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Dedicated to

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Inspire yourself to aspire high

Carve yourself to crave high

PREFACE

The THIRD EDITION OF EXCEL DENTISTRY has been updated with recent advancements, hope the readers will find the book more informative and updated.

The material in the book is introductory for a beginner in dentistry.

Although there are many books, in this book we have solved 85 plus question papers from the previous 11 years question papers, and every topic was discussed in detail keeping in mind the information required.

While updating the second edition of Excel dentistry, suggestions and corrections which were received from the students and colleagues have been taken into deeply grateful consideration.

We are intensely grateful for all those who were involved with this.

We are immensely thankful to so many colleagues as well as to the readers of the previous edition.

Hopefully, the book provokes both positive and negative reactions. Despite many efforts, we accept imperfection in this book if any.

As the Third edition of Excel dentistry, We genuinely welcome all the readers for any kind of suggestions or any mistakes and We'll look forward to further improvement which will be deeply cherished.

Finally, we extend my heartfelt thanks and acknowledge the pleasure of working with the EXCEL BDS TEAM.

Dr Syed Ahmed Khadri

Dr Junaid ur Rahman Syed

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Under Almighty's guidance and blessings, it's a matter of pleasure to introduce 3rd Edition of "ExcelDentistry"

We are deeply grateful to my faculty and would like to owe a special note of thanks for all that today. First and fore most, we would like to thank Dr.Ayub, Dr.Malik Aqueel, Dr.Nandini and Dr. Meghashyama Kulkarni for their prop up.

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We are thankful to the staff of EXCEL BDS, for their patience and continuous support.

Last but not least, we'd like to thank our parents.

Lastly, we acknowledge each and every person who helped us in some or the other way has inspired us and work hard towards making the quality of this book.

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NOVEMBER 2021

LONG ESSAY (2 x 10 = 20 Marks)

1. Describe parotid gland under a) location and external features, b) structures within gland, c) Structures passing out of gland, d) Blood supply, e) Nerve supply

2. Classify dural venous sinuses and describe cavernous sinus under (a) position, (b) relations, (C) veins draining, (d) communications, (e) applied aspects (June 2019)

SHORT ESSAYS (8 x 5 = 40 Marks)

3. Boundaries and contents of Digastric triangle. (July 2018)

4. Gross anatomy of Submandibular gland. (June 2015)

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6. Fertilization. (June 2012)

7. Lateral Pterygoid muscle (July 2018)

8. Lacrimal apparatus. (March 2021)

9. Nasal septum-formation, blood supply and nerve supply (June 2019)

10. Maxillary air sinus. (Dec 2017)

SHORT ANSWERS (5 x 2 = 10 Marks)

11. Derivatives of third pharyngeal arch. (Dec 2017)

12. Ansa cervicalis. (Dec 2015)

13. Labeled diagram of histology of white fibro cartilage.

14. Name the Muscles of soft palate. (Dec 2017)

15. Structures passing through foramen magnum (June 2014)

ANSWERS

Q1. Describe parotid gland under a) location and external features, b) structures within gland, c) Structures passing out of gland, d) Blood supply, e) Nerve supply

Ans.

a. Location and external features:

The parotid gland is present in the pyramidal fossa which is posterior to the ramus of the mandible called retromandibular fossa.

The glands appears to be a three-sided pyramid with apex directed downwards.

An apex

Four surfaces

a. Anteromedial surface.

b. Posteromedial surface.

c. Superior surface or base.

d. Superficial surface.

Three borders

i. Anterior.

ii. Medial.

iii. Posterior.

b. Structures within gland:

Three main structures that are present within it are:

1. Facial nerve.
2. External carotid artery.
3. Retromandibular vein.
4. Parotid lymph nodes.
5. Auriculotemporal nerve.

1. Facial nerve:

It is the superficial nerve that is situated within the gland.

Entering surface: It enters through the upper part of the posteromedial surface.

Leaving surface: The branches move horizontally and exits the gland through the anteromedial surface.

The five terminal branches appear as a goose-foot through the anterior border of the gland and that pattern of the facial nerve is termed pes anserinus.

2. External carotid artery:

Entering surface: It enters through the posteromedial surface and stays in the deeper part of the gland. Inside the gland it divides as superficial temporal and maxillary arteries.

Exiting artery: Transverse facial artery which is a branch of superficial temporal artery exits the gland through the anterior border of the parotid gland.

