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PREFACE

با درود به خوانندگان و داوطلبین آزمون دستیاری دندانپزشکی. مجموعه درک مطلب زبان انگلیسی دستیاری دندانپزشکی "CEDA" بر اساس کتاب Dental Hygiene and Therapy که یکی از رفرنس‌های مهم زبان انگلیسی آزمون دستیاری دندانپزشکی می باشد، تهیه و تدوین شده است. رفرنس تعیین شده علاوه بر محتوای سنگین، از حجم بالایی برخوردار است و در نگاه اول، خواننده بدلیل ضیق وقت آن را کنار گذاشته و یا به مرور اجمالی آن اکتفا می کند که در نتیجه مطالب مهم این کتاب را از دست می دهد.

لذا اینجانب با اطلاع از حجم رفرنس‌های تعیین شده در آزمون دستیاری، بر آن شدم تا با تهیه مجموعه‌های کم حجم و موضوعات دسته‌بندی شده، علاوه بر ارائه نکات مهم کتاب رفرنس، سوالهای تشریحی و تستی همراه با پاسخ برای داوطلبان عزیز این حوزه فراهم آورم. این مجموعه تقریباً یک چهارم کتاب رفرنس را شامل می شود.

کتاب حال حاضر، جلد اول (CEDA۱) از این مجموعه ۴ جلدی است. و جلدهای بعدی به یاری خدا به محض آماده شدن ارائه خواهد شد. جلد اول شامل ۵ قسمت و هر قسمت شامل ۴ متن تخصصی، ۲۰ سوال تشریحی و ۲۰ سوال تستی است که در مجموع این کتاب حاوی ۲۰ متن اختصاصی، ۱۰۰ سوال تشریحی و ۱۰۰ سوال تستی به همراه پاسخ تشریحی می باشد. با توجه به دسته‌بندی موضوعات در هر متن و سوالهای مختص به آن متن، مطالعه این کتاب حس خوبی به خواننده می دهد و داوطلب را از سر در گمی مطالعه رفرنس‌ها رها می سازد. توصیه می نمایم داوطلبین عزیز قبل از مطالعه این کتاب حتماً آموزش ساختار لغت Word Formation در کتاب FAST و آموزش درک مطلب در کتاب DELTA از سری مجموعه‌های آموزش زبان دستیاری دندانپزشکی چاپ شده توسط انتشارات رویان پژوه را مطالعه نمایند. مطالعه مهارتهای درک مطلب در کتاب DELTA در پاسخگویی به سوالات این کتاب بسیار حائز اهمیت بوده و خواننده با تسلط بر این مهارتها به راحتی سوالها را پاسخ می دهد.

در پایان از مدیر مسئول محترم انتشارات وزین رویان پژوه و همکاران مجرب و عالیقدر ایشان که در آماده سازی این مجموعه متقبل زحمات زیادی شدند، قدردانی می نمایم.

تابستان ۱۴۰۱

دکتر سعید طالع پسند

CHAPTER 1

Passage 1

The primitive oral cavity, which is known as the stomodeum, develops five facial swellings: one frontonasal process, two maxillary processes and two mandibular processes. The frontonasal process eventually develops to form the forehead, nose and philtrum; the two maxillary processes form the middle face and upper lip; and the two mandibular processes form the mandible and lower lip.

The palatal shelves contact each other forming the secondary palate; the shelves also contact anteriorly with the primary palate dividing the oral and nasal cavities. The primary nasal septum and primary palate are formed, both derived from the fronto-nasal process. Two lateral palatal shelves develop behind the primary palate from the maxillary process. A secondary nasal septum grows behind the primary nasal septum from the roof of the primitive oral cavity dividing the nasal cavity into two. The mandible appears as a band of dense fibrous tissue known a Meckel's cartilage; this cartilage provides a framework around which the bone will form. Bone formation commences at the mental foramen area and begins to spread backwards, forwards and upwards outlining the future body of the mandible. As the bone grows backwards, two small secondary cartilages develop, which eventually form the condyle and coronoid processes. Anteriorly, the left and right mandibular plate of bone is separated by cartilage at the mandibular symphysis; these two plates eventually unite to form a single bone approximately 2 years after birth. The upward growth of bone increases the height of the mandible forming the alveolar process which will surround the developing tooth germ.

