

INBDE Item Development Guide - APPENDICES

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Appendix A:

FOUNDATION KNOWLEDGE FOR THE GENERAL DENTIST

This document is intended to provide communities of interest with information concerning the content domain underlying the Integrated National Board Dental Examination (INBDE) that is under development by the Joint Commission on National Dental Examinations (JCNDE). This document outlines the foundational knowledge, cognitive skills, and abilities necessary for the safe, entry-level practice of general dentistry. Knowledge in each area is applied by the dentist to aid in the prevention, diagnosis, and management of oral disease and to promote and maintain oral health.

Information in this document can be used to help serve a variety of purposes, including the following:

- understand the content basis for the INBDE
- understand how and where existing dental disciplines and clinical science areas fit within this framework
- inform dental program curriculum development
- inform development of examination questions using this framework (INBDE test constructors, faculty members)

Specific areas of application appear in the clinical content areas adopted by the JCNDE. These clinical content areas—involving Diagnosis and Treatment Planning, Oral Health Management, and Practice and Profession—are described in other documents appearing on the JCNDE website (www.ada.org/jcnde/inbde).

The Foundation Knowledge areas were derived from "The Scientific Foundations for Future Physicians," a 2009 report created by a committee formed between the Association of American Medical Colleges and the Howard Hughes Medical Institute. The Committee was comprised of 24 prominent educators, scientists, and physicians. The JCNDE used this report as a starting point for development of the INBDE. The 10 foundation knowledge areas that serve as the basis of the integrated examination were adjusted to properly reflect the cognitive skills requirements for an entry level dentist.

Within this document, each Foundation Knowledge (FK) area is presented as follows:

- Statement describing the general content associated with the FK area
- Examples of dental disciplines relevant to the FK area
- Examples of clinical dental science areas relevant to the FK area
- Major topics and subtopics within each FK area, including relevant disciplines and detailed examples

In each case, the examples provided are intended to serve as a helpful reference; these examples are not intended to be fully comprehensive of the area under discussion.

Foundation Knowledge Area One (FK1)

Molecular, Biochemical, Cellular, and Systems-Level Development, Structure, and Function

Foundation Knowledge Area 1 (FK1) focuses on application of knowledge of molecular, biochemical, cellular, and systems-level development, structure and function, to aid in the prevention, diagnosis, and management of oral disease and to promote and maintain oral health.

Examples of Relevant Disciplines: Gross and Head and Neck Anatomy, Regional Anatomy, Dental Anatomy, Gnathology, Occlusion (including TMJ), General and Oral Histology, Embryology, Physiology, Cell Biology, Biochemistry, Molecular Biology, Genetics, Neuroscience, Nutrition, Oral Biology, General and Systemic Pathology, Cancer Biology, etc.

Examples of Relevant Clinical Science areas: Periodontology, Oral and Maxillofacial Surgery, Occlusion, TMD, Ergonomics, Prosthodontics, Pediatric Dentistry, Orthodontics, Implant Dentistry, Forensic Dentistry, Oral Medicine, Oral Pathology, Clinical Nutrition, etc.

1.1 Structure and function of the normal cell and basic types of tissues comprising the human body.

Relevant Disciplines: Gross and Head and Neck Anatomy, General and Oral Histology, Dental Anatomy, Occlusion, TMJ, etc.

Examples:

- structure of the human body in general and the craniofacial region in particular
- structure and function of salivary glands, including the production, secretion, content and the function of saliva
- development and structure of the deciduous and permanent teeth
- development and structure of periodontal tissues
- development, structure and function of the major muscles of mastication and facial expression
- development, structure and function of the temporomandibular joint and its supporting and accessory structures.
- anatomical and functional relationships of landmarks of the oral cavity and contiguous regions
- structure and function of oral mucosa
- structure, function, and metabolism of collagen, proteoglycans and other proteins in connective and mineralized tissue
- calcium and phosphorus metabolism, the formation of biological hydroxyapatite and its role in the mineralization of hard tissues (e.g., bone and teeth)

1.2 Structure and function of cell membranes and the mechanism of neurosynaptic transmission.

Relevant Disciplines: Membrane and Cell Biology, Biochemistry, Molecular Biology, Physiology, Neuroscience, etc.

Examples:

- local and central mechanisms of pain modulation
- the role of ion channels in neurotransmission, sodium channel function and mechanism of action of local anesthetics
- function of specific neurotransmitters in a variety of physiological and pathologic conditions
- the role of dopamine in Parkinson's disease
- structure and function of sensory and motor pathways of the central nervous system as they relate to normal functioning of the body in general, and of the craniofacial region in particular
- innervation and anesthesia of the oral cavity
- relationships between sensory and motor innervations and the functions of the orofacial complex (mastication, salivation, orofacial somatosensation, pain, taste and smell)

1.3 Mechanisms of intra and intercellular communications and their role in health and disease.

Relevant Disciplines: Biochemistry, Cell Biology, etc.

Examples:

- mechanism of neurotransmitter and hormone signaling – i.e., pain, hormones like of insulin, thyroxin, neurotransmitters like acetylcholine, adrenaline, etc., through their cell surface receptor
- role of second messengers in muscle contraction (with implications on myofacial pain), cardiostimulation (with implications for local anesthesia), in glycogen breakdown in the liver (with implications to diabetes and nutrition), of stimulation of bone growth and breakdown (with implications for understanding implant behavior), etc.
- role of intra and intercellular signaling during osteointegration of implants
- role of cell signaling in sensitivity to drugs or bacterial toxins

1.4 Health maintenance through the regulation of major biochemical energy production pathways and the synthesis/degradation of macromolecules. Impact of dysregulation in disease on the management of oral health.

Relevant Disciplines: Biochemistry, Cell Biology, Membrane Biology, Physiology, Molecular Pathology, Nutrition, Sports Medicine, etc.

Examples:

- major anabolic and catabolic pathways for proteins, carbohydrates, and lipids and how energy for all activities of the body is derived
- mechanisms of biologic energy transduction
- the role of insulin in regulation of glucose and lipid metabolism, and the pathogenesis of types I and II diabetes mellitus

1.5 Atomic and molecular characteristics of biological constituents to predict normal and pathological function

Relevant Disciplines: Biochemistry, Cell Biology, Genetics, etc.

Examples:

- the role of nucleic acids, DNA and RNA, in heredity and metabolic regulation
- the role of enzymes in bodily functions

1.6 Mechanisms that regulate cell division and cell death, to explain normal and abnormal growth and development.

Relevant Disciplines: Cell Biology, Physiology, Molecular Biology, Pathology, Cancer Biology, etc.

Examples:

- how abnormalities in regulation of cell division and cell death result in cancer
- the role of growth factors and their receptors in uncontrolled tissue proliferation
- the role of oncogenes in the context of normal growth factor-initiated signal transduction and how this information is used to treat cancer (e.g., antibodies to EGFR in breast cancer; tyrosine kinase inhibitors in leukemia)

1.7 Biological systems and their interactions to explain how the human body functions in health and disease.

Relevant Disciplines: Physiology, General and Systems Pathology, etc.

Examples:

- basic principles of nutrition, sources of vitamins, minerals, and their importance in oral and systemic health and disease
- how osteoporosis affects the structure and function of the maxillofacial complex
- gastric acid reflux and its impact on oral structures

1.8 Principles of feedback control to explain how specific homeostatic systems maintain the internal environment and how perturbations in these systems may impact oral health.

Relevant Disciplines: Physiology, Systems Pathology, Oral Medicine, Pharmacology, etc..

Examples:

- the hydroelectrolytic balance of the body and consequences of fluid and

- hemodynamic disturbances
- how loss of fluids due to trauma or due to polypharmacy can lead to xerostomia

Foundation Knowledge Area Two (FK2)

Physics and Chemistry to Explain Normal Biology and Pathobiology

Foundation Knowledge Area 2 (FK2) focuses on application of knowledge of physics and chemistry to explain normal biology and pathobiology, to aid in the prevention, diagnosis, and management of oral disease and to promote and maintain oral health.

Examples of Relevant Disciplines: Physiology, Systems Pathology, and Pharmacology, etc.

Examples of Clinical Science areas: Oral Medicine, Oral Pathology, Periodontology, Diagnosis and Treatment Planning, History and Physical Examination, Emergency Care, Oral and Maxillofacial Surgery, Pediatric Dentistry, etc.

2.1 Principles of blood gas exchange in the lung and peripheral tissue to understand how hemoglobin, oxygen, carbon dioxide and iron work together for normal cellular function.

Relevant Disciplines: Chemistry, Physiology, Systems Pathology, Oral Medicine, Pharmacology, etc.

Examples:

- diffusion to gas exchange in the lung
- normal blood chemistry and how blood chemistry assists diagnosis of common conditions such as anemia, diabetes, bleeding disorders, cyanosis, and acidosis

2.2 Impact of atmospheric pressure and changes therein (e.g., high altitudes, in space, or underwater).

Relevant Disciplines: Physics, Chemistry, Physiology, Anatomy

Examples:

- oral/dental or facial pain, facial/cranial pressure change, changes in hearing or equilibrium as a result of inflammation in the eustachian tube/middle ear during upper respiratory infections or similar conditions
- availability and/or solubility of blood gases (oxygen, nitrogen, carbon dioxide) under different atmospheric conditions

2.3 The stability and dissolution of enamel and dentin as a result of factors and conditions within the oral environment, including: abrasion, attrition and erosion; changes in oral pH; exposure to physical or chemical substances, or to physical force (gritty/rough physical materials, stone powder, acidic food or drink, bulimia, bruxism, physical trauma, etc.).

Relevant Disciplines: Physics, Chemistry, Anatomy, Psychology, Behavioral Science

Examples:

- the buffering capacity of saliva
- stability and the critical pH at which enamel, hydroxyapatite, fluoroapatite dissolves
- forms of salivary calcium phosphates (di-, tri-, octa-, and decacalcium phosphates) and their conversion as a function of oral pH and the implications for enamel dissolution and calculus formation
- supersaturation of saliva with respect to calcium phosphate salts
- salivary crystal growth inhibition by salivary proteins: statherin and acidic proline-rich proteins
- formation of calculus as a result of calcium phosphate precipitation
- composition of enamel and occlusal wear
- enamel erosion due to gastroesophageal reflux disease (GERD), bulimia, and patient behaviors such as the habitual consumption of soft drinks or citrus juices
- the relationship between abrasion, the physical characteristics of a toothbrush, and a patient's brushing technique
- the relationship between the physical properties of food containing gritty particles and dental abrasion or attrition.
- the relationship between the physical force used during bruxism/parafunctional habits and dental attrition
- enamel destruction and tooth fracture due to the physical forces associated with tongue jewelry (tongue piercing) of various kinds

2.4 External forces resulting in hard and soft tissue trauma; tissue milieu factors that play a role in inflammation, erosion, overgrowth, or necrosis.

