

Ministry of Health of Ukraine
Poltava State Medical University

PREVENTION OF DENTAL DISEASES

Edited by Professor L.F. Kaskova

Lviv

Publishing “Magnolia 2006”

2025

*Recommended by the Academic Council of Poltava State Medical University
as a textbook for English-speaking students of the second (master's) level of higher
education EPP "Dentistry" (minutes No. 6, 12.03.2025)*

Authors:

L. F. Kaskova, Doctor of Medical Sciences, Professor
L. I. Amosova, Candidate of Medical Sciences, Associate Professor
S. Ch. Novikova, Candidate of Medical Sciences, Associate Professor
O. V. Khmil, Candidate of Medical Sciences, Associate Professor
L. P. Ulasevych, Candidate of Medical Sciences, Associate Professor
N. V. Yanko, Candidate of Medical Sciences, Associate Professor
M. O. Sadovski, PhD, Associate Professor
O. S. Pavlenkova, Candidate of Medical Sciences, Associate Professor
O. Yu. Andriianova, Candidate of Medical Sciences, Associate Professor
I. Yu. Vashchenko, Candidate of Medical Sciences, Associate Professor
N. A. Morgun, Candidate of Medical Sciences

Reviewers:

O. V. Klitynska, Doctor of Medical Sciences, Professor, Professor of the Department of Postgraduate Dentistry Education of State Higher Educational Establishment "Uzhhorod National University", Ministry of Education and Science of Ukraine
O. I. Hodovanets, Doctor of Medical Sciences, Professor, Professor of the Department of Pediatric Dentistry of Bukovinian State Medical University
O. V. Sheshukova, Doctor of Medical Sciences, Professor, Head of the Department of Pediatric Dentistry of the Educational and Scientific Institute of Postgraduate Education of Poltava State Medical University

Prevention of Dental Diseases: textbook for English-speaking students of the second level of higher education EPP Dentistry / L. F. Kaskova, L. I. Amosova, S. Ch. Novikova [et al.]; edited by Prof. L. F. Kaskova. – Lviv: "Magnolia 2006 Publishing", 2025. – 360 p.

ISBN 978-617-574-309-6

The textbook comprehensively outlines the fundamental principles of dental disease prevention, the patterns of forming a healthy lifestyle, the role of hygiene and hygienic education in the population.

It delves into the aspects of pathogenetic and etiologic prevention of dental caries and periodontal diseases, as well as antenatal prevention. The textbook also includes structured guidelines for implementing the comprehensive prevention system, incorporating epidemiological assessment methods.

The textbook is intended for English-speaking students of the second (master's) level of higher education EPP Dentistry at higher medical education establishments, and can also be used by interns and dental professionals.

UDC 616.314-084

- © L.F. Kaskova, L.I. Amosova, S.Ch. Novikova,
O.V. Khmil, L.P. Ulasevych, N.V. Yanko,
M.O. Sadovski, O.S. Pavlenkova,
O.Yu. Andriianova, I.Yu. Vashchenko,
N.A. Morgun, 2025
- © PDMU, 2025
- © Magnolia 2006 Publishing, 2025

ISBN 978-617-574-309-6

CONTENT

INTRODUCTION	8
GENERAL ISSUES FOR PREVENTING DENTAL DISEASES	10
ALGORITHM FOR DENTAL PATIENT EXAMINATION	14
Recording the dental formula.....	25
Determination of caries indices.....	27
Indices of oral cavity hygiene.	29
Index evaluation of periodontal tissue condition	36
BASIC METHODS OF DENTAL EXAMINATION ACCORDING TO THE WHO. DENTAL STATUS REGISTRATION FORM.	46
Epidemiology of dental diseases	46
Basic methods for examination of dental status according to the WHO	46
CARIESOGENIC SITUATION IN THE ORAL CAVITY. METHODS OF ITS DETECTION AND ELIMINATION	73
Causes leading to caries	73
General cariogenic factors.....	73
Local cariogenic factors	77
Caries risk identifying methods. Diagnosis of individual risk of caries development	81
STRUCTURE AND BIOLOGICAL PROPERTIES OF ENAMEL AND DENTIN	92
Composition and structural features of the enamel structure.....	92
Chemical composition of enamel.....	92
Amelogenesis	95
Enamel mineralization.....	97
Histological structure of enamel	98
Structure, main stages of dentin development	101
Chemical structure of dentin	101
Histological structure of dentin	103
Enamel maturation after tooth eruption	107

