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# Contents

## AIIMS PAPERS


1. AIIMS November 2014 3
2. AIIMS May 2014 56
3. AIIMS November 2013 87
4. AIIMS May 2013 133
5. AIIMS November 2012 164
6. AIIMS May 2012 192
7. AIIMS November 2011 222
8. AIIMS May 2011 245
9. AIIMS November 2010 275
10. AIIMS May 2010 300


## AIPGEE (DENTAL) PAPERS


11. AIPGEE 2015 329
12. AIPGEE 2014 399
13. AIPGEE 2013 482
14. AIPGEE 2012 547
15. AIPGEE 2011 603
16. AIPGEE 2010 664

# AIIMS May 2013

## Questions

### Anatomy

1. **Massetric notch is formed due to action of:**
   a. Masseter on buccinators
   b. Superior constrictor on masseter
   c. Superior constrictor on buccinators
   d. Buccinator on masseter
2. **TMJ development starts at:**
   a. 10th week b. 3rd week
   c. 13th week d. 18th week
3. **Taste sensation is carried by all except:**
   a. Facial nerve
   b. Glossopharyngeal nerve
   c. Vagus nerve
   d. Trigeminal nerve
4. **Dangerous area/zone of scalp is:**
   a. Loose areolar tissue b. Aponeurotic layer
   c. Connective tissue d. Pericranium
5. **Deepest layer of deep cervical fascia is:**
   a. Prevertebral b. Carotid sheath
   c. Pretracheal d. Temporal
6. **Cavernous sinus thrombosis caused when infection spreads through:**
   a. Pterygoid plexus of vein b. Ethmoid sinus
   c. Maxillary sinus d. Submental lymph node
7. **Muscle responsible for opening of mandible:**
   a. Lateral pterygoid b. Medial pterygoid
   c. Masseter d. Temporalis
8. **All are true of facial nerve except:**
   a. Large motor and small sensory root
   b. Supplies anterior belly of digastrics muscle
   c. Secretomotor to submandibular gland
   d. Supply nasal and palatine glands
9. **Taste sensation from circumvallate papilla is carried by which cranial nerve:**
   a. V b. IX
   c. VII d. X
10. **In facial nerve injury which occurs just above the branching of chorda tympani nerve, which is not seen:**
    a. Decreased salivation
    b. Paralysis of facial muscles
    c. Loss of taste
    d. Hyperacusis

### Dental Anatomy

11. **Incidence of 2 canals in Mandibular incisor is:**
    a. 3 to 12% b. 12 to 20%
    c. 20 to 41% d. Less than 3%
12. **Nerve fibers in pulp are:**
    a. Sympathetic efferent postganglionic
    b. Parasympathetic postganglionic
    c. Motor fibers
    d. Both autonomic parasympathetic and sympathetic fibers
13. **Additional period required for enamel calcification after eruption into oral cavity:**
    a. 5 yrs b. 2 yrs
    c. 8 yrs d. 1 yr

### Genetics

14. **45 chromosomes are seen in:**
    a. Turner's syndrome
    b. Down's syndrome
    c. Dentinogenesis imperfecta
    d. Treacher's Collins syndrome
15. **Microscopic examination of chromosomes shape, size and arrangement is known as:**
    a. Chromosomal mapping
    b. Karyotyping
    c. Inheritance testing
    d. Genotyping
16. **Base pairs in DNA:**
    a. 1.5 billion b. 46 billion
    c. 3.2 billion d. 100 billion

### Pharmacology

17. **Gingival hyperplasia is caused by all except:**
    a. Sodium valproate
    b. Carbamazepine
    c. Verapamil
    d. Bleomycin
18. **A 25-year-old person with history of repeated episodes of rheumatic fever is hypersensitive to penicillin. Which of following drug can be prescribed to him**
    a. Penicillin G b. Sulfisoxazole
    c. Sulfasalazine d. Streptomycin

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**19. All are true of paracetomol poisoning except:**
a. N-acetylcysteine is antidote
b. Asymptomatic for 24 to 30 hours
c. 10 mg is safe dose
d. N-acetylcysteine block glutathione in paracetamol poisoning

**20. Lithium potentiates the action of non-depolarizing muscle relaxants, before how many days it should be stopped before anaesthesia?**
a. 1 day b. 2
c. 3 d. 4

**21. Which anti-cholinergic drug does not cross the blood brain barrier?**
a. Glycopyrrolate b. Hyoscine bromide
c. Hyoscine butyl bromide d. Atropine

**22. Shelf life of colourless, aqueous solution of suxamethonium (succinyl choline) is:**
a. 6 months b. 1 year
c. 2 year d. 3 year

**23. All are true of midazolam over diazepam except:**
a. 2 to 3 times more potent than diazepam
b. It has low water solubility and shows minimal risk for thrombophlebitis
c. Has more affinity for benzodiazepine receptors
d. Better anxiolysis and amnesia

**24. What causes malignant hyperpyrexia?**
a. Thiopentone b. Cisatracurium
c. Propofol d. Suxamethonium

**25. In children which of the following can be given though nasal drop in conscious sedation?**
a. Halothane b. Diazepam
c. Midazolam d. Ketamine

**26. Dose of cisatracurium:**
a. 0.1 mg/kg b. 0.15 mg/kg
c. 0.2 mg/kg d. 0.5 mg/kg

## Periodontology

**27. After enamel has been exposed to bacteria, irreversible bacterial colonization takes place in about:**
a. 2 to 4 hours b. 24 hours
c. Few minutes d. 1 to 2 hours

**28. Diameter of soft bristle brush is:**
a. 0.007 inch b. 0.012 inch
c. 0.014 inch d. 0.009 inch

**29. To identify key microorganisms in periodontal disease, Koch's postulate have been modified by:**
a. Socransky
b. Glickman
c. Russell
d. Vermillion

**30. Which of the following cells migrate into the sulcus in largest quantity as a result of plaque accumulation?**
a. Lymphocytes b. Macrophages
c. Neutrophils d. Plasma cells

**31. Supragingival plaque microflora undergoes which of the following changes with time:**
a. Microflora becomes more gram positive
b. Microflora becomes more gram negative
c. Microflora becomes predominantly spirochetal
d. Plaque mass decreases

