





Operative Dentistry Endodontics

IN 2 VOLUMES

Edited by Professor **A.V. BORYSENKO**

Second edition

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1

RECOMMENDED
by the Ministry of Health of Ukraine
as a textbook for students of higher
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The textbook covers the history of dentistry, considers the anatomical and histological structure of the teeth and oral mucosa, describes the restorative materials for caries cavities restoration and root canals obturation, methods of caries cavity preparation and restoration, and root canals obturation.

The textbook outlines basic examination methods of patients with hard dental tissue lesions: dental caries and its complications; the basic data of the most common human disease — dental caries, its main etiologic and development factors. The dental caries clinical features, diagnosis and differential diagnosis of caries with other similar diseases are described. The methods of dental caries treatment with the use of modern medicamental preparations and restorative materials are described.

The causes and mechanisms of dental pulp inflammation — pulpitis, its clinical features, the basic principles of diagnosis and treatment using modern methods of anesthesia are described.

The etiology, pathogenesis, clinical features of periodontal ligament inflammation — apical periodontitis are described. The basic methods of its treatment are presented.

Considerable attention is paid to typical dentist errors that happen during treatment of dental caries, pulpitis and apical periodontitis, their causes, methods of prevention and elimination are described.

The textbook is aimed at English-speaking students of stomatologic faculties of higher medical education establishments.

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HISTORY OF DENTISTRY

CHAPTER

1

THE ANCIENT NEAR EAST

Mesopotamia: Between 3500 and 3000 B.C., on the fertile plain between the Tigris and Euphrates rivers the Sumerians developed an advanced civilization. From their tablets with wedge-shaped, or «cuneiform», scripts much of our knowledge of Mesopotamian medicine and dentistry is derived. As in primitive societies, the medicine practiced in Mesopotamia was largely magical or religious in nature.

The code of laws drawn up during the reign of Hammurabi (1792—1750 B.C.) has come down to us on a stele of black diorite, and here the punishments and rewards due to practitioners of medicine were clearly spelled out:

Law 196: If someone injures the eye of an equal his own eye is destroyed.

Law 198: If someone injures the eye of an inferior he is fined a *mina* of silver.

Law 200: If someone knocks out the tooth of an equal his own tooth is knocked out.

Law 201: If someone knocks out the tooth of an inferior he is fined a third of a *mina* of silver.

It is interesting to note that, although an eye was clearly considered more valuable, nevertheless a substantial sum was placed on the value of a tooth.

Among the clay tablets are a number devoted exclusively to diagnosis and prognosis, and the state of the teeth was used as a means of determining the course and source of an illness. The belief (stubbornly clung to until the eighteenth century AD) that a tooth worm is the cause of dental caries, which was first documented in Babylonia.

Israel: There are numerous references to the importance of healthy teeth in the Old Testament, much of which deals with the period antedating 1000 B.C. Sound teeth were considered objects of beauty. The Bible even sets forth the punishment to be metered out to those who cause others to lose teeth: «Thou shalt give life for life, eye for eye, tooth for tooth, hand for hand, foot for foot» (Exodus 21:23—27).

The Talmud is also rich in references to treatment supposed to be efficacious in either remedying or preventing oral problems. Tooth extractions were dreaded by the

Fig. 1. The part of ancient egyptian stele with hieroglyphic inscription devoted to the dental diseases treatment

ancient Jews. An interesting aspect of the Talmudic disputations concerns the ills that might be treated on the Sabbath. In accordance with the Jewish belief in the sanctity of human life, one might violate the Sabbath when a life-threatening situation existed. So toothache was regarded as a life-threatening disease.

Egypt: The practice of medicine in Egypt was thus clearly established as long as 4,600 years ago. Soon doctors began to specialize in healing certain parts of the body and certain organ systems. More than 2,000 years later Herodotus, a Greek historian of the fifth century B.C., described: «All the country is full of physicians, some of the eyes, some of the teeth and some of the hidden diseases». The earliest dentist whose name we know is Hesi-Re, who lived during the reign of Zoser and who is described on the plaque illustrated in figure 1 as «the greatest of the physicians who treat the teeth».

The Egyptians suffered from a variety of dental diseases, and even the pharaohs were not immune to their ravages. It appears that extraction was the principal remedy for the relief of dental distress. It is also probable that early dentists drilled holes through the cortical plates of the jawbones in order to relieve the pressure of the purulent exudates associated with an abscessed tooth. A number of skulls thus drilled have been found. One of the principal causes of dental disease among the early Egyptians was the coarse diet consumed by rich and poor alike.

Egyptians learned to make writing paper from the papyrus plant. The principal documents dealing with medical treatment are the Georg Ebers papyri. The last is dating from about 1550 B.C. and it is not an original work but merely a compilation of many medical texts of still earlier times, some written as early as 3500 B.C. It contains numerous references to dental ills, including gingivitis, erosion, pulpitis, and toothache; cites numerous operations of fractures and dislocations of the mandible compound, comminuted fractures of the maxilla and so on (Fig. 1). There were found primitive fixed bridge on incisors: the artificial teeth were bound to the neighboring teeth by strands of gold wire.





THE CLASSICAL WORLD

THE CLASSICAL WORLD

Greece: Toward the beginning of the sixth century B.C., the Greeks developed a comprehensive philosophical system of thought, and the natural sciences and medicine. Medical schools came into being in many towns and they were flourishing by the middle of the fifth century B.C. The earliest of the Hippocratic writings can be traced to about the fifth century B.C. The cult had numerous centers called asklepiions. If the patient was cured it was customary for him to make a temple offering of a stone tablet carved in the shape of the affected part of his body and inscribed with thanks to the god for granting recovery from the illness. Many of these votive tablets have been found at asklepiions and at other sites, and among them are representations of teeth and jaws, evidence that dental maladies were treated.

Scattered through the Hippocratic writings are numerous references to the teeth, their formation, and their eruption; and to maladies of the teeth and mouth together with methods of treatment. Hippocrates believed that specific parts of the body to be more susceptible to cold, and thus we read, «The bones, the teeth, and the tendons have cold as an enemy, warmth as a friend; because it is from these parts that come the spasms... that cold induces, heat removes». Book Seven of *Epidemics* cites numerous case histories, many of which explain the importance Hippocrates attached to toothache and dental disease. Hippocrates believed that problems with the teeth arose from a natural predisposition or an inherited weakness. Extraction was to be considered only when a tooth was loose, as the operation was regarded as fraught with danger. The dental forceps he refers to, made of iron and known as *odontagra*, have been discovered in various excavated sites in Greece.

The practice of oral hygiene was slow in coming to Greece. Diocles of Carystus, an Athenian physician of Aristotle's time, admonished, «Every morning you should rub your gums and teeth with your bare fingers and with finely pulverized mint, inside and outside, and remove thus the adherent food particles».

Rome: When the medical profession was in its infancy in Rome, dentistry was being practiced there. About 450 B.C. a commission of magistrates was empanelled to write a body of laws for the nation, later known as the Laws of the Twelve Tables. The dentistry as a separate profession did not exist among the Romans but was included as part of medical practice, and Roman physicians made no distinction between diseases affecting the mouth and teeth and those affecting other parts of the body. Nor did nonprofessionals specialize in dentistry, although we have extensive knowledge of the services performed by Roman barbers.

The encyclopedic Celsus, writing about the time of Tiberius, described in detail the surgical instruments used by the physicians of his day and included among them forceps and a special instrument known as *tenaculum* for the extraction of the roots



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