

**COURSE DATA****Data Subject**

Code	34736
Name	Advanced clinical cariology
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1206 - Degree in Dentistry	Faculty of Medicine and Odontology	5	First term

Subject-matter

Degree	Subject-matter	Character
1206 - Degree in Dentistry	33 - Advanced clinical cardiology	Optional

Coordination

Name	Department
FORNER NAVARRO, LEOPOLDO	131 - Stomatology
LLENA PUY, MARIA DEL CARMEN	131 - Stomatology

SUMMARY

Caries is a disease with a high prevalence, and it affects people's quality of life. Despite the growing number of dentists trained in universities and the development of new technologies associated with non-operative and operational treatment, data show that in the last 20 years caries indicators have remained, and in some cases even increased in our country.

The interpretation of the etiopathogenesis of the disease has undergone fundamental changes in recent years, currently being understood as a non-communicable ecological disease caused by the imbalance of dental biofilm as a result of frequent consumption of sugars. We must not forget the role that socio-cultural factors play in the development of the disease, with the most vulnerable people accumulating the greatest amount of disease.

The study of tooth decay is cross-cutting to all disciplines of dentistry and constitutes a high percentage of the dentist's clinical activity.



Current perspectives on disease management and caries injury, focused on knowledge and address of, patient risk and injury activity, are essential in the formation of future dentists.

The subject "Advanced Clinical Cariology", aims to provide the dentist with a joint overview of all the concepts and principles related to knowledge of the etiological factors, risk and therapeutic approach of tooth decay studied in different subjects and help him to integrate and manage them in a fluid and effective way in clinical practice from scientific evidence and taking into account the emerging therapeutic perspectives.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

34718- Dental Pathology, Conservative Dentistry and Endodontics I

34706- Preventive and Community Dentistry I

It is recommended to review the contents of the subjects related to it, such as: anatomy and dental histology, radiology, dental pathology, conservative dentistry, preventive and community dentistry.

OUTCOMES

1206 - Degree in Dentistry

- Be able to identify the patient's concerns and expectations, and to communicate effectively and clearly, both orally and in writing, with patients, their relatives, the media and other professionals.
- Encourage independent learning of new knowledge and skills, and promote motivation for quality.
- Know how to share information with other health professionals and how to work in a team.
- Understand the importance of maintaining and using patient records for further analysis, while safeguarding data confidentiality.
- Obtain and prepare medical records containing all the relevant information.
- Know how to carry out a complete oral examination, including relevant x-rays and complementary examinations, and how to obtain the appropriate clinical references.
- Be able to prepare an initial diagnosis and establish a reasoned diagnostic strategy, and to recognise situations requiring urgent odontological attention.
- Establish a diagnosis, prognosis and correct therapeutic plan in all clinical areas of odontology, with competence in the diagnosis, prognosis and preparation of the treatment plan for patients requiring special care, including medically compromised patients (such as patients with diabetes, hypertension, immunodeficiencies, anticoagulant conditions, etc.) and disabled patients.



- Know and be able to apply basic treatments for the most common dental pathologies in patients of all ages. Therapeutic procedures must be based on minimally invasive techniques and on a global and integrated approach to oral healthcare.
- Formulate and recommend appropriate preventive measures for each clinical situation.
- Acquire clinical experience under appropriate supervision.
- Recognise the determinants of oral health in the population, including genetic, lifestyle, demographic, environmental, social, economic, psychological and cultural factors.
- Recognise the role of the dentist in measures to prevent and protect against oral diseases and to maintain and promote good health, both in individuals and at a community level.
- Possess knowledge of the national health system and the basics of healthcare legislation, clinical management and the correct use of health resources, with an understanding of the importance of the role of the dentist in the field of primary healthcare.
- Module: Introduction to Dentistry - Take dental radiographs, interpret the images obtained and be familiar with other relevant diagnostic imaging techniques.
- Module: Introduction to Dentistry - Be familiar with clinical and laboratory diagnostic procedures and tests, know their reliability and diagnostic validity and be competent to interpret their results.
- Module: Introduction to Dentistry - Recognise normal and pathological oral conditions and be able to analyse semiological data.
- Module: Introduction to Dentistry - Identify the main reason for consultation and the history of the current disease. Compile a general medical history of the patient and a medical record that accurately reflects the patient's records.
- Module: Introduction to Dentistry - Handle, differentiate and select appropriate materials and instruments in dentistry.
- Module: Introduction to Dentistry - Be familiar with dental biomaterials: handling, properties, indications, allergies, bio-compatibility, toxicity, waste disposal and environmental impact.
- Module: Introduction to Dentistry - Know how to use basic dental equipment and instruments.
- Module: Introduction to Dentistry - Provide a comprehensive approach to oral care and apply the principles of health promotion and prevention of oral diseases.
- Module: Dental Pathology and Therapeutics - Perform basic treatments of oral-dental pathologies in patients of all ages. Therapeutic procedures must be based on minimally invasive techniques and on a global and integrated approach to oral health care.
- Module: Dental Pathology and Therapeutics - Diagnose, plan and apply a general multidisciplinary, sequential and integrated treatment of limited complexity in patients of all ages and conditions and in patients with special needs (diabetic, hypertensive, oncological, transplanted, immunosuppressed, anticoagulated, among others) or disabled.
- Module: Dental Pathology and Therapeutics - Take and interpret radiographs and other image-based procedures relevant to dental practice.