**32. Delayed hypersensitivity or cell mediated immune reactions occur in patients with periodontal disease because they often have:**
a. Soluble immune complexes in saliva
b. T lymphocytes sensitized to bacterial antigens
c. IgG antibodies reactive with bacterial antigens
d. All of the above

**33. Which is not a common finding in trauma from occlusion?**
a. Mobility b. Thermal sensitivity
c. Sensitivity to percussion d. Vertical bone loss

## Orthodontics

**34. Force generated by 90 degree rotation of pendulum appliance while distalization:**
a. 250 gms b. 75 gms
c. 125 gms d. 350 gms

**35. For class II div I malocclusion of a 14-year-old child, which analysis is used to decide extraction and non extraction:**
a. Ashley and Howe b. Peck and Peck
c. Pont's d. Bolton's

**36. Mother of a 10 month child came with a complaint of non eruption of teeth, how will you perfectly satisfy their parents:**
a. Wait and watch
b. You will do OPG which shows developing tooth buds
c. PA skull view which shows developing tooth buds
d. Pediatric consultation

**37. Decreased collum angle is seen in:**
a. Class I bimaxillary protrusion
b. Class II div I
c. Class II div 2
d. Class III

**38. Increased interincisal angle is characteristic of:**
a. Class I bimaxillary b. Class II div I
c. Class II div 2 d. Class I type 2

**39. Moyers classification in type D in class II:**
a. Orthognathic maxilla and orthognathic mandible
b. Orthognathic maxilla and retrognathic mandible
c. Prognathic maxilla and orthognathic mandible
d. Both jaws are retrognathic

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**40. Orthodontically treated midline diastema is best retained by:**
a. Hawley's appliance for 6 months
b. Hawley's appliance for 12 months
c. Bonded lingual retainer
d. No need for retainer as it is self-retained

**41. Normal growth of maxilla occurs by:**
a. Displacement and drift
b. Drift only
c. Apposition
d. Replacement resorption

**42. Gjessing canine retractor is made up of:**
a. 0.18 X 0.25 stainless steel rectangular wire
b. 0.16 X 0.22 stainless steel rectangular wire
c. 0.17 X 0.25 TMA wire
d. 0.15 X 0.22 TMA wire

**43. For space analysis all of the following assumptions are used except:**
a. All permanent teeth are erupting normally
b. Erupted Mandibular incisor size is correlated with succedaneous teeth
c. Prediction table is constant for most of the population
d. Arch dimension is stable during the growth

**44. Male will attain full thickness of lip by:**
a. 16 years
b. 18 years
c. 21 years
d. 25 years

## Pedodontics

**45. Which of the following is not true for Aspartame?**
a. 200 times sweeter than sugar
b. Is an ester derivative
c. Calorific value is 4 kcal
d. Can be safely given in type I diabetes

**46. An 8-year-old boy got trauma and got his central incisor avulsed which got contaminated with debris and comes to dentist within 20 minutes, what will be line of treatment?**
a. Clean root surface with saline and reimplant
b. Clean and curette root surface and reimplant
c. Clean root surface, do RCT and reimplant
d. Scrub root surface and reimplant

## Community Dentistry

**47. Study done in different age groups at same time is:**
a. Longitudinal
b. Cross sectional
c. Cross longitudinal
d. Case control

**48. Which one is false regarding role of placenta in fluoride transport to foetus**
a. No role of placenta
b. Acts as a barrier
c. Regulator of fluoride and concentration reaching foetus is lower than maternal levels
d. Regulator of fluoride and concentration reaching foetus is higher than maternal levels

**49. Metallic taste in stannous fluoride is due to:**
a. Tin hydroxyl phosphate
b. Stannous triphosphate
c. Stannic triphosphate
d. Stannous hydroxide

## Oral Surgery

**50. All are true about use of articaine in a child except:**
a. It is an amide which is metabolized in liver
b. Plasma half life is 90 min
c. Infiltration produces adequate anesthesia in primary molar so need for block anesthesia is eliminated
d. More breakdown cause less toxicity

**51. In India which preservative is most commonly used in LA:**
a. 2.5% LA
b. Methyl hydroxyl benzoate
c. Cetrimide
d. Sodium paraben

**52. In patient with cleft lip and palate closure of cleft lip is done at:**
a. 3 months
b. 12 months
c. 3 years
d. 10 years

**53. After surgery of cleft lip and cleft palate most common finding is:**
a. Open bite
b. Extensive deep bite
c. Maxillary rotated incisor
d. Anterior cross bite

**54. There is a swelling in a patient with respect maxillary LI, since last 48 hours, the swelling is hot and palpable, rebound on pressure, the treatment of choice is:**
a. Incision and drainage
b. Antibiotic coverage
c. Antibiotics of heat only
d. Aspiration

**55. Initial clicking of TMJ while opening is due to:**
a. Protruded condyle in respect to articular disc
b. Retruded condyle in respect to articular disc
c. Perforated disc
d. Lateral displacement of the condyle

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## General Surgery

**56. In a bus accident which patient is given more priority to shift to the hospital?**
a. Severe hemorrhage with leg fracture
b. Head injury
c. Circulation shock
d. Airway obstruction

**57. Epidural hematoma is caused by:**
a. Middle meningeal artery
b. Vertebral artery
c. Anterior cerebral artery
d. Post cerebellar artery

## Oral Radiology

**58. Halo effect surrounding the root of tooth on IOPA X-ray is seen with:**
a. Horizontal root fracture
b. Root caries
c. Widening of periodontal ligament space
d. Periapical periostitis

**59. For root fracture it is imperative to take X-ray at:**
a. 45 degree, 90 degree
b. 90 degree
c. 90 degree, 110 degree
d. 45 degree, 90 degree, 110 degree

**60. Maximum recommended dose for dental X-ray operator in a week is:**
a. 100 milliroentgen
b. 10 roentgen
c. 100 roentgen
d. 300 roentgen

## Oral Pathology

**61. Till what age tetracycline should not be given to prevent discoloration?**
a. 3 year
b. 8 year
c. 12 year
d. 18 years

**62. Minimum dosage of tetracycline which will show tooth discoloration is:**
a. 5 mg/kg body weight
b. 20 mg / kg body weight
c. 50 mg/kg body weight
d. 80 mg. kg body weight

