

## IMPAIRMENT OF SMELL CAUSED BY WOOD-DUST

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The organ of smell is in the industry poorly protected. Besides existing regulations concerning the compulsory removal of offensive odours from the environment, there are few countries with regulations concerning the protection of the olfactory function. Since it is regarded as nonessential, the olfactory sense is wrongly neglected, while in the legislation of different countries there are decisive directions to guard hearing, sight, the lungs and other organs. Olfaction is by no means indispensable for survival in civilized life, but no doubt a person with lack of smell perception should be regarded as crippled.

We are used to meet patients with damaged smell solely in the chemical industry and in persons being for long period influenced by pungent and offensive odours. Three patients complaining of impaired smell and working for a longer time in an atmosphere saturated with wood-dust gave rise to the idea of examining the problem. We started by checking up the workers in a parquet factory.

Though the factory was equipped with modern sets and powerful aircleaners, we could realize even without conimetry that the atmosphere was full of tiny dust particles. After 1—2 hours we had the feeling in upper airways as if

Table 1. Anosmia

	name	sex	age	period	nasal mucosa	causative factor
1	B.M.	fem.	33	9 years	atrophic	wood-dust
2	K.B.	fem.	35	7 "	atrophic	wood-dust
3	L.S.	fem.	34	10 "	atrophic	wood-dust
4	B.D.	fem.	38	2 "	atrophic	wood-dust
5	S.Z.	fem.	31	8 "	atrophic	wood-dust
6	B.D.	fem.	45	10 "	normal	wood-dust
7	S.J.	male	41	13 "	atrophic	wood-dust
8	B.K.	fem.	29	6 "	atrophic	wood-dust
9	S.T.	fem.	40	11 "	atrophic	wood-dust
10	Z.K.	fem.	19	2 "	normal	wood-dust
11	J.I.	male	40	15 "	normal	wood-dust
12	B.B.	fem.	33	7 "	atrophic	wood-dust
13	H.J.	male	46	14 "	normal	laryngostomia
14	U.A.	male	27	1 "	normal	fractura cranii
15	B.K.	fem.	35	3 "	normal	influenze-vaccination
16	K.S.	fem.	51	10 "	normal	partus protractus
17	M.K.	fem.	37	23 "	normal	partus protractus
18	K.L.	fem.	50	20 "	atrophic	erysipelas
19	M.T.	fem.	37	8 "	atrophic	influenze
20	K.M.	male	47	20 "	atrophic	congenital

the cleaning and moistening of the inhaled air were blocked. In that environment the workers usually spend 7½ hours daily, many of them for as many as 30 years.

The whole team of 154 workers (21 males and 133 females) was subjected to our strict examination, rhinoscopy and olfactometry. The olfactometry we used was the modified method introduced by Proetz. The examined workers were offered 7 fundamental odours. The criterion for hyposmia was the lack of perception of 100 olfacts and for anosmia the absence of perception of concentrated odours. The examination revealed 20 cases of anosmia and 14 cases of hyposmia leading to a total of 34 cases of impaired smell. 22% is by all means far above the "normal" level of impaired smell in a population. Among the anosmic workers there were 12 cases whose histories, regarding the usual agents noxious to smell were negative. All these workers insisted on having had a keen sense of smell before they started to work in this factory. In the course of years in contact with the wood-dust they observed a progressive weakening of olfaction. Most of them noticed a considerable improvement after weekends and vacations. Each of their histories is worth our attention, but we should like to emphasize 3 single cases which are peculiar.

The first two cases are represented by two sisters. Each one lost her olfaction within a few months, after getting a job in the same factory. In their family records there is no evidence of anosmia. The third case was a male worker, who lost his smell after three years. This trouble compelled him to ask for a cure in an ENT department, where he was submitted to a septum operation. For a short while his sense of smell was improved. It disappeared completely soon after he started to work again in the same environment.

Of the 12 cases of professional anosmia in 9 cases the nasal mucosa was very poor and in some cases with an exceeding reduction of turbinates. In three cases of partial anosmia the perception of minty, pungent and putrid odours was still preserved.

In hyposmic patients it is interesting to stress that seven of them are still

Table 2. Hyposmia

	name	sex	age	period	mucosa	after ephedrine	after rest
1	S.M.	fem.	21	4 years	normal	no change	better
2	B.D.	fem.	28	7 "	hypertroph	better	better
3	M.K.	fem.	25	7 "	normal	no change	better
4	S.J.	male	38	12 "	atrophic	no change	no change
5	P.P.	fem.	33	10 "	atrophic	no change	no change
6	G.A.	fem.	25	2 "	normal	no change	normal
7	M.A.	fem.	22	3 "	normal	no change	normal
8	L.B.	male	41	18 "	atrophic	no change	no change
9	D.D.	fem.	32	12 "	hypertroph	no change	no change
10	O.M.	fem.	30	9 "	normal	better	no change
11	S.R.	fem.	43	15 "	atrophic	no change	no change
12	G.D.	fem.	23	1 "	hypertroph	better	better
13	K.S.	fem.	40	20 "	atrophic	no change	no change
14	C.O.	fem.	26	5 "	normal	no change	better

observing the recovery of smell when for a few days out of work. This indicates the reversibility of the process in its early stage.

The parquet blocks are produced in Yugoslavia mostly of oak, beech and ash. All the three sorts of wood are containing, some components which have harmful properties on the nasal mucous membrane.

Cellulose in contact with water or monovalent and bivalent ion solutions gets an electrokinetic potential which leads to electrophoresis and electroosmosis. The cellulose acts also as so called ion exchanger. The hygroscopic character of cellulose is well known and in that way cellulose could spoil the balance of water in the nasal mucosa.

Hemicelluloses are characterized by hydrolytic decomposition into uronic acids, which are biologically active in the tissues of the human organism. Lignin gives a whole series of organic acids by its oxidation.

Of extractive substances in the wood-dust one can find: resins, terpens, various sorts of toxic alkaloids, glycosides and finally tannins. All these components of the wood-dust can have a negative influence on the mucosa, especially on olfactory epithelium, but tannin is probably the most harmful part owing to its adstringent activity.

Anyhow there are enough elements in the wood-dust to act noxiously upon a less resistant mucosa after a certain period of exposition. The fact that not all of the workers in the saw-mill have suffered this damage could be explained with the wide individual resistance and regeneration ability. On the other hand the fact that the majority of patients are handicapped by their anosmias brings us to the idea of suggesting certain measures.

In the first place there is a need to obtain an opinion of rhinologists before such a factory is put in operation.

Secondly, the workers in contact with the wood-dust should be periodically put under a rhinologic control. As soon as a hyposmia is found, especially with the signs of improvement after a rest, the worker should be advised to change the environment and in cases of partial anosmia it should be legally imposed.

The workers showing symptoms of nasal atrophy should not be admitted to that kind of job.

Finally it should be pointed out that the loss of smell should be considered in the interest of the worker as a disability, particularly in some professions.

### SUMMARY

Saw-mills represent workshops where the organ of smell is attacked. The author performed olfactometry in 154 workers in a parquet factory. Total anosmia was found in 12 cases and partial anosmia in 3 cases. The rest of 8 anosmias are supposed not to have been caused by wood-dust. There were 14 hyposmias in the same group, most of them showing certain improvement after a leave. In constructing such factories rhinologists should be consulted. The workers should be periodically put under rhinologic control and in case of olfactory impairment transferred to more suitable work.

### RÉSUMÉ

Après avoir constaté que les ouvriers d'une usine des parquets souffrent de l'anosmie, l'auteur a examiné 154 ouvriers de cette usine. En 12 cas l'auteur

a trouvé l'anosmie totale et en 3 cas l'anosmie partielle. Il semble probable que les anosmies ont été provoquées par le travail de longues années dans l'atmosphère saturée par la poussière du bois. Dans le même groupe il y avait 14 cas de l'hyposmie dont certains cas ont montré une amélioration de l'odorat après le repos de dimanche ou après le congé. L'auteur est d'avis qu'il faut faire le test de l'odorat chez les ouvriers avant de les embaucher sur ce type de travaux et en cas des troubles d'odorat, l'auteur recommande de les transférer à une autre poste de travail.

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