The first sign of tooth development occurs at the 6th week of intrauterine life. Underneath the oral ectodermal epithelium there is a condensation of mesenchymal cells in areas where teeth will eventually form. The ectodermal epithelium thickens in these areas and protrudes into the mesenchymal cells forming the primary epithelial band.

By 14 weeks of intrauterine life the enamel organ consists of the Cells lining the inner surface of the enamel organ which are columnar in shape. The inner enamel epithelium defines the shape of the crown. They will eventually differentiate into enamel forming cells (ameloblasts). Lies over the inner enamel epithelium. Consists of two to three layers of cells. Transports nutrients to and from the ameloblasts. Lies between the stratum intermedium and the outer enamel epithelium. It consists of star-shaped cells that protect the underlying dental tissues. It also maintains the shape of the tooth.

Cells lining the outer surface of the enamel organ. They are cuboidal in shape. They maintain the shape of the enamel organ. The outer enamel epithelium meets with the internal enamel epithelium at the cervical loop. Eventually the inner and outer enamel epithelium grows downwards at the cervical loop forming Hertwig's root sheath, which maps out the shape of the root.

At the late bell stage the dental lamina disintegrates and is ready for the formation of dental hard tissue. Dentine formation always precedes enamel formation. Late bell stage the inner enamel epithelium cells have mapped out the shape of the crown. The inner enamel epithelium cells induce cells at the periphery of the dental papilla to form columnar odontoblast cells (dentine-forming cells). Odontoblast cells begin to secrete an unmineralized dentine matrix. As more dentine matrix is deposited, the odontoblast cells retreat in the direction of the pulp leaving an elongated process known as the odontoblast process. The dentine matrix formed prior to mineralization is termed predentine. A narrow layer of predentine is always present on the surface of the pulp. Mineralization of dentine begins when the predentine is approximately 5 μm thick. Spherical zones of hydroxyapatite called calcospherites are formed within the dentine matrix. Mineralization of the dentine matrix starts at random points and eventually these calcospherites fuse together to form mineralized dentine. Dentinal tubules form around each odontoblast process. The odontoblasts retreat in S-shaped curves towards the dental papilla. The first layer of mineralized dentine is called mantle dentine and the remaining bulk of the mineralized dentine is known as circumpulpal dentine.

As the enamel organs grow and increase in size, the inner aspect becomes concave resembling skull caps. By the late cap stage, at 12 weeks of intrauterine life, cells on the inner aspect of the enamel organ change from cuboidal to columnar forming the inner enamel epithelium. The outer layer of cells remains cuboidal and is known as the outer enamel epithelium. Beneath the inner enamel epithelium, the condensation of mesenchymal cells is termed the dental papilla; this will eventually become the pulp. A fibrous capsule surrounds each enamel organ and this is termed the dental follicle; this will eventually become the periodontal ligament.

Salivary glands are compound exocrine glands (glands that discharge secretions, usually through a tube or a duct, onto a surface). They have special epithelial secretory cells that produce saliva. Saliva is produced by both major and minor salivary glands. The major glands are the parotid, submandibular and sublingual glands; the minor salivary glands are found throughout the oral cavity.

Parotid gland: this is the largest of the major salivary glands. It is located below and in front of each ear and lies on the surface of the masseter muscle. The parotid gland produces a pure serous secretion that enters the oral cavity through the parotid duct opposite the upper second molar tooth. The parotid gland is enclosed in a strong fibrous capsule. Several important structures pass through the parotid gland; namely the facial nerve, facial vein, external carotid and temporal vein. The parotid gland is supplied by the glossopharyngeal nerve.