**63. Most characteristic feature of mandibulofacial dysostosis is:**
a. Normal hearing
b. Normal vision with coloboma
c. Mandibular prognathism
d. Vertical maxillary excess

**64. In biopsy true about formalin as fixative is all except:**
a. To prevent autolysis
b. To make tissue rigid
c. To kill micro-organisms
d. 2% formalin is used

## Forensic Odontology

**65. To identify bite mark in case of child abuse, which impression material should be used to record bite marks:**
a. Alginate
b. Impression plaster
c. Polyvinyl siloxane
d. Silicone putty

## Endodontics

**66. Electric nerve tester detects pain by stimulating which nerve fibers:**
a. A alpha
b. A beta
c. A delta
d. C fibers

**67. Law of pulse oxymetry is based on:**
a. Doppler's law
b. Pascal's law
c. Poille's law
d. Beer's law

**68. During RCT while giving inferior alveolar nerve block for successful anesthesia what should be done?**
a. Increased volume of solution from 1.8 ml to 3.6 ml
b. Carbonated solution
c. Slow the speed of injection
d. Increase concentration from 1:1,00,000 to 1:1,50,000

**69. Predisposing clinical condition for endodontic flare up:**
a. Acute periapical abscess
b. Acute apical periodontitis
c. Asymptomatic necrotic pulp with periapical lesion
d. Pain and swelling since the time treatment

**70. Cohesiveness of gold at room temperature is due to**
a. Atomic attraction
b. Annealing
c. Adaptability
d. Wedging

**71. Diagnodent uses what for detecting caries:**
a. Sound waves
b. Visible light
c. Laser
d. Nanotechnology

**72. Bacterial free zone of dentinal caries is:**
a. Zone of decomposed dentin
b. Zone of bacterial invasion
c. Zone of decalcification
d. Zone of dentinal sclerosis

**73. Caries associated with pre-eruptive enamel hypoplasia:**
a. Secondary caries
b. Chronic caries
c. Occult caries
d. Incipient caries

**74. Caries risk in a 4 year old child is best diagnosed by:**
a. Previous caries experience
b. Maternal caries
c. School fluoridation
d. Daily fluoride mouthwash

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**75. In Caries Assessment Test (CAT) which condition doesn't come in highest risk category?**
a. Isolated white spot lesion on tooth
b. Enamel Hypoplasia
c. Child with special care needs
d. Visible plaque on anterior teeth

**76. A 40-year-old female came with fullness in upper right quadrant of abdomen with diabetes type II, hyperlipidemia, biopsy shows:**
a. Biliary cirrhosis
b. Luminal thrombosis
c. Non-alcoholic steatohepatitis
d. Autoimmune hepatitis

**77. Best source for factor VIII transfusion:**
a. Cryoprecipitate b. Fresh blood
c. Fresh frozen plasma d. Desmopressin

**78. In a 32-year-old patient, left supraclavicular lymph node biopsy histologically shows acidophilic owl eye nucleoli lying freely in empty spaces showing immunohistocompatibility with CD 15 and CD 30, it is suggestive of:**
a. Nodular sclerosis Hodgkin's lymphoma
b. Lymphocytic predominant Hodgkin's lymphoma
c. Reactive nodular hyperplasia
d. Large cell lymphoma

**79. An observer injects myeloid stem cell in an ablated skin of mouse, as a consequence of healing, he will observe:**

**Or**

**In an ablated animal, myeloid series cells are injected. Which of the following is seen after incubation period?**
a. Erythrocytes
b. T Lymphocytes
c. Hematopoietic stem cells
d. Fibroblasts

**80. A lady complains of headache, nausea and tenderness in temporal region with migraine. On microscopic investigation what will be seen?**
a. Temporal aneurysm
b. Giant cell arteritis
c. Granulomatous giant cell lesions
d. Luminal thrombosis

**81a. Patient with increased PT and aPTT and normal TT, fibrinogen and platelet counts, diagnosis is:**
a. DIC
b. Factor VIII deficiency
c. Liver disease
d. Vitamin K deficiency

**81b. Patient with increased PT, APTT and TT and decreased fibrinogen and platelet counts, diagnosis is:**
a. DIC
b. Factor VIII deficiency
c. Liver disease
d. Vitamin K deficiency

**82. Which is not seen in Neuroimaging of patient of tuberous sclerosis?**
a. White matter lesion
b. Ependymoma
c. S0ubependymal nodules
d. Giant cell astrocytoma

**83. A 4-year-old girl child suffering from vomiting, cerebral edema and is being treated for viral infection from past 5 days. Liver biopsy in this patient may show:**
a. Central hemorrhagic necrosis
b. Non-alcoholic steathepatitis
c. Autoimmune hepatitis
d. Microvascular steatohepatitis

**84. A patient with history of frequent abortions and pain in calf muscles from past 4 years is due to deficiency of:**
a. Factor VIII b. Protein C
c. Plasmin d. Thrombin

**85. C wave in JVP is due to:**
a. Atrial contraction b. Atrial filling
c. Tricuspid bulging d. Rapid ventricular filling

**86. Carbon monoxide diffusion while transfusion is limited because of:**
a. It binds avidly with Hb
b. Base of lung is poorly ventilated
c. PCO2 rises in blood immediately on exposure
d. Diffusion of CO across blood gas barrier is slow

**87. In a 60-year-old hypertensive male with renal failure, renal biopsy shows onion skin appearance. The most likely diagnosis is:**
a. Hyaline arteriosclerosis
b. Thromphlebitis obliterans
c. Hyperplastic arteriosclerosis
d. Arteriosclerosis obliterans

**88. In pregnancy cardiac output increases 30 to 40% during:**
a. 20th week of pregnancy
b. 22nd weeks of pregnancy
c. 24th weeks of pregnancy
d. 28th weeks of pregnancy

## Biochemistry

**89. Both ketogenic and lipogenic amino acid is:**
a. Isoleucine b. Leucine
c. Argenine d. Glycine

**90. Both ketogenic and glucogenic amino acid is:**
a. Isoleucine b. Leucine
c. Argenine d. Glycine

**91. Which of the following may be used to fill the pathological void of a non perforating internal resorption:**
a. Silver amalgam
b. Guttapercha
c. ZOE
d. All of the above