- Module: Dental Pathology and Therapeutics - Determine and identify the patients' aesthetic requirements and the possibilities of meeting their concerns.
- Module: Dental Pathology and Therapeutics - Manage acute infections, including prescription and simple surgical aspects.
- Module: Dental Pathology and Therapeutics - Identify and respond to any dental emergency.
- Module: Dental Pathology and Therapeutics - Perform endodontic treatments and apply procedures to preserve pulp vitality.
- Module: Dental Pathology and Therapeutics - Perform conventional aesthetic procedures from a multidisciplinary perspective.

LEARNING OUTCOMES

Learning Results: When graduating the dentist should be able to:

- Describe the normal development, growth and structure of oral and dental tissues at the macroscopic, microscopic and molecular level.
- Identify macroscopic, microscopic and molecular alterations in the development of oral and dental tissues.
- Explain the dynamic mechanisms and processes involved in preserving the state of health, as well as the macroscopic, microscopic and molecular response of the host to caries and other alterations of dental tissues.
- Describe the role of oral biofilms, diet, nutrition, saliva and other host factors; behavioral and social factors related to caries and other alterations of dental tissues, as well as protective factors.
- Describe the production of acids and bases, buffer properties and the effects of saturation on saliva and biochemical events in oral biofilms, saliva and dental tissues.
- Analyze the role of fluorides and other agents in caries and other alterations of dental tissues.
- Analyze the role of diet in caries and other alterations of dental tissues such as erosion or abrasion.
- Describe the role of environmental factors, drugs and systemic diseases related to caries and other alterations of dental tissues.
- Describe physical and biological changes in dental tissues related to the detection and evaluation of caries and other alterations of dental tissues.
- Describe the mode of action, performance, limitations and problems of conventional methods and other emerging methods, to detect, evaluate and diagnose caries and other alterations of dental tissues.



- Interpret the results obtained with the different methods of diagnosing caries and other alterations of dental tissues.
- Identify methods for determining the risk of caries at the individual and community level.
- Apply the psychological, sociological and communication principles aimed at modifying behaviors related to the development of caries and other alterations of dental tissues.
- Identify the mode of action, composition, properties, limitations and side effects, both locally and generally, of biomaterials for dental use, as well as the products and techniques commonly used for the treatment of caries and other dental alterations, at the individual and population level.
- Recognize the theoretical basis of emerging strategies and materials for the prevention and treatment of caries and other dental alterations.
- Interpret epidemiological indices and indicators related to caries and other dental alterations.
- Describe the research methodology in Cariology and its limitations, including study design, sampling, biases and statistical analysis.
- Determine the level of risk of caries of a patient by making his/her medical history including the following factors: medical, oral, social and economic aspects; previous caries experience; oral health behavior by collecting data on oral hygiene, eating habits and intraoral biological factors; the use of fluorides or other oral remineralization or antibacterial agents; their knowledge and preferences; and considering new risk factors that have been validated as new evidence emerges.
- Communicate the results of the risk assessment to patients, their relatives or caregivers, and offer recommendations that allow them to reduce the likelihood of developing caries injuries and/or the progression of existing ones.
- Detect the social determinants of caries risk, differentiating the individual and Community level.
- Judge emerging information on new factors and risk indicators.
- Recognize abnormal dental tissue by differentiating between serious and non-caries lesions. This should include both primary and secondary lesions, on coronary and root surfaces.
- Record and interpret data or signs present in the different evolutionary stages of the tooth decay process and related symptoms, and use this information to make reasoned treatment decisions.
- Assess the level of activity at the different stages of the caries process, as well as the status of existing restorations and assess, where appropriate, the need for repair or replacement.
- Collect and analyze the signs and symptoms of other alterations of dental tissues to arrive at a differential diagnosis.
- Evaluate the different methods for detecting and determining the stage of the caries process and evaluating the activity of injuries, as well as using such information to make reasoned and shared decisions with the patient (or their guardians and/or caregivers where appropriate) about treatment



