**VPHY 50: General Physiology Laboratory Exercises**

GROUP NO: 1

GROUP MEMBERS:   
**Dianne Villamaria, Jacob Tungol, Mary Turingan, Marc Jocson, Kaizz Cirera**

**INTRODUCTION**

\_\_\_\_\_\_\_\_\_\_\_A reflex arc represents a mechanism by which a physiological function is automatically managed or regulated. Reflex arcs can be found throughout the body, ranging from skeletal muscles to smooth muscle in glands. Reflex arcs are initiated via the excitation or stimulation of specific sensory cells that are directly connected to motor neurons thus enabling motor nerve impulses to be automatically passed on to that particular muscle or gland. Therefore a basic reflex arc consists of sensory cells and their associated nerve fibers, motor nerve fibres and the ultimate muscle or gland.

Some reflex arcs can include a coordination centre within the spinal cord or brain prior to stimulation of the motor nerve. Reflex arcs can involve single or multiple segments up and down the body, although reflex arcs do not require brain input in order to function. However, the brain can act to modulate reflexes. The brain obtains its afferent information via the ascending sensory tracts of the spinal cord. The descending tracts originate from the brain to allow responses to be modulated. These tracts constitute the white matter of the spinal cord.

A number of different sensory inputs are utilised by reflex arcs, including; skin receptors, muscle spindles, the retina, the organ of Corti and the olfactory mucosa. These sensory aspects of reflex arcs feed into two main types of reflex systems in the body; autonomic reflexes and somatic reflexes.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**OBJECTIVES**

1. To study the mechanisms underlying the normal and abnormal reflex

responses examined in this experiment.

2. To be able to differentiate somatic reflexes from autonomic reflexes

3. To understand the effect of mental distraction and fatigue to reflex

response

**Animal Reflex Physiology**

**Cranial Nerve Examination** – perform the tasks indicated below on your animals and

note your observations.

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I Olfactory - Owner’s observation

As the dog exposed to the dog food it wagged it tail that

Means it show a positive response and showed opposite response

After exposing to a week old sock.

II Optic - Menace reflex is examined by dropping a cotton ball on the

eye which normally elicits blinking response

Observations:

\_\_\_no other response but only blinking his eyes

- Pupillary reflex

Observations:

\_there is a dilation or widening of his eyes

III Occulomotor - pupillary reflex

- Oculocephalic reflex is done by moving the head sideways

causing the eyes to look at the same direction

Observations:

\_\_\_\_the patient’s eyes are held open

- Stabismus is a defect that causes downward and outward

deviation of the eye with the inability to converge

- ptosis is due to innervation to levator palpebrae

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IV Trochlear - strabismus results to upward and outward deviation of the eye

V Trigeminal

Opthalmic - Corneal reflex, touching the cornea results to blinking

- Palpebral reflex of the upper lid reflex

- Vibrissae-palpebral

- Touch of pin-prick over the skin muzzle exclusive of the

mandible will lead to avoidance

Observations:

\_\_\_\_as a result there is a blinking of the patient’s eyes

Mandibular - Touch or pin-prick over the lateral side of the cranium skin of

the mandible and oral mucosa

- Ear tickle reflex leads to avoidance

Observations:

the same result there’s a blinking of the patient’s eyes and there’s a movement of the right hindlimb

Maxillary - Upper lip pinch reflex results to avoidance

Observations:

The patient avoided while pinching his upper lip

- Dropped jaw is an abnormality of this nerve

VI Abducens - Strabismus there is medial deviation of the eye with inability

to gaze laterally

- Corneal Reflex

Observations:

The patient’s eyes stays the same or no movement happen

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- Immobilized lids result from abnormality

VII Facial - Palpebral reflex

- Vibrissae reflex, by pulling the whiskers result to avoidance

- Menace reflex

- Corneal reflex

- Handclap reflex

Observations:

While performing each reflexes there is attempt to avoid the procedure resulting to discomfort

- Signs of defect may show dropped ear with no response to

stimulation, lip retracted toward the sound side or dropped

ear and lower eyelid

VIII Auditory

Cochlear - Handclap reflex or owner’s observation

Observations:

\_the patient showed amaze like expression to the owner

Vestibular - Signs of defect includes head tilting, rolling movements or

abnormal nystagmus

IX Glossopharyngeal - Gag reflex

X Vagus - Gag reflex

- Oculocardiac reflex is done by pressing the eyeball of the

animal causing increased heart rate

Observations:

\_\_After pressing both eyeball in separate procedure there is an increased of heat rate and also the patient felt nervous to the owner

- Effects of stimulation are dysphagia, tachycardia, altered

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depth of respiration and digestive disturbances

XI Spinal Accesory - Signs of defects include roaring, voice change, trapezius muscle

degeneration

XII Hypoglossal - Signs of defect includes tongue protruding out of the mouth

toward the side of the lesion, or atrophy of the tongue

- Pulling the tongue causes retraction

Observations:

\_there is a competition on pulling the tongue between the owner and the dog

**Attitudinal and Postural Reactions**

These require intact peripheral nerves, local segments of the spinal cord, ascending and

descending pathways, brain stem, cerebellum and cerebrum. These occur in all normal

animals.

