Dental

NBDHE-Part-A

National Board Dental Hygiene Examination (NBDHE Part A)

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Question: 1

The 3 stages of syphilis are:
check all answers that apply

A. Primary
B. Secondary
C. Initiation
D. Transmutation
E. Tertiary

Answer: A,B,E

Explanation:
Syphilis, a sexually transmitted infection caused by the bacterium Treponema pallidum, progresses through three distinct stages if left untreated: primary, secondary, and tertiary. Each stage has unique clinical manifestations and potential complications.
In the primary stage, the most characteristic symptom is the appearance of a single sore, known as a chancre. The chancre is typically firm, round, and painless and appears at the spot where the bacteria entered the body. While the chancre is most commonly found on or near the genitals, it can also appear in or around the mouth or anus. This stage usually begins about 3 to 6 weeks after exposure to the bacteria. The sore remains for 3 to 6 weeks and heals on its own, even without treatment. However, if the infection is not treated, it progresses to the next stage.
The secondary stage of syphilis can occur weeks to months after the first appearance of the chancre, when some symptoms of the primary stage might still be present or have already disappeared. This phase is characterized by a rash that can cover parts of every area of the body, including the palms of the hands and the soles of the feet. Other symptoms may include fever, swollen lymph nodes, sore throat, patchy hair loss, headaches, weight loss, muscle aches, and fatigue. The signs and symptoms of secondary syphilis can resolve with or without treatment, but again, without treatment, the infection will progress.
The tertiary stage of syphilis is the most destructive phase and can occur years to decades after the initial infection. This stage can affect multiple organ systems, including the cardiovascular system, where it can cause syphilitic aortitis, and the central nervous system, leading to neurosyphilis. Additionally, it can result in gummas, which are soft, tumor-like growths of inflamed tissue. Tertiary syphilis can be life-threatening and is significantly more difficult to treat than the earlier stages.
Early detection and treatment with appropriate antibiotics can cure syphilis and prevent progression to the later, more dangerous stages of the disease. It is crucial for sexually active individuals to undergo regular screenings for syphilis and other sexually transmitted infections to catch and treat them early, preserving health and preventing transmission.

Question: 2

The abbreviation q.d. means:

A. Once per day
B. As directed
C. As needed
D. By mouth
E. Twice daily

Answer: A

Explanation:
The abbreviation "q.d." stands for "quaque die," which is Latin for "once per day." In medical prescriptions, this abbreviation is used to indicate that a specified dose of medication should be taken daily. It's crucial for ensuring the correct frequency of medication administration, which can significantly impact the effectiveness and safety of the treatment.
Understanding these abbreviations is essential for healthcare providers and patients alike to avoid confusion and errors in medication management. For instance, confusing "q.d." (once per day) with "q.i.d." (which stands for "quater in die," meaning four times per day) could lead to significant overdosing or underdosing.
Other similar abbreviations include "b.i.d." (bis in die) for twice per day, and "t.i.d." (ter in die) for three times per day. These are all part of a system of Latin abbreviations that have been traditionally used in prescriptions to convey the frequency of medication doses.
It is worth noting that the use of Latin abbreviations, including "q.d.," has been discouraged by some in the medical community due to the potential for misinterpretation. The Institute for Safe Medication Practices, for example, recommends using the full English phrases such as "daily" instead of "q.d." to minimize errors.
In summary, the abbreviation "q.d." is a critical notation in medical prescriptions, indicating that a medication should be taken once per day. Proper understanding and use of such abbreviations are vital for effective and safe medical care.

Question: 3

Used to treat hyperactivity of the thyroid gland that is present with Grave's disease.

A. Methimazole (Tapazole)
B. Liotrix (Euthroid)
C. Levothyroxine (Synthroid)
D. Medroxyprogesterone (Provera)
E. Metformin (Glucophage)

Answer: A

Explanation:
Methimazole, marketed under the brand name Tapazole among others, is a medication primarily used to manage hyperthyroidism, which is an overactivity of the thyroid gland. Hyperthyroidism can lead to a