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# Answers with Explanation

## Anatomy

**1. Answer a. Masseter on buccinators**

**Ref:** *Sheldon Winkler 2nd Edition , Page No:90*

- The distobuccal border, at the end of the buccal vestibule, must converge rapidly to avoid displacement by the contracting masseter muscle, whose anterior fibers run outside and behind the buccinator muscle in this region.
- When the masseter muscle contracts, it pushes inward against the buccinator muscle and produces a bulge into the mouth which is recorded as maseteric notch.
- The Retromolar pad must be covered by the denture base it aids in the stability of denture by adding another plane to resist movement of the base it contains:
  1. Fibres of pterygomandibular raphae
  2. Fibres of superior pharyngeal constrictor and buccinators muscles
  3. Fibers of temporal tendon, and glandulartissue

**2. Answer a. 10th week (in utero development is mostly expressed in terms of weeks).**

**Ref:** *Gray's Anatomy 40th Edition*

**Development of the Temporomandibular Joint**

- The bony components of the secondary jaw joint develop in membrane as two separate ectomesenchymal condensations between the **8th and 12th week** in utero.
- This arrangement is different from that seen with most synovial joints, where a single blastema cavitates to form a joint space and the articulating bones are derived from the same condensation of tissue.
- The separate development of the temporal and condylar parts of the temporomandibular joint means that the articular surface of each bone is covered by a persisting layer of proliferative cells that is continuous with the periosteum surrounding each separate bony component.

**3. Answer d. Trigeminal Nerve**

**Ref:** *Gray's Anatomy 40th Edition*

**Innervation of Taste Buds**

- The gustatory nerve for the anterior part of the tongue, excluding the circumvallate papillae, is the **chorda tympani**, which travels via the **lingual nerve.**
- **In most individuals**, taste fibres run in the **chorda tympani** to cell bodies in the **facial ganglion**, but **occasionally** they diverge to the **otic ganglion**, which they reach via the **greater petrosal nerve.**
- Taste buds in the **inferior surface of the soft palate** are supplied mainly by the **facial nerve, through the greater petrosal nerve, pterygopalatine ganglion and lesser palatine nerve**: they may also be supplied by the **glossopharyngeal nerve.**
- Taste buds in the **circumvallate papillae, postsulcal part of the tongue and in the palatoglossal arches and the oropharynx** are innervated by the **glossopharyngeal nerve.**
- Taste buds in the **extreme pharyngeal part of the tongue and epiglottis** receive fibres from the **internal laryngeal branch of the vagus.**
- Each taste bud receives two distinct classes of fibre: one branches in the periphery of the bud to form a perigemmal plexus, the other forms an intragemmal plexus within the bud itself which innervates the bases of the receptor cells.
- The perigemmal fibres contain various neuropeptides including calcitonin gene-related peptide (CGRP) and substance P, and appear to represent free sensory endings. Intragemmal fibres branch within the taste bud and each forms a series of synapses.

**4. Answer c. Connective Tissue**

**Ref:** *Grant's Dissector 13th Edition*

**SCALP**

- The connective tissue layer of the scalp contains collagen fibers that attach to the external surface of the blood vessels.
- When a blood vessel of the scalp is cut, the connective tissue holds the lumen open, resulting in profuse bleeding.
- If an infection occurs in the scalp, it can spread within the **connective tissue layer.** Therefore, this layer has been called the **"dangerous area."**
- From the "dangerous area," the infection may pass into the cranial cavity through emissary veins.

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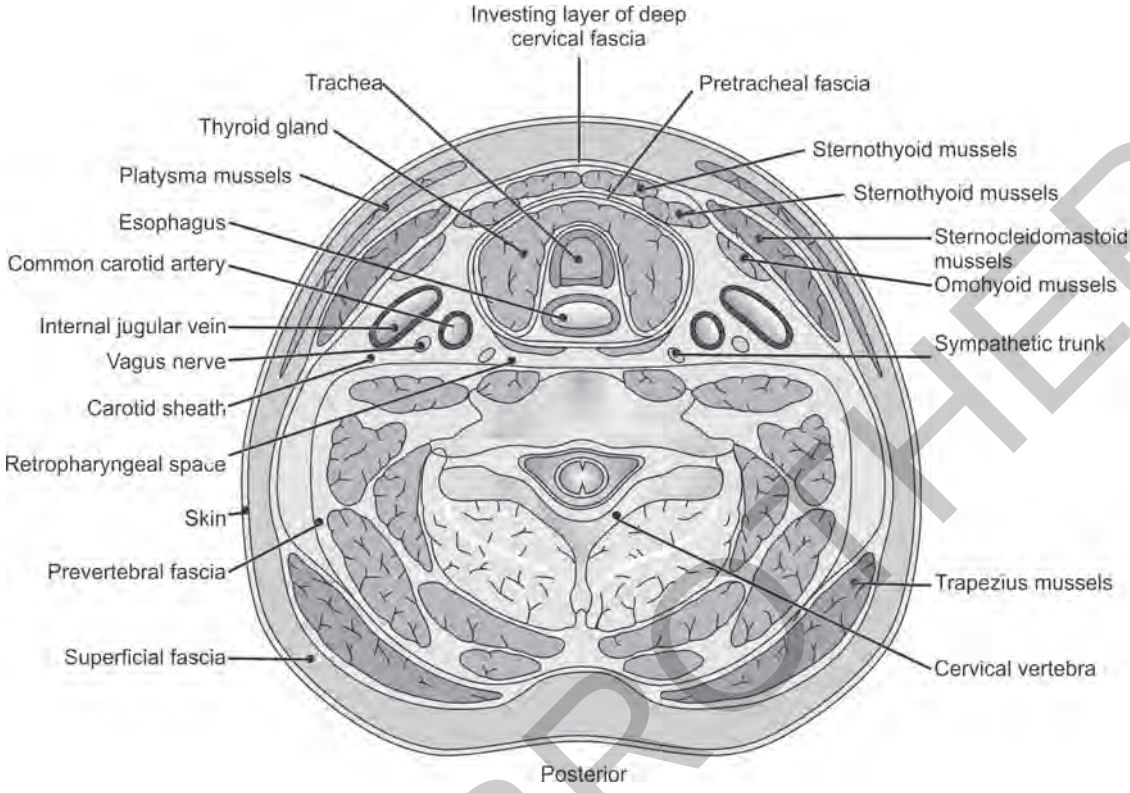


**5. Answer a. Prevertebral**

**Ref:** *Grant`S Dissector 13th Edition*

- Deep fascia in the neck is conventionally divided into an investing layer, pretracheal fascia, and prevertebral fascia, from superficial to deep.
- The carotid sheath is a condensation of deep cervical fascia around the common and internal carotid arteries, the internal jugular vein, the vagus nerve and the constituents of the ansa cervicalis. It is thicker around the arteries than the vein, an arrangement that allows the vein to expand. Peripherally the carotid sheath is connected to adjacent fascial layers by loose areolar tissue.

