

BITING MECHANISM OF SNAKE

Snakes belong to order - ophidia. Out of 2500 species found all over the world about 300 species are poisonous. Every year about 40,000 - 50,000 people die due to snake biting.

Poisonous snakes differ from non-poisonous snakes in having poison gland and ^{poison} fangs.

The biting mechanism of snakes may be studied under two headings:

- ① Poisonous apparatus
- ② Biting apparatus.

① Poisonous apparatus:

It consists of three parts -

- ① poison gland
- ii) poison ducts
- iii) fangs.

(i) Poison gland: These are one pair situated on either side of upper jaw. These are modified salivary gland. They secrete an enzyme known as poison or venom. Venom is a kind of protein and it is capable of breaking complex organic compounds into simple ones causing death of the victim. Venoms can be grouped into two types -

i) Haemotoxins: It destroy the blood vessels and cause haemorrhage and formation of thrombus.

ii) Neurotoxins: It effect on nervous system and causes respiratory and cardiac failure.

The poison gland is kept in position by means of two ligaments. The anterior end of poison gland is attached to maxilla by an anterior ligament. A posterior

Ligament passes between the gland and quadrate bone of skull. Between lateral side and junction of squamosal and quadrate fan shaped ligaments are present.

ii) Poison duct.

Each poison gland continues anteriorly into a tubular narrow duct, the poison duct. It carries the venom from poison gland to fangs.

iii) Fangs.

The paired fangs are sharply pointed and grooved and are actually enlarged maxillary teeth. They act as syringe and inject poison into the victim. The fangs are regenerated when lost or destroyed. The fangs may be two types.

a) Open type: In open type (eg. Cobra) the poison groove is open and

b) closed type: In closed type (eg. Viper) the poison groove form a tunnel having two openings one at the base and the other near the apex.

Fangs are modified maxillary teeth and are of three types:

i) Ophisthaglyphous: When the fangs are present at the posterior end of the maxillae. They are slightly poisonous eg. Natrix.

ii) Proteroglyphous: When the fangs are present at the anterior end of the elongated maxillae. They are deadly poisonous eg. Cobra, Krait, Sea snakes etc.

iii) Solenoglyphous: When the maxillae are short and have only the poison fangs with narrow groove then the fangs are called Solenoglyphous. Such fangs are found in Viper and pit viper.

(1) Biting apparatus: Biting apparatus are (i) Movable bones and (ii) Specialized muscles

(i) Movable bones:

The important skull bones which become movable and help in biting are maxillae, Squamosal, quadrate, pterygoid, ecto-pterygoid and palatine

The maxillae are usually reduced, and freely movable. It can rotate on its lacrimal joint clockwise and the connected fangs can be erect into a vertical position.

The maxillae is also attached to pterygoid by ectopterygoid. The squamosal is horizontal and is attached to the cranium on the one hand and ^{on} the other hand to the quadrate. The quadrate suspends the lower jaw and the junction acts as fulcrum for the rotational movement. Teeth may be present on the palatine, pterygoid and upper and lower jaws

