

## Swallowing

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1. **Moistening.** Food is moistened by saliva from salivary glands (parasympathetic)
2. **Mastication.** It is mechanically broken down by the action of the teeth, and the tongue against the hard palate by the muscles of mastication (Vc) acting on the temporomandibular joint. This results in a bolus. Buccinator (VII) helps to contain the food.
3. **Trough formation.** A trough is then formed in the tongue by the intrinsic muscles (XII). The trough obliterates from front to back, forcing the bolus to the back of the tongue.
4. **Closure of soft palate.** The soft palate is tensed by tensor palati (Vc), and then elevated by levator palati (PP).to close the nasopharynx. The superior constrictor (pharyngeal plexus) also helps to close the nasopharynx.
5. **Movement of bolus posteriorly.** The food bolus is moved by the back of tongue into oropharynx. Mylohyoid (Vc) lifts tongue and Styloglossus (XII) pulls it back. The palatoglossal arches are opened by relaxation of palatoglossus (PP).
6. **Opening of auditory tube.** The auditory tube is opened by levator palati (PP), tensor palati (Vc) and salpingopharyngeus (PP) to equalise the pressure between the nasopharynx and the middle ear.
7. **Pharynx prepares to receive bolus.** The pharynx is pulled upwards and forwards by the suprahyoid and pharyngeal muscles, to receive the bolus - (stylopharyngeus (IX), salpingopharyngeus (PP), palatopharyngeus (PP) and inferior constrictor (PP)).
8. **Closure of oropharynx.** The oropharynx kept closed by palatoglossus (PP), the intrinsic muscles of tongue (XII) and styloglossus (XII).
9. **Laryngeal closure.** The larynx closes by three mechanisms. It is pulled up with the pharynx under the tongue by stylopharyngeus (IX), salpingopharyngeus (PP), palatopharyngeus (PP) and inferior constrictor (PP).; the cords close (X-RLN), the laryngeal aditus is closed by aryepiglotticus (X-RLN) and the epiglottis flaps over the aditus.
10. **Hyoid elevation.** The hyoid is elevated by stylohyoid (VII), lifting the pharynx and larynx up even further.
11. **Bolus transits pharynx.** The pharynx helps the bolus towards the oesophagus by constricting along its length. The lower part of the inferior constrictor (cricopharyngeus) is normally closed and only opens for the advancing bolus.
12. **Oesophageal peristalsis.** The bolus enters the oesophagus and is propelled downwards first by the striated muscle (Recurrent laryngeal) then by the smooth muscle (X) at a rate of 3-5cm/sec.
13. **Relaxation phase.** Finally the hyoid, larynx & pharynx move down to their relaxed positions mostly by elastic recoil.