number of health issues, including rapid heartbeat, excessive sweating, nervousness, and weight loss. One common cause of hyperthyroidism is Graves' disease.
Graves' disease is an autoimmune disorder that leads the immune system to mistakenly attack the thyroid gland, causing it to overproduce thyroid hormones. This overstimulation results in the symptoms associated with hyperthyroidism. Graves' disease is most prevalent in women, particularly those aged between 30 and 40 years. The disease can manifest visibly as a goiter (an enlarged thyroid gland) and exophthalmos (protruding eyes due to inflammation and swelling of the eye muscles), among other symptoms.
Methimazole works by inhibiting the synthesis of thyroid hormones by the thyroid gland, thereby reducing the levels of these hormones in the body. This reduction helps to alleviate the symptoms of hyperthyroidism. The use of methimazole is preferred in certain patient groups, including those who are young, pregnant, or preparing for radioactive iodine therapy, as it is less likely to cause side effects than some alternative treatments.
It is important for patients taking methimazole to be closely monitored by healthcare professionals. This is due to the potential side effects of the medication, which can include agranulocytosis (a potentially serious reduction in the number of white blood cells), liver problems, and allergic reactions. Regular blood tests are often recommended to monitor the patient's white blood cell count and liver function.
In conclusion, methimazole is a critical component in the management of hyperthyroidism caused by Graves' disease. By effectively reducing the production of thyroid hormones, it helps to control the symptoms and prevent complications associated with this autoimmune disorder. However, like all medications, it requires careful administration and monitoring to ensure safety and effectiveness.

Question: 4

The phagocytes that act against invading pathogens are known as:
check all answers that apply

A. Neutrophils
B. Eosinophils
C. Basophils
D. Mast cells
E. Polymorphonuclear leukocytes

Answer: A,E

Explanation:
The phagocytes that act against invading pathogens include Polymorphonuclear leukocytes and Neutrophils. These cells are essential components of the immune system, playing critical roles in the body's defense mechanism against infections.
Polymorphonuclear leukocytes, often abbreviated as PMNs, are a type of white blood cell characterized by the presence of granules with enzymes that are released during infections. These enzymes can digest pathogens. The term "polymorphonuclear" refers to the varying shapes of the nucleus, which is a distinctive feature seen under a microscope. Neutrophils are the most abundant type of PMNs in most mammals and are usually among the first cells to arrive at a site of infection.
Neutrophils are a type of polymorphonuclear leukocyte. They are particularly known for their role in combating bacterial infections. When activated, neutrophils engulf and kill microorganisms through a

process known as phagocytosis. After engulfing a pathogen, neutrophils use their granules to release reactive oxygen species and enzymes that kill the pathogen.
The swift response of neutrophils is crucial during acute inflammation—a rapid and early stage of the immune response. The accumulation of neutrophils at the site of infection often results in the characteristic signs of acute inflammation, such as redness, heat, and swelling.
While other types of polymorphonuclear leukocytes such as eosinophils and basophils also play roles in the body's defense mechanisms, they are not primarily involved in phagocytosis like neutrophils. Eosinophils are more associated with allergic responses and parasitic infections, and basophils play roles in allergic reactions.
In summary, both Polymorphonuclear leukocytes and Neutrophils are critical in the body's defense against pathogens. Neutrophils, as a subset of PMNs, are particularly important for their rapid response capabilities during acute bacterial infections. Understanding the functions of these cells is crucial for insights into the immune system's operations and the overall management of infections.

Question: 5

A fat-soluble vitamin that is necessary for blood clotting.

A. Vitamin A
B. Vitamin D
C. Vitamin E
D. Vitamin K
E. Vitamin C

Answer: C

Explanation:
The correct answer to the question about a fat-soluble vitamin necessary for blood clotting is Vitamin K. Vitamin K plays a critical role in the body's ability to form blood clots, which are essential for stopping bleeding. Without adequate Vitamin K, the body cannot produce prothrombin, a protein and clotting factor that is important in blood clotting and bone metabolism.
Vitamin K is classified as a fat-soluble vitamin, which means it can be dissolved in fats and oils. Fat-soluble vitamins are absorbed in the intestine along with dietary fat and can be stored in the body's fatty tissue and liver for future use. This storage capability allows the body to have a reserve of Vitamin K that can be used when dietary intake is low.
Sources of Vitamin K include green leafy vegetables such as spinach, kale, and broccoli, as well as some fruits like avocado and kiwifruit. Additionally, smaller amounts can be found in some vegetable oils and in fermented foods, where bacteria produce Vitamin K during the fermentation process. It is also important to note that gut bacteria in the human intestine can synthesize Vitamin K, which contributes to the internal supply.
Vitamin K is essential not only for blood clotting but also plays a role in maintaining strong bones. It helps in the modification of bone matrix proteins, improves bone calcium retention, and acts as a modifier of bone matrix proteins, thus playing a role in bone mineralization.
In summary, Vitamin K is a vital nutrient that supports blood clotting and bone health, is fat-soluble, and can be stored in the body. It is found predominantly in green leafy vegetables and can also be synthesized by intestinal bacteria, contributing to its levels within the body.