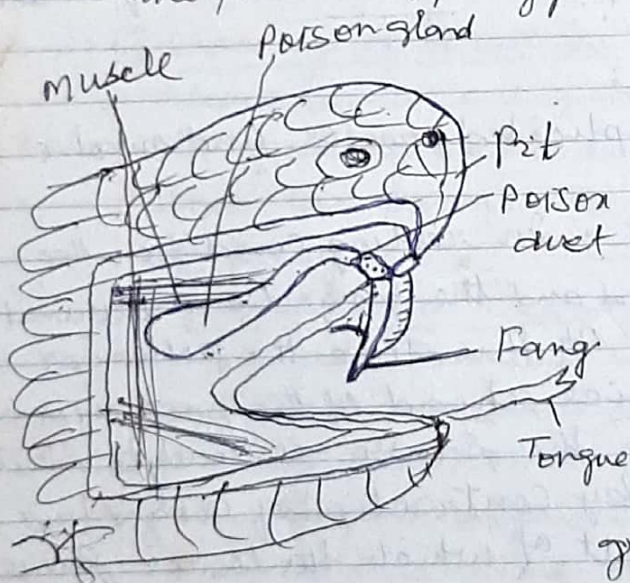


Fig. Head of Poisonous snake showing poison apparatus

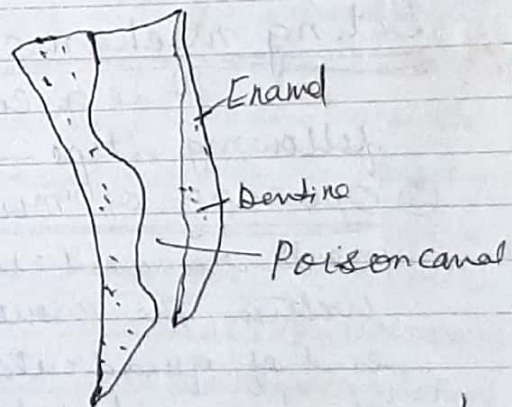


Fig. L.S. of Solenoglyphous

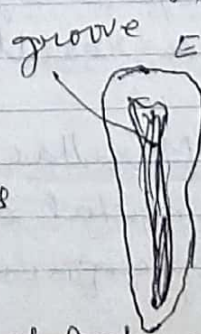
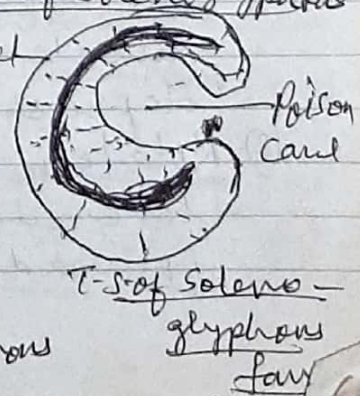


Fig. P.S. of Proteroglyphous



T.S. of Solenoglyphous fang

(i) Specialized muscles:

A number of specialized muscles associated with the biting apparatus are present. These muscles are

- a) Digastric muscle: These muscles are attached to squamale at one end and condyle at the other to the articular of lower jaw. They bring about the opening and closing of mouth.
- b) Sphenopterygoid muscle (Protracto-ptyerygoid): These muscles are attached anteriorly to the orbito-sphenoid region and posteriorly to the dorsal surface of the pterygoid. They help in pulling the pterygoid forward.
- c) The temporalis muscle: These muscles extend from the side wall of the canal to the lower jaws. They assist in closing the lower jaw.
- d) The masseter muscle or Mandibularis Constrictor muscle: These muscles associated with poison glands and press them when required.

Biting mechanism:

It is a complicated process and involve following steps —

- (1) Opening of the mouth: In resting condition the mouth remained closed and the fangs lie uncurred within the mouth. At this time the posterior end of quadrate lies ahead of the posterior end of pterygoid. When the snake is ready to strike the mouth opens by contraction of digastric muscle as a result of which the lower jaw is depressed.
- (2) Rotation of Maxillae: As the mandible is lowered the distal end of the quadrate thrust forward consequently pushing forward the

pterygoid and ectopterygoid bones also this action aided by the condition of sphenopterygoid muscles. The forward and upward movement of the ectopterygoid brings about the rotation of maxilla and the fangs become erected into vertical position.

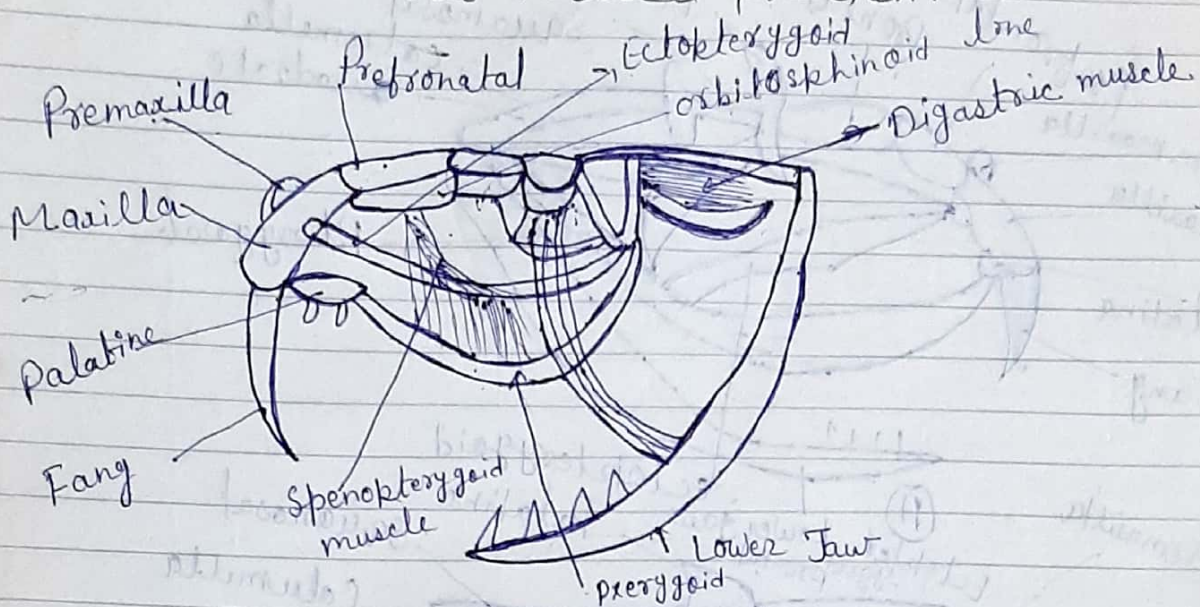


Fig - Biting apparatus of Poisonous Snacks.

