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Storage/Labeling

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EFFECT OF ULTRA HIGH FREQUENCY FIELD (UHF) UPON THE
FUNCTIONAL CONDITION OF OTORHINOLARYNGOLOGICAL
(ORL) ORGANS

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It can be considered an established fact that under the prolonged action of an UHF field upon the human organism first of all functional disorders can be seen in the central nervous system. This was demonstrated by both clinical specialists (N. V. TYAGIN, 1962; V. N. GUR'YEV, 1962 et al), and physiologists (E. N. GONCHARUK and M. A. PIVOVAROV, 1966, et al). The effect of UHF field upon the functional condition of ORL organs was not sufficiently studied at the present time. Thus, YE. A. LOBANOVA and Z. V. GORON (1959, 1960), found that in specialists who are working at radar stations the acuity of olfaction is diminished. FREY (1961) showed that a pulsed electromagnetic field aimed directly upon the head causes sound sensation of a humming character in people, which the author explains with a demodulation effect in the neurons of the sound analyzer.

Because of the insufficient study of the effect of UHF field upon ORL organs, we made a series of observations. We studied 97 persons who were divided into two groups: (1) the first group (46 persons) was irradiated irregularly (from a few minutes to 1 to 2 hours daily with a PD(power density) within the range of 10 to 100 microwatts per cm^2); (2) the second group (51 persons) was regularly irradiated (during the performance of duties with a PD of 15 - 38 microwatts per cm^2). In both cases, control groups were set up which were not subjected to the effect of UHF field. The length of service time was also taken into consideration.

The examination method was the following. After the detection of complaints and an instrumental examination of the ORL organs, the thresholds of sensitiveness were determined to the odor of acetic acid, by using 1%, $\frac{1}{2}$ %, $\frac{1}{4}$ %, 1/8%, 1/16%, 1/32% dilutions, and also the degree of strength of the defense reflex of the olfactory organ in response to the inhalation of ammonia solution. Then, a verbal audometry was made with the aid of an existing transmission set with magnetic recording of a special table of Russian words. At this, first the thresholds of 50% speech discrimination were determined for each ear taken separately, and thereafter the binaural discriminatory ability. The function of the vestibular apparatus was investigated by determining the sensitivity threshold to the effect of Coriolis forces with the method of KHILOV for which the rotatory test (10 turns during 20 seconds) was used with closed eyes and forward tilting of the head with its subsequent straightening. We considered what the index value was at which a barely perceptible animal response and a sensation of counterrotation appeared. The index was determined in relation to the speed of head straightening: in 0.5 sec...index "1"; in 1.5 sec...index "3"; in 3 sec...index "6"; in 6 sec... index "12"; in 12 sec...index "24". Moreover, the otolithic response was determined (according to V. I. VOYACHEK). As a result of the examination of ORL organs, pathological changes were detected which are shown in the following Table.

TABLE

Pathological changes	Number of cases			
	1. Group		2 Group	
	Exper.	Control	Exper.	Control
Congenital increased sensitiveness to rocking	2	1		
Congenital hyposmia	3	1		1
Chronic pharyngitis	3	1	4	1
Chronic rhinitis	2	1	2	1
Deviation of the nasal septum	1	1	1	1
Acute laryngitis			1	1
Anterior dry rhinitis			2	1
Chronic tonsillitis			2	1
Chronic maxillary sinusitis				1

It is evident from the Table that pathological changes in the ORL organs cannot be explained with the effect of UHF field, since in the same degree they are found also in persons of the control group.

It was also found that in persons of the second and third years of service who are subjected to the effect of UHF field, the acuity of olfaction is somewhat lower than in persons of the first year of service and in the control group. This phenomenon can be explained together with the action of other harmful factors and with the effect of a weak UHF field during a definite period of time. This is in agreement with the findings of other authors (P. P. FUKALOVA and YE. I. SMUROVA, 1962, et al). At the examination of the defense reactions of the organ of smell, of the hearing and vestibular functions under the effect of adequate stimuli, no distinct changes could be detected.

Usually all investigations were made soon after watch duty; hence, in our opinion, the comparative findings of repeat examinations made after 8 - 10 hour rest are of major interest. Such examinations were conducted on 8 persons of the second group: --- four persons were subjected to the effect of UHF field, and four served as controls. From these examinations, it was found that after a brief rest (8 - 10 hours), the acuity of olfaction improves. Thus, immediately after watch duty the acuity of olfaction was reduced in all, while after rest it rose in all; moreover, in the control sub-group, it rose to the normal level, while in the first group which was subjected to the effect of UHF field, the recovery of the acuity of olfaction was partial. The sensitivity thresholds of the vestibular apparatus did not change after a brief rest. The threshold of 50% speech discrimination markedly increased after rest (from 15 to 25 db); moreover, these changes were noticed both in those who were subjected to the effect of UHF field, and in persons of the control sub-

group, which can be explained with the general fatigue under the influence of doing watch duty.

Thus, on the basis of our investigations, the conclusion should be drawn that, under the effect of UHF field, weakly marked functional changes occur in the olfactory, and sound analyzers. Reduction of speech discrimination could depend upon the direct effect of the UHF field upon the central sector of the sound analyzer. The drop in olfactory sensitiveness is possibly conditioned by the direct action upon neurons of the olfactory pathway.

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