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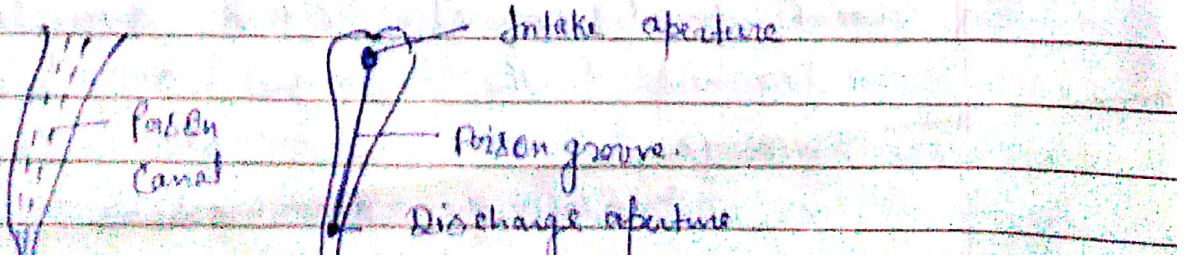
BITING MECHANISM IN SNAKES.

The biting mechanism in poisonous snake is a complicated process and is aided by with a pair of poison glands, their ducts and a pair of fangs. The biting habits has brought about structural modifications in the skull bones and jaw which together constitutes the biting apparatus or ~~poisonous~~ poisonous apparatus. These poisonous apparatus and its associated are -

① Poison gland :- Poison glands are modified or specialized salivary labials glands or parotid glands that manufacture poison. The glands are situated one on either side of the upper jaw. Each gland is sac like and is provided with a narrow duct at its anterior end. The poison duct which opens at the base of the fang or at the base of the tunnel on the fang. The poison gland is held in position by means of two ligaments. An anterior ligament attaches the anterior end of the gland to the maxilla while the posterior ligament passes between the gland and the quadrate bone of the skull. In addition to these ligaments, fan shaped ligaments are situated between the side walls and squamoso-quadrate junction.

Fangs :- The fangs are sharply pointed and grooved and are enlarged maxillary teeth. The fangs regenerate when lost. They act as syringe and inject poison into the victim. The fangs may be of open type or closed type. In open type e.g. cobra the poison groove is open and in closed types as in vipers poison groove forms a tunnel having two opening at the base and one near the apex.



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Teeths other than fangs are solid and recurved to hold the prey. Number of fangs varies with age of the snake. The fangs of cobra are permanently erect and in striking pose, while the fangs vipers normally remain curved back and retracted into special sheath in the roof of the mouth cavity.

The fangs are of three types :-

(1) When the fangs are situated at the posterior end of the maxillae, they are known as opisthoglyphous. Snakes having such fangs are slightly poisonous.

(2) Proteroglyphous snakes like king-cobra, krait, sea snakes have fangs at the anterior end of the elongated maxillae.

(3) When the maxilla are short and have only the poison fangs with narrow groove they are called solenoglyphous.

Muscles :- The poison apparatus is associated with specialized bands of three types of muscles -

(a) Digastric muscles are attached to the squamosal of the skull at one end and at the other to the articular of lower jaw. It help in the opening of the mouth.

(b) Sphenoptenygoid (Protractor-pterygoid) muscles- It is attached anteriorly to the sphenoid region and posteriorly to the dorsal surface of the pterygoid. They help in pulling the pterygoid forward.

(c) The temporalis muscles extends from the side wall of the cranium to the lower jaw. They assist in closing the lower jaw.

In addition, the masseter muscles or mandi-

bularis Constrictor muscles are associated with the poison gland and press them when required.

~~BITING MECHANISM~~

RELATED BONES :- The concerned bones in the biting mechanism are- the maxilla, Squamosal, quadrate, pterygoid, palatine and ectopterygoid. The maxilla is usually reduced and freely movable. It can rotate on its lacrymal joint clockwise and the connected fangs can be erected into a vertical position. The maxilla 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 to the quadrate. The quadrate suspend the lower jaw and their function acts as fulcrum for the rotational movement.

BITING MECHANISM :→ The biting mechanism of snake involves the following steps —

(1) opening of the mouth :→ In resting condition the mouth remains closed and the fangs lie encased 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 the contraction of the diagastric muscles as a result of which the lower jaw is depressed.

(2) Rotation of maxilla :- As the mouth open the lower jaw moves forward and a rotation of the squamosal, quadrate and mandible ~~is~~ occurs. This action is aided by the contraction of Sphenopterygoid muscles and consequently pushing forward the pterygoid and ectopterygoid bones also. The forward and upward movement of the ectopterygoid brings about the rotation of the maxilla and the fangs

become erected into a vertical position.

3. Closing of the mouth :→ The closing of the mouth is brought about by the contraction of the temporalis muscles pulling up the lower jaw. As the mouth closes the fangs are inserted into the body of the prey. It takes longer time to open the mouth than to close it.

4. Injection or Transference of Venom :—

During the contraction of the diagastric muscles the posterior ligament is relaxed and during the rotation of the squamosal bone the fan shaped ligaments are stretched to squeeze the wall of the poison gland. The massiter muscles also contract and push the poison through fang. This makes the poison to come out of poison gland through the poison gland duct and the fangs.

The biting apparatus is so constructed that all the action takes place automatically. With the raising of lower jaw all the related bones are brought to their normal position.

Swallowing mechanism :—

Snakes are capable of swallowing very large animals through their mouth gap which can be widen enormously. This is possible because of the peculiar structure of the skull. In snakes the skull is kinetic that is the two maxilla are able to move in relation to the rest of the cranium. The upper jaw is loosely attached to the skull and freely movable. The quadrate which suspends the jaws is loosely attached to

pterygoid and lower jaw. Levator and protractor pterygoidei raise the pterygoids and pull them forwards and inwards so that the prey is held between them. The two ramie of the lower jaw are separate anteriorly, but are connected by an elastic ligament which allows much expansion of lower jaw. Thus the lowering of the lower jaw and forward movement of reduced upper jaw bring about great expansion of mouth gape enabling snakes to swallow large animals.

The brain case is protected underneath by large parasphenoid bone, so that the brain cannot be injured by the struggling prey. The contraction of the pharyngeal muscles propels the prey backwards. The skin of the throat is greatly distensible and a prey much wider than snake's head can be swallowed. The absence of pectoral girdle and sternum also facilitates the process of swallowing.