Submandibular gland: this lies in the submandibular fossa below the mylohyoid line on the inner aspect of the mandible. Part of the gland extends posteriorly around the free boarder of the mylohyoid

muscle to lie above the mylohyoid muscle. The submandibular gland produces a mixture of serous and mucous secretions that enter the oral cavity though a small lingual papilla (lingual caruncle) on either side of the lingual fraenum. The submandibular gland is contained in a loose capsule through which passes the facial artery. Innervation is by the chorda tympani branch of the facial nerve and the lingual nerve.

Sublingual gland: this is the smallest of the major salivary glands. It lies within the sublingual fossa on the inner aspect of the mandible above the mylohyoid muscle and below the sublingual folds. The sublingual gland produces a mixed secretion that is predominantly mucous, which enters the oral cavity through 8–20 small ducts (plica sublingualis) along the sublingual folds. The sublingual gland is not capsulated. The nerve supply is the same as for the submandibular gland.

The maxilla accommodates the upper dentition and forms the upper jaw. It is largely hollow because of the presence of the large maxillary sinus and consists of a roughly four-sided pyramidal body and four processes:

The frontal process projects upwards and helps to form the lateral border of the nasal aperture and joins the frontal bone of the skull. The horizontal palatine processes from both maxillae form the anterior part of the hard palate. The horizontal plates of the palatine bone form the posterior part of the hard palate. The following foramina can be found on the hard palate – the incisive foramen located at midline behind the central incisors through which pass the nasopalatine nerve and artery, the greater and lesser palatine foramina can be found on the posterior part of the hard palate through which pass the greater and lesser palatine nerve and artery. The curved alveolar process projects downwards and contains the sockets of the maxillary teeth.

An orbital plate forms the base of the orbit. On the anterior surface below the lower border of the orbit is the infraorbital foramen through which passes the infraorbital nerve and artery.

A: Descriptive Questions: Write full answer for each question.

1. What is the stomodeum?

2. At approximately 6 weeks of intrauterine life, the mandible appears as a band of dense fibrous tissues, what is this known as?

3. What is the earliest indication of tooth development?

4. In tooth development, what is the function of the inner enamel epithelium?

5. At what stage of tooth development does hard dental tissue begin to form?

B: Multiple Choice Questions: Choose the best item.

1. During the development of the mandible the left and right mandibular plate of bone is separated by cartilage at the:

(a) Mental foramen.
(b) Condyle process.
(c) Mandibular symphysis.
(d) Mental protuberance.

2. Mantle dentine is the:

(a) Dentine formed prior to mineralization.
(b) First layer of mineralized dentine.
(c) Bulk of mineralized dentine.
(d) Dentine formed within the dentinal tubules.

3. The periodontal ligament is formed from:

(a) Dental follicle.
(b) Dental papilla.
(c) Sharpey's fibers.
(d) Outer enamel epithelium.

4. The salivary gland that secretes mainly serous saliva is:

(a) Minor salivary gland.
(b) Sublingual salivary gland.
(c) Submandibular salivary gland.
(d) Parotid salivary gland.

5. What nerve passes through the incisive foramen?

(a) Infraorbital nerve.
(b) Greater palatine nerve.
(c) Nasopalatine nerve.
(d) Lesser palatine nerve.

Passage 2

During maturation from pre-enamel to mature enamel, the enamel crystallites increase in size and the organic content is reduced. On completion of enamel formation, the ameloblast cell loses the Tomes' process, flattens and becomes the reduced enamel epithelium. The reduced enamel epithelium protects the enamel during eruption and will eventually become the junctional epithelium.