Question: 6

Which portions of the Trigeminal Maxillary nerve passes through the infraorbital canal?
check all answers that apply

A. Anterior superior alveolar
B. Middle superior alveolar
C. Posterior superior alveolar
D. Greater palatine
E. Lesser palatine

Answer: A,B

Explanation:
The correct answer to the question regarding which portions of the Trigeminal Maxillary nerve pass through the infraorbital canal is "Both the anterior and middle portions of the superior alveolar nerve." This answer specifically refers to the Anterior Superior Alveolar (ASA) nerve and the Middle Superior Alveolar (MSA) nerve. Both of these nerves are branches of the maxillary division of the trigeminal nerve.
The ASA nerve primarily supplies sensation to the maxillary incisors, canines, and the surrounding gingival tissues. It enters the infraorbital canal after branching from the infraorbital nerve, which itself is a continuation of the maxillary nerve. The infraorbital nerve travels through the infraorbital canal and exits the infraorbital foramen to provide sensation to the midface region.
Similarly, the MSA nerve functions to innervate the maxillary premolars and, occasionally, the first molar. Like the ASA, it also courses through the infraorbital canal as a branch of the infraorbital nerve, contributing to dental and facial sensory innervation.
In contrast, other nerves listed in the options, such as the Posterior Superior Alveolar (PSA) nerve, the Greater Palatine, and the Lesser Palatine nerves, have different pathways and areas of innervation. The PSA nerve, for example, does not travel through the infraorbital canal; instead, it branches from the maxillary nerve earlier and descends posteriorly to supply the maxillary molars. The Greater and Lesser Palatine nerves are primarily concerned with providing sensory innervation to the hard and soft palates, respectively, and do not enter the infraorbital canal.
Understanding the pathways and areas of innervation of these nerves is crucial for clinical practices involving dental procedures and maxillofacial surgery, as well as for diagnosing dental and facial pain originating from various etiologies related to nerve distribution.

Question: 7

The parasympathetic nervous system uses _____ as its neurotransmitter.

A. Acetylcholine
B. Epinephrine
C. Norepinephrine
D. Dopamine
E. Cholinergic

Answer: A

Explanation:
Acetylcholine is a crucial neurotransmitter in the body, playing a significant role in both the central and peripheral nervous systems. In the context of the parasympathetic nervous system (PNS), acetylcholine serves as the primary neurotransmitter. The PNS is one of the two branches of the autonomic nervous system, the other being the sympathetic nervous system, and is often referred to as the "rest and digest" system because it is responsible for conserving energy and managing bodily functions when at rest.
In the PNS, acetylcholine is released by nerve fibers at various target organs, including the heart, lungs, and digestive tract. Upon its release, acetylcholine binds to specific receptors known as cholinergic receptors. There are two main types of cholinergic receptors: muscarinic and nicotinic receptors. Muscarinic receptors are primarily found in the heart, smooth muscles, and glands. When acetylcholine binds to these receptors, it can induce a variety of effects such as decreasing the heart rate, increasing glandular secretions, and stimulating smooth muscle contractions in the digestive tract.
On the other hand, nicotinic receptors are located in the autonomic ganglia (both sympathetic and parasympathetic) and the neuromuscular junction of skeletal muscles. In the context of the parasympathetic nervous system, when acetylcholine binds to nicotinic receptors on postganglionic neurons, it causes the neuron to depolarize and carry the parasympathetic nerve impulse to the target organ.
Understanding the role of acetylcholine in the parasympathetic nervous system is fundamental in pharmacology and medicine, as it helps in the management and treatment of various conditions. Drugs that mimic or block the action of acetylcholine at its receptors can be used to treat diseases such as asthma, cardiovascular diseases, and gastrointestinal disorders, showcasing the importance of this neurotransmitter in maintaining homeostasis and responding to physiological needs.

Question: 8

Two essential minerals that influence heart function.
check all answers that apply

A. Sodium
B. Potassium
C. Phosphorus
D. Calcium
E. Nitrate

Answer: A,B

Explanation:
Potassium and sodium are two essential minerals that play critical roles in maintaining heart health and overall bodily functions. These minerals are electrolytes, which means they carry an electrical charge and are vital for conducting electrical signals in the body, including those that regulate the heart's rhythm and function.