- Evaluate different methods to detect and classify other alterations of dental tissues (such as erosion, non-erosive wear, HIM or fluorosis) and use such information to help make evidence-based decisions.
- Assess the needs, preferences and priority interest of the patient for the control of caries disease.
- Make clinical decisions incorporating the result of monitoring, review and reassessment.
- Recognize and assess dental erosion, non-erosive dental wear and other alterations of the hard tissues of the tooth, synthesizing all relevant findings of history and examinations, combining and interpreting them, to allow the making of shared and patient-centered clinical decisions, contemplating the context of the existing health system.
- Detect and evaluate the needs, preferences and interest of the patient (or their guardians and/or caregivers where appropriate) for the management of erosion and non-erosive wear and tears, as well as HIM and fluorosis.
- Differentiate possible treatment options from a particular case, including assessing when a patient should be referred for specialized medical and/or dental care due to rare disorders of dental tissues or medical conditions that cause alterations thereof.
- Manage nonverbal communication skills such as intonation, body language and eye contact.
- Apply behavioral interventions such as motivational interview.
- Establish an empathetic and mutually trusting relationship with the patient
- Recognize patient-related factors (physical, psychological, social and cultural) for preventive counseling and compliance over time.
- Assess the expectations, desires, attitudes, needs and preferences of the patient in the planning of preventive treatment.
- Motivate the patient to play an active role in prevention as a contribution to the maintenance of their oral health.
- Provide the information that allows the patient to recognize the association between oral and systemic diseases.
- Share the information and professional knowledge of Cariology with other health professionals in relation to the prevention, diagnosis, detection of injuries and control of the disease, to work together in the control of risk factors that affect oral and general health.
- Understanding and transmitting to the patient that not having apparent caries lesions is no guarantee that the disease will not develop, or that the disease is already in a subclinical stage.
- --- Obtain informed consent for the provision of all aspects of preventive and therapeutic care.
- Describe the different etiological and pathogenic mechanisms of caries disease and other alterations of dental tissues.



- Determine the mechanism of action of caries prevention agents and products (including those of recent occurrence), their methods of application and administration, and their limitations and adverse effects.
- Make decisions based on the concept of minimal intervention and a comprehensive and integrated approach to oral treatment.
- Recognize the different preventive needs of risk groups (e.g. elderly or physically or behaviorally challenged persons), individualize them for each patient and adapt them to each community.
- Set self-care goals for the patient.
- Educate patients about the etiology of diseases affecting dental tissues, such as dietary, hygiene habits, and other habits relevant to oral health.
- Instruct patients to apply appropriate oral hygiene measures.
- Perform professional mechanical removal procedures of the biofilm.
- Administer remineralization and chemical control agents of biofilm according to the risk of caries, and according to available scientific evidence.
- Apply crack sealants, considering the placement criteria, and identify when they should be repaired or reapplied.
- Monitor the effects of the different strategies of the individualized preventive protocol.
- Select the treatment and biomaterial option indicated according to the best available evidence on the different possibilities of non-operative and operative treatment, and the risk of caries of the patient.
- Identify, describe and manage the consequences of operational intervention.
- Distinguish possible reactions of the dentino-pulpal complex and periodontal tissues against the restorative process and restorative procedures.
- Identify the success rate and failure of restorations according to the risk of caries of the patient.
- --- - Decide when, how and how much tissue to remove according to histological, clinical and microbiological criteria, before performing a restoration to increase the longevity of a restorable tooth, preserving dental tissues, pulp vitality and periodontal health.
- Execute the different techniques to remove decayed tissue in order to preserve dental structure and pulp vitality.
- Select, manage and apply correctly and safely the restorative biomaterials, considering their physical and chemical properties, biocompatibility and longevity.
- Select and execute the appropriate operating techniques for each case and material.
- Identify the impact of restorative procedures on oral mucosa, periodontal tissues, occlusion and oral function.



