Anatomy in Dental Implant Surgery

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Editorial Note

The knowledge of nerves and vessels in the maxillofacial region, particularly the anatomical structures in the maxilla, mandible, tongue muscles, and salivary glands, is essential for dental surgeons. In addition, the structures in the mandibular canal, palate, and maxillary sinus should be understood well.

The arteries and nerves in the maxillofacial region were observed in this study. Some variations in the origin of the inferior alveolar artery were found. Notably, the variations in the origin of the inferior alveolar artery from that of the external carotid artery and a double origin of the inferior alveolar artery were observed. Thus, the maxillary artery may originate from the external carotid and stapled arteries. The following points are important.

Implant Surgery

The head is composed of mainly rigid sclerites or sclerotized segments. The insect head is a capsule that contains the compound eyes, simple eyes (ocelli), mouthparts, and antennae. In most insects there is one pair of large, prominent compound eyes composed of units called ommatidia. There may be up to 30,000 ommatidia in a compound eye. This type of eye gives less resolution than the vertebrate eye, but it gives acute perception of movement. When present, ocelli, detect lowlight or small changes in light intensity. The four main mouthparts are the labrum, mandibles, maxillae (plural maxilla) and labium. The labrum is a simple fused sclerite, often called the upper lip, and moves longitudinally. It is hinged to the clypeus. The mandibles, or jaws, are highly sclerotized paired structures that move at right angles to the body. They are used for biting, chewing and severing food. The maxillae are paired structures that can move at right angles to the body and possess segmented palps. The labium often called the lower lip, is a fused structure that moves longitudinally and possesses a pair of segmented palps. Mouthparts very greatly among insects of different orders but there are two main functional groups: mandibulate and haustellate. Haustellate mouthparts can be further classified as piercing-sucking, sponging, and siphoning.

Mandibulate mouthparts are used for biting and grinding solid foods. Examples: Dragonflies and damselflies of order Odonata, termites of order Isoptera, adult lacewings of order Neuroptera, beetles of order Coleoptera, ants of order Hymenoptera, cockroaches of order Blattaria, grasshoppers, crickets and katydids of order Orthoptera, and caterpillars of order Lepidoptera. Adult Lepidoptera have siphoning mouthparts. Haustellate mouthparts are primarily used for sucking liquids and can be broken down into two subgroups: those that possess stylist and those that do not. Stylist are needle-like projections used to penetrate plant and animal tissue. The modified mandibles, maxilla, and hypopharynx form the stylist and the feeding tube. After piercing solid tissue, insects use the modified mouthparts to suck liquids from the host. To the left is a diagram of cicada mouthparts. Some haustellate mouthparts lack stylist. Unable to pierce tissues, these insects must rely on easily accessible food sources such as nectar at the base of a flower. One example of non-stylate mouthparts are long siphoning proboscis of butterflies and moths. Although the method of liquid transport differs from that of the Lepidopteran proboscis, the rasping-sucking rostrum of some flies is also considered to be haustellate without stylist. Piercing-sucking mouthparts are used to penetrate solid tissue and then suck up liquid food. Examples: Cicadas, aphids, and other bugs of order Hemiptera, sucking lice of order Phthiraptera, stable flies and mosquitoes of order Diptera. Siphoning mouthparts lack stylist and are used to suck liquids. Examples: Butterflies, moths and skippers of order Lepidoptera, bees of order Hymenoptera. Larval Lepidoptera have chewing mouthparts. Sponging mouthparts are used to sponge and suck liquids. Examples: House flies and blow flies of order Diptera.

Antennae function almost exclusively in sensory perception. Some of the information that can be detected by insect antennae includes: motion and orientation, odor, sound, humidity, and a variety of chemical cues. Antennae vary greatly among insects, but all follow a basic plan: segments 1 and 2 are termed the scape and pedicel, respectively. The remaining antennal segments (flagellomeres) are jointly called the flagellum. Aristate antennae are pouch-like with a lateral bristle. Examples: House and shore flies. Capitate antennae are abruptly clubbed at the end. Examples: Butterflies of order Lepidoptera. Clavate antennae are gradually clubbed at the end. Examples: Carrion beetles of order Coleoptera. Adult carrion beetles feed on decaying animal matter or maggots. Filiform antennae have a thread-like shape. Examples: Ground and long horned beetles, cockroaches. Geniculate antennae are hinged or bent like an elbow. Examples: Bees and ants of order Hymenoptera. Lamellate or clubbed antennae end in nested plates. Examples: Scarab beetles, Moniliform have a bean like shape. Examples: Termites, Pectinate antennae have a comb-like shape. Examples: Fire-colored beetles and fireflies, plumoantennae have a feather-like shape. Examples: Moths and mosquitoes.

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