Relevant Disciplines: Physics, Anatomy

Examples:

- cranial architecture and bone strength as they relate to outcomes of blunt force impact from a particular direction
- contralateral subcondylar fracture as a potential outcome of blunt force induced fracture of the mandibular body
- probability and severity of tooth damage (e.g., pulp damage, fractured enamel, fractured dentin) as a function of the type and direction of physical impact.

2.5 Ergonomic issues resulting in loss of productivity, musculoskeletal disorders, illnesses, injuries, or decreased work satisfaction (contingent on the intensity, frequency and duration of exposure).

Relevant Disciplines: Physics, Anatomy, Physiology, Behavioral Sciences, Psychology

Examples:

- Musculoskeletal Disorders (MSDs)
 - Signs and symptoms
 - Back, neck, and muscle issues

- Hand and wrist issues
- Risk factors
- Awkward posture
- Forceful exertions
- Repetitive motions
- Repetitive strain disorders
 - Signs and symptoms (caused by forceful or prolonged exertions of the hands and prolonged awkward postures)
 - Carpel Tunnel Syndrome
 - Cubital Tunnel Syndrome
 - Thoracic Outlet Syndrome
- Preventive measures
 - Exercise
 - Chairside stretching
 - Operator positioning
 - Dental delivery systems and equipment selection
 - Rear, side, or over the patient delivery systems
 - Lighting and magnifications
 - Instruments (automatic and hand)
 - Gloves
 - Patient positioning
 - Appointment scheduling
- Professional help
- Psychosocial factors

Foundation Knowledge Area Three (FK3)

Physics and Chemistry to Explain the Characteristics and Use of Technologies and Materials

Foundation Knowledge Area 3 (FK3) focuses on application of knowledge of physics and chemistry to explain the characteristics and use of technologies and materials used in the prevention, diagnosis, and management of oral disease and to promote oral health.

Examples of Relevant Disciplines: Basic Radiology, Dental Material Sciences, Biomaterials, Biophysics, etc.

Examples of Relevant Clinical Science Areas: Prosthodontics, Restorative Dentistry, Oral Diagnostics, Applied Biomaterials, Preventive Dentistry, Laser-Assisted Dentistry, Applied Pharmacology, Radiology, Implant Dentistry, Endodontics, Esthetic Dentistry, Cosmetic Dentistry, Radiation Oncology, Oral Oncology, etc.

3.1 Principles of radiation, radiobiologic concepts, and the uses of radiation in the diagnosis and treatment of oral and systemic conditions

Relevant Disciplines: Basic and Oral Radiology, etc.

Examples:

- types of radiation and their impact on biologic systems
- safeguards against radiation exposure
- radiographic techniques for optimal diagnosis

3.2 Dental material properties, biocompatibility, and performance, and the interaction among these in working with oral structures in health and disease.

Relevant Disciplines: Dental Material Sciences, Biomaterials, Biophysics, Chemistry, Ethics, etc.

Examples:

- advantages and disadvantages of biomaterials used in dentistry
- compatibility of dental materials both with each other and with biologic systems
- dental materials and considerations involving substantivity or adhesion of chemicals, drugs, dental plaque, food, etc., to tissues in the mouth
- clinical decision making that incorporates consideration of the physical and chemical characteristics of various biomaterials and devices
- appropriately pairing of the physical and chemical qualities of biomaterials and devices with specific clinical situations
- discriminating between appropriate and inappropriate applications of materials and devices. (For example, the impact of aspirin acidity on oral mucosa or the

use of a complex, time-consuming or expensive treatment when simpler, quicker, and cheaper forms of effective treatment are available.)

3.3 Principles of laser usage; the interaction of laser energy with biological tissues; uses of lasers to diagnose and manage oral conditions

Relevant Disciplines: Biophysics, Laser-Assisted Dentistry, etc.

Examples:

- benefits and limitations of laser devices for detecting dental caries
- practical use of lasers for surgical procedures involving soft and hard tissues
- safety considerations for the use of lasers

Foundation Knowledge Area Four (FK4)

Principles of Genetic, Congenital, and Developmental Diseases and Conditions and their Clinical Features to Understand Patient Risk

Foundation Knowledge Area 4 (FK4) focuses on the principles of genetic, congenital, and developmental diseases and conditions and their clinical features to understand patient risk in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Genetics, Developmental Biology, Embryology, Craniofacial Biology, etc.

Examples of Relevant Clinical Science areas: Oral Medicine, Oral Pathology, Orthodontics, Pediatric Dentistry, Oral Diagnostics, Oral and Maxillofacial Surgery, Facial Prosthesis, Periodontology, Pediatric Dentistry, Radiology, Cariology, etc.

4.1 Genetic transmission of inherited diseases and their clinical features to inform diagnosis and the management of oral health.

Relevant Disciplines: Genetics, Hereditary Medicine, Developmental Biology, Teratology, etc.

Examples:

- Ectodermal dysplasia, Amelogenesis imperfecta, Hereditary hemorrhagic telangiectasia, neurofibromatosis, dentinogenesis imperfecta, osteogenesis imperfecta, basal cell nevus syndrome, various bleeding disorders, osteoporosis, and other hereditary conditions

4.2 Congenital (non-inherited) diseases and developmental conditions and their clinical features to inform the provision of oral health care.

Relevant Disciplines: Genetics, Developmental Biology, Teratology, etc.

Examples:

- Sturge-Weber syndrome and other non-hereditary conditions
- anterior overjet and thumbsucking

Foundation Knowledge Area Five (FK5)

Cellular and Molecular Bases of Immune and Non-Immune Host Defense Mechanisms

Foundation Knowledge Area 5 (FK5) focuses on the application of knowledge of the cellular and molecular bases of immune and non-immune host defense mechanisms in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Immunology, Immunopathology, Microbiology, Virology, etc.

Examples of Relevant Clinical Science areas: Oral Pathology, Periodontology, Preventive Dentistry, Pediatric Dentistry, Diagnosis and Treatment Planning, History and Physical Examination, Cariology, Implant Dentistry, Emergency Care, Oral Radiology, Endodontics, Oral and Maxillofacial Surgery, Clinical Laboratory Sciences, etc.

5.1 Function and dysfunction of the immune system, of the mechanisms for distinction between self and non-self (tolerance and immune surveillance) to the maintenance of health and autoimmunity.

Relevant Disciplines: Immunology, Immunopathology, Immunobiology, Microbiology, Virology, etc.

Examples:

- the role of the immune system in the pathogenesis of periodontal disease
- the effect of immunization in the prevention of infectious diseases

5.2 Differentiation of hematopoietic stem cells into distinct cell types and their subclasses in the immune system and its role for a coordinated host defense against pathogens (e.g., HIV, hepatitis viruses)

Relevant Disciplines: Immunopathology, Immunology, Hematology, etc.

Examples:

- synthesis and secretion of salivary antibodies and their use for diagnostic purposes.

5.3 Mechanisms that defend against intracellular or extracellular microbes and the development of immunological prevention or treatment strategies.

Relevant Disciplines: Immunopathology, Immunobiology, Immunology, Microbiology, Virology, Mycology, Parasitology, etc.

Examples:

- the induction of antibody response to prevent influenza or hepatitis
- the development and successful use of vaccines against polio and measles
- the potential for use of vaccines for caries

Foundation Knowledge Area Six (FK6)

General and Disease-Specific Pathology to Assess Patient Risk

Foundation Knowledge Area 6 (FK6) focuses on the application of knowledge of general and disease-specific pathology to assess patient risk in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Cellular and Molecular Pathology, General and Systems Pathology, etc.

Examples of Relevant Clinical Science areas: Periodontology, Oral Pathology, Oral Medicine, Oral Oncology, Oral Cancer, Oral Diagnostics, Diagnosis and Treatment Planning, History and Physical Examination, Endodontics, Emergency Care, Oral Radiology, Oral and Maxillofacial Surgery, Clinical Laboratory Sciences, Prosthodontics, Craniofacial Prosthodontics, Applied Biomaterials, etc.

6.1 Cellular responses to injury; the underlying etiology, biochemical, and molecular alterations; and the natural history of disease; in order to assess therapeutic intervention.

Relevant Disciplines: Cellular and Molecular Pathology, General Pathology, etc.

Examples:

- formation and removal of free radicals from cells and conditions under which tissue injury occurs due to lack of perfusion
- susceptibility of different cell types (cardiomyocytes, neurons) to the effects of anoxic injury caused by vascular compromise

6.2 Vascular and leukocyte responses of inflammation and their cellular and soluble mediators to understand the prevention, causation, treatment and resolution of tissue injury.

Relevant Disciplines: Cellular and Molecular Pathology, General Pathology, Pharmacology, Immunopathology, etc.

Examples:

- the role that arachidonic acid-derived mediators play in various steps of acute inflammation and how the inflammatory process can be moderated by use of specific inhibitors of these mediators (COX inhibitors, aspirin)
- benefits of neutralizing various immune mediators (e.g., anti-TNF in rheumatoid arthritis) in the context of specific diseases
- benefits of regulated functions of the inflammatory response (e.g., the elimination of infectious agents)

6.3 Interplay of platelets, vascular endothelium, leukocytes, and coagulation factors in

maintaining fluidity of blood, formation of thrombi, and causation of atherosclerosis as it relates to the management of oral health.

Relevant Disciplines: Cellular and Molecular Pathology, General Pathology, etc.

Examples:

- implications of the administration of local anesthesia with epinephrine to a severely atherosclerotic patient
- evaluation of patients for oral surgical procedures

6.4 Impact of systemic conditions on the treatment of dental patients.

Relevant Disciplines: Systemic Pathology, Internal Medicine, Medically Complex Patient, etc.