**6. Answer a. Pterygoid plexus of vein.**

**Ref:** *Gray's Anatomy 40th Edition*

**Caroticocavernous Sinus Fistula and Cavernous Sinus Thrombosis**

- Direct communication between the intracavernous portion of the internal carotid artery and the cavernous sinus, creating a caroticocavernous sinus fistula (CCF), occurs occasionally, either as a result of severe head trauma or degenerative or aneurysmal vessel disease.
- The classic signs are ptosis, proptosis (which may be pulsatile), chemosis, eyelid edema, peri-orbital edema and extra-ocular dysmotility caused by combinations of third, fourth and sixth cranial nerve palsies.
- Hypo- or hyperesthesia of the ophthalmic and maxillary divisions of the fifth cranial nerve and a decreased corneal reflex may also be detected.
- There may be evidence of dilated, tortuous retinal veins and papilloedema. These changes can cause permanent blindness.
- CCFs are most commonly treated by passing a catheter up the carotid into the fistula, and then occluding it with dilatable balloons or flexible metal coils.
- Any spreading infection involving the upper nasal cavities, paranasal sinuses, cheek (especially near the medial canthus), upper lip, anterior nares or even an upper incisor or canine tooth, may very rarely lead to septic thrombosis of the cavernous sinuses: **infected thrombi pass from the facial vein or pterygoid venous complex into the sinus** via either ophthalmic veins or emissary veins that enter the cranial cavity through the foramen ovale.
- This is a critical medical emergency with a high risk of disseminated cerebritis and cerebral venous thrombosis.

**7. Answer a. Lateral pterygoid**

**Lateral Pterygoid**

- Lateral pterygoid is a short, thick muscle consisting of two parts. The upper head arises from the infratemporal surface and infratemporal crest of the greater wing of the sphenoid bone. The lower head arises from the lateral surface of the lateral pterygoid plate.

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- From the two origins, the fibres converge, and pass backwards and laterally, to be inserted into a depression on the front of the neck of the mandible (the pterygoid fovea). A part of the upper head may be attached to the capsule of the temporomandibular joint and to the anterior and medial borders of its articular disc.
- Unlike the other muscles of mastication, lateral pterygoid is not pennate, nor does it have a significant number of Golgi tendon organs associated with its attachments.

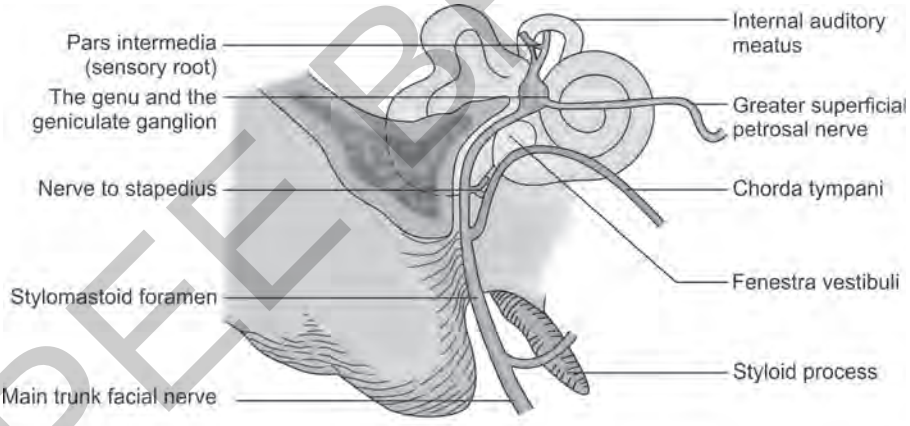
**Actions**

- When left and right muscles contract together the condyle is pulled forward and slightly downward. **This protrusive movement alone has little or no function except to assist opening the jaw.**
- **Digastric and geniohyoid are the main jaw opening muscles:** unlike lateral pterygoid, when acting alone they rotate the jaw open, provided other muscles attached to the hyoid prevent it from being pulled forward.

**8. Answer b. Supplies anterior belly of digastrics muscle.**

- **The Anterior belly of digastric is supplied by the mylohyoid branch of the inferior alveolar nerve, and the posterior belly is supplied by the facial nerve.**

**Cranial Nerve Functional Anatomy:**




**Clinical Anatomy - Ellis**

As can be seen in the figure that nerve to the stapedius is located well above the level of branching of facial nerve to give off chorda tympani, so if facial nerve injury occurs just above the branching of chorda tympani nerve, nerve to the stapedius remains unaffected.

## Dental Anatomy

**11. Answer c. 20 to 41%**

**Ref:** *Pathways of the Pulp. Cohen S and Burns R. 6th Edition Pg 152*

- The different innervation of the two parts reflects their separate derivations from the mesenchyme of the first and second branchial arches.

**Actions**

- Digastric depresses the mandible and can elevate the hyoid bone. The posterior bellies are especially active during swallowing and chewing.

**9. Answer b. IX**

Refer question no. 3

**Ref:** *Gray's Anatomy 40th Edition*

- Taste buds in the **circumvallate papillae, postsulcal part of the tongue and in the palatoglossal arches and the oropharynx** are innervated by the **glossopharyngeal nerve.**

**10. Answer d. Hyperacusis**

**Stapedius: Hyperacusis**

- Dysfunction of the smallest muscle supplied by the facial nerve can cause a distressing symptom. Stapedius dampens the movements of the ossicular chain and if it is inactive, sounds will be distorted and echoing. This is hyperacusis.