3. Retromandibular vein:

It is formed by the union of the superficial temporal and maxillary veins.

When it exits it is divided into anterior and posterior divisions.

The anterior division merges with the facial vein to form the common facial vein.

The posterior division merges with the the posterior auricular vein forming the external jugular vein.

4. Parotid lymph nodes:

The lymph nodes draining the parotid gland are called as the parotid lymph nodes.

More specifically, it can refer to: deep parotid lymph nodes. superficial parotid lymph nodes.

5. Auriculotemporal nerve:

The auriculotemporal nerve is a branch of the mandibular nerve that provides sensation to several regions on the side of head, including the jaw, ear, and scalp.

c. Structures passing out of gland

Parotid Duct (Stenson's Duct): The parotid duct, or Stensen duct,is the duct draining the salivary gland.

It is the route that saliva takes from the major salivary gland, the parotid gland, into the mouth.

It runs forward along the lateral side of the masseter muscle.

In this course, the duct is surrounded by the buccal fat pad.

It takes a steep turn at the border of the masseter and passes through the buccinator muscle, opening into the vestibule of the mouth that opens in front of the second Maxillary molar tooth.

Nerves

Zygomatic branch of facial nerve

Posterior auricular nerve

Buccal branch of facial nerve

Lower buccal branch of facial nerve

Marginal mandibular branch of facial nerve

Cervical branch of facial nerve

Temporal branch of facial nerve

Auriculotemporal nerve

Artery

Transverse facial artery

Superficial temporal vessels

Posterior auricular artery

d. Blood supply:

Arterial supply:

Parotid gland is supplied by external carotid and superficial temporal arteries.

Venous supply:

Parotid gland is drained by retromandibular and external jugular veins.

e) Nerve supply:

Three types of nerve supply the parotid gland

Parasympathetic

Sympathetic

Sensory fibres:

a. Parasympathetic supply:

It is supplied via auriculotemporal nerve.

Inferior salivatory nucleus

↓

Glossopharyngeal nerve

↓

Tympanic branch

↓

Tympanic plexus

↓

Lesser petrosal nerve

↓

Otic ganglion.

↓

Auriculotemporal nerve

↓

Parotid gland

↓

Produces watery secretion.

b. Sympathetic supply:

Supplied by:

Plexus around external carotid artery from superior cervical sympathetic ganglion.

Preganglionic sympathetic fibres:

Begin from lateral horn of T1 spinal segment.

c. Sensory supply:

It is derived from:

Auriculotemporal nerve.

Great auricular nerve

Q13. Labeled diagram of histology of white fibro cartilage.

NOV 2021

LONG ESSAY (1 x 10 = 10 Marks)

1. Describe the intrinsic pathway of coagulation. **(Dec 2016)** Add a note on anti-coagulants.

SHORT ESSAYS (3 x 5 = 15 Marks)

2. Describe the short-term regulation of blood pressure. **(Aug 2017)**
3. Explain the mechanism of oxygen transport in the blood.
4. List the properties of synapse. Explain any two of them.

SHORT ANSWERS (5x2=10 Marks)

5. Define hypoxia. Mention its types. **(June 2019)**
6. List the components of juxta glomerular apparatus. Mention its function.
7. List four functions of saliva. **(June 2019)**
8. List the changes in eyes during accommodation.
9. List the hormones regulating serum calcium level. **(Aug 2017)**

ANSWERS

Q1. Add a note on anti-coagulants.

Ans:

- Anticoagulants, commonly known as blood thinners, are chemical substances that prevent or reduce coagulation of blood, prolonging the clotting time.
- The commonly used anticoagulants are hepairin.
- Heparin is used in vivo and in vitro.
- Heparin is chemically a mucoitin polysulphuric acid.
- It is secreted by the mast cells.

Mechanism of action:

- It inhibits the transformation of prothrombin to thrombin.
- It is accompanied by a plasma cofactor albumin X
- It leads to the neutralization of thrombin on fibrinogen.

The use of anticoagulants:

- It is a decision based upon the risks and benefits of anticoagulation.

The uses are:

- Atrial fibrillation — commonly forms an atrial appendage clot.
- Coronary artery disease
- Deep vein thrombosis — can lead to pulmonary embolism
- Ischemic stroke
- Hypercoagulable states
- Mechanical heart valves
- Myocardial infarction

Q3. Explain the mechanism of oxygen transport in the blood.