Late bell stage the inner enamel epithelium cells have mapped out the shape of the crown. The inner enamel epithelium cells induce cells at the periphery of the dental papilla to form columnar odontoblast cells (dentine-forming cells). Odontoblast cells begin to secrete an unmineralized dentine matrix. As more dentine matrix is deposited, the odontoblast cells retreat in the direction of the pulp leaving an elongated process known as the odontoblast process. The dentine matrix formed prior to mineralization is termed predentine. A narrow layer of predentine is always present on the surface of the pulp. Mineralization of dentine begins when the predentine is approximately 5 μm thick. Spherical zones of hydroxyapatite called calcospherites are formed within the dentine matrix. Mineralization of the dentine matrix starts at random points and eventually these calcospherites fuse together to form mineralized dentine. Dentinal tubules form around each odontoblast process. The odontoblasts retreat in S-shaped curves towards the dental papilla. The first layer of mineralized dentine is called mantle dentine and the remaining bulk of the mineralized dentine is known as circumpulpal dentine.

The Hertwig's root sheath induces the formation of odontoblast cells. When root dentine has formed, Hertwig's root sheath fragments allowing adjacent cells from the dental follicle to come into contact with the root dentine. These cells differentiate into cementoblasts (cementum-forming cells). Cementoblasts are cuboidal in shape and form a single layer on the surface of the root dentine. The cementoblasts secrete cementum matrix and crystallites of hydroxyapatite are deposited in this matrix and mineralization occurs. During formation, a thin layer of unmineralized cementum is always present on the surface; this is known as cementoid.

The surface of the oral mucosa consists of epithelial tissue. Epithelial tissue is first classified according to the shape of the cells as being squamous (flat cells), cuboidal (cube shaped) or columnar (tall, narrow cells) and second by the number of cell layers. A single layer of epithelial cells is called simple and where there are several layers it is called stratified. The structure of the mucous membrane varies in different parts of the oral cavity according to the variation in function. In areas subject to chewing such as the hard palate and the attached gingivae, the mucosa has a firm keratinized epithelial layer of fibrous protein (also found on the palms of the hands and soles of the feet). In other areas such as the cheeks and floor of the mouth that require more flexibility, this is reduced or absent. The cells of this keratin layer have no nuclei and no nerve supply. Underneath the keratinized layer of cells is a non-keratinized layer of epithelial cells which have nuclei and act as cushion against mechanical forces. The deepest layer of these cells is known as the basal layer and is attached to the basal lamina.

Dentine is mineralized tissue forming the bulk of the tooth. It underlies the enamel in the crown area and is covered by the cementum in the root area. Dentine is pale yellow in color and is harder than bone and cementum but not as hard as enamel. Dentine consists of many dentinal tubules that run parallel to each other following a double curved course and extend from the pulp to the amelodentinal junction. Each dentinal tubule contains an odontoblast process surrounded by intercellular ground substance composed of fine collagenous fibrils. The odontoblast cells are a layer of closely arranged cells on the pulpal surface of the dentine with their nuclei situated at the basal (pulpal) end of each cell. There are many theories for the mechanism of dentine sensitivity. The principal current theories are: Innervation theory: the nerve fibers of the pulp pass into the dentinal tubules. Odontoblast receptor theory: the odontoblasts act as a receptor transmitting nerve impulses. Brännström's hydrodynamic theory: this suggests that there is movement of fluid within the dentinal tubules.

The mandibular division is the largest division of the trigeminal nerve. It contains both motor and sensory fibers. It leaves the cranium through the foramen ovale and enters the infratemporal fossa.

Lingual nerve: this branch supplies sensory fibers to the lingual gingiva of all the lower teeth, the anterior two-thirds of the tongue and the floor of the mouth. The chorda tympani branch of the facial nerve joins the lingual nerve providing special taste fibers to the anterior two-thirds of the tongue. It also carries parasympathetic fibers to the submandibular ganglion to supply the submandibular and sublingual salivary glands.

The facial nerve enters the internal auditory meatus and travels through the facial canal which is in the temporal bone. The facial nerve leaves the cranium through the stylomastoid foramen and gives off branches to the posterior belly of the digastric and stylohyoid muscle. It enters the parotid gland where it gives off five terminal branches: the temporal, zygomatic, buccal, mandibular and cervical. These branches supply motor fibers to the muscles of facial expression.