- Frequently the mandibular incisors have two canals. One study reported that 41.4% of mandibular incisors studied had two separate canals; of these, only 1.3% had two separate foramina.

**12. Answer a. Sympathetic efferent post ganglionic**

**Ref:** *Ten Cate's Oral Histology. Antonio Nanci. 7th edition. Pg 230*

- Parasympathetic fibers leave the central nervous system through cranial nerves III, VII, IX, and X; additional parasympathetic fibers leave the lowermost part of the spinal cord through the second and third sacral spinal nerves and occasionally the first and fourth sacral nerves. About

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75 per cent of all parasympathetic nerve fibers are in the vagus nerves (cranial nerve X), passing to the entire thoracic and abdominal regions of the body.**( Textbook of Medical Physiology. Guyton and Hall. Pg 750.)**

- The nerve bundles that enter the tooth pulp consist principally of sensory afferent nerves of the trigeminal (fifth cranial) nerve and sympathetic branches from the superior cervical ganglion.
- Since none of the fires from cranial nerves III, VII, IX, and X, innervate the pulp, it does not contain parasympathetic post ganglionic fibres.

**13. Answer b. 2 yrs**

- At the time of tooth eruption the enamel is not yet completely calcified and undergoes a post eruptive period, approximately 2 years, during which enamel calcification continues (enamel maturation period).
- During this period fluoride deposition takes place in the superficial layer of enamel. This fluoride is derived from saliva and also from exposure of teeth to fluoride- containing water and food.

## Genetics

**14. Answer a. Turner`s syndrome**

**Ref:** *Syndromes of the Head and Neck 4th Edition*

- **In 1938, Turner** recognized the combination of sexual infantilism, webbed neck, and cubitus valgus as a distinct entity. **In 1959, Ford et al** showed that patients with **Turner syndrome** were **missing one sex chromosome (45,X).**
- The syndrome consists of short stature, streak gonads, webbed neck, shield chest, peripheral lymphedema at birth, coarctation of the aorta, hypoplastic nails, short metacarpals, and multiple pigmented nevi. **(Page No. 57)**
- **Treacher`s Collins syndrome** has **autosomal dominant inheritance.** The frequency is approximately 1 per 50,000 live births. The **gene for the syndrome (Treacle or TCOF1) has been mapped to 5q32–33.1.** The gene encodes a putative **nucleolar phosphoprotein.** The mutation leads to premature termination of the coded protein. **(Page No. 799)**

**Ref:** *Burket`S Oral Medicine 11th Edition Page No. 558*

**Chromosomal disorders are categorized into three general areas.**

- The first is **incorrect chromosomal number** such as **trisomy 21 (Down syndrome) of chromosome 21**; this type is termed **aneuploidy.** Turner's syndrome occurs in women who acquire only one X chromosome. Klinefelter's syndrome occurs in men who receive two X chromosomes in addition to one y chromosome.
- The second type is large chromosomal structural defects, including microdeletions. DiGeorge syndrome is characterized by T-cell immunodeficiency and cardiac anomalies and is caused by a microdeletion of chromosome 22.
- The third type of anomaly is uniparental disomy, which refers to the presence of two copies of a chromosome (or part of a chromosome) from one parent and none from the other parent. Examples included are Beckwith-Wiedmann syndrome, glomus tumors, Prader-Willi and Angelman's syndrome.

**Ref:** *Shafer's Oral Pathology 7th Edition Page No. 55*

- **Dentinogenesis imperfecta** is an **autosomal dominant condition** affecting both deciduous and permanent teeth. Affected teeth are gray to yellowish-brown and have broad crowns with constriction of the cervical area resulting in a 'tulip' shape. Radiographically, the teeth appear solid, lacking pulp chambers and root canals. Enamel is easily broken leading to exposure of dentin that undergoes accelerated attrition. **The gene maps to chromosome number 4. It encodes a protein called dentin sialophosphoprotein (DSPP).**

**15. Answer b. Karyotyping**

**Ref:** *A Dictionary of Genetics 7th Edition*

- **Karyotype** the chromosomal complement of a cell, individual, or species. It describes the **light microscopic morphology of the component chromosomes, so that their relative lengths, centromere positions, and secondary constrictions can be identified.** The karyotype is often illustrated with a figure showing the chromosomes placed in order from largest to smallest. This illustration, called an **idiogram,** may be constructed by aligning photomicrographs of individual chromosomes, or it may be an inked drawing summarizing the data from a series of analyses of chromosome spreads.
- **Chromosome mapping** is the process of determining the position of loci on specific chromosomes and constructing a diagram of each chromosome showing the relative positions of loci; techniques include family studies with linkage analysis, somatic cell hybridization and chromosome deletion mapping.
- **Genotyping** is the process of determining differences in the genetic make-up (**genotype**) of an individual by examining the individual's DNA sequence using biological assays and comparing it to another individual's sequence or a reference sequence.

**16. Answer c. 3.2 billion**

**Ref:** *Burket's Oral Medicine 11th Edition Page. No. 550*

**The Human Genome Project was initiated in 1988 and was completed as of October 2004.**

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- Exhaustive analyses of the enormous database **(the "instruction book" of life)** representing the Human Genome Project revealed that **humans contain 20,000 to 25,000 genes within the nucleus of each somatic cell** and another **9 genes that are encoded within mitochondria** found in all human cells.
- Genes are discrete units of information encoded within DNA, which, in turn, is localized within chromosomes found in the nucleus of each somatic cell or within mitochondria dispersed through the cytoplasm of all cells.
- **Each cell** contains **3.2 × 109 nucleotide pairs per haploid genome** in the nucleus and **16,569 nucleotide pairs in each mitochrondrion.**

## Pharmacology

**17. Answer d. Bleomycin**

**Ref:** *Neuiue 2nd Edi Pg- 46*

- Drug-induced gingival enlargement is most commonly associated with the administration of anticonvulsants (principally phenytoin), cyclosporine, and calcium channel blocking agents.
- Anticonvulsant- phenytoin, ethotoin, mephynetoin, ethosuximide, methusuximide, **valproic acid (Na valproate), Carbamazepin.**
- Immunosuppressant- cyclosporine.
- Calcium channel blockers- amlodipine, felodipine, nicardipine, nifedipine, nitrendipine, diltiazem, **Verapamil**.