THE TOOTH ENAMEL RESISTANCE TO CARIOUS DAMAGE. IMPACT ON THE PROCESSES OF ENAMEL DEVELOPMENT, MINERALIZATION AND MATURATION FOR CARIES PREVENTION	112
BIOLOGICAL CHARACTERISTICS OF DENTAL PULP. MODERN CONCEPTS OF METABOLIC PROCESSES IN ENAMEL AND DENTAL PULP	119
Histological structure of the pulp	119
Cellular composition of the pulp:	121
Pulp circulatory system	125
COMPOSITION AND PROPERTIES OF ORAL FLUID: ITS ROLE IN THE PROCESSES OF ENAMEL MATURATION, DEMINERALIZATION, REMINERALIZATION	127
ORAL CAVITY DEFENSE MECHANISMS	135
ORAL MICROFLORA, ITS INFLUENCE ON THE DEVELOPMENT OF DENTAL DISEASES	143
Anaerobic group of oral microorganisms	146
Anaerobic cocci.	146
Curved anaerobic forms	147
SUPERFICIAL FORMATIONS ON TEETH. CLASSIFICATION OF DENTAL DEPOSITS	151
ORAL HYGIENE	156
Personal hygiene products	157
Tooth powders	157
Toothpastes	158
Dental gels	169
Chewing gums	169
Liquid oral hygiene products	171
Decoctions	171
Infusions	171
Elixirs	171
Mouthwashes (or tooth rinses)	172
Oral care water	173
Gingival balms and tonics	173

Oral care foams	173
Sprays (deodorants).....	174
Hygiene items.....	174
Toothbrushes	174
Flosses, flossettes and dental tapes	179
Toothpicks	180
Interdental brushes	181
Interdental stimulators.....	181
Tongue cleaners.....	182
Irrigators	183
Toothbrushing techniques	185
PROFESSIONAL ORAL HYGIENE	189
Indicators for detecting dental deposits.....	191
Kits and systems for determining the risk degree of dental diseases development in a specific person	191
Manual, ultrasonic and air-abrasive tools for removing dental deposits	192
Chemical means for removing dental plaque.....	194
Circular brushes for dental handpieces	195
Polishing cups for dental handpieces and other items for polishing tooth surfaces	195
Pastes of different abrasiveness for removing dental deposits and polishing tooth surfaces	196
Mineral-containing products for use in a clinical setting.....	197
Professional oral hygiene course.....	198
Professional removal of non-mineralized dental deposits	199
Professional removal of mineralized dental deposits.....	200
ENDOGENOUS CARIES PREVENTION	203
General (endogenous) prevention	203
EXOGENOUS CARIES PREVENTION	217
Local application of fluoride, calcium, mineral components preparations...	217
DEEP FLUORIDATION METHOD	225

SEALING DENTAL FISSURES. METHODS, INDICATIONS FOR USE. MEANS FOR SEALING DENTAL FISSURES AND METHODS FOR THEIR USE	228
PREVENTIVE MEASURES FOR CHILDREN OF DIFFERENT AGES	238
ANATOMY AND PHYSIOLOGY OF PERIODONTAL TISSUES	244
Short development of periodontium.....	244
Structure and age-related changes of gums in children	244
Gingival sulcus	246
Age-related features of periodontal ligament in children	247
Principal fibres of the periodontal ligament:.....	249
Age-related features of cementum in children	249
Structure of alveolar process in children.....	250
Blood supply of periodontal tissues	254
Lymph supply of periodontal tissues	255
Periodontal innervation	255
PREVENTION OF PERIODONTAL DISEASES IN CHILDREN. THE MAIN ETIOPATHOGENETIC FACTORS OF PERIODONTAL DISEASES. PLANNING, METHODS OF IMPLEMENTATION.....	256
General etiological factors of periodontal diseases.....	256
Disorders of the endocrine system	256
Hormonal dysfunctions during puberty	257
Diseases of the gastrointestinal tract	257
Diseases of the respiratory tract	257
Metabolic disorders, hypovitaminoses.....	258
Neurotrophic disorders	258
Local etiological factors of periodontal diseases	259
Deposits on the surface of the teeth: dental plaque, dental calculus.....	259
Traumatic factors.....	263
Tooth position anomalies and malocclusion (crowding, dystopia)	264
Impaired nasal breathing	264
Functional underloading or overloading the maxillofacial region.....	264

Anomalies in the structure and location of some oral soft tissues (shallow vestibule of the oral cavity, pronounced mucosal bands and abnormal attachment of the labial and lingual frenula)	264
PREVENTION OF PERIODONTAL DISEASES	266
ORAL HYGIENE AS THE BASIS OF PERIODONTAL DISEASE PREVENTION. RECOMMENDATIONS FOR ORAL HYGIENE PRODUCTS BASED ON PERIODONTAL TISSUE STATE	273
Tooth cleaning methods	279
COMPREHENSIVE SYSTEM FOR PREVENTING DENTAL DISEASES IN CHILDREN	280
TESTS AND CONTROL TASKS	287
EDUCATIONAL PUBLICATION.....	352

INTRODUCTION

The significant prevalence and high intensity of oral diseases among the population, particularly children, necessitate the implementation of preventive measures aimed at preserving dental health.