Examples:

- joint replacement
- osteoporosis
- bacterial endocarditis
- diabetes
- AIDS

6.5 Mechanisms, clinical features, and dental implications of the most commonly encountered metabolic systemic diseases.

Relevant Disciplines: Systemic Pathology, Internal Medicine, Medically Complex Patients, etc.

Examples:

- Diabetes
- Hyper- and hypothyroidism

Foundation Knowledge Area Seven (FK7)

Biology of Microorganisms in Physiology and Pathology

Foundation Knowledge Area 7 (FK7) focuses on the application of knowledge of the biology of microorganisms in physiology and pathology in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Microbiology, Virology, Parasitology, Mycology, Oral Epidemiology, Oral Public Health, Statistics, etc.

Examples of Relevant Clinical Science areas: Cariology, Periodontology, Oral Pathology, Oral Malodor, Oral Medicine, Oral Diagnostics, Diagnosis and Treatment Planning, History and Physical Examination, Endodontics, Emergency Care, Oral Radiology, Oral and Maxillofacial Surgery, Applied Pharmacology, Applied Epidemiology, Preventive Dentistry, Community Dentistry, etc.

7.1 Principles of host–pathogen and pathogen–population interactions and knowledge of pathogen structure, transmission, natural history, and pathogenesis to the prevention, diagnosis, and treatment of infectious disease.

Relevant Disciplines: Microbiology, Virology, Parasitology, Mycology, Pharmacology, Oral Biology, Pulp Biology, etc.

Examples:

- mechanisms by which bacteria increase their drug resistance susceptibility
- use of antiviral drugs in the treatment of herpes simplex infection
- emergence of antibiotic-resistant bacteria
- components the oral microflora
- components of and formation of dental plaque
- the role of specific bacterial groups in the production of periodontal disease
- the role of bacteria in production of dental caries, pulpal and periapical pathology

7.2 Principles of epidemiology to achieving and maintaining the oral health of communities and individuals.

Relevant Disciplines: Epidemiology, Public Health, Preventive Medicine, Preventive Dentistry, etc.

Examples:

- evaluate potential effectiveness of fluoride, varnishes, brushing, flossing, mouthwashes to prevent caries, periodontal disease and oral malodor
- evaluate patterns of health and disease to better manage community oral health
- apply the principles of universal precautions in preventing the transmission of

infectious diseases

7.3 Principles of symbiosis (commensalisms, mutualism, and parasitism) to the maintenance of oral health and prevention of disease.

Relevant Disciplines: Parasitology, Microbiology, Pharmacology, Immunopathology, etc.

Examples:

- the protective effect of normal oral flora and its perturbation after antibiotic treatment or immunosuppressive therapy

Foundation Knowledge Area Eight (FK8)

Pharmacology

Foundation Knowledge Area 8 (FK8) focuses on the application of knowledge of pharmacology in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Basic and Applied Pharmacology, Biomedical Research, Evidence-Based Dentistry, Public Health Policy, etc.

Examples of Relevant Clinical Science areas: Clinical Pharmacology, Cariology, Periodontology, Endodontics, Oral and Maxillofacial Surgery, Pediatric Dentistry, Preventive Dentistry, Applied Epidemiology, Community Dentistry, etc.

8.1 Pathologic processes and basic principles of pharmacokinetics and pharmacodynamics for major classes of drugs and over-the-counter (OTC) products to guide safe and effective treatment.

Relevant Disciplines: Basic and Applied Pharmacology, Cancer Biology, etc.

Examples:

- explain modes of action of the major classes of antimicrobial drugs
- apply therapeutic strategies to help minimize or prevent drug resistance
- understand the use of multiple drugs with different mechanisms of action for cancer chemotherapy

8.2 Optimal drug therapy for oral conditions based on an understanding of pertinent research, relevant dental literature, and regulatory processes.

Relevant Disciplines: Clinical and Applied Pharmacology, Public Health Policy, Evidence-Based Dentistry, Biomedical Research, etc.

Examples:

- explain the limitations of the claims for therapeutic efficacy and safety as reported by oral product/pharmaceutical manufacturers
- understand the process by which drugs become approved and withdrawn in the United States

Foundation Knowledge Area Nine (FK9)

Behavioral Sciences, Ethics, and Jurisprudence

Foundation Knowledge Area 9 (FK9) focuses on the application of knowledge of sociology, psychology, ethics, and other behavioral sciences in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Sociology, Psychology, Philosophy and Ethics, Cultural Competence, Ergonomics, Applied Nutrition, Communication Skills, Emotional Intelligence, and other Behavioral Sciences, etc.

Examples of Relevant Clinical Science areas: all major clinical disciplines where patient interaction is anticipated including Speech Therapy and Clinical Nutrition, Nicotine Replacement Therapy, and Practice Management including Access to Care and Patient Education and Compliance.

9.1 Principles of sociology, psychology, and ethics in making decisions regarding the management of oral health care for culturally diverse populations of patients.

Relevant Disciplines: Sociology, Psychology, Ethics, Cultural Competence, Emotional Intelligence, Communication Skills, Community Health, Public Health, etc.

Examples:

- understand patient responses to treatment recommendations based on beliefs associated with cultural or ethnic background
- assess community-based interventions for prevention of oral disease

9.2 Principles of sociology, psychology and ethics in making decisions and communicating effectively in the management of oral health care for the child, adult, geriatric, or special needs patient.

Relevant Disciplines: Sociology, Psychology, Ethics, Communication Skills, Child Psychology, Geriatric Medicine, Patients with Special Needs, Applied Nutrition, Speech Therapy, etc.

Examples:

- use of behavior modification techniques in treatment of young children
- use of appropriate methods for tobacco cessation education
- use of appropriate methods for dietary counseling

9.3 Principles of sociology, psychology, and ethics in managing fear and anxiety, and acute and chronic pain in the delivery of oral health care.

Relevant Disciplines: Sociology, Psychology, Ethics, Applied Pharmacology, Psychotherapy, etc.

Examples:

- management of pain and anxiety in patients with a history of substance abuse
- understand the implications of transference and projection in the doctor-patient relationship

9.4 Principles of sociology, psychology, and ethics in understanding and influencing health behavior in individuals and communities.

Relevant Disciplines: Sociology, Psychology, Ethics, Public Health, Community Health, Medical and Dental Informatics, etc.

Examples:

- develop effective strategies for achieving water fluoridation in a community
- understand reasons for avoidance of professional dental care

9.5 Principles of psychology, ethics, and related principles of practice management in making decisions regarding delivery of care and choice of instrumentation, materials, and treatment.

Relevant Disciplines: Psychology, Ethics, Evidence-Based Dentistry, Critical Thinking, Communication Skills, etc.).

Examples:

- the choice of forceps to extract a tooth, selection of an elevator or periodontal instrument, selection of a restorative material, crown, implant, or partial dental prosthesis. These choices are based on pure or applied knowledge, ethics and psychology.
- the choice of a device or instrument when appropriate and its misuse for profit. For instance, the purchase of a sophisticated instrument and its overuse - even when not indicated - simply to profit.
- the ethical dilemma and moral obligation following the injury of soft tissue during treatment due to an accident or the misuse of an instrument.

Foundation Knowledge Area Ten (FK10)

Research Methodology and Analysis, and Informatics Tools

Foundation Knowledge Area 10 (FK10) focuses on the application of research methodology and analysis, and informatics tools in the prevention, diagnosis, and management of oral disease and the promotion and maintenance of oral health.

Examples of Relevant Disciplines: Statistics, Public Health Dentistry, Descriptive and Analytical Epidemiology, Dental and Health Informatics, Evidence-Based Dentistry, Applied Research, etc.

Examples of Relevant Clinical Science areas: All major disciplines associated with practicing dentistry including Practice Management.

10.1 Basic mathematical tools and concepts, including functions, graphs and modeling, measurement and scale, and quantitative knowledge, in order to understand the specialized functions of membranes, cells, tissues, organs, and the human organism, especially those related to the head and neck, in both health and disease.

Relevant Disciplines: Basic Algebra, Basic Mathematics, Analytical and Descriptive Epidemiology, Statistics, Critical Evaluation of the Scientific Literature, Evidence-Based Dentistry, etc.

Examples:

- interpret and apply graphical representations of drug levels as a function of dosage and pharmacokinetics
- explain the impact of diet, salivation, and swallowing on salivary pH
- analyze skeletal growth and development patterns in children

10.2 Principles and logic of epidemiology and the analysis of statistical data in the evaluation of oral disease risk, etiology, and prognosis.

Relevant Disciplines: Evidence-Based Dentistry, Epidemiology, Statistics, Preventive Dentistry, Health Promotion, Public Health Dentistry, Community Dentistry, etc.

Examples include:

- understand the relative risk and attributable risk as useful guides to clinical and public oral health decision making with regard to caries, periodontal disease and oral cancer prevention
- understand the ability of a diagnostic test to discriminate between high and low risk of disease given the prevalence of the disease

10.3 Principles of information systems, their use and limitations, and their application to information retrieval and clinical problem solving.

Relevant Disciplines: Dental Informatics, Health Informatics, Descriptive and Analytical Epidemiology, Evidence-Based Dentistry, Library Sciences, etc.

Examples:

- understand and be able to access search capability of bibliographic databases (Cochrane Data Base, PubMed, and others), using at least two Boolean connectors, on a clinical topic
- utilize an electronic health record system to manage oral health care
- understand and apply the levels of evidence in the scientific literature
- understand how to formulate a PICO (Patient, Intervention, Comparison, Outcome) question for a problem in oral health

10.4 Biomedical and health informatics, including data quality, analysis, and visualization; and its application to diagnosis, therapeutics, and characterization of populations and subpopulations.

Relevant Disciplines: Dental Informatics, Evidence-Based Dentistry and Medicine, Health Informatics, etc.

Examples:

- the role of informatics in health care quality
- the role of informatics in health policy

10.5 Elements of the scientific process, such as inference, critical analysis of research design, and appreciation of the difference between association and causation, to interpret the findings, applications, and limitations of observational and experimental research in clinical decision-making using original research articles as well as review articles.

Relevant Databases: Evidence-Based Dentistry, Applied Research, etc.

Examples:

- the value of evidence from observational versus experimental studies in determining the efficacy of therapeutic interventions

Content Domain Comparison

Comparison of scientific areas covered by individual *Foundation Knowledge* (FK1-FK10) and those currently covered on either Part I or Part II of NBDE

Excerpts from a presentation by Dr. Andrew Spielman
to the Joint Commission's
Committee on Research and Development
delivered on
February 22, 2013

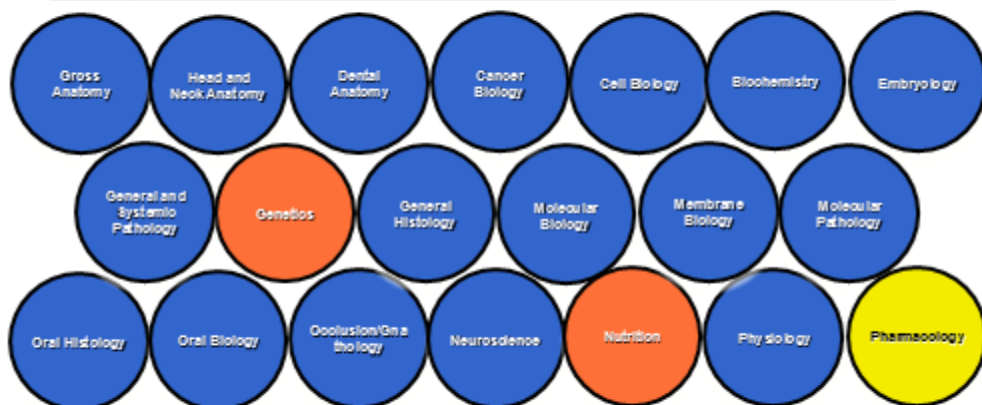
Content Domain Comparison

- The following slides represent science areas covered by Foundation Knowledge Areas 1 through 10.
- Note, that a science area potentially covered by the Foundation Knowledge **does not** mean it will end up with a substantial number of questions on the new exam. The size of the circle of a specific scientific field is **not** proportional to their relative representation on the exam.
- This is a qualitative analysis where all fields are considered equal.



Basic and Foundation Sciences covered in part by Foundation Knowledge 1 (FK1)

FK1 Molecular, biochemical, cellular, and systems-level development, structure and function

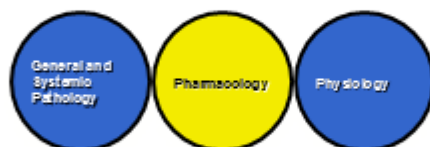


Color Coding



Basic and Foundation Sciences covered in part by Foundation Knowledge 2 (FK2)

FK2 Physics and chemistry to explain normal biology and pathobiology



Color Coding



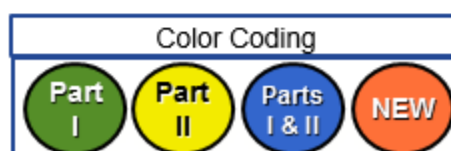
Basic and Foundation Sciences covered in part by Foundation Knowledge 3 (FK3)

FK3	Physics and chemistry to explain the characteristics and use of technologies and materials
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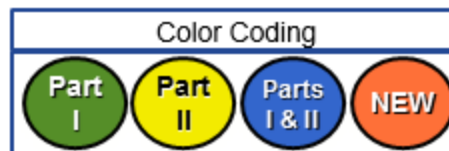
Basic and Foundation Sciences covered in part by Foundation Knowledge 4 (FK4)

FK4	Principles of genetic, congenital and developmental diseases and conditions and their clinical features to understand patient risk
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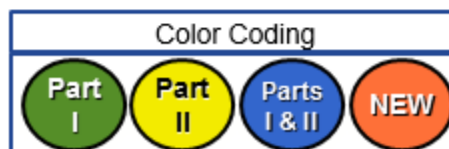
Basic and Foundation Sciences covered in part by Foundation Knowledge 5 (FK5)

FK5	Cellular and molecular bases of immune and non-immune host defense mechanisms
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Basic and Foundation Sciences covered in part by Foundation Knowledge 6 (FK6)

FK6	General and disease-specific pathology to assess patient risk
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Basic and Foundation Sciences covered in part by Foundation Knowledge 7 (FK7)

FK7 Biology of microorganisms in physiology and pathology



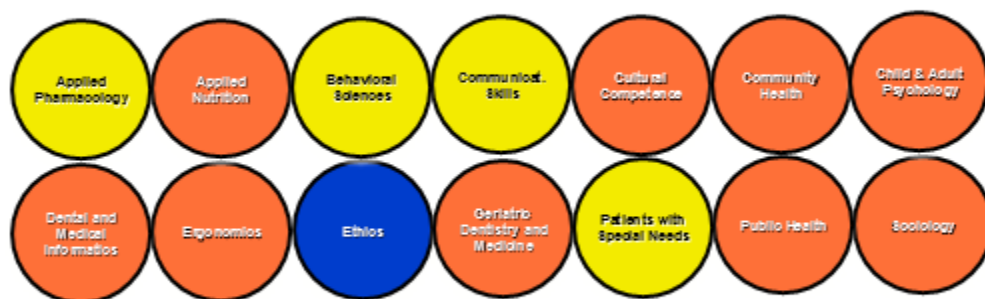
Basic and Foundation Sciences covered in part by Foundation Knowledge 8 (FK8)

FK8 Pharmacology



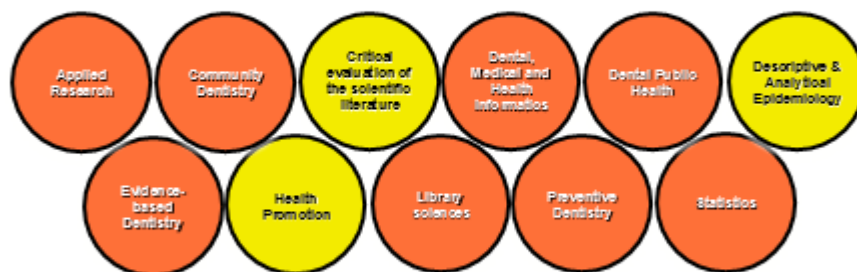
Basic and Foundation Sciences covered in part by Foundation Knowledge 9 (FK9)

FK9 Behavioral sciences, ethics, and jurisprudence



Basic and Foundation Sciences covered in part by Foundation Knowledge 10 (FK10)

FK10 Research methodology and analysis, and informatics tools



Appendix C: INBDE Fairness Review Checklist

The following provides a checklist that can be used to help develop fair examination items.

A. Avoid Cognitive Construct-Irrelevant Variance:

1. Does the item assume knowledge in subject areas not relevant to the focal construct?

For example: Post-collegiate-level vocabulary in a quantitative reasoning item
 Geometric formula in a biology item
 Geographic knowledge in a reading passage
 Chemical compounds in an anatomy item

2. Does the item contain language, concepts, or objects familiar only to test takers from a certain geographical region, ethnic group, or religious affiliation?

For example: political jurisdictions: borough, province, county, parish
 food: bouillabaisse, potage, gumbo, goulash
 weather: snowflakes, pack ice, riptide, sports:
 hockey, jet ski, grand slam, triple play

3. Does the item contain specialized, vocational, or professional language or terminology not relevant to the focal construct? Note: if the focal construct involves use of this language, it would be appropriate to include it.

For example: Farming: combine, thresher
 Finance: arbitrage, hedge fund
 Medicine: prophylaxis, amyloidosis
 Dentistry: bruxism, debridement
 Optometry: astigmatism, emmetropia

4. Does the item employ literary devices?

For example: Humor
 Irony or satire
 Double entendre

If so, these should be present only to test understanding of such devices and when it is important for valid measurement (as in some literature tests).

B. Avoid Affective Construct-Irrelevant Variance:

1. Does the item contain subject matter (images or language) that might evoke strong emotions?

For example: Accidents, illnesses, or natural disasters
 Death and dying
 Advocacy of religious or political agenda
 Children in peril
 Cruelty to animals

2. Does the item reference potentially offensive, controversial, or sensitive topics?

For example: Particular holidays or activities surrounding holidays
 Tobacco, drug, or alcohol use
 Music, dancing, social dating

3. Does the item describe or refer to individuals using any of the following attributes?

For example: Age, Disability, Ethnicity, Gender, National or regional origin,
 Native language, Race, Religion, Sexual orientation
 Socioeconomic status

If so, and the description or reference is necessary, use correct, specific terminology.

For example: Use White or Black people, instead of “Whites” or “Blacks”
 Use the phrase “sexual orientation” rather than “sexual preference.”

4. Does the item state or imply the superiority of one group over another?

For example: Culturally-deprived group: implies that the majority culture is superior and
 that any differences from it constitute deprivation.

5. Does the item depict social situations unfamiliar to any groups?

For example: Experiencing luxuries
 Frivolous spending
 International travel

6. Does the item/test depict stereotypes (either positive or negative) or repeated representations of certain societal roles (either positive and negative)?

For example: Phrases such as women’s work, or man-sized job
 Repeated depictions of men or women in certain occupations
 Assumed characteristics of certain categories of individuals: Boys like to
 play with trucks, Asian people are smart, Native American people are in
 tune with nature

C. Avoid Physical Construct-Irrelevant Variance

1. Does the item contain content or utilize stimulus material (images, graphs, etc.) that may not be easily interpreted by all groups?

For example:

- Small print in labeling of a graph
- Small print of superscripted mathematical symbols
- Blurred radiograph
- Colored lines in a graph

INBDE Model Items

Patient

Female, 10 years old

Chief Complaint

"My daughter is here for her regular check up."

Background and/or Patient History**Current Findings**

Which permanent tooth is least likely to spontaneously erupt?



- A. 2
- B. 5
- C. 6
- D. 29

Key: C
CC07, CC08, CC14
FK4
Field Test A

Patient
Male, 60 years old
Chief Complaint
"My gums are bleeding for no apparent cause."
Background and/or Patient History
Prosthetic heart valve Medications: lithium (Lithobid®) metformin (Glucophage®) atorvastatin (Lipitor®) warfarin (Coumadin®)
Current Findings
Vital signs stable No acute distress Spontaneous gingival bleeding INR: 5

Which mechanism of action most likely explains the current complaint?

- A. Vitamin K inhibition
- B. Direct thrombin inhibition
- C. Antithrombin III activation
- D. Platelet aggregation inhibition

Key: A
CC09, CC20
FK8, FK1
Field Test A

Patient
Male, 32 years old
Chief Complaint
"My gums hurt over my front tooth."
Background and/or Patient History
Recurrent gingival lesion - outbreaks last 7-10 days
Current Findings
Vesicular lesion between teeth 9 and 10

Which is the best treatment for the labial buccal mucosal lesions?



- A. Dexamethasone elixir
- B. Nystatin suspension
- C. Tetracycline oral rinse
- D. Valacyclovir (Valtrex®) tablets

Key: D
CC19
FK8
Field Test A

Patient
Male, 48 years old
Chief Complaint
"I've been in pain for two days and now my face is swollen,"
Background and/or Patient History
<p>Hypertension Type 2 diabetes Penicillin allergy</p>
Current Findings
<p>Facial edema Lymphadenopathy Extensive apical radiolucency associated with tooth 6 Temp: 100.3 BP: 150/93 Blood glucose: 240 mg/dL</p>

Where is the infection most likely located?

- A. Buccal vestibule
- B. Canine space
- C. Nasal cavity
- D. Pterygomaxillary space

Key: B
CC01, CC20, CC31
FK1, FK2, FK5, FK7
Field Test A

Patient
Male, 48 years old
Chief Complaint
<p>"I've been in pain for two days and now my face is swollen,"</p> <p>Five days after starting the antibiotic, the patient called and said, "I have bad watery diarrhea, a high temp, and stomach cramps."</p>
Background and/or Patient History
<p>Hypertension</p> <p>Type 2 diabetes</p> <p>Penicillin allergy</p>
Current Findings
<p>Facial edema</p> <p>Lymphadenopathy</p> <p>Extensive apical radiolucency associated with tooth 6</p> <p>Temp: 100.3</p> <p>BP: 150/93</p> <p>Blood glucose: 240 mg/dL</p>

The most appropriate next step would be to:

(Progressive paired with Model Item 5)

- A. discontinue current antibiotic and refer to physician.
- B. discontinue current antibiotic and substitute with azithromycin (Z-Pak®).
- C. recommend loperamide (Imodium®).
- D. recommend probiotics.

Key: A
CC19, CC20
FK8
Field Test A

Patient
Male, 5 years old
Chief Complaint
Background and/or Patient History
<p>First dental examination two weeks ago</p> <p>Cooperation assessment: good</p> <p>Restorable caries on one or more primary molars in every quadrant</p>
Current Findings

After demonstration during the first restorative appointment, the next management technique would be:

- A. distraction.
- B. explanation.
- C. rationalization.
- D. sedation.

Key: A
CC14
FK9
Field Test A

Patient
Female, 12 years old
Chief Complaint
"My mouth hurts."
Background and/or Patient History
Four first premolars extracted 24 hours ago.
Current Findings
No swelling

Post-treatment discomfort is best managed with:

- A. acetaminophen (Tylenol®).
- B. codeine.
- C. ibuprofen (Advil®).
- D. tramadol (Ultram®).

Key: C
CC21, CC33, CC38
FK1, FK8
Field Test A

Patient
Male, 65 years old
Chief Complaint
"My tooth has turned dark grey."
Background and/or Patient History
Prosthetic heart valve Medications: warfarin (Coumadin®)
Current Findings
Necrotic tooth 24 Not responding to cold No swelling present INR: 3

Before extracting tooth 24, which one of the following is the best option?

- A. No antibiotic administration is required.
- B. Amoxicillin 2 grams should be taken 30 minutes to 60 minutes before procedure.
- C. Warfarin (Coumadin®) should be discontinued the morning before procedure.
- D. Clarithromycin (Biaxin®) 500 milligrams should be taken 30 minutes to 60 minutes before procedure.

Key: B
CC01
FK3
Field Test A

Patient
Male, 35 years old
Chief Complaint
"I've had a metallic taste in my mouth for the past few days."
Background and/or Patient History
<p>Good oral hygiene Several implants Several restorations recently completed:</p> <ul style="list-style-type: none"> • Gold crown on tooth 2 • MOD amalgam on tooth 3 • Zirconia crown on tooth 4 • PFM bridge on teeth 29 to 31 • Good overall health
Current Findings

What is most likely causing the chief complaint?

- A. Gold interfacing with amalgam
- B. PFM bridge
- C. Titanium implants
- D. Zirconia interfacing with amalgam

Key: A
CC01, CC46
FK3, FK10
Field Test A

Patient
Male, 9 years old
Chief Complaint
Parent: "My son was hit in the face with a baseball and he's bleeding and missing teeth!"
Background and/or Patient History
Type 1 diabetes
Current Findings

Which is most important to ask the parent first?

- A. "Did the child lose consciousness?"
- B. "Do you have the teeth?"
- C. "When did the child last eat?"
- D. "When did the injury occur?"

Key: A
CC19, CC31, CC38
FK2, FK 5, FK7
Field Test A

Patient
Male, 14 years old
Chief Complaint
"I can't seem to get rid of the sores at the corners of my mouth."
Background and/or Patient History
Painful lesion - recurrent, never go away entirely
Current Findings

The most appropriate treatment is:



- A. acyclovir (Zovirax®) cream.
- B. amantadine (Symmetrel®).
- C. amlexanox (Aphthasol®).
- D. nystatin and triamcinolone (Mycolog®-II) cream.

Key: D
CC09, CC19
FK8
Field Test A

Patient
Male, 65 years old
Chief Complaint
"My mouth has been dry for over a month."
Background and/or Patient History
Previous endocarditis Medications: warfarin (Coumadin®)
Current Findings
Tooth 24 is missing incisal 1/3, INR: 3

Before performing a crown lengthening surgery, which one of the following is the best option?

- A. No antibiotic administration is required.
- B. Amoxicillin 2 grams should be taken 30 minutes to 60 minutes before procedure.
- C. Warfarin (Coumadin®) should be discontinued the morning before procedure.
- D. Clarithromycin (Biaxin®) 500 milligrams should be taken 30 minutes to 60 minutes before procedure.

Key: B
CC19
FK8
Field Test A

Patient

Female, 75 years old

Chief Complaint

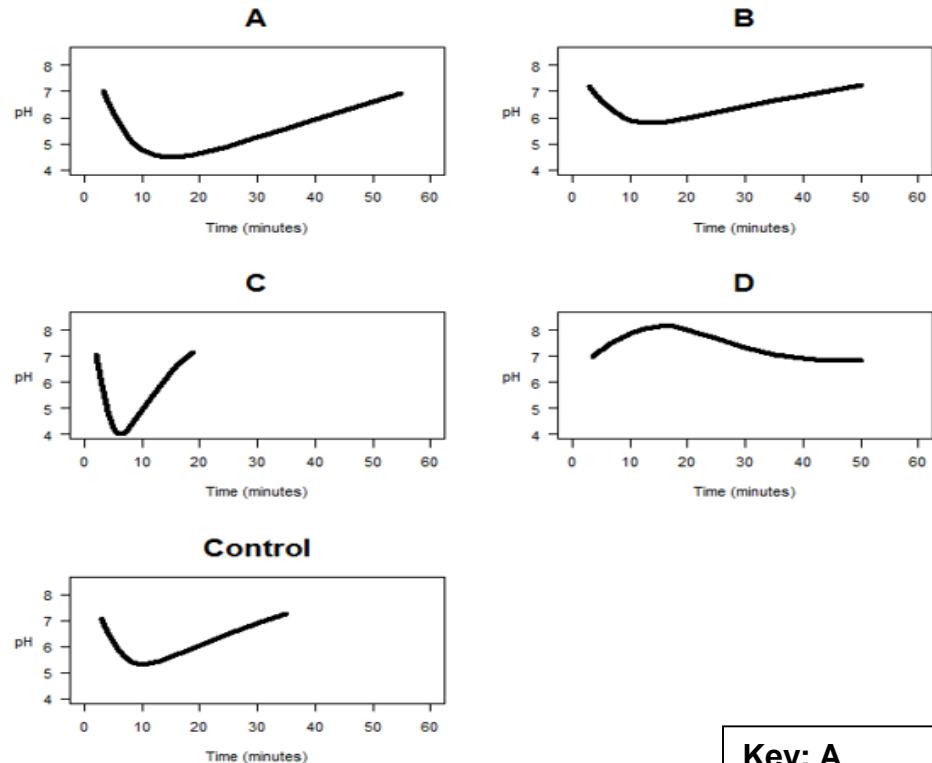
"My gums hurt over my front tooth."

Background and/or Patient History

Oropharyngeal cancer treated by radiation.

Current Findings

Which graph best shows the likely plaque pH response after drinking a sugary beverage?



Key: A
CC24
FK1
Presented to ADEA

Patient
Male, 60 years old
Chief Complaint
"My gums bleed easily."
Background and/or Patient History
Paroxysmal supraventricular tachycardia Pulmonary embolism Type 2 diabetes Hypertension Hyperlipidemia Medications: metformin (Glucophage®) atorvastatin (Lipitor®) warfarin (Coumadin®) aspirin 81 mg daily
Current Findings
BP: 145/90 Diffuse gingival bleeding

Which mechanism of action most likely explains the chief complaint?

- A. Antithrombin III inactivation
- B. Coagulation activation
- C. Thrombin inhibition
- D. Vitamin K antagonism

Key: D
CC020
FK8

Patient
Male, 60 years old
Chief Complaint
"My gums bleed easily."
Background and/or Patient History
Paroxysmal supraventricular tachycardia Pulmonary embolism Type 2 diabetes Hypertension Hyperlipidemia Medications: metformin (Glucophage®) atorvastatin (Lipitor®) warfarin (Coumadin®) aspirin 81 mg daily
Current Findings
BP: 145/90 Diffuse gingival bleeding

Which test would provide a definitive diagnosis of the complaint?

- A. Bleeding time
- B. International normalization ratio
- C. Partial thromboplastin time
- D. Platelet count
- E. Serum vitamin K

Key: B
CC01, CC20
FK1

Patient
Male, 48 years old
Chief Complaint
"I've been in pain for two days and now my face is swollen."
Background and/or Patient History
Hypertension Type 2 diabetes Penicillin allergy
Current Findings
Facial edema Lymphadenopathy Extensive apical radiolucency associated with tooth 6 Temp: 100.3 F BP: 150/93 Blood glucose 240 mg/dL

The most appropriate antimicrobial agent is:

- A. amoxicillin and clavulanate (Augmentin®).
- B. cephalexin (Keflex®).
- C. clindamycin (Cleocin®).
- D. metronidazole (Flagyl®).

Key: C
CC19, CC31, CC38
FK1, FK2, FK5, FK7

Patient
Male, 9 years old
Chief Complaint
Parent: "My son was hit in the face with a baseball and he's bleeding and missing teeth!"
Background and/or Patient History
Type 1 diabetes
Current Findings

Which screening radiograph would be most helpful in diagnosing a mandibular fracture?

- A. Bitewing
- B. Lateral cephalogram
- C. Panoramic
- D. Periapical

Key: C
CC08, CC38
FK1, FK2

Patient
Male, 9 years old
Chief Complaint
Parent: "My son was hit in the face with a baseball and he's bleeding and missing teeth!"
Background and/or Patient History
Type 1 diabetes
Current Findings

Reimplantation is desired. What is the best way to protect permanent teeth after avulsion?

- A. Place back into the sockets
- B. Place under the tongue
- C. Put in a cup of milk
- D. Wrap in a wet napkin

Key: A
CC36, CC38
FK1, FK5, FK6

Patient
Male, 9 years old
Chief Complaint
Parent: "My son was hit in the face with a baseball and he's bleeding and missing teeth!"
Background and/or Patient History
Type 1 diabetes
Current Findings

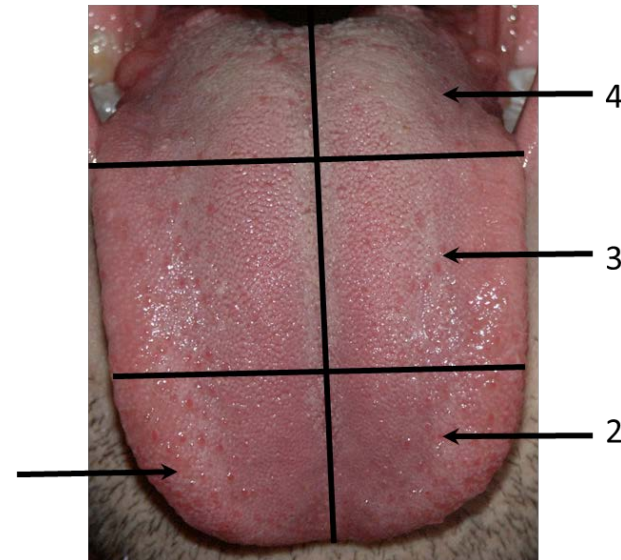
The fractured fragment of tooth 7 has not been found. What is the first step?

- A. Administer appropriate pulp therapy
- B. Ask the parent if there was a pre-existing fracture
- C. Evaluate pulpal status
- D. Radiographic image of lower lip

Key: B
 CC01, CC03, CC06,
 CC08, CC31, CC32,
 CC38
 FK1, FK2

Patient
Male, 38 years old
Chief Complaint
"I haven't been able to taste on the left side of my tongue for the past three days."
Background and/or Patient History
Left inferior alveolar nerve block during a prior dental treatment
Current Findings

Where would a loss of taste be expected?



- A. 1 and 2
- B. 2 and 3
- C. 3 and 4
- D. 2, 3, and 4

Key: B
CC21
FK1, FK2

Patient
Male, 75 years old
Chief Complaint
"I'm here to have my filling done
Background and/or Patient History
Atrial fibrillation Medications: dabigatran (Pradaxa®) metoprolol (Toprol®)
Current Findings

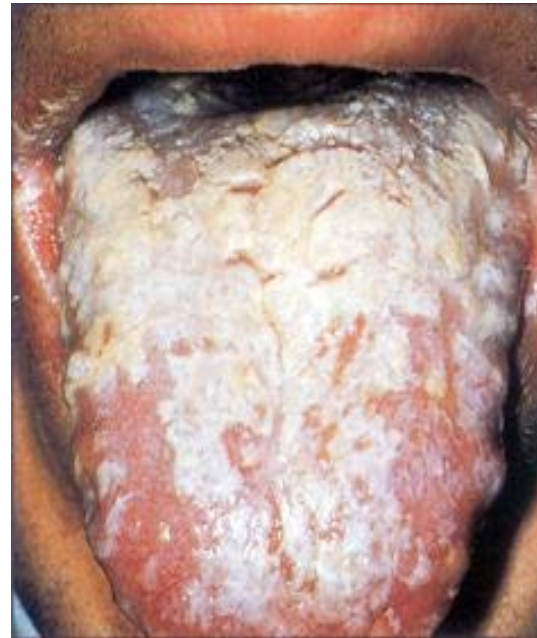
The procedure results in a carious exposure of the pulp. The patient chooses to have the tooth extracted. What is the next step at this appointment?

- A. Discontinue dabigatran (Pradaxa®) the morning of the appointment.
- B. Obtain an INR the morning of the procedure.
- C. Proceed without treatment modification.
- D. Use 2% lidocaine (Xylocaine®) with 1:50,000 epinephrine.

Key: C
CC20
FK6, FK8

Patient
Male, 37years old
Chief Complaint
"I have white stuff on my tongue."
Background and/or Patient History
Recurrent low grade fever, fatigue, periodically feels cold and a little ill
Current Findings
White coating can be wiped off

What is the etiology of this condition?



- A. Bacterial infection
- B. Fungal infection
- C. Viral infection
- D. Vitamin B12 deficiency

Key: B
CC42
FK7

A drug has a half-life of 4 hours. Upon discontinuing the drug:

- A. 87% will be eliminated in 8 hours.
- B. 90% will be eliminated in 24 hours.
- C. 94% will be eliminated in 12 hours.
- D. 94% will be eliminated in 16 hours.

Key: C
CC20
FK6, FK8

Patient
Male, 65 years old
Chief Complaint
"A year ago I lost the filling in my back tooth."
Background and/or Patient History
<p>Smokes tobacco – 40 pack years</p> <p>Dental phobia</p> <p>Medications:</p> <p>hydrochlorothiazide (Microzide®)</p> <p>rosuvastatin (Crestor®)</p> <p>aspirin 81 mg</p>
Current Findings
<p>BP: 170/100</p> <p>Height: 6' 1"</p> <p>Weight: 325 lbs</p>

Physician referral is most urgent for the treatment of:

- A. anxiety.
- B. hypertension.
- C. obesity.
- D. smoking.

Key: B
CC01, CC10
FK6, FK8

When making decisions about patient treatment, which type of study provides the strongest evidence?

- A. Case control
- B. Cohort
- C. Double-blind randomized
- D. Evidence summary
- E. Systematic review

Key: E
CC??
FK10

Patient
Male, 60 years old
Chief Complaint
"My gums are bleeding with no apparent cause."
Background and/or Patient History
Type 2 diabetes Medications: lithium (Lithobid®) metformin (Glucophage®) atorvastatin (Lipitor®) dabigatran (Pradaxa®)
Current Findings
Vital signs stable No acute distress Spontaneous gingival bleeding Blood glucose: 90 mg/dL

Which mechanism of action most likely explains the current complaint?

- A. Vitamin K inhibition
- B. Direct thrombin inhibition
- C. Antithrombin III activation
- D. Platelet aggregation

Key: B
CC??
FK?

Which anatomical structure is indicated by the arrow?



- A. Tooth 1
- B. Tooth 2
- C. Tooth 16
- D. Tooth 17

Key: D
CC??
FK?

Patient

Male, 12 years old

Chief Complaint

"My teeth are crooked."

Background and/or Patient History**Current Findings**

Which permanent tooth is most likely to erupt next?



- A. Tooth marked by a
- B. Tooth marked by b
- C. Tooth marked by c
- D. Tooth marked by d

Key: D
CC??
FK?

Patient
Male, 45 years old
Chief Complaint
"My teeth look bad and are loose. I also have a sore throat and don't feel good."
Background and/or Patient History
Smoker (cigarettes), 12 pack-year history Factory worker
Current Findings
Temp: 101 F Malaise for 4-5 days Bilateral tender anterior cervical lymph nodes Bilateral enlargement of tonsils

The bilateral radiopacity inferior to the mandible is the:

- A. calcified carotid artery.
- B. clavicle.
- C. hyoid bone.
- D. laryngeal skeleton.

Key: C
CC07
FK?

Patient
Male, 57 years old
Chief Complaint
"I need a check up"
Background and/or Patient History
Current Findings
Non-cavitated demineralized lesion on the occlusal surface of tooth 13

The most appropriate management is:

- A. amalgam restoration.
- B. monitor lesion at subsequent visits.
- C. resin restoration.
- D. sealant.

Key: D
CC12
FK?

Patient
Female, 61 years old
Chief Complaint
"I didn't want to miss my appointment but I don't feel good. I have a fever, cough, and I can't catch my breath."
Background and/or Patient History
Diagnosed with H3N2 strain influenza Osteoarthritis Dysplastic nevus syndrome Fractured right ankle repaired with bone plates and screws, 1 year ago Melanoma removed from left shoulder, 3 years ago Medications: acetaminophen (Tylenol®) meloxicam (Mobic®) tramadol (Ultram®)
Current Findings
Temp: 101.4 F

Which statement is correct regarding the prior skin tumor?

- A. The depth of invasion is not important in establishing prognosis.
- B. It is formed by malignant Langerhans cells.
- C. It is often associated with chronic actinic damage.
- D. It often has well demarcated borders.

Key: C
CC13
FK?

A patient has a maximum opening of 25mm. Each of the following could be a contribution. Which is the EXCEPTION?

- A. Condylar ankylosis
- B. Fatigue of the masseter muscle
- C. Hypertrophy of the coronoid process
- D. Pericoronitis

Key: B
CC05
FK?

Patient
Male, 45 years old
Chief Complaint
"My teeth look bad and are loose. I also have a sore throat and don't feel good."
Background and/or Patient History
Smoker (cigarettes), 12 pack-year history Factory worker
Current Findings
Temp: 101 F Malaise for 4-5 days Bilateral tender anterior cervical lymph nodes Bilateral enlargement of tonsils

The dentist refers the patient to his physician for the complaint of a sore throat. The patient is given a prescription for amoxicillin (Amoxil®), which is taken by the patient for the next three days. The patient returns two weeks later with complaints of pain in multiple joints and an epidermal rash on his trunk area. What is the most likely cause of these new signs and symptoms?

- A. An allergy to amoxicillin (Amoxil®)
- B. Bacterial endocarditis
- C. Erythema multiforme
- D. Rheumatic fever

Key: D
CC02
FK?

Patient
Male, 53 years old
Chief Complaint
"I don't like the way I look. I want dentures."
Background and/or Patient History
Cardiac bypass surgery, 3 years ago Right hip replacement, 5 years ago Prostate adenocarcinoma, 3 years ago Anxiety and Depression GERD Post-cancer osteoporosis Medications: alprazolam (Xanax®) bupropion (Wellbutrin®) clopidogrel (Plavix®) omeprazole (Prilosec®) simvastatin (Zocor®) zoledronic acid (Zometa®) Has not seen a dentist in 25 years Smoker (cigarettes), 30 pack-year history
Current Findings
Decayed and missing front teeth with periodontitis Sensitivity to cold in upper posterior left quadrant Xerostomia

Definitive management of the lesion would include:

- A. an antifungal agent.
- B. exfoliative cytology.
- C. incisional biopsy.
- D. tobacco cessation treatment.

Key: C
CC04
FK?

Patient
Male, 45 years old
Chief Complaint
"My teeth look bad and are loose. I also have a sore throat and don't feel good."
Background and/or Patient History
Smoker (cigarettes), 12 pack-year history Factory worker
Current Findings
Temp: 101 F Malaise for 4-5 days Bilateral tender anterior cervical lymph nodes Bilateral enlargement of tonsils

Which is the most likely cause of the oropharyngeal signs and symptoms?

- A. Hand, foot, and mouth viral infection
- B. Mononucleosis
- C. Streptococcal pharyngitis
- D. Varicella zoster infection

Key: C
CC05
FK?

A patient expresses the desire to quit smoking after a 40 pack-year history. Each of the following would be an appropriate action EXCEPT one. Which is the EXCEPTION?

- A. Prescribe a nicotine (NicoDerm-CQ®) patch
- B. Recommend hypnosis
- C. Recommend nicotine (Nicorette®) chewing gum
- D. Recommend use of a smokeless tobacco

Key: D
CC13
FK?

Patient
Male, 48 years old
Chief Complaint
"My jaw hurts when I chew, and I cannot open wide."
Background and/or Patient History
No history of medical problems or medications Previous dental history: routine prophylaxis only Recently assumed an executive position in a large company
Current Findings
Maximum opening is 20mm Sensitivity to palpation of masseter, temporalis, and pterygoid muscles

The initial treatment should include each of the following EXCEPT one. Which is the EXCEPTION?

- A. Bite plane splint therapy
- B. Diet modification
- C. Minor occlusal adjustment
- D. Muscle relaxant prescription

Key: C
CC05
FK?

Patient
Female, 59 years old
Chief Complaint
"I have many missing teeth and several more are loose. My mouth is also dry."
Background and/or Patient History
Hypertension Medications: aspirin 81 mg hydrochlorothiazide/triamterene (Dyazide®) Works in the shoe section of a department store
Current Findings
Height: 5' 9" Weight: 140 lbs BP: 123/78 New patient presents for an initial examination Missing many teeth Several remaining teeth exhibit class 1-2 mobility Wants to save as many teeth as possible Willing to consider upper and lower partial dentures Intraoral examination reveals profound mucosal dryness Manipulation of major salivary gland ducts fails to produce saliva

The bilateral radiopacities are:

- A. amalgam tattoos.
- B. artifacts.
- C. remnants from iatrogenic dentistry.
- D. rigid fixation from trauma.

Key: B
CC07
FK?

Patient
Male, 45 years old
Chief Complaint
"My teeth look bad and are loose. I also have a sore throat and don't feel good."
Background and/or Patient History
Smoker (cigarettes), 12 pack-year history Factory worker
Current Findings
Temp: 101 F Malaise for 4-5 days Bilateral tender anterior cervical lymph nodes Bilateral enlargement of tonsils

Which mechanism results in the soft tissue condition identified in the intraoral exam?

- A. Activation of cellular autophagy to decrease apoptosis
- B. Binding of proinflammatory-related receptors on myeloid cells
- C. Increased production of the osteoblastogenesis-related factors
- D. Upregulation of receptor antagonists against enzyme activity by *Porphyromonas gingivalis*

Key: B
CC20
FK?

What is the greatest threat to pulp vitality during preparation of a tooth?

- A. Bacteria
- B. Desiccation
- C. Heat
- D. Pressure

Key: C
CC19
FK?

Which base or liner may interfere with the polymerization of a resin composite restoration?

- A. Calcium hydroxide
- B. Copolymer
- C. Glass ionomer
- D. Zinc oxide eugenol

Key: D
CC28
FK?

Each of the following is true of taurodontism EXCEPT one.
Which is the EXCEPTION?

- A. Larger pulp chamber due to occlusally displaced furcation
- B. Occurs in patients with amelogenesis imperfecta and Down syndrome
- C. Permanent and primary teeth may be affected
- D. Unusual root shape due to late invagination of Hertwig's root sheath

Key: A
CC32
FK?

Patient
Male, 45 years old
Chief Complaint
"My teeth look bad and are loose. I also have a sore throat and don't feel good."
Background and/or Patient History
Smoker (cigarettes), 12 pack-year history Factory worker
Current Findings
Temp: 101 F Malaise for 4-5 days Bilateral tender anterior cervical lymph nodes Bilateral enlargement of tonsils

Periodontal findings in the mandibular anterior region demonstrate a correlation between:

- A. erythema and smoking history.
- B. original margin position and post-therapy gingival margin position.
- C. probing depths and radiographic findings.
- D. soft tissue contours and local factors.

Key: D
CC20
FK?

Patient
Male, 16 years old, accompanied by parent
Chief Complaint
"I am here for my cleaning."
Background and/or Patient History
Medications: albuterol (Proventil®)
Current Findings
White plaque covering the areas of the posterior hard and soft palatal mucosa

The best diagnosis is:

- A. candidosis.
- B. herpangina.
- C. mononucleosis.
- D. streptococcal pharyngitis.

Key: A
CC37
FK?

Patient

Female, 59 years old

Chief Complaint

"I have many missing teeth and several more are loose. My mouth is also dry."

Background and/or Patient History

Hypertension

Medications:

aspirin 81 mg

hydrochlorothiazide/triamterene

(Dyazide®)

Works in the shoe section of a department store

Current Findings

Height: 5' 9"

Weight: 140 lbs

BP: 123/78

New patient presents for an initial examination

Missing many teeth

Several remaining teeth exhibit class 1-2 mobility

Wants to save as many teeth as possible

Willing to consider upper and lower partial dentures

Intraoral examination reveals profound mucosal dryness

Manipulation of major salivary gland ducts fails to produce saliva

Management of the most common opportunistic infection in this case includes which drug?

- A. Carbamazepine (Tegretol®).
- B. Cephalexin (Keflex®).
- C. Clonazepam (Klonopin®).
- D. Clotrimazole (Mycelex®).

Key: D
CC24
FK?

Patient

Female, 25 years old

Chief Complaint

"My upper left back tooth has been sensitive to hot, cold and chewing. I woke up in pain last night."

Background and/or Patient History

Has not seen a dentist for five years
Expresses a strong desire to maintain her teeth

Current Findings

Apical radiolucency tooth 15, no swelling

What is the most appropriate emergency treatment?

- A. Antibiotics and NSAIDs
- B. Occlusal adjustment and NSAIDs
- C. Pulpectomy and antibiotics
- D. Pulpectomy and NSAIDs

Key: D
CC17
FK?

Patient

Male, 75 years old

Chief Complaint

"I have a painful burning sensation on my tongue and on the roof of my mouth."

Background and/or Patient History

Hepatitis C, diagnosed 20 years ago
 Insomnia
 GERD
 Incontinence
 Gout
 Surgery for benign prostatic hyperplasia, 2 years ago
 Replacement of left proximal thumb joint due to osteoarthritis, 1.5 years ago
 Medications:
 allopurinol (Zyloprim®)
 esomeprazole (Nexium®)
 solifenacin (Vesicare®)
 trazodone (Desyre®)
 Allergies: penicillin - urticaria
 Smoker (cigarettes), 40 pack-year history
 Farmer for 55 years

Current Findings

Height: 6' 2"
 Weight: 190 lbs
 BP: 135/68
 Burning sensation involved his dorsal tongue and palate for the past 5 years
 Symptoms are worse late in the day
 Past treatment with nystatin has not resulted in relief
 Dorsal glossal and palatal mucosae reveals no clinical abnormality

The patient's physician prescribed cephalexin (Keflex®) 2 gm, to be taken prior to the dental treatment. The patient presents to the dental office with a rash and itching on the chest, neck, and arms. Each of the following is an appropriate next step EXCEPT one. Which is the EXCEPTION?

- A. Administer diphenhydramine (Benadryl®) and monitor the patient
- B. Contact the patient's physician to discuss options for treating the patient
- C. Recommend clindamycin (Cleocin®) if an antibiotic is needed for future dental treatment
- D. Decrease the dose of cephalexin (Keflex®) to 1 gm prior to dental treatment

Key: D
CC15
FK?

Patient
Female, 45 years old
Chief Complaint
"I want to get my teeth checked."
Background and/or Patient History
New patient Self-proclaimed dental phobia History of infrequent dental care Suffered traumatic dental treatment experience as a child
Current Findings
Oral and radiographic examination reveal multiple caries

What should be the first action for the dentist to take after the initial oral diagnosis and treatment plan discussion?

- A. Encourage the patient to discuss previous traumatic dental experiences.
- B. Refer the patient for behavioral therapy prior to initiating dental treatment.
- C. Schedule the patient for restorative procedures in one appointment.
- D. Schedule the patient for restorative procedures under conscious sedation.

Key: A
CC17
FK?

Patient
Male, 1 year old, accompanied by mother
Chief Complaint
Mother: "My son fell and a baby tooth came out."
Background and/or Patient History
Has never seen a dentist before, but family members are patients of record
Current Findings
Tooth E has avulsed and is in a cup of milk

Which action should be performed by the dentist?

- A. Curette the socket and suture the site.
- B. Inspect the socket and reassure the mother and infant.
- C. Reimplant the tooth and splint to adjacent teeth.
- D. Reimplant the tooth but do not splint.

Key: B
CC37
FK?

Patient
Female, 30 years old
Chief Complaint
"I want my teeth fixed before getting pregnant."
Background and/or Patient History
Duodenal ulcer Medications: antacids oral contraceptives Extractions prior to orthodontic treatment 10 years since last dental visit
Current Findings
Missing and carious teeth Gingival swelling and erythema around tooth 17 Bilateral tenderness in muscles of mastication

There are four posterior teeth present in the mandibular left quadrant. One tooth has five cusps, two teeth have four cusps, and another tooth has three cusps. Which tooth is missing?

- A. 18
- B. 19
- C. 20
- D. 21

Key: D
CC26
FK?

Patient

Male, 75 years old

Chief Complaint

"I have a painful burning sensation on my tongue and on the roof of my mouth."

Background and/or Patient History

Hepatitis C, diagnosed 20 years ago
 Insomnia
 GERD
 Incontinence
 Gout
 Surgery for benign prostatic hyperplasia, 2 years ago
 Replacement of left proximal thumb joint due to osteoarthritis, 1.5 years ago
 Medications:
 allopurinol (Zyloprim®)
 esomeprazole (Nexium®)
 solifenacin (Vesicare®)
 trazodone (Desyrel®)
 Allergies: penicillin - urticaria
 Smoker (cigarettes), 40 pack-year history
 Farmer for 55 years

Current Findings

Height: 6' 2"
 Weight: 190 lbs
 BP: 135/68
 Burning sensation involved his dorsal tongue and palate for the past 5 years
 Symptoms are worse late in the day
 Past treatment with nystatin has not resulted in relief
 Dorsal glossal and palatal mucosae reveals no clinical abnormality

The patient asks about replacement of his missing teeth. What is the most appropriate response?

- A. "It will help stabilize your bite."
- B. "Replacement isn't essential."
- C. "Replacing those teeth will improve esthetics."
- D. "Your medical condition precludes replacement."

Key: B
CC38
FK?

Patient

Male, 5 years old, accompanied by parents

Chief Complaint

Parents: "We are here for our son's initial exam."

Background and/or Patient History

Duchenne muscular dystrophy, an X-linked recessive disorder, diagnosed 3 years ago
 Difficulty swallowing
 Lives in area with fluoridated water
 Parents assist with brushing teeth, twice daily

Current Findings

Occlusal caries noted on tooth T
 Gingival swelling distal to tooth T

If the patient's father is unaffected and the mother is a carrier, what is the expected incidence of siblings NOT being phenotypically affected?

- A. 12.5%
- B. 25%
- C. 50%
- D. 75%
- E. 100%

Key: D
CC04
FK?

What poses the most prevalent risk of pathogen transmission in the dental office?

- A. Aerosals
- B. Dental instruments
- C. Environmental surfaces
- D. Hands

Key: D
CC51
FK?

OSHA's bloodborne pathogen standard requires healthcare employers to do each of the following EXCEPT one. Which is the EXCEPTION?

- A. Establish an exposure control plan.
- B. Implement the use of standard precautions.
- C. Make hepatitis C vaccinations available.
- D. Provide personal protective equipment.

Key: C
CC44
FK?

Patient
Male, 53 years old
Chief Complaint
"I don't like the way I look. I want dentures."
Background and/or Patient History
Cardiac bypass surgery, 3 years ago Right hip replacement, 5 years ago Prostate adenocarcinoma, 3 years ago Anxiety and Depression GERD Post-cancer osteoporosis Medications: alprazolam (Xanax®) bupropion (Wellbutrin®) clopidogrel (Plavix®) omeprazole (Prilosec®) simvastatin (Zocor®) zoledronic acid (Zometa®) Has not seen a dentist in 25 years Smoker (cigarettes), 30 pack-year history
Current Findings
Decayed and missing front teeth with periodontitis Sensitivity to cold in upper posterior left quadrant Xerostomia

Each of the following would be included in the treatment plan discussion EXCEPT one. Which is the EXCEPTION?

- A. "Do you understand that you might have to go without teeth for a while?"
- B. "The denture will allow you to chew much better than your natural teeth."
- C. "What do you expect your denture to do for you?"
- D. "You will need to return for regular follow-ups after the first phase of treatment."

Key: B
CC38
FK?

The most accurate predictor of financial stability during retirement is the:

- A. ability to time the market gains and losses.
- B. duration of time one has to invest.
- C. formation of a defined benefit pension plan.
- D. mix of stocks and bonds in one's portfolio.

Key: B
CC4
FK?

Patient
Female, 59 years old
Chief Complaint
"I have many missing teeth and several more are loose. My mouth is also dry."
Background and/or Patient History
Hypertension Medications: aspirin 81 mg hydrochlorothiazide/triamterene (Dyazide®) Works in the shoe section of a department store
Current Findings
Height: 5' 9" Weight: 140 lbs BP: 123/78 New patient presents for an initial examination Missing many teeth Several remaining teeth exhibit class 1-2 mobility Wants to save as many teeth as possible Willing to consider upper and lower partial dentures Intraoral examination reveals profound mucosal dryness Manipulation of major salivary gland ducts fails to produce saliva

Each of the following is an appropriate patient management measure EXCEPT one. Which is the EXCEPTION?

- A. Antibiotic premedication prior to surgical procedures
- B. Respect for patient's autonomy
- C. Referral to a dental specialist
- D. Use of local anesthetic with epinephrine

Key: A
CC45
FK?



Appendix E: Department of Testing Services (DTS) Contributor Agreement Form

CONTRIBUTOR AGREEMENT FORM DEPARTMENT OF TESTING SERVICES

The Department of Testing Services is a shared service of the American Dental Association that implements high-stakes admissions and licensure examination programs. The table below lists the governing bodies the Department serves, and the examination programs that are overseen by each governing body.

Joint Commission on National Dental Examinations (JCND E)	ADA Council on Dental Education and Licensure (CDEL)
<ul style="list-style-type: none"> National Board Dental Examination (NBDE) Part I and Part II^a Integrated National Board Dental Examination (INBDE)^a National Board Dental Hygiene Examination (NBDHE)^a 	<ul style="list-style-type: none"> Dental Admission Test (DAT)^b Advanced Dental Admission Test (ADAT)^b
ADA Board of Trustees, Dental Licensure Objective Structured Clinical Examination (DLOSCE) Steering Committee	Association of Schools and Colleges of Optometry (ASCO)
<ul style="list-style-type: none"> Dental Licensure Objective Structured Clinical Examination (DLOSCE)^a 	<ul style="list-style-type: none"> Optometry Admission Test (OAT)^b

^aLicensure (dental or dental hygiene); ^bAdmissions (dental or optometry)

In working with the Department of Testing Services, you may be asked to contribute to one or more of the examination programs listed above, based on your qualifications, experience, and the requirements of the corresponding governing bodies. Contributions can be made in a variety of ways. Key activities and roles include – but are not limited to – Member of the Joint Commission, Test Constructor, Steering Committee Member, Consultant, and *ad hoc* Committee Member.

High stakes examination programs require the presence of high levels of security to help ensure examinations continue to operate as intended. This agreement form describes requirements related to confidentiality, intellectual property, and conflicts of interest. Individuals must abide by all of the terms indicated in working with the Department of Testing Services. Certain terms and agreements (e.g., confidentiality) extend beyond the time in which the individual is an active contributor working with DTS. The information contained in this form has important implications for the security and integrity of the examination programs the Department of Testing Services implements. Please read the following pages carefully. Questions about this form can be forwarded to Alexis Curtis, Manager of Volunteers and Meetings, Department of Testing Services, curtisa@ada.org.



CONFIDENTIALITY AGREEMENT

I am aware that, in my work with the American Dental Association's (ADA's) Department of Testing Services (DTS), I will have access to information that must remain confidential. I understand this requirement and agree to maintain the confidentiality of any materials, recommendations and discussions before, during and after any meetings or activities in which I serve. I further understand that I may be removed from my role in working with the ADA and/or DTS if I fail to keep confidential any exclusive information protected by secrecy that becomes known to me by reason of the performance of my duties.

Volunteer Initials _____

COPYRIGHT AGREEMENT

I am aware that, in working with the American Dental Association's (ADA's) Department of Testing Services (DTS), I may have access to, work with, or develop copyrighted or copyrightable materials. I acknowledge and agree, individually and collectively, that all such materials belong solely to the ADA and that the ADA holds any and all rights to obtain and retain ownership of copyrights for such materials in its own name. I acknowledge and agree that any and all contributions I make to such materials will be original works, not copies in whole or in part of works of third parties. I acknowledge and agree that the ADA is the sole owner of such materials, and that I have no ownership rights whatsoever in such materials, the ADA has all rights to obtain copyrights for such materials, and such materials constitute "work made for hire" under copyright laws. I assign any and all ownership rights I may have to the ADA, and I agree that I will execute any additional documents necessary to effect this assignment to the ADA upon request.

Volunteer Initials _____



CONFLICT OF INTEREST STATEMENT

When indicating conflicts of interest, please consider each of the examination programs implemented by the Department of Testing Services (DTS). You may be asked to contribute to more than one examination program.

I declare that I have no proprietary, financial or other personal interest of any nature or kind in any product, service and/or company that will be considered during my term as a volunteer, except the following:

Volunteer Initials _____

I declare that I have no proprietary, financial or other personal or professional interest or obligation of any nature or kind in any firm or organization beneficially associated with any product and/or service that will be considered during my term as a volunteer, except the following:

Volunteer Initials _____



I declare that I have no past or present financial interest, consulting position or other involvement of any nature or kind related to any of the examination programs the Department of Testing Services implements that could give rise to even a suspicion of a conflict of interest, except the following:

Volunteer Initials _____

I am aware that, in working with the American Dental Association's (ADA's) Department of Testing Services (DTS), I may be asked to contribute to one or more of the examination programs implemented by DTS. I am willing to serve as a volunteer for all of the examination programs, except for the program(s) indicated below.

Programs to which I do NOT wish to contribute: _____

Volunteer Initials _____

I understand and agree that as a condition of working with the Department of Testing Services (DTS), I will exercise particular care that no detriment to DTS and/or the governing bodies DTS serves will result from conflicts between my interests and those of any of the examination programs DTS implements.

Volunteer Initials _____



I understand that I must refrain from conflicts of interest in the areas indicated above, throughout my entire tenure in working with the Department of Testing Services (DTS), and will inform DTS immediately if a change occurs relative to these conflicts of interest.

Volunteer Initials _____

In signing below, I agree to abide by all terms and agreements set forth in this agreement.

Signature

Date

Name (Print Legibly)