1. *Tonic Neck and eye retraction*

Description: When the nose is elevated, the forelimbs extend and the hindlimb

flex. Deviating the head to one side results in increased extensor tonus on that

side. As the nose is elevated, the eyes should conjugately adjust to remain in the

middle of the palpebral fissure. Normal nystagmus should be observed on lateral

deviation of the head (quick phase toward the side of the deviation).

Abnormalities of eye movements indicate lesions of the vestibulocochlear

system.

*Observations*

a. Elevation of the nose

\_the patient extend his forelimb to the nose

b. Head deviation to the left

\_the patient tried to give back the original position of his head

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c. Head deviation to the right

\_the patient also tried to balance his head by giving so much force to the right side

*2. Proprioreceptor positioning*

Description: A normal animal returns the limb to normal position wh en the

following test are done: (1) abduction of one limb from its normal position; (2)crossing of one limb in front of the other; (3) flexion of the carpus or tarsus and

the rest of the limb on the dorsum of the paw.

*Observations*

a. Abduction of the limb

Immediately he returned his limb to its original position after abducted his limb

b. Crossing the limb together

There is no other response but only returned to its original position after crossing his limb together

c.Flexion of the limb

The patient normally returned his limb to its original position after flexion of the limb

*3. Blindfolding*

This will accentuate the locomotor ataxia if there is lesions in the dorsal white

column of the spinal cord of their cranial extensions to the cortex. However, if

the lesion is present in the cerebellum, no response may occur.

*Observations*

The patient tried to remove the blindfold while moving around with caution

**Placing Reactions**

*1. Optic*

Activity: Carry the animal toward the table top. On approaching the surface, the

animal will reach out to support itself on the table. This reaction requires intact

visual pathways in addition to the central and peripheral areas mentioned.

*Observations*

At first the patient normally sat in the middle calmly then after collecting some energy, the patient perfectly get down from the table.

*2. Tactile*

Activity: carry a blindfolded animal toward a table. Allow the dorsum of each

forepaw to strike the edge of the table. The normal animal will immediately

place both forefeet on the table to support its weight.

*Observations*

The patient normally sat in the middle of the table without movement.

*3. Extensor postural thrust*

Activity: Hold the animal up by the thorax and lower its hindlimbs towards the

ground. The animal will extend its limbs to support its weight, if the animal is

blindfolded, the tactile pathways will be tested instead of the visual.

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*Observations*

The patient extended its hindimbs to reach the ground.

*4. Hopping*

Activity: Hold the animal with three limbs off the ground. Shift its center of

gravity over the fourth limb which is supporting the animal. The normal animal

will hop to keep the supporting limb under its body.

*Observations*

Immediately the patient outbalanced and fell to the ground.

*5. Righting*

Activity: Turn the animal to its lateral recumbency and then release it. Or drop

the animal (this applies best for cats) upside down from a height over a padded

surface. The normal animal will land on its feet.

Another approach is to suspend the animal by its hip and pelvis and turn its body

from side to side. The normal animal will carry and hold its head in the normal

position.

*Observations*

The head of the dig held to its normal position. Then the cat can control their body when dropped so the cat landed its feet.

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*6. Walking Reaction/Wheelbarrowing*

Activity: Supporting the animal under the abdomen so that the hindlimbs are off

the ground surface and then force the animal to walk on its forelimbs. Normally,

the animal should walk with symmetry characterized by alternate forelimb

movements with head extended in the normal position.

*Observations*

After supporting the abdomen the dog walk with symmetry. And the head was in normal position.

*7. Hemistanding and Hemiwalking*

Activity: Hold the opposite hind or forelimbs off the ground and force the animal

to walk forward or sideward. Thus, allow the animal to stand or walk with the

hind or forelimb of one side only.

*Observations*

When the dog is forced to walk without the opposite side of limbs, the dog can’t move normally.

**Discussion questions:**

1. Which of the above-mentioned cranial nerves have a sensory, motor or both

components?

Cranial nerves with sensory only are olfactory, optic and [vestibulocochlear](http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/h_n/cn/cn1/cn8.htm), with motor only are trochlear, abducens, accessory and hypoglossal while the cranial nerves with both compenents are oculomotor, trigeminal, facial,glossopharyngeal and vagus.

2. Briefly discuss the role of learning in altering the activity of the reflexes above.

Learning the altering of the reflexes of the animals show if animals have normal behavior through these different activities.

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