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REVIEW OF BOOK "ULTRASOUND IN OTORHINOLARYNGOLOGY"

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Translation of review of "Ul'trazvuk v otorinolarin-
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16. Abstract This is a book review. The development of medicine at the current stage is closely linked to the achievements of physics, electronics and cybernetics. The use in medicine, and in particular, in otorhinolaryngology of ultrasound is very promising. The monograph consists of eight chapters, conclusion and bibliographic index. The material is presented on 190 pages, 71 figures and 9 tables are given. The work is well illustrated with original photographs; figures, schemes and graphs. However the monograph does have certain shortcomings. Thus, the authors have not held to the new, generally accepted International Anatomical Nomenclature TNA, using incorrect terms in naming certain structures of the ORL organs, for example; "round window" instead of "cochlear window, etc.			
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REVIEW OF BOOK "ULTRASOUND IN OTORHINOLARYNGOLOGY"

By Academician of the USSR Academy of Medical Sciences I. B. Soldatov

A. I. Tsyganov, A. F. Fedotov, N. P. Feygin, V. L. Isakov, D. F. Batyuk, /86*
V. A. Novikova, A. K. Pokotilenko, Ul'trazvuk v otorinolaringologii ["Ultra-
sound in Otorhinolaryngology"], general editor A. I. Tsyganova, Kiev, Naukova
dumka, 1978.

The development of medicine at the current stage is closely linked to the achievements of physics, electronics and cybernetics. The use in medicine, and in particular, in otorhinolaryngology of ultrasound is very promising. At the same time whereas its use for diagnostic purposes has been covered by a considerable number of studies, the material concerning the possible use of ultrasonic therapy in ORL-diseases, is very incomplete, and the data on this question are fairly contradictory. Therefore the publication of the monograph Ultrasound in Otorhinolaryngology, that systematizes and generalizes results of clinical and experimental studies of domestic and foreign authors is urgent and timely.

Of especial value in the book is the new information (the results of many years of joint activity of physicians and engineering-technical workers of the

*Numbers in margin indicate pagination in original foreign text

Kiev Scientific Research Institute of Otolaryngology) on the use of ultrasound in experiment and clinical practice.

The monograph consists of eight chapters, conclusion and bibliographic index. The material is presented on 190 pages, 71 figures and 9 tables are given.

The first two chapters state the current conclusions on the physical grounds for ultrasonic oscillations and biophysical properties of ultrasound. The technical parameters and schemes for the effect of ultrasound that are graphically presented in the tables broaden the idea of the readers, in particular medical workers, on the physical essence of the effect of an ultrasonic wave and the outlook for its use in medicine.

Chapter 3 covers the therapeutic effect of ultrasound. It gives an analysis of the literature on technique and efficiency of ultrasonic therapy for different diseases of the organism.

Of considerable interest is Chapter 4 of the monograph, which gives the experimental substantiation for the use of ultrasonic therapy for certain diseases of the ORL organs. As a result of conducting a number of experiments on animals, the authors have worked out certain optimal conditions for the effect of ultrasonic oscillations that serve as a foundation for the use of ultrasound in treating chronic maxillary sinusitis and Meniere's disease.

The monograph presents a comprehensive analysis of the authors' material and published data on the functional morphology and immunological activity (specific and nonspecific) of the tonsil during the effect of ultrasound in

experiments on experimental animals, and in clinical practice on patients with chronic tonsillitis. The results of studies are based on the use of a set of modern morphochemical, neurohistological, histophotometric and immunological methods that make it possible to determine the condition of cellular and non-cellular structures of the tonsils. The authors presented their own, fairly proven viewpoint on the mechanism for the therapeutic effect of ultrasonic oscillations on the tonsils. It has been proven, that ultrasound stimulates the processes of biological oxidation of cellular components in the parenchyma and stroma of the tonsils, endothelium of capillaries and cells of the epithelium, and also activates the oxidation-reduction processes in the cellular components of the macrophage systems of the tonsils, and intensifies their phagocytic function. With an increase in the activity of enzymes of the oxidation-reduction cycle, metabolic processes and migration of different metabolites through the vascular barrier under the influence of ultrasound are activated in the vascular system.

Thus, the authors explain the positive effect of ultrasonic therapy in treating chronic tonsillitis by local nonspecific stimulating effect of ultrasonic oscillations, that result in temporary normalization of the morphofunctional, and correspondingly, defense-adaptive properties of the tonsils, which is expressed in a stopping of relapses of angina in a certain contingent of patients.

Of clinical value are the results of studies that indicate the end of the therapeutic effect of ultrasonic oscillations within 4-6 months, and the need for repetition of the treatment course (on the average two times a year). The phenomena of exacerbation in the disease that were noted in a number of patients in the first days of use of ultrasonic therapy are explained by the authors by the still great reduction in synthesis of the macroglobulins that is usually

/87

normalized after ten treatment sessions.

The experimental data given in the work on the effect of ultrasound on the mucous membrane of the nasal cavity and determination of the average statistical coefficient for absorption of ultrasonic energy by the bone tissues in the maxillary sinus substantiate the use of ultrasonic therapy to treat vasomotor rhinitis and maxillary sinusitis. The technique of ultrasonic effect in experiments on the posterior region of the otic labyrinth in order to disengage it for treatment of Meniere's disease is treated in detail.

Chapter 5 contains information on therapeutic ultrasonic apparatus that can be employed in otorhinolaryngology. Table 4 is very graphic; it acquaints the readers with the main technical characteristics of different apparatus. Designs and plans of ultrasonic generators, irradiators, transformers and other component parts of the instruments are presented.

Of definite importance is the ultrasonic apparatus type M for treatment of Meniere's disease that has been updated by the authors. For this purpose the Kiev Scientific Research Institute of Otolaryngology has developed special ultrasonic emitters, which can be used for making microoperations on the ear with the help of optical apparatus. They direct an ultrasonic beam precisely to the assigned object, without damaging the adjacent ear structures.

The result of experimental studies has been confirmed in clinical observations of the authors (Chapters 6, 7 and 8) that concern the therapeutic effect of ultrasound during chronic tonsillitis, vasomotor rhinitis and chronic maxillary sinusitis, as well as Meniere's disease. Observations in dynamics (for a period up to 4 years) of 8,800 patients with chronic tonsillitis (Chapter 6)

indicate the therapeutic effect obtained in 79.7% of the patients after the use of ultrasonic therapy, which was expressed in the stopping or reduction in frequency of relapses of angina, improvement in the pharyngoscopic pattern and increase in reactivity of the organism, expressed in a rise in the titer of the complement, and heterophilic agglutinins, as well as lysozyme. Of definite importance are the research results (A. I. Tsiganov, L. V. Vizirenko, N. P. Feygin, 1977) on the effect of ultrasound on reactions of the cellular and humoral immunity of palatine tonsils during chronic tonsillitis. One should consider the substantiated recommendation for treatment of chronic tonsillitis by the method of phonophoresis of interferon, which has proved to be more effective than the use of only ultrasound to be practically important.

Chapter 7 covers an analysis of the treatment with ultrasound of 3,000 patients with vasomotor rhinitis. A detailed presentation is given of a technique for examination and treatment of patients, descriptions are made of the perfections introduced in recent years of a technique of endonasal ultrasonic therapy and phonophoresis.

Chapter 8 is important; it generalizes the experience of treating Meniere's disease with ultrasound. The authors have noted, that with the use of the generally known technique of sonication according to Arslan the approach to the semi-circular canals is difficult (trepanation of the mastoid process is necessary). In addition, often deafness occurs. The suggested method for irradiating the vestibular region of the labyrinth that can be carried out after endaural tympanotomy through the window of the cochlea with the help of a generator and miniature emitter of special design, results in the disengagement of the function of the receptors without damage to the nerve formation of the anterior

section of the labyrinth. Prerequisites for the introduction into therapeutic practice of this method were results of experimental studies that covered the effect of ultrasound on the vestibular region of the labyrinth in 163 animals (Chapter 4).

In analyzing the findings, the authors graphically have proved that a precisely focused thin ultrasonic beam results in the destruction of the neurosensory and secretory epithelium in the peripheral section of the vestibular analyzer, without having a significant influence on the function of the cochlear receptors. Proof of this is both the results of morphochemical and neurohistological studies, and the indices for recording cochlear biocurrents induced by sound signals of the same intensity in the frequency range 200-8,000 Hz.

The work is well illustrated with original photographs, figures, schemes and graphs. However the monograph does have certain shortcomings. Thus, the authors have not held to the new, generally accepted International Anatomical Nomenclature TNA, using incorrect terms in naming certain structures of the ORL organs, for example: "round window" instead of "cochlear window," "sinus of Highmore" instead of "maxillary," etc. The last names of the domestic authors are often cited without initials. Chapter 1 should be made more accessible for a broad circle of readers, since it presents many formulas and schemes that are primarily designed for engineering-technical personnel and present certain difficulties for content interpretation by medical workers.

On the whole the book leaves one with a good impression. It comprehensively covers one of the important trends in modern otorhinolaryngology.

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