- Recognize the relevance of the biomechanics of restorations.
- Identify the different defects that restorations may present over time, assess how they affect their function, aesthetics and anatomy.
- Decide whether a restore needs to be repaired or replaced.
- Review, polish, repair or replace restorations to prolong their longevity.
- Recognize the differences in Cariology at the individual level and at the community level.
- Apply basic strategies for the prevention of these oral diseases for population groups.
- Assess health-related behaviors and educate to make the necessary changes.
- Apply the epidemiological method in Dental Public Health.
- Diagnose and record using Community indices/indicators of oral diseases.
- Interpret these Community indices/indicators on population groups and their relationship with socio-demographic variables.
- Describe the epidemiological trend in dental health and the treatment needs of the community and population groups.
- Assess treatment needs from a public health perspective.
- Explain the prevention and promotion of oral health of the population as part of the promotion of general health.
- Identify risk groups in the population and plan specific strategies and programs for them.
- ---- identify common risk factors that share caries and other oral and general diseases, including social determinants.
- Describe the organization of the different models of dental health care that exist in Spain and its Autonomous Communities, and their portfolio of services.
- Explain the Primary Health Care System and the different dental health care systems at the international level.
- Describe the role played by health and non-health professionals in promoting these diseases at the individual and community level.
- Explain the concept of equity, identify the possible existence of inequities in the population, as well as propose improvement strategies with public health programs.
- Explain the concept of oral quality of life.
- Define the health economy and economic assessment techniques of oral health programs.



- To argue that all knowledge can have areas of uncertainty and that it is constantly evolving.
- Ask clinical questions and know how to use the appropriate bibliographic and database sources to solve them with the available evidence.
- Define the concept of Evidence-Based Dentistry (OBE), the pyramid of scientific evidence, recommendation levels, and patient preferences.
- Analyze available evidence on forms of treatment to decide on their incorporation into practice.
- Describe the methodological principles of an investigation, including the design, sampling, bias and analysis of necessary data.
- Consider the limitations of the research methodology.
- Apply critical sense to diagnostic and therapeutic methods.
- Identify clinical guidelines for managing tooth decay.

DESCRIPTION OF CONTENTS

1. THEORETICAL CONTENT

Caries in the context of health

Caries disease

Caries injury

Terminology

Definitions

Epidemiology of tooth decay

Evolution of tooth decay in the world and in Spain

Specific analysis of oral health indicators related to caries

Tools available for epidemiological studies based on scientific evidence.

Requirements for comparing epidemiological data.

Tooth decay in a biological context

Oral microbiome and dental biofilm

The role of saliva

Chemical interaction between the tooth and oral fluids

Diet in the aetiology of the disease

Other host-specific factors

Social, cultural and behavioral factors

Caries pathogenesis

Structural changes in enamel in early and advanced phases

Structural changes in dentin

Evolution and progression of injury



Octopus-dentinal response
Root caries

2. THEORETICAL CONTENT

Diagnosis of caries injury

Clinical diagnosis of tooth decay. Visual and tactile inspection. Magnification

Application of the ICDAS II system in the clinical diagnosis of caries

Radiology in the diagnosis of caries.

Other complementary procedures in the diagnosis of caries

Fiber optic transillumination

Electrical resistance in caries diagnosis (ECM)

Fluorescence-based methods

Diagnosis of injury activity

Identifying caries risk

Main risk factors for caries, based on scientific evidence

Tools for identifying the risk of caries. Its scientific evidence and application procedure

Emerging methods for risk assessment.

Strategies in the prevention and non-operative treatment of caries based on patient risk

Control of disease progression and injury

Fluorides, remineralizing agents, repairing agents, antimicrobials and their mechanisms of action

Biofilm control

Diet control

Saliva intervention

Procedures for specific prevention in retention areas

Implementation of preventive programs in the clinic. Multidisciplinary teams

Restorative treatment with minimum intervention criteria

Principles of restoration with minimal intervention

Handling caries injury according to patient risk

Handling deep caries injury

Restorative alternatives with criteria for maximum preservation of structures

Bio inductor materials

Adhesive materials and techniques

Addressing caries from a community perspective

Community oral health programs

Primary Health Care and the integration of dental care.