**18. Answer b. Sulfisoxazole**

**Ref:** *Goodman Gilman 12th Edi Pg- 719*

- The sulfonamides are as efficacious as oral penicillin in preventing streptococcal infections and recurrence of rheumatic fever in susceptible subjects and are used in patients who are hypersensitive to penicillin. Untoward responses usually occur during the first 8 weeks; serious reactions after this time are rare. White blood cell counts should be checked weekly during the first 8 weeks.

**19. Answer b. Asymptomatic for 24 to 30 hours**

**Ref:** *KDT 6th Edi Pg- 198-199*

**Acute paracetamol poisoning:**

- It occurs especially in small children who have low hepatic glucouronide conjugating ability.
- If large dose (>150 mg/kg or >10 g in adult) is taken, serious toxicity can occur. Hence 10 g is a safe dose. Fatality is common with >250 mg/kg.
- Early manifestation – nausea, vomiting, abdominal pain and liver tenderness with no impairment of consciousness
- After 12–18 hours centrilobular necrosis occurs which may accompanied by renal tubular necrosis and hypoglycemia may progress to coma.
- N-acetyl-p-benzoquinonemine (NABQI) is a highly reactive arylating minor metabolite of paracetamol which is detoxified by conjugation with glutathione.
- When very high dose of paracetamol is taken, glucouronidation capacity is saturated, more of the metabolite is formed- hepatic glutathione is depleted and this metabolite binds covalently to proteins in liver cells and renal tubules causing necrosis.
- Early treatment- inducing vomiting or gastric lavage.
- Activated charcoal- to prevent absorption.
- Specific treatment- N-acetylcysteine 150 mg/kg should be infused i.v. over 15 min, followed by same dose i.v. over the next 20 hours.
- N-acetylcysteine replenishes the glutathione stores of liver and prevents binding of the toxic metabolite to other cellular constituents.

**20. Answer b. 2 days before anesthesia**

**Ref:** *Lee synopsis of anesthesia Pg 26-28*

**Lithium should be stopped 2 days before major surgery because it potentiates non-depolarising relaxants**. In emergencies, suxamethonium and regional blocks should be considered as alternatives.

Lithium toxicity occurs if patient is dehydrated. It is generally safe to continue lithium therapy before minor surgery provided that due attention is paid to fluid and electrolyte balance.

Friends, Remember, Lithium is an **antimaniac – mood stabilizing agent**.

Use:-Acute mania (optimum conc. in plasma 0.5-0.8 mEq/L)

Prophylaxis in bipolar disorder. (0.8-1.1 mEq/L)

Toxicity at 1.5 mEq/L

T ½ = 16–30 hrs.

Pre Existing Drug Therapy management Before Elective Surgery

- Antihypertensives- Continued
- Antianginal- Continued
- Lithium- Stop before 2 days
- Non selective MAO Inhibitors- Stop before 2 weeks
- Specific MAO inhibitors- Continued with caution
- SSRI- Continued with caution
- Corticosteroid- Hydrocortisone- It is may be safe to increase dose during and after surgery.
- Oral contraceptives (oestrogen containing- combined)- Increases risk of DVT-0 stop before 4 weeks

**21. Answer a. Glycopyrrolate**

**Ref:** *KDT 6th Edi Pg-109, 110*

Anticholinergic drugs are those which block actions of Ach on autonomic effectors and in the CNS exerted through the muscarinic receptors.

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**Classification of anticholinergic drugs:**

- Natural alkaloids-atropine, hyoscine
- Semisynthetic- homatropine, hyoscine butyl bromide
- Synthetic compounds-
- Mydriatics- cyclopentolate
- Antisecretory
  a. Quaternary compounds- propantheline, isopropamide, glycopyrrolate.
  b. Tertiary amine- Dicyclomine
     - ❑ Vasicoselective- Oxybuynin
     - ❑ Antiparkinsonian- Benzhexol, Procyclidine.
     - ❑ Hyoscine is rapidly absorbed from g.i.t. it is more completely metabolized and has better blood-brain barrier penetration.
     - ❑ Atropine at low doses, has restricted entry into the brain.
     - ❑ Glycopyrrolate – it is a quaternary compound.

**Features of quaternary compound**

- Incomplete oral absorption
- Poor penetration in brain and eyes.
- Elimination is generally slower.
- Have higher nicotinic blocking property.

**22. Answer c. 2 years**

**Ref:** *Pg 189, Lee synopsis of Anesthesia*

Suxamethonium chloride is the dicholine ester of acetyl choline. **It is presented as a clear colourless aqueous solution of ph 3.0-5.0 with a shelf life of 2 years and stored at 4oc**. Spontaneous hydrolysis occurs in warm or alkaline conditions.

Remember, these are **Peripherally acting skeletal muscle relaxants**.

**Uses:**

a. Adjuvants to **general anesthesia** for **relaxation of skeletal muscle, during intubation**, abdominal, thoracic surgeries etc.
b. Assisted ventilation in terminally ill patients.
c. Convulsion, tetanus etc.

| Neuro-muscular blocking agents | | | Directly acting agents |
|---|---|---|---|
| Non-depolarising(competitive) Blockers | | Depolarizing Blockers | Dantrolene[Q] Quinine. |
| Long[Q] | d-Tubocurarine,[Q] Pancuronium,[Q] doxacuronium, piperacuronium | SCh- Succinyl choline, (Suxamethonium)[Q] | |
| Int | Vecuronium, atracurium, cisatacurium, rocuronium, rapacuronium, | Decamethonium. | |
| Short | Mivacurium | | |

Remember **Dantrolene is used in malignant hyperthermia[Q] induced by halothane[Q]**

Remember **Baclofen is Centrally** acting muscle relaxant- It is **GABA[B] Receptor agonist[Q].**

**GABA[A] AGONISTS-** Barbiturates, alcohol, BZD[Q], propofol, inhalational anesthetics,

GABA[A] Antagonist- Bicuculline.Q

Remember, GABA is involved as a receptor in drugs acting on CNS (only imp points given) For full text Refer KD Tripathi Pg 348, 394, 395

**23. Answer b. It has low water solubility and shows minimal risk for thrombophlebitis.**

The sentence is half true; it is **water soluble** and shows minimal risk for thrombophlebitis.

