

OCCUPATIONAL DISEASES OF THE NOSE

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The nose is the first line of defense of the lungs. Here inhaled particles are for the greater part removed, the presence of irritating vapours is detected and moreover the organ of smell warns against threatening dangers.

In the mining industries and in certain factories the demands on these nose functions are very high, the amount of particles deposited in the nose is considerable. It occasions not surprise that nose diseases must be the consequence in the long run.

The nose can be damaged in different ways:

1. Chronic irritation by otherwise innocuous particles, causing swelling, secretion and eventually infection.
2. Etching of the mucous membranes resulting in destruction of the ciliar epithelium, forming of scar tissue and septum perforations.
3. Toxic damage by the inhalation of substances which are tissue-poisons resulting in local necrosis.
4. Proliferative and non-proliferative inflammations by penetrating particles.
5. Carcinogenous action of tar and radio-active material.
6. Sensitisation resulting in allergy.

Ulcers on the mucosa and septal perforations are found very commonly in workers of factories where arsenic and calciumnitrate is used. According to **Legge** arsenic can cause a septum perforation already after one month of employment, and according to **Marchand** in 75 percent of calciumnitrate workers a septal perforation is found. Chromium is not so dangerous. Heimburg found in 38 workers only 3 perforations but as much as 29 ulcerations.

In the manganese mines most of the workers suffer from chronic rhinitis and bronchitis. Neurological illnesses and pneumonia among them are frequent. Manganese is used in steel- and glass factories.

Vanadium and osmium are used for the tempering of steel. They have a strong irritating effect on the nose and the eyes. According to **Browne**, a strong nasal secretion and nose-blocking develops first often accompanied by ulcers, and a chronic pharyngitis and bronchitis follow.

A similar irritating and etching effect is known from the small (4-12 μ) pointed particles of cement. Manciola found among 102 workers only 3 septum perforations but nearly all of them suffered from rhinopharyngitis and conjunctivitis. In the course of time chronic bronchitis and lung-diseases may develop — especially when the dust-absorbing capacity of the nose is insufficient.

Iron-particles and iron-fume, originating by the process of welding, give the nasal secretion the colour of rust. In the nose and the lungs a non-proliferative inflammation may result (Doig).

A sharp distinction must be made between substances which (mainly in the lungs), cause a non-proliferative inflammation and which are relatively harmless, and those substances which cause a proliferative, relatively dangerous, inflammation.

Non-proliferative substances are a.o.: iron, anthracite, bitumen and tin. Proliferative substances are a.o.: silicon, asbestos, talc and granite.

In the non-proliferative inflammation the particles are isolated by a fibrotic reaction, as foreign bodies, without any remaining activity. On the contrary, in the proliferative inflammation a progressive fibrosis develops. Notwithstanding suspension of the work and good care the fibrosis continuous and results in emphysema. Repeated nasal infections and tuberculosis worsen this process.

In glass-works nasal impairments are often met with because through the action of silicon-dioxide and sodium carbonate a fine alkaline powder is formed, possessing a strong etching property.

Through the packing of soda, clouds of very small particles are inhaled, resulting, with the newly employed workers, in sneezing attacks and strong secretion (Archibald). Later on adaptation occurs but septum perforations are seen in 10%, with occasionally atrophy and crusts.

The most frequent occupational diseases of the upper airpassage are the allergic disorders — vasomotor rhinitis and asthma. We already described the unspecific vasomotor rhinitis due to irritants — more important however is the specific sensibilisation which workers may acquire for certain products after sufficiently long exposure. Classic examples are sensitisations among bakers, millers, hussars, furriers, breeders and chemists, but in recent times in many other occupations — too many to enumerate — workers are sensitized. So in this respect penicilline, other medicaments and plastics are well known as well in the factories as among patients and nurses. They are responsible not only for nasal disorders and asthma but also for contact eczema and urticaria. In penicilline factories 20—30% sensