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1. Introduction

Basic medical science (BMS) is a cornerstone of the contemporary dental curriculum. It underpins all aspects of clinical practice and equips new graduates for 40 or more years of lifelong learning and practice. Many aspects of contemporary BMS are at the evolving front of scientific understanding and rapidly changing, whilst others are more stable and form a foundation of core knowledge. Yet, both are important to new dental graduates in preparing them for safe, patient-centred practice, and equipping them to deal with change.

This complex and continually changing environment has led to some differences in the content of BMS coverage between schools. There is consensus over the need for coverage in core areas such as the surgical anatomy of local anaesthesia, oral histology or tooth morphology. But, keeping pace with the emerging and increasingly important topics made relevant by the rate of scientific advance has been more difficult. Staffing constraints and curriculum overload have meant that schools often lack the time and expertise necessary to cover the new disciplines of cell and molecular biology or genetics, or have devolved this teaching to paired Medical or Science faculties (Best *et al*, 2016). Often this means that content is poorly matched to the needs of the dental programme, inadequately contextualised and its relevance unclear to the students.

To assist curriculum planners, a Special Interest Group was convened by the Association for Dental Education in Europe (ADEE) to discuss and put together an inventory of topics that might reasonably be expected to be included in a dental BMS curriculum. This will parallel curricula put together by stakeholder groups in Genetics (Johnson *et al*, 2008), Cariology (Anderson *et al*, 2011; Schulte *et al*, 2011), Pharmacology (British Pharmacological Society, 2004), Radiology (British Society for Oral and Maxillofacial Radiology, 2008), Oral Pathology (Odell *et al*, 2004; Darling and Daley, 2006), Clinical Medical Sciences for dental students (Mighell *et al*, 2011) and Oral Surgery (Macluskey *et al*, 2008) and others. It has been informed by established curricular guidelines such as those published by ADEE (Cowpe *et al*, 2010), the UK General Dental Council (GDC, 2015), or documentation prepared to guide medical curriculum planning, for example the ‘...core syllabus in anatomy for medical students..’ (McHanwell *et al*, 2007).

Bodies in both Europe and North America, involved with the development of Dental curricula, have recognised that the explosion of knowledge has made it practically impossible to cover all topics (Feld, 1995; Manogue *et al*, 2010), and that traditional, lecture based models of education, which may have been effective in the past, are becoming fragmented, convoluted and do not meet the requirements of contemporary clinical practice (Henzi *et al*, 2007). Several educational models have emerged to address this. These have involved case based, problem based or hybrid approaches (Fincham and Shuler, 2001; McHarg and Kay, 2008) which have sought to move away from a strictly didactic approach, towards pedagogic models which foster the development of self-directed learning, problem solving and critical

appraisal skills. Coupled to this, there has been a move towards greater integration, both horizontally between topic areas, and vertically across successive years of a programme (Plasschaert *et al*, 2006). The traditional division into basic science coverage in the early years of the programme progressing to clinical training in the senior years in a '2+3' model is no longer universally applicable, and programmes are increasingly characterised by clinical involvement in the early years of the programme and continuance of basic science coverage into the senior years (Manogue and Brown, 2007). This is vertical integration desirable as it facilitates application, contextualisation and reinforcement of core knowledge alongside a broadening clinical experience (Mattick and Knight, 2007).

Any curriculum in BMS must allow for the variety of pedagogic approaches used in dental schools throughout Europe. Indeed, groups such as ADEE regard some degree of diversity in approaches to dental education as desirable (Manogue *et al*, 2011). So, this document is not prescriptive and does not seek to define the order in which subjects should be taught, when or how they should be grouped together. Instead it provides a framework, which represents a consensus view of what BMS content might reasonably be covered in an undergraduate dental curriculum, presented by topics. This allows sufficient flexibility to individual institutes to decide how it might best be incorporated into their own situation.

ADEE has recommended that dental programmes should be based around a core curriculum defining fundamental competencies, complemented by a catalogue of elective courses which give an opportunity to broaden the student experience to suit individual interests (Manogue *et al*, 2011). BMS related to Dentistry fits this model. Some topics are 'core' issues and an essential component of all dental programmes (e.g. the surgical anatomy of inferior-alveolar nerve anaesthesia). But, in other areas, knowledge is desirable, but the scope of coverage may better lend itself to elective courses. For example, a basic course in genetics should be mandatory with subsequent elective opportunities to allow interested individuals to explore advanced aspects. Furthermore, schools may have different strengths and a portfolio of electives may allow flexibility for students to benefit from particular areas of expertise within their own institutions.

Learning in BMS will be based on a presumption of achievement of a satisfactory standard in chemistry, physics, biology and mathematics as pre-requisite for entry to a dental programme. The BMS component of a dental undergraduate/first professional programme must provide the student with a foundation of knowledge and understanding of how the molecular, cellular and anatomical structure of the tissues of the body relate to their physiological function. It must emphasise how pathological processes reflect abnormalities in structure and function, and that understanding the pathogenesis of disease, oral or systemic, is integrated with a sound appreciation of normal anatomy and physiology.

Whilst, of necessity, focus will be placed on issues directly relating to the delivery of oral healthcare, BMS coverage should not be restricted to oral function. Students must have sufficient understanding of physiological and pathological processes occurring elsewhere in the body necessary to underpin broader aspects of patient care, and the role of oral healthcare as part of wider patient management.

Furthermore, students must be equipped to communicate, and participate as part of a team with other healthcare professionals in managing complex conditions.

In addition to anatomy, physiology, pathology and the biomolecular sciences, any consideration of BMS applied to dentistry must include ...

- 1) a study of the causative agents of key disease process i.e. bacteria, viruses, fungi and prions and the principles underpinning infection control
- 2) an appreciation of the scientific principles which underpin the pharmacological management of oral diseases
- 3) an understanding of the principles of and application of biomaterial science
- 4) consideration of the biological effects of ionising radiation on both the oral tissues and the body as a whole

Whilst sections have been devoted to these areas, coverage is not complete as it is envisaged that these will spiral into a more contextualised consideration of specific issues as part of a clinical curriculum.

The BMS component of the dental curriculum is important in introducing students to the principles of scientific logic and reasoning, and to critical appraisal of the broader scientific literature. Furthermore, teaching informed by contemporary scientific research helps to motivate and develop students, fosters a '*deep approach to learning*', and helps to develop transferrable skills¹. Therefore, an approach to coverage of basic medical science in the dental curriculum informed by contemporary scientific advance is highly desirable.

In construction of this BMS curriculum for professional programmes in Dentistry, input has been sought from across Europe and to include the views of students from several jurisdictions. Curricula may vary widely in pedagogic approach, and this is desirable. However, greater emphasis needs to be placed on integration of the elements of the biological and clinical sciences in order to provide a co-ordinated appreciation of structure-function-disease relationships. Inclusion of the biomedical sciences as part of a fully integrated, contextualised, clinically relevant curriculum must remain a primary goal of the 21st century dental programme.

¹ Higher Education Funding Council for England, Fundamental Review of Research Policy and Funding: Final Report of the sub-group to consider the interaction between teaching, research and other activities of HEIs, 2000. Research Forum, '*The Relationships Between Research and Teaching in Institutions of Higher Education*'. June 2004.

2. The Structure of the Human Body²

2a: General Principles of Anatomy

- I. General principles of anatomical description; standard anatomical position, anatomical terminology.
- II. A general overview of the axial and appendicular skeleton, joints and sutures
- III. An overview of the anatomy of the...
 - thorax and abdomen
 - heart and cardiovascular system
 - liver
 - renal system
 - gastrointestinal tract
 - gall bladder and biliary system
- IV. An overview anatomy of the lymphatic system.
- V. A knowledge of the anatomy of the autonomic nervous system – the parasympathetic and sympathetic supply to the head and neck and their functions
- VI. An appreciation of the anatomy of the orbit and associated peri-orbital structures
- VII. An appreciation of the neuroanatomy appropriate to an understanding of general physiology and oral biology, the principles of clinical diagnosis and the understanding of human disease processes
- VIII. The anatomy of venous access (for administration of IV drugs etc.)

2b: Head and Neck Anatomy

An understanding of...

- I. the osteology of the skull, mandible, palate and facial skeleton
- II. the intra- and extra-cranial course of the cranial nerves; examination and recognition of their normal and abnormal function and its application to wider understanding of disease processes
- III. the surgical anatomy of the Vth and VIIIth nerves as it relates to dental procedures
- IV. the regional anatomy of the teeth, jaws, tongue and perioral soft tissues (to include the muscles of facial expression) together with their functional significance
- V. the anatomy and function of the temporomandibular joint (TMJ) and muscles of mastication (including Posselt's envelope of movement)
- VI. the anatomy of the salivary glands (cross reference: salivary function)
- VII. the structure and function of the paranasal air sinuses, pharynx and upper airway to include the velopharyngeal apparatus

² In order to facilitate an integrated, systems based approach, anatomy should, where possible, be taught using an integrated approach in combination with physiology, pathology and its application to diagnosis and the management of human disease states.

- VIII. A knowledge of the surgical anatomy of the head and neck as it relates to:-
- Clinical diagnosis
 - The spread of serious infections from the teeth and other tissues
 - Lymphoid tissue and lymph drainage
 - Common oral surgical procedures
 - Local anaesthesia
 - The management of medical emergencies
- IX. the arterial blood supply to and venous drainage from the head and neck to include an overview understanding of the intra-cranial blood supply
- X. the functional anatomy of the larynx.
- XI. an understanding of the surgical anatomy of the thyroid and parathyroid glands and related structures

2c: Core Embryology (to integrate with Section 4f - Reproduction, Growth and Development):

- I. Early embryology from conception to gastrulation
- II. An overview of foetal and post-natal development
- III. A detailed understanding of pre-natal head and neck development
- IV. Post-natal growth of the head and neck
- V. Key developmental anomalies and related pathologies of the neck (e.g. branchial cysts, thyroglossal duct cysts etc.)

3. From Molecule to Cell - the molecular basis of oral function

- I. The basic molecules of the cell and the bonds which link them together.
- II. Prokaryotic and eukaryotic cells – structural levels of organisms
- III. The structure, main characteristics and function of the four main classes of biological macromolecules carbohydrates, lipids, nucleic acids and proteins
- IV. The roles of nucleic acids in information transfer from DNA to protein; genes and the regulation of gene expression
- V. Proteins – structure, diversity of function, enzymes
- VI. Protein biosynthesis, post-translational modification and secretion.
- VII. An understanding of how knowledge of DNA and protein synthesis and function may be applied in clinical and diagnostic situations
- VIII. Biological membranes – molecular structure, membrane transport, channels and transporters, control of intracellular environment, fluid compartments etc.
- IX. The structure and function of major subcellular structures and organelles.
- X. Cellular metabolism – major pathways for synthesis/turnover of macromolecules and energy metabolism, including carbohydrate metabolism
- XI. The principles of cell signalling and communication
- XII. Biomineralisation and hydroxyapatite

4. From Cell to Tissue and Organ

4a: Architecture and function of principle body tissues

- I. Cells and their extracellular matrices
- II. Connective tissue characteristics – fibrous, tendons and ligaments, cartilage, bone and other mineralised tissues
- III. Formation and architecture of major organ systems relevant to dentistry
- IV. Molecular and cellular basis of neoplastic processes

4b: Support and Movement³

- I. Skin – structure/function; appendages (hair, nails, glands); homeostasis of body temperature; control of integrity :
- II. Bone- types, composition, structure/function ; intramembranous & endochondral ossification; growth and resorption; fractures
- III. Cartilage – structure/function; growth
- IV. The range and characteristics of contractile tissues – smooth muscle, skeletal muscle and myofibroblasts; key molecules associated with contractile function – actin and myosin;
- V. Structure/function of skeletal muscles including attachment, actions & lever systems; the control of neuro-muscular function (to integrate with Section 2b: anatomy of the TMJ and Section 8: Temporomandibular joint, mastication and occlusion, deglutition and speech).

4c: Communication, Control and Integration

- I. Homeostasis- the principles of physiological control; autocrine, paracrine, endocrine and neural control of body functions
- II. Basic principles of neural structure and function – microscopic structure of neural tissue, generation and propagation of the action potential, peripheral synaptic transmission, neurotransmitters
- III. Organisation of the central nervous system (CNS)- brain, spinal cord and cerebro-spinal fluid; somatic sensory pathways including pain in the CNS; somatic motor pathways in the CNS, somatic nervous system.
- IV. Organisation of the peripheral nervous system -autonomic and somatic, autonomic (spinal) reflexes, sensory and motor pathways, comparison of the trigeminal and spinal afferent pathways
- V. Pain: acute and chronic; inflammatory and neuropathic, hyperalgesia and neurogenic inflammation, 'pain' receptor molecules
- VI. Plasticity and repair in nerve tissues
- VII. Sense organs – sensory receptors; somatic senses; special senses (smell, taste, hearing & balance, vision)

³ The overall architecture of the skeleton, together with a consideration of articular surfaces is considered as part of '*The Structure of the Human Body*'.

- VIII. Endocrine system - hormones; prostaglandins; glands (pituitary, thyroid, parathyroid, adrenal, pancreatic islets, gonads, placenta, thymus)
- IX. Neural and endocrine response to stress

4d: Transportation and Defence

- I. Blood - composition and function
- II. Haemostasis and fibrinolysis; evaluation of haemostatic function.
- III. Cardiovascular system – heart; blood vessels: structure/function of the arterial and venous systems; capillary function
- IV. Physiology of heart; control of circulation & blood pressure; velocity of blood and pulse, anastomoses and collateral circulations
- V. Lymphatic system – lymph and interstitial fluid; lymphatic vessels; circulation of lymph; lymph nodes; lymphatic drainage; tonsils, thymus, spleen, MALT and its significance for the oral cavity

4e: Respiration, Nutrition and Excretion

- I. Respiratory system – overview; upper & lower respiratory tracts, thorax; respiratory physiology : pulmonary ventilation, pulmonary gas exchange, blood transport of gases, regulation of breathing
- II. Digestive system – overview; anatomy of mouth, pharynx, oesophagus, stomach, small & large intestines, peritoneum, liver, gallbladder, pancreas; physiology of digestion, digestive gland secretion, absorption, elimination
- III. The functional anatomy and physiology of mastication, swallowing, speech and upper respiratory protective reflexes
- IV. Nutrition – overview; dietary sources, body needs and handling of carbohydrates, lipids, proteins, vitamins, minerals; metabolic rates, energy balance, regulation of dietary intake
- V. Urinary system – overview; anatomy of urinary system; renal physiology
- VI. Fluid and electrolyte balance – body water and fluid compartments, mechanisms of homeostasis of body fluids, regulation of body fluid electrolytes, respiratory and renal regulation of pH

4f: Reproduction, Growth and Development (to integrate with Section 2c-
Core Embryology)

- I. Understanding of the terms genotype and phenotype
- II. The genetic basis of disease, disorders of chromosome form and number with key examples, single gene defects, hereditary and sex-linked traits, complex, polymodal patterns of inheritance.
- III. Patterns of inheritance (autosomal and X linked disorders with key examples, complex patterns of inheritance)
- IV. Somatic cell and germ cell mutations

5. Microbiology and the Control of Infection

- I. Microbial classification and diversity - bacteria, fungi, viruses and prions; key features of the major microbial groups
- II. Transmission of infectious disease; Principles of sterilisation and disinfection.
- III. Dental plaque; oral bacterial ecology; oral biofilms
- IV. Microbial biochemistry (where relevant e.g. sugar, protein metabolism, etc.
- V. The human microbiome, colonisation, resistance and systemic diseases
- VI. Virulence factors – colonisation, evasion of host defence, tissue damage.
- VII. Bacteraemia, septicaemia and infective endocarditis
- VIII. Anti-microbial agents and resistance mechanisms.
- IX. The microbiology of key oral diseases⁴
- X. Emerging and re-emerging diseases relevant to Dentistry⁵
- XI. Microbial sampling and characterisation techniques

⁴ see also '*Oral Biology and Physiology*'

⁵ An exploration of the pathogenesis of infectious diseases which have had particular influence on the development of contemporary dental practice - examples include tuberculosis, hepatitis B and C, HPV, HIV and vCJD. Several groups, e.g. Kunde and Harendza (2015), have noted that dental practitioners rate knowledge of hepatitis, HIV and other infectious diseases as particularly important 'systemic disease' issues underpinning the practice of dentistry. So, the BMS curriculum must provide sufficient exploration of their pathogenesis to spiral into a subsequent clinical discussion later in the dental programme.

6. Key Disease Processes

6a: Immunology and Defence against Infection

- I. The development and structure of the immune system, primary and secondary lymphoid tissue and the lymphatic system⁶
- II. Innate immune response and host-microbe interactions
- III. Adaptive immune response (cell mediated and humoral immunity)
- IV. Allergy, hypersensitivity and immunodeficiency and their oral manifestations
- V. The immune system and the oral mucosa (MALT)
- VI. Development and aging in the immune system
- VII. Immune tolerance
- VIII. The immune response in autoimmune disease,
- IX. Immunity and tumours,
- X. Iatrogenic influences on immune function to include immunosuppression, vaccines and vaccination
- XI. Application of immunology to diagnosis and laboratory investigation (Immunohistochemistry, ELISA etc.)

6b: Inflammation and Repair

- I. Tissue homeostasis; cell growth and division and death (mitosis, apoptosis and necrosis); labile, stable and permanent populations of cells
- II. The acute inflammatory response
- III. Chronic inflammation and its consequences
- IV. Healing of a small skin wound
- V. Specialised forms of wound healing (e.g. fracture repair or repair of a tooth following root fracture)
- VI. Senescence and degenerative processes

6c: Blood and Cardiovascular

- I. Abnormalities in haemostasis therapeutic modulation of clot formation and breakdown, congenital and acquired disorders of haemostasis
- II. Blood loss and its consequences; hypovolemic and other forms of shock
- III. Anaemia – an appreciation of its causes and consequences
- IV. Atheroma and its sequelae; thrombosis including consideration of Virchow's triad, embolism and its consequences,

⁶ Details of the gross anatomy of lymphatic drainage including from the head and neck and other parts is considered under '*The Structure of the Human Body*'; this section focussed on the functional anatomy at a microscopic level, relating microstructure to immune function.

6d: Pre-neoplasia and Neoplasia⁷

- I. The characteristic features of benign and malignant disease; tumour nomenclature and classification; major groups of human tumours
- II. Oncogenes, tumour suppressor genes and genes associated in the regulation of apoptosis and their role in the aetiology of cancer
- III. Tumours resulting from single gene defects; the 'two-hit' hypothesis
- IV. the multistage theory of carcinogenesis; the concept of pre-neoplasia
- V. The metastatic cascade
- VI. Synchronous and metachronous lesions
- VII. Scientific advances – the possibility of personalised medicine

6e: Tissue Damage by Ionising Radiation

- I. Biological mechanisms of radiation induced damage; background radiation, acute and chronic effects on the tissues, deterministic and stochastic effects
- II. Biological responses to diagnostic and therapeutic doses of ionising radiation – an overview

⁷ It is anticipated that a detailed description of key neoplastic diseases of the oro-facial region will be considered as part of an integrated Oral Pathology, Oral Medicine and Oral Surgery programme. The Basic Medical Science curriculum should provide an understanding of the neoplastic process sufficient to facilitate understanding of, and participation in this discussion.

7. Pharmacology⁸

This is a core element of the BMS curriculum to be considered alongside a discussion of normal body function (Sections 3 and 4). It should ensure a basic understanding of the principles of drug action and of the mechanism of action of key families of drugs and spiral into a more detailed consideration of issues related to drug prescription and the uses of individual medications as part of oral medicine and human disease later in the programme

7a: Basic Principles

- I. Pharmacokinetics; the absorption, distribution, biotransformation and excretion of drugs.
- II. Pharmacodynamics; the nature of receptors and transduction mechanisms
- III. Targets for drug action (receptors, ion channels, enzymes, transporters and DNA)
- IV. Selectivity, agonism, antagonism, quantitative effects of drugs (dose-response relationships)
- V. The process and mechanisms involved in neurotransmission with particular reference to cholinergic and noradrenergic neurotransmission
- VI. Adverse reactions to drugs, including immunological hypersensitivity reactions and with particular regard to anaphylactic shock.
- VII. Adverse drug interactions of importance in Dentistry

7b: Groups of Drugs- core knowledge

- I. Adrenoceptor agonists and antagonists
- II. Antimicrobial agents to include antibacterials, antifungals and antivirals
- III. Benzodiazepines
- IV. Drugs which affect haemostasis
- V. Local anaesthetics
- VI. Non-steroidal anti-inflammatory drugs, paracetamol and carbamazepine
- VII. Steroids – their mechanism of action and uses

⁸ Adapted from 'Core Curriculum In Pharmacology for Dental Courses' - British Pharmacological Society (2004)

7c: Groups of Drugs – general awareness

- I. Anti-asthmatic drugs
- II. Anticonvulsants; antidepressants; anxiolytics and hypnotics
- III. Chemotherapeutic agents used in the management of malignant disease
- IV. Recreational drugs; drugs of abuse
- V. Drugs used in the treatment of cardiovascular diseases
- VI. Drugs used in the treatment of Parkinson's disease and other neurological conditions
- VII. General anaesthetics and neuromuscular blocking agents
- VIII. Immunosuppressants
- IX. Inhibitors of gastric acid secretion
- X. Insulin preparations and oral hypoglycaemic drugs
- XI. Muscarinic and histamine receptors antagonists
- XII. Neuroleptic drugs
- XIII. Opioid analgesics
- XIV. Oral contraceptives

8. Oral Biosciences

The programme in the oral biosciences should generate an appreciation of the complex relationship between the oral environment, the diagnosis and the management of oral disease. It must provide a foundation for deep understanding of caries, periodontal disease and disorders of the oral mucosa and facilitate an appreciation of the complex relationship between oral and general health. It should be sited within the context of clinical situations and must underpin and inform an understanding of contemporary issues and their consequences for oral health.

8a: Oral Anatomy and Embryology

- I. A detailed understanding of the morphology of the deciduous and permanent (successional) crown and root morphology; an appreciation of the relevance of an understanding of crown and root morphology to restorative dentistry, endodontics and oral surgery
- II. Composition, structure/function relationships of dental and periodontal tissues to include enamel, dentine, cementum, pulp, the periodontal ligament and alveolar bone
- III. Development of teeth and their supporting tissues, dentinogenesis, amelogenesis, cementogenesis and periodontal development
- IV. Tooth eruption, resorption and exfoliation
- V. Post-eruptive tooth movements
- VI. The development of the dentition, calcification and eruption dates, dates of completion of root formation
- VII. Development of the occlusion and the mixed dentition
- VIII. Structure & function of oral mucosa
- IX. Temporomandibular joint, mastication and occlusion, deglutition and speech (to integrate with Section 2b: Anatomy of the TMJ and Section 4b: Structure/Function of Skeletal Muscles).
- X. Salivary gland structure and composition
- XI. The concept of labile, stable and permanent populations of cells; turnover and regeneration in the oral tissues; an awareness of possible applications of regenerative medicine to the clinic

8b: Oral Biosciences

- I. The major components of saliva and their function; the interface between salivary secretion, oral function and the maintenance of the oral hard tissues
- II. The control of salivation; diurnal variations in salivary flow rate
- III. Gingival crevicular fluid – source, composition and function
- IV. pH changes and acid-base balance in the oral environment; its consequences for biomineralisation
- V. Dental plaque formation, metabolism and properties
- VI. Functional inter-relationships of oral & dental tissues and secretions and importance in defence and homeostasis of the oral cavity
- VII. Effect of fluoride on host tissues and bacterial metabolism.
- VIII. Taste and olfaction
- IX. Pain and sensory responses from the teeth and peri-oral tissues; mechanisms of dentinal sensitivity
- X. Dental caries - microbiology, biochemistry, molecular aspects of caries formation and inhibition.
- XI. Control of dental caries : fluoride, antimicrobial agents, alternative sweeteners, novel therapies
- XII. Periodontal disease - microbiology, immunology, molecular aspects, virulence factors of periodontal pathogens
- XIII. Non-cariou tooth surface loss (attrition, erosion and abrasion)

9. Biomaterials in Dentistry

Students will be expected to have a broad understanding of the range and uses of biomaterials in Dentistry. The BMS curriculum must provide a foundation of basic principles which will spiral into subsequent contextualised consideration of specific materials as part of a clinical programme. This should include...

- I. An appreciation of the diverse range of oral environments in which dental materials have to function
- II. Knowledge of the physical properties of oral tissues as they relate to the use of dental materials (see also Section 8)
- III. An understanding of the nature of the interaction between materials and oral tissues to include the principle of osseointegration
- IV. An understanding of the parameters used to describe and evaluate the physical properties of dental materials (e.g. hardness, elasticity etc.)
- V. Knowledge of the mechanisms, both chemical and mechanical, by which materials may bond to the dental hard tissues and to each other
- VI. An understanding of the properties of resin and glass ionomer restorative materials
- VII. Knowledge on the composition of amalgam alloys and of the issues relating to their contemporary use
- VIII. Knowledge of the properties of precious metals, base metals and metal alloys and their application to dental situations
- IX. The properties of ceramics used in Dentistry
- X. Knowledge of the chemistry and properties of impression materials
- XI. An appreciation of the particular characteristics of materials which make them suitable for use in clinical situations in orthodontics and endodontics
- XII. An awareness of the characteristics of materials which make them suitable for use as denture base materials

10. Conclusion

Given the broad nature of BMS applied to dentistry, this curriculum framework is advisory and aims to give programme planners an indicative list of topics to be mapped to specific learning objectives in complex, contemporary integrated curricula. In many respects it is arbitrary as it is difficult to define where the BMS curriculum ends and overlapping parts of curricula in the clinical disciplines begin. For example, at what point does consideration of the inflammatory response cease to be BMS and start to become part of periodontology or oral pathology. There is no clear answer to this question, and the curriculum must allow each school sufficient freedom to make a decision as to what is taught where and when and areas for discussion are bound to emerge as it becomes more widely distributed. So, this document should be seen as a beginning. It will need regular review as curricula and the basic medical sciences evolve.

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