Potassium is crucial for maintaining proper heart function. It helps to regulate heartbeats by controlling the electrical activity of the heart. Adequate levels of potassium ensure that the heart contracts properly and rhythmically, pumping blood effectively throughout the body. Low levels of potassium, a condition known as hypokalemia, can lead to arrhythmias, or irregular heartbeats, which can be potentially life-threatening if not addressed.
Sodium, on the other hand, plays a significant role in controlling blood volume and pressure. It is also involved in the operation of muscles and nerves, including those in the heart. Maintaining the right balance of sodium is critical; too much sodium can lead to high blood pressure, which is a major risk factor for heart disease and stroke. Conversely, too little sodium, or hyponatremia, can also disrupt heart function and is dangerous to overall health.
Both potassium and sodium are integral in maintaining the acid-base balance and the water balance in the body. These balances are critical for normal cellular operations and for the functioning of major organs, including the heart. Disruptions in these balances can lead to serious health issues, emphasizing the importance of consuming adequate amounts of these minerals through a balanced diet.
In conclusion, both potassium and sodium are indispensable minerals for heart health. They contribute to maintaining the electrical and fluid balances necessary for normal heart rhythm and function. It is essential to manage the intake of these minerals through diet and, when necessary, supplementation under medical supervision, to prevent deficiencies or excesses that could lead to cardiac complications.

Question: 9

Excess of this vitamin can cause calcification of the pulp.

A. Vitamin A
B. Vitamin D
C. Vitamin C
D. Niacin
E. Thiamin

Answer: B

Explanation:
The correct answer to the question regarding the vitamin that can cause calcification of the pulp when in excess is Vitamin D. Vitamin D plays a crucial role in the regulation of calcium and phosphate metabolism, which are vital components for bone growth and remodeling, as well as for the proper mineralization of teeth.
When the body has an excess of Vitamin D, it can lead to hypercalcemia, a condition where the calcium levels in the blood are too high. This excessive calcium can be deposited in soft tissues, including the pulp of the teeth, leading to pulp calcification. Pulp calcification can compromise the health and function of the tooth pulp, potentially leading to decreased vascular supply and nerve function within the tooth. This can increase the tooth's susceptibility to infections and reduce its ability to respond to other dental issues.
Additionally, excessive Vitamin D can cause enamel hypoplasia, a defect of the teeth where the enamel is hard but thin and deficient in amount. This can make the teeth more vulnerable to decay and other forms of dental damage.
On the other hand, a deficiency in Vitamin D can also have detrimental effects on dental health. It can lead to a loss of alveolar bone, which supports the teeth, delayed dentition (delay in the appearance of

teeth in infants and young children), and an increased risk of caries (tooth decay). Vitamin D is essential for the absorption of calcium in the gut, which helps in the normal mineralization of bone and teeth. Therefore, maintaining optimal levels of Vitamin D is crucial for dental health, among other physiological functions. Both excessive and insufficient levels of this vitamin can lead to significant dental issues, highlighting the importance of a balanced approach to Vitamin D intake.

Question: 10

The decalcification of cementum begins at a pH of

A. 4.5
B. 5.5
C. 6.75
D. 6.7
E. 4.0

Answer: D

Explanation:
To understand why decalcification occurs at this pH, it's important to consider the nature of cementum and its role in dental health. Cementum is a specialized calcified substance covering the root of a tooth. It is less mineralized and softer than enamel, the hard outer surface of the tooth crown, and dentin, which forms the majority of the tooth structure.
Decalcification, or demineralization, is the process by which minerals (such as calcium) are removed from the dental structure. In the oral environment, this is usually triggered by acids produced by bacterial fermentation of dietary carbohydrates in plaque. The normal pH of plaque is slightly acidic, ranging between 6.75 and 7.0. However, when the pH drops below a certain threshold, the acids begin to dissolve the minerals in the dental structures.
For enamel, the threshold pH level is typically between 4.5 and 5.5, making it more resistant to acid attacks compared to cementum. Cementum, being softer and less mineralized, begins to decalcify at a higher pH level of around 6.0 to 6.7. This higher susceptibility makes the root surfaces more vulnerable to decay if exposed due to gum recession or improper oral hygiene.
Therefore, maintaining a neutral or slightly alkaline oral pH is crucial in preventing the decalcification of both cementum and enamel. Regular oral hygiene practices such as brushing, flossing, and using fluoride toothpaste can help maintain healthy pH levels in the mouth, alongside regular dental check-ups to monitor and manage the health of both teeth and gums.

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