The mandible has a horseshoe shaped body which extends upwards and backwards into the ramus. The ramus has two processes; the posterior condylar process which forms part of the temporomandibular joint and the anterior coronoid process to which the temporal muscle is attached. Anteriorly there is a triangular prominence near the midline called the mental protuberance. The mental foramen, through which the mental nerve and artery pass, is located buccally between the first and second premolars. Just posterior to the mental foramen can be found the external oblique line which gives attachment to the buccinators muscle.

The floor of the mouth is made up of the mylohyoid, genioglossus, geniohyoid and the digastric (anterior belly) muscles. The floor of the mouth is covered by non-keratinised mucosa. The lingual fraenum connects the under surface of the tongue to the floor of the mouth. On either side on this fraenum can be found the submandibular salivary ducts (Wharton's ducts). The ducts of the sublingual glands are numerous and can be found along the sublingual folds or plica sublingualis.

Enamel is highly mineralized and is the hardest tissue in the body. Enamel covers the anatomical

crown of the tooth and varies in thickness. It is semi-translucent and its color can vary from bluish white to hues of yellow. Enamel is made up of millions of enamel prisms or rods, which run from the amelodentinal junction to the enamel surface. Each prism is made up of a large number of enamel crystallites. When viewed under a light microscope each prism resembles the rounded ‘head’ portion of a keyhole (Figure1.12). The enamel crystallites run parallel to the long axis of the prism and in the ‘tail’ portion the enamel crystallites are inclined away from the long axis of the enamel prism. Enamel is laid down in layers which produce incremental growth lines. After each successive layer the ameloblasts retreat so as not to be trapped within their matrix. Some growth lines mark daily deposits which are about 4 um thick; these are called cross striations. 96–97% inorganic material (by weight), the main inorganic component being hydroxyapatite. 1% organic material (by weight), the main organic component being protein. 2–3% water (by weight).

A: Descriptive Questions: Write full answer for each question.

6. What happens to the ameloblast cell when enamel formation has completed?

7. What happens to the odontoblasts just after secreting the dentine matrix?

8. What do you understand by the term cementoid?

9. Which areas of the oral mucosa are keratinized?

10. What are the three theories for dentine sensitivity?

B: Multiple Choice Questions: Choose the best item.

6. The chorda tympani is a branch of:

(a) Facial nerve.
(b) Maxillary nerve.
(c) Mandibular nerve.
(d) Trigeminal nerve.

7. The facial nerve passes through the:

(a) Foramen ovale.
(b) Infraorbital foramen.
(c) Jugular foramen.
(d) Stylomastoid foramen.

8. The insertion of the temporalis muscle is the:

(a) Temporal lines of the parietal bone.
(b) Condyle process and anterior border of the ramus.
(c) Coronoid process and lateral border of the ramus.
(d) Coronoid process and anterior border of the ramus.

9. The main muscle that forms the floor of the mouth is:

(a) Hyoglossus muscle.
(b) Styloglossus muscle.
(c) Mylohyoid muscle.
(d) Stylohyoid muscle.

10. What percentage of enamel is organic?

(a) 10%.
(b) 1%.
(c) 96%.
(d) 40%.

Passage 3

The bones which make up the cranium are as follows:

Cranium	Number	Facial region	Number
Frontal	1	Mandible	1
Ethmoid	1	Vomer	1
Occipital	1	Maxilla	2
Sphenoid	1	Palatal	2
Parietal	2	Zygomatic	2
Temporal	2	Nasal	2
		Lacrimal	2
		Inferior concha	2
Total	8	Total	14

