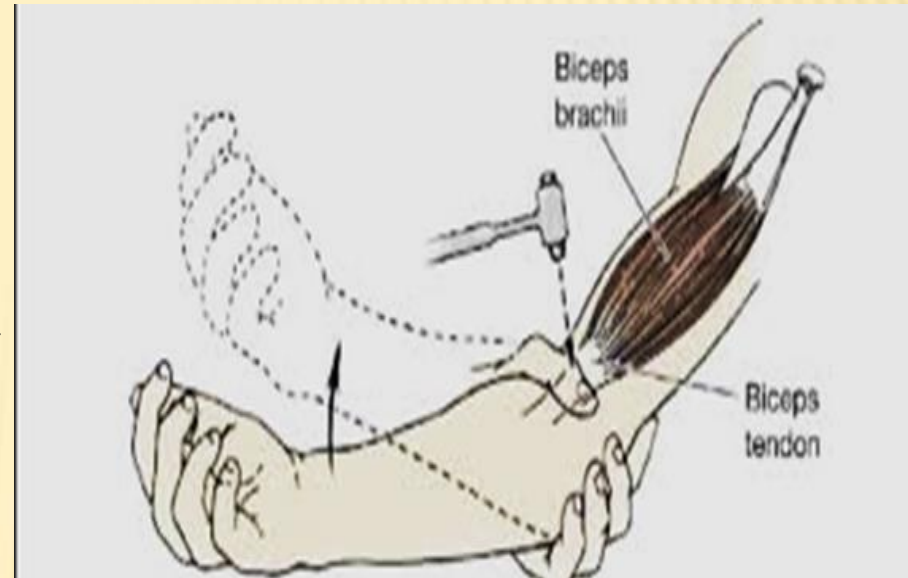
✘ **Normal :** mild contraction of biceps with slight flexion of elbow

#### ✘ *2) Triceps reflex Center (C 6,7)*

#### ✘ **Procedure :-**

✘ Tapping the triceps directly while the elbow is flexed at 90°.

✘ **Normal :-** Mild contraction of triceps and extension of elbow .



## *II- in the lower limb*

### *1) knee jerk*                      **Center (L2,3,4)**

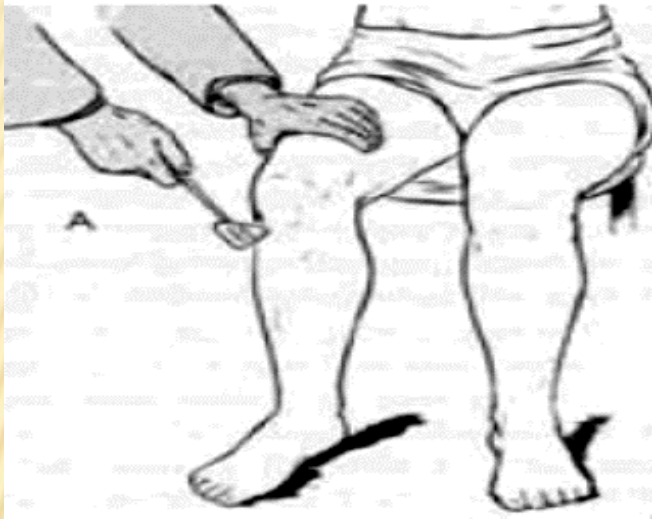
**Procedure :-** Tapping the patellar (quadriceps) tendon while the hip and knee joints are flexed.

**Normal :-** Contraction of quadriceps and **extension** of knee .

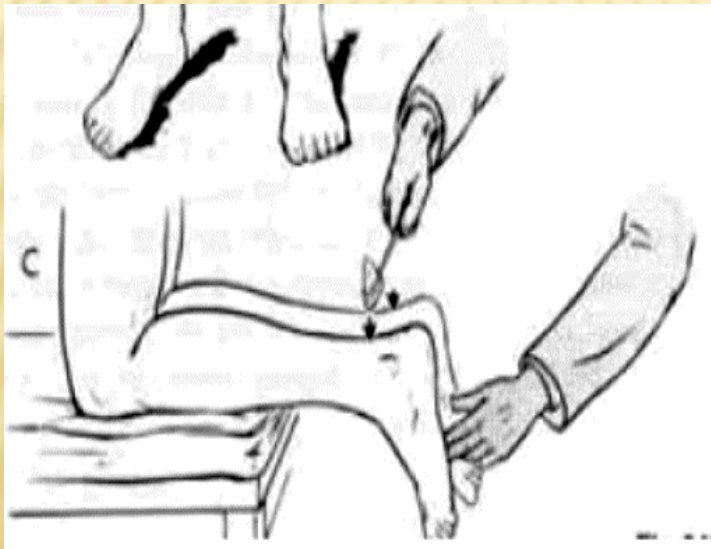
### *2- Ankle jerk*                      **Center ( S1 , 2 )**

**Procedure:** Tap on tendo Achilis while the hip is abducted and externally rotated , the knee is flexed at 90 degree and Ankle is dorsi-flexed .

**Normal:** mild contraction of the calf muscles with **planter** Flexion of the ankle .



Knee jerk in bed



Ankle jerk in bed

# CLINICAL ABNORMALITIES OF THE TENDON JERK

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## ***A- EXAGGERATED (HYPERREFLEXIA)***

- ✘ 1-Upper motor neuron lesion.
- ✘ 2- Hyperthyroidism.
- ✘ 3- Tetany (Ca<sup>++</sup> deficiency).
- ✘ 4-Paleocerebellum syndrome.
- ✘ 5- Anxiety.
- ✘ 6- Eclampsia (toxicity of pregnancy).



## ***B-INHIBITED (HYPOREFLEXIA)***

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- ✘ 1 - Sleep
- ✘ 2 - Coma
- ✘ 3 - Shock
- ✘ 4- Anesthesia
- ✘ 5-Myxedema (hypothyroidism)

## ***C- COMPLETELY ABSENT, "AREFLEXIA"***

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- ✘ 1- Lower motor neuron lesion.
- ✘ 2- Shock stage of complete transection of the spinal cord.
- ✘ 3-Advanced tabes dorsalis.

## ***D-"PENDULAR" KNEE JERK (HYPOTONIA):***

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like the "pendulum" of the watch, occurs in hypotonia.

On tapping the tendon there will be a weak contraction of the muscle, then the limb is dropped like a dead object which causes another stretch of the tendon, and a second weaker contraction occurs and the limb oscillates for few times then stops.

**Causes:** 1 - Neocerebellar syndrome .

2- Chorea (lesion in basal ganglia) .

3-Anterior quadrant lesion of the spinal cord.

4- Pure motor area "4" lesion.

# ***E-CLONUS***

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- ✘ It is an abnormal response of tendon jerk that occurs in U.M.N.L. It is either ankle or patellar clonus
- ✘ Ankle clonus: If a *sudden sustained stretch* is applied on tendocalcanius by dorsiflexion of the foot, there will be *regular rhythmic oscillation of contractions and relaxations*

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**Thank You**