Prevention is a complex of state, social, hygienic and medical measures aimed at ensuring a high level of health and preventing the development of diseases.

There are three levels of organization for preventive work: state, territorial and individual.

1. **State level** involves creating a legislative framework for preventive work, implementing and financing state programs for the prevention of dental diseases and creating appropriate socio-economic conditions to ensure the dental health of children and adolescents, etc.

2. **Territorial level** includes developing and providing resources for long-term programs of preventive dental care for children according to the standards for the child population in the appropriate administrative unit. This level also involves controlling the fluoride levels in drinking water.

Territorial programs should encompass social, hygienic and medical measures.

Social preventive measures for dental diseases are related to ensuring a healthy lifestyle for children, namely, adhering to nutritional standards, maintaining a balanced schedule of work and rest, personal hygiene, etc.

Hygienic preventive measures include educating children on oral care; ensuring environmental monitoring; implementing mass hygienic preventive measures – fluoridation of drinking water, use of iodized salt, etc. This group also includes educational work, particularly spreading knowledge about a healthy lifestyle, forming hygienic habits for oral care and maintaining oral health.

Medical preventive measures for dental diseases are aimed at developing and implementing etiologically and pathogenetically justified methods influencing the body and oral organs of children to increase their resistance to cariogenic factors.

3. **Individual system** of preventive care is created to reduce the incidence of dental and oral diseases. It involves selecting hygiene products, providing dietary advice to minimize the harmful effects of refined carbohydrates and conducting preventive visits to pediatric dental clinics.

According to the recommendations of the World Health Organization Expert Committee, all preventive measures are classified into primary, secondary and tertiary levels.

Primary prevention is a set of general measures to strengthen human health combined with specific measures aimed at preventing the occurrence of dental caries, periodontal diseases, dentofacial anomalies and other oral health issues.

Secondary prevention encompasses a range of methods for treating dental caries and its complications, periodontal diseases and dentofacial anomalies that have already developed. This involves therapeutic and surgical interventions to ensure the full functionality of the teeth, periodontium and the dentofacial system as a whole. The primary organizational method of secondary prevention is scheduled sanitation or the planned provision of dental care to preschool and school-age children, adolescents and organized adult populations based on a territorial principle.

Tertiary prevention in dentistry refers to the restoration of the lost function of the dentofacial system due to tooth extraction or diseases that have led to severe surgical operations on the face or jaws. Global prevention experience, summarized by the WHO, shows that compared to the 1970s, the level of periodontal tissue damage has increased by 30-40% depending on age. Epidemiological research indicates that the prevalence of dental caries in deciduous teeth among six-year-old children is 87,9%, and the prevalence of caries in permanent teeth among twelve-year-old children is 72,3%. The high incidence of dental caries necessitates significant improvements in preventive work through the implementation of a state prevention program, training the relevant specialists, a system for monitoring dental diseases and the most effective means of individual prevention.

**Каськова Людмила Федорівна
Амосова Людмила Іванівна
Новікова Світлана Чеславна
Хміль Олена Всеволодівна
Уласевич Лариса Павлівна
Янко Наталія Валентинівна
Садовські Марина Олександрівна
Павленкова Оксана Сергіївна
Андріянова Ольга Юріївна
Ващенко Ірина Юріївна
Моргун Наталія Анатоліївна**

ПРОФІЛАКТИКА СТОМАТОЛОГІЧНИХ ЗАХВОРЮВАНЬ

За редакцією проф. Л. Ф. Каськової

Підручник

У підручнику докладно висвітлено основи вчення про профілактику стоматологічних захворювань, закономірності формування здорового способу життя, роль гігієни й гігієнічного виховання населення.

Детально розглянуто аспекти патогенетичної й етіотропної профілактики карієсу зубів і хвороб пародонта, антенатальної профілактики. Подано схеми організаційних заходів щодо впровадження комплексної системи профілактики з відображенням епідеміологічних методів обстеження.

Призначається для англomовних здобувачів другого (магістерського) рівня вищої освіти ОПП Стоматологія закладів вищої медичної освіти, а також може бути використаний інтернами й лікарями-стоматологами.

Формат 60×84/16. Папір офс.
Умовн. друк. арк. 20,81. Наклад 300 прим.

ПП «Магнолія 2006»
м. Львів-53, 79053, Україна, вул. В. Великого, 51/50,
тел. +38 (050) 370-19-57
e-mail: magnol06@ukr.net

Свідоцтво про внесення суб'єкта видавничої справи
до Державного реєстру видавців, виготівників і розповсюджувачів
видавничої продукції: серія ДК № 2534 від 21.06.2006 року,
видане Державним комітетом
інформаційної політики, телебачення та радіомовлення України

Надруковано у друкарні видавця Марченко Т. В.