The temporomandibular joint (TMJ) is a double synovial joint consisting of the condylar process of the mandible articulating with the squamous portion of the temporal bone (Figure 1.21). A synovial joint is a joint made up of bone ends covered with cartilage, ligaments, a cavity filled with synovial fluid (joint fluid) and an outside fibrous capsule. The articular joint surface of the temporal bone consists of a concave articular fossa and a convex articular eminence anterior to it. There is a fibrocartilaginous disc known as the articular disc; this disc is saddle-shaped and lies between the glenoid fossa and the condyle. The disc varies in thickness; the middle portion of the disc is thinner than the anteriorly and posteriorly portions. Posteriorly the disc is fused with the TMJ capsule and anteriorly it is attached to the lateral pterygoid muscle, dividing the joint into two distinctive compartments the upper and lower spaces. The upper joint space is bounded on the top by the articular fossa and the articular eminence. The lower joint space is bounded at the bottom by the condyle. The entire TMJ is enclosed in a fibrous capsule, the inner aspect of this capsule is lined with synovial membrane; this produces synovial fluid, which provides lubrication and nutrients to the TMJ.

All of the muscles of mastication work together to perform a smooth co- ordinated series of movements of the mandible, they are innervated by the mandibular branch of the trigeminal nerve.

Temporalis: an extensive fan-shaped muscle that covers the temporal region.

Origin: superior and inferior temporal line of the parietal bone. Insertion: coronoid process and anterior border of the ramus of the mandible.

Function: elevates and retracts the mandible. Mandibular condyles lead back to the glenoid fossa. This muscle is less powerful than the masseter.

Superior thyroid artery is the first branch of the external carotid artery and supplies the thyroid gland. the superficial temporal artery and the maxillary artery are the terminal branches of the external carotid. The maxillary artery is the largest and most complex branch supplying the deep structures of the face.

The dorsum of the tongue is divided into the anterior two-thirds that lie within the oral cavity and the posterior third that faces the pharynx. A 'V'-shaped groove termed the sulcus terminalis separates the anterior part from the posterior part. At the apex of the 'V' is a small pit called the foramen caecum. A median fibrous septum runs from the tip of the tongue dividing the tongue into two halves. The anterior two thirds of the tongue are covered by specialized keratinized mucosa.

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Function of the periodontal ligament:

It provides a support mechanism for the tooth; it cushions teeth against excessive occlusal forces preventing damage to the blood vessels and nerves at the root apex.

It maintains the functional position of a tooth by keeping the teeth in contact and prevents the tooth from drifting or tilting.

The periodontal fibers undergo continuous change. Its cells form, maintain and repair the alveolar bone and cementum.

Sensors in the periodontal ligament provide proprioceptive input, detecting pressures on the tooth.

The periodontal ligament has a rich supply of blood, which provides nutrients to the cementoblasts.

Immediately after the first layer of dentine is formed, the inner enamel epithelium ameloblast cells (enamel forming cells). The ameloblast cell is columnar in shape with its base attached to cells of the stratum intermedium.

At the secretory end of ameloblast cells is a pyramidal extension called the Tomes' process. The enamel matrix is secreted through the Tomes' process at the amelodentinal junction.

During maturation from pre-enamel to mature enamel, the enamel crystallites increase in size and the organic content is reduced. On completion of enamel formation, the ameloblast cell loses

the Tomes' process, flattens and becomes the reduced enamel epithelium. The reduced enamel epithelium protects the enamel during eruption and will eventually become the junctional epithelium.

Cells lining the inner surface of the enamel organ which are columnar in shape. The inner enamel epithelium defines the shape of the crown. They will eventually differentiate into enamel forming cells (ameloblasts). Cells lining the outer surface of the enamel organ. They are cuboidal in shape. They maintain the shape of the enamel organ. The outer enamel epithelium meets with the internal enamel epithelium at the cervical loop. Eventually the inner and outer enamel epithelium grows downwards at the cervical loop forming Hertwig's root sheath, which maps out the shape of the root.

At the late bell stage the dental lamina disintegrates and is ready for the formation of dental hard tissue. Dentine formation always precedes enamel formation.