**Ref:** *Goodman Gilman 12th Edi Pg-239, KDT 6th Edi Pg-376, Midazolam: Review of a Versatile Agent for Use in Dentistry, Anesth Prog 34:164-170 1987*

- Midazolam belongs to an unusual class of benzodiazepine known as the imidazobenzodiazepines.
- The pKa of Midazolam is 6.15, which permits the preparation of salts that are water soluble and typically is administered intravenously but also can be given orally, intramuscularly or rectally; oral midazolam is particularly useful for sedation of young children.
- Midazolam produces minimal venous irritation as opposed to diazepam and lorazepam, which are formulated in propylene glycol and are painful on injection, sometimes producing thrombophlebitis.
- It has the specific anxiolytic, anticonvulsant, sedative, muscle relaxant and amnestic properties. Its lipid solubility is among the highest in the class, making it one of the most potent benzodiazepines. It is approximately 3–4 times more potent than diazepam.
- Specific receptor for the benzodiazepines parallels that of GABA in brain, major inhibitory neurotransmitter in the spinal cord, glycine. Midazolam has a high affinity for the benzodiazepine receptors. Midazolam has twice the affinity for the receptor as diazepam. The amnestic effect of Midazolam is also more intense than diazepam.
- Midazolam has more rapid onset and shorter duration of effect. The short duration of action is attributed to its very high rate of metabolic clearance and rapid rate of elimination.
- Midazolam is highly protein bound (> 95%). A decrease in plasma proteins, especially serum albumin, as is often found in renal failure, would artificially increase the free fraction of midazolam. This could result in more profound and prolonged effects. Therefore, the dose of midazolam should be reduced in patients with chronic renal failure.

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**24. Answer d. Suxamethonium**

**Ref:** *KDT 6th edition Pg-372, Lippincott's Illustrated reviews of pharmacology 5th Edi Pg- 67, 140*

- A genetically determined reaction malignant hyperthermia occurs rarely. Susceptible subjects have an abnormal RyR (Ryanodine receptor) calcium channel at the sarcoplasmic reticulum of the skeletal muscles, which is **triggered by halothane** to realease massive amounts of Ca2+ intracellularly causing persistent muscle contraction and increased heat production. **Succinylcholine accentuates** the condition.
- Rapid external cooling, bicarbonate infusion, 100% O2 inhalation and i.v. dantrolene are used for treatment.

**25. Answer c. Midazolam**

**Ref:** *Stanley Malamed Sedation in dentistry Midazolam:- IN (Intranasal) Pg 128*

- Midazolam has been demonstrated to provide a consistent level of CNS activity following IN administration.
- A dose of 0.2 mg/kg appears to be the most effective in pediatric patients for premedication before general anesthesia, with somewhat larger doses recommended for sedation adequate to permit treatment.
- The mean IN absorption rates (*t*max) of flurazepam, midazolam, and triazolam were 1.7, 2, and 2.6 times faster, respectively, than those achieved with oral dosing.
- When children accept oral administration at all, they appear to accept it better than drugs administered intranasally IN drugs are administered by either the parent or the dentist using a 1- or 3-ml syringe with an aerosolizing adapter attached.,

***Remember, Midazolam, a water-soluble benzodiazepine, and sufentanil, an opioid analgesic, have received the most attention regarding administration via the IN route***

**26. Answer b. 0.15 mg/kg**

**Ref:** *KDT 6th Edi Pg-343*

- It is an intermediate acting neuromuscular blocking agent.
- R-Cis enantiomer of atracurium is nearly 4 times more potent, slower in onset.
- It does not provoke histamine release.
- Duration of action is - 0.15 - 0.2 mg/kg.

## Periodontology

**27. Answer a. 2 to 4 hours**

**Ref:** *Carranza clinical periodontology 10thed pg 144*

Important changes in the plaque growth rate can be detected within first 24 hours.

During the first 2–8 hours, the adherent pioneering streptococci saturate the salivary pellicular binding sites and thus cover 3% to 30% of the enamel surface.

Instead of the expected steady growth during the next 20 hours a short period of rapid growth is observed.

After 1 day, the term biofilm is fully deserved because organization takes place within it. Thus it is clear that irreversible colonization of tooth surface starts after 2–8 hours of exposure of the enamel. Thus the answer is option A.

**28. Answer a. 0.007 inch**

**Ref:** *Carranza clinical periodontology 9th ed pg 654*

- Toothbrush bristles are grouped in tufts that are usually arranged in three or four rows. Multitufted toothbrushes contain more bristles and may clean more efficiently than skimpier brushes.
- Rounded bristle ends cause fewer scratches on the gingiva than flat cut bristles with sharp ends. The question of the most desirable bristle hardness is not settled.
- Bristle hardness is proportional to the square of the diameter and inversely proportional to the square of bristle length.
- Diameters of commonly used bristles range from 0.007 inch (0.2 mm) for soft brushes to 0.012 inch (0.3 mm) for medium brushes and 0.014 inch (0.4 mm) for hard brushes. Soft bristle brushes of the type described by Bass"' have gained wide acceptance.
- Bass recommended a straight handle and nylon bristles 0.007 inch (0.2 mm) in diameter and 0.406 inch (10.3 mm) long, with rounded ends, arranged in three rows of tufts, six evenly spaced tufts per row, with 80 to 86 bristles per tuft. For children, the brush is smaller, with thinner (0.005 inch or 0.1 mm) and shorter (0.344 inch or 8.7 mm) bristles.

**29. Answer a. Socransky**

**Ref:** *Carranza clinical periodontology 10th ed, pg 155*

In 1970 Robert Koch has developed the classic criteria by which a microorganism can be judged to be a causative agent in human infection. These criterias were stipulated as Koch's postulates.

But these postulates cannot be applied to variety of infectious diseases and the validity of these postulates has been challenged for many times in later period.

Thus Sigmund Socransky, a researcher at the forsyth dental centre in Boston proposed criteria by which a periodontal organism can be judged to be potential pathogen. These criteria stipulate following for a potential pathogen.

- Be associated with disease, as evident by increase in the number of organisms at diseased sites.
- Be eliminated or decreased in sites that demonstrate clinical resolution of disease with treatment.

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