Interdisciplinary teams

Health education in the community

**3. PRACTICAL CONTENT**

Application of ICDAS clinical criteria in the diagnosis of caries and their correlation with radiological and other complementary diagnostic methods

Risk assessment with clinical assumptions, using the different existing tools

Use of universal caries indicators and their implementation in the design of community programs

Preparation of materials for patient information on measures to control caries risk factors and their application

Removal of caries and identification of different types of dentin, with minimum intervention criteria

Application of remineralization and bio inductor materials in the treatment of deep caries injury

Resolution and discussion of clinical assumptions

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	32,00	100
Classroom practices	21,00	100
Laboratory practices	7,00	100
TOTAL	60,00	

TEACHING METHODOLOGY

The programming of the subject will be made public at the official start of the course. This will make it easier to organize time and prepare seminars in advance. The subject will be taught in the second half of the course, on Thursday afternoons.

The theoretical teaching will be carried out in the form of workshops, with an introduction of the contents by the teacher and individual or group work in the form of seminars, in which students will carry out different activities, according to the contents that must be developed. Each workshop will be described in the Virtual Classroom with the contents and activities to be carried out. The theoretical contents will be intended to review and strengthen acquired content and expand more specific aspects of Cariology, using clinical assumptions and real situations that help the student to relate concepts and integrate knowledge. They shall be taught in such a way as to emphasize the practical aspects of their contents through images, case presentation and explanation of diagnostic and therapeutic procedures. Gamification tools will be used to stimulate students' attention and participation. Group work and self-formation in the field of Cariology will be encouraged. In the entire teaching-learning process, new ICT will be incorporated as far as possible. E-learning will be done through the Virtual Classroom tool. Clinical assumptions will also be raised through the Virtual Classroom that students must resolve in a reasoned way. Appropriate bibliographic support will be provided. The content of each of the workshops proposed for the development of teaching the subject will be described below

Internships will be performed in the laboratory, clinic or classroom, depending on the characteristics of each.



Workshop	Content
1	Presentation of the subject. Review of concepts relating to the etiology, pathogenesis and epidemiology of tooth decay. Caries disease/caries injury. Specific terminology
2	Caries in the biological context. Oral microbiome and its role in the etiology of the most common oral diseases and their impact on overall health
3	Clinical diagnosis of tooth decay. Use of ICDAS and its application in clinical practice. Use training. Injury activity.
4	Clinical/radiological correlation and other complementary tests. Use training. Therapeutic indications according to ICCMS criteria
5	Epidemiological studies. Epidemiological indicators. ICDAS-CAO correlation. Calculation of the different indices and their application in clinic and epidemiology
6	Caries risk assessment. Tools to evaluate it and practical application
7	Early Childhood Caries: Forms of clinical presentation. Specific etiological factors. Prevention. Evaluation and Control of risk factors. Specific aspects of cavities in the temporal tooth. Therapeutic alternatives.
8	Root caries. Caries injury in the adult and in the medically compromised patient. Procedures for inactivating caries injuries in these patients
9	Prevention and non-operative treatment of tooth decay. Biofilm control. Fluorides and other remineralization agents. Emerging technologies
10	Dietary factors and their role in the risk of tooth decay. Hidden sugars. Diet control in the context of oral and systemic health
11	Oral hygiene. Mechanical devices in the control of oral hygiene. Toothpastes. Composition. Active agents and their functions.
12	Removal of caries with minimum intervention criteria. Deep caries injury. Identification of the different types of dentin. Histology of caries in enamel and dentin.



13	Remineralizing and bioinducing materials, its mechanism of action. Its application in the treatment of deep caries injury.
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Tutoring will take place at the schedule assigned by each teacher, by appointment by e-mail.

EVALUATION

The subject matter assessment shall consist of the following elements:

- 1.- Written examination. 50 multiple choice questions. For the correction of this exam, the formula $X - A - (E - K)$, in which X is the score obtained (correcting randomness, A is the number of items correctly answered, E is the number of items answered incorrectly or unreswred and k corresponds to $1/n-1$, n being the number of distractors (5). The pass is located at X-25 points.
- 2.- Continuous evaluation of practical contents. Once the written examination has been approved, an average of its qualification will be made with the practice note, the result will constitute 90% of the overall rating.
- 3.- Qualification of clinical assumptions: The remaining 10% will be the qualification of clinical assumptions through the virtual classroom

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