- ③ Closing of ~~the~~ the Mouth: This is brought about by the contraction of the temporalis muscles pulling up the lower jaw. As the mouth close the fangs are inserted into the body of prey.
- ④ Injection or transfer of venom: As the fangs are pierced, the masseter muscles contract and squeeze the poison gland forcing the poison through the fangs. The fan shaped ligaments also come into play at this time and help in squeezing the poison.

Feeding and Swallowing mechanism:

Snakes are capable of swallowing very large animal through their mouth

gape which can be extended enormously as possible because of the peculiar structure of the skull. In the snake the skull is kinetic that is, the two maxilla are able to move in the relation to rest of the cranium.

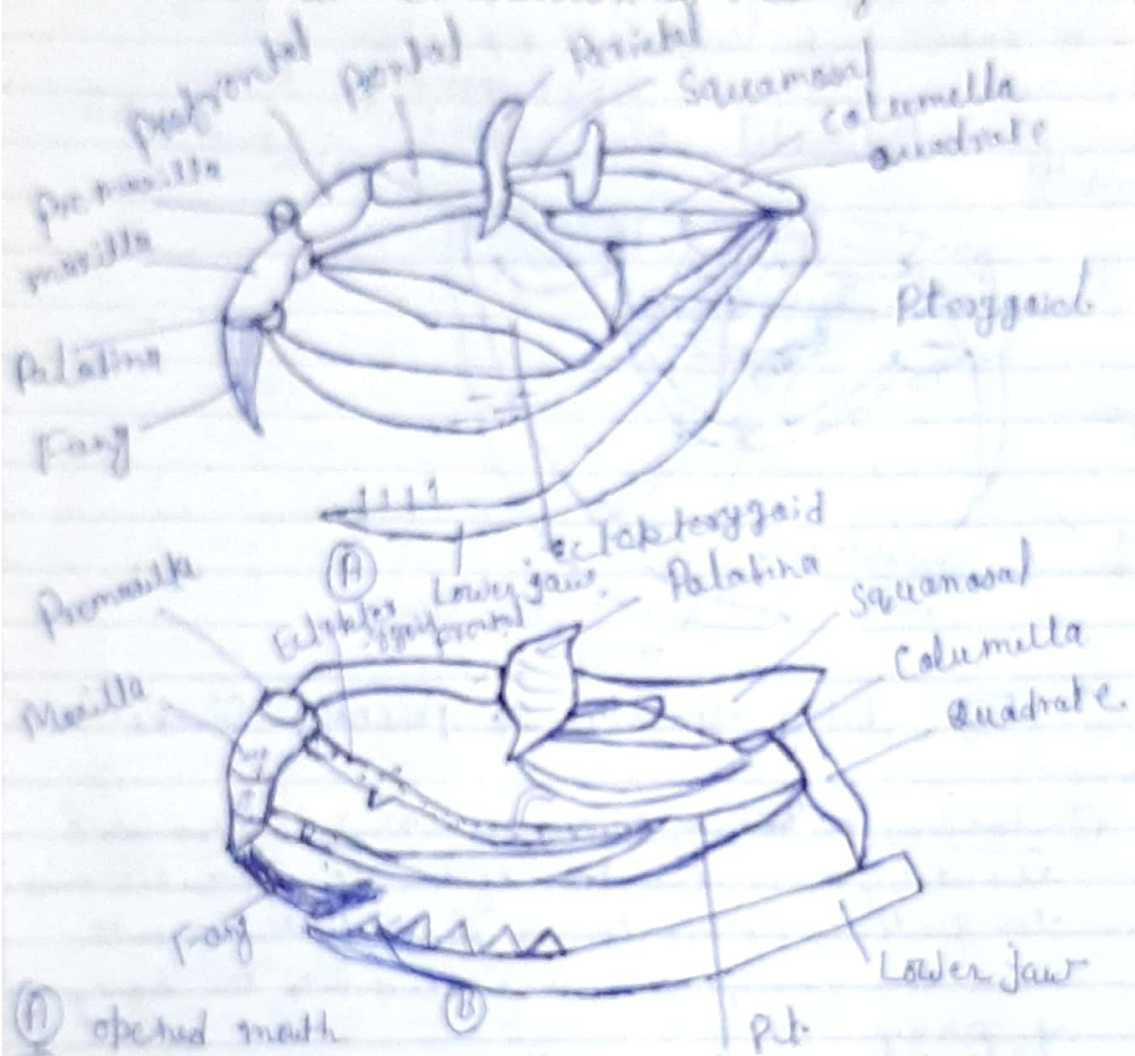


Fig - Mechanism of biting in a Poisonous snake.

Conclusion:

The biting mechanism is so constructed that all the action takes place automatically. With the raising of lower jaw all the related bones are brought to the normal position. The time taken in opening the mouth is longer than the time taken in closing it.