Ans:

- Oxygen is carried in the blood in two forms such as the

a. Dissolved in plasma.

b. Reversibly bound to hemoglobin (about 97% of the total).

a. Dissolved in plasma

- Only a small amount of oxygen is dissolved in plasma since oxygen has such a low solubility.
- At elevated PO2 (breathing 100 % oxygen or during hyperbaric oxygenation), however, the physically dissolved form of oxygen can become significant.
- Henry's law states that the amount of oxygen dissolved in plasma is directly proportional to PO2.
- **b. Reversibly bound to hemoglobin** (about 97% of the total).

- The protein hemoglobin is a molecule which is responsible for carrying almost all of the oxygen in the blood.
- It is composed of four subunits, each with a heme group plus a globin chain.
- The heme group is composed of a porphyrin ring which contains an iron (Fe) atom in its center.
- Normally, the Fe is in the +2 redox state (ferrous) and can reversibly bind oxygen.
- There are at least six genes that control globin synthesis in humans, resulting in the formation of six structurally different polypeptide chains.
- The blood of a normal adult human contains at least six different species of hemoglobin molecules, all of which have the same principal structure and function.
- Hemoglobin A (A for adult) makes up 92% of the total hemoglobin concentration in a normal adult human.
- Hemoglobin A (HbA) is composed of two α chains and two β chains, symbolically written as α2 β2.
- Oxygen-haemoglobin Dissociation curve **(Dec 2016)**

Q4. List the properties of synapse. Explain any two of them.

Ans:

- Synapse, also called neuronal junction, the site of transmission of electric nerve impulses between two nerve cells (neurons) or between a neuron and a gland or muscle cell (effector).

The properties are:

a. One-way conduction (unidirectional conduction)

b. Postsynaptic Potentials

c. Synaptic Delay

d. Synaptic Inhibitor

e. Fatigability

f. Convergence and divergence:

- Impulses from one presynaptic nerve fiber may end on postsynaptic region of large number neurons and this is called as divergence.
- When nerve fibers of different presynaptic neurons end on a common postsynaptic neuron, this is known as convergence.
- In CNS, on an average about 10000 synapses are found on any one neuron.

g. Summation:

- When a stimulus of subthreshold strength is applied, there will not be development of action potential in postsynaptic region.
- But if many subthreshold stimuli are applied at presynaptic region, effects of these stimuli can get added up and lead to action potential development in postsynaptic region. This is known as summation.
- There are two types of summation namely spatial and temporal. In temporal summation, presynaptic neuron stimulated will be same, but many stimuli are applied in rapid succession (timing of stimuli will be different, but place of stimulation will be same).
- In spatial summation, presynaptic neurons stimulated will be different but stimuli will be applied simultaneously (time of stimulation shall be same, but places of stimulation will be different).
- This is possible because of the property of convergence.

Short answers

Q6. List the components of juxta glomerular apparatus. Mention its function.

Ans:

Juxtaglomerular Apparatus

- The juxtaglomerular apparatus is a specialized structure formed by the distal convoluted tubule and the glomerular afferent arteriole.
- It is located near the vascular pole of the glomerulus. The main function of the apparatus is the secretion of renin, which regulates systemic blood pressure via the renin-angiotensin-alodosterone system.

The juxtaglomerular apparatus is composed of:

a. Macula densa, a collection of specialized epithelial

cells of the distal convoluted tubule. These cells are enlarged as compared to surrounding tubular cells.

The cells of the macula densa sense sodium chloride concentration in the tubule, which in turn reflects the systemic blood pressure.

b. Juxtaglomerular cells of the afferent arterioles, which are responsible for secreting renin. These cells are derived from smooth muscles cells of afferent arterioles.

c. Extraglomerular mesangial cells, which are flat and elongated cells located near the macula densa. Their function is currently unclear.

Q8. List the changes in eyes during accommodation.

- Accommodation is the process by which the vertebrate eye changes optical power to maintain a clear image or focus on an object as its distance varies.
- In this, distances vary for individuals from the far point—the maximum distance from the eye for which a clear image of an object can be seen, to the near point—the minimum distance for a clear image.

The changes observed are:

- Change in focal length because there is contraction in the ciliary muscle.
- Cornea being a fixed structure and its curvature is constant along with its refractive power is constant.
- Poster surface of lens curvature does not change.
- Suspensory ligaments is relaxed with the tension exerted on the lens capsule.

NOVEMBER 2021

LONG ESSAY (1 x 10 = 10 Marks)

1. Discuss Glycogenesis **(July 2018)** and Glycogenolysis. **(Dec 2013)** Add a note on Von Gierke's disease. **(June/July 2012)**

SHORT ESSAYS (3 x 5 = 15 Marks)

2. Phospholipids. **(Dec 2016)**
3. Biochemical functions and deficiency manifestations of Vitamin D. **(July 2018)**
4. Creatinine clearance test. **(Dec 2018)**

SHORT ANSWERS (5 x 2 = 10 Marks)

5. Phenylketonuria. **(Dec 2018)**
6. Name two (2) plasma proteins and give their function. **(March 2021)**
7. Dietary Fibers. **(June 2019)**
8. Features of Genetic code. **(June 2011)**
9. Mention the normal serum levels of

   a) Phosphorous **(Nov 2020)**

   b) Cholesterol.

ANSWERS

Q9. Mention the normal serum levels of

a) Phosphorous (Nov 2020)

b) Cholesterol.

Ans:

Normal value:

Normal level of cholesterol in serum is 150-220 mg/ di.

Clinical significance:

Increased serum cholesterol level is the major risk factor in promoting atherosclerosis.

NOVEMBER 2021

LONG ESSAY (2 x 10 = 20 Marks)

1. Discuss in detail chronology and morphology of permanent mandibular 1st molar (REFER TABLE-PAGE NO-382)
2. Enumerate and write in detail hypocalcified structures of enamel. (July 2015)

SHORT ESSAYS (8 x 5 = 40 Marks)

3. Development of mandible. (June 2014)
4. Interglobular dentin (March 2021)
5. Ground section
6. Theories of mineralization (Dec 2017)
7. Discuss in detail lingual aspect of permanent maxillary canine (REFER TABLE-PAGE NO-374)
8. Regressive changes of pulp (June 2019)
9. Histology of maxillary sinus (July 2018)
10. Histology of mucous acini (Aug 2017)

SHORT ANSWERS (5 x 2 = 10 Marks)

11. Bundle bone (July 2015)
12. Dental papilla derivatives (June 2013)
13. Non-keratinocytes (June 2019)
14. Oblique ridge (Dec 2015) and triangular ridge (Dec 2010)(Pg 366)
15. Cementoenamel junction (June 2019)

ANSWERS

Q5. Ground section

Ans.

A section of bone or tooth prepared for histological study by polishing until thin enough for microscope viewing is called ground section.

Ground sections of teeth or bone are considered best solutions for the study of any hard tissues in the study of histopathology.

Ground sections of teeth are sections prepared without using any chemical and maintaining its anatomy

Apparatus used for ground section of teeth are:

Extracted Teeth

Electrical lathe machine (High and Low speed): Grounding done till 4-5mm thickness.

Carborundum stone (Rough, Static, Fine).

Procedure:

- Teeth are first soaked in 20% formaldehyde for 24 hours.
- Washed in water.
- Tooth could be sectioned to any thickness by using Ultra-microtomes with diamond cutting blades.
- Using electrical lathe machine also grinding could be done and equally both sides grounded, thus preparing a thin ground section.

  Continuous spray of water is required, as tooth gets heated up due to friction of grinding.

  Tooth is grounded at high speed until 4-5 mm thickness is done. At low speed further grounding is done till 3-4 mm thickness is achieved.
- Manually grounding can be done in two steps, first using rough carborundum stone till a section of 2- 3mm is obtained and then using a static carborundum stone till a section thickness of 1mm is obtained.

  Grinding is further continued using fine carborundum stone till a section thickness of 0.25mm is obtained.

  Continuous water is poured on this stone, due avoid friction of heat.

- Finally, the grounded section is cleaned in xylene for one minute.
- The dried section is then mounted on microscopic slide using DPX and viewed under microscope.

Merits and demerits

Cost Restriction: Availability of ultra microtomes with diamond cutting blades.

- Using burs have their own disadvantage: Leads to some anatomical changes when teeth are grounded.
- Electrical Lathe and hand grinding is well suited.

Instruments available are low cost and easily available.

- Carborundum stone used by dental surgeon are 4-5 cm diameter. Grinding of teeth with small surface is a problem with fatigue and not possible.
- Hand grinding is really injurious to the fingers. Fingers are also rubbed on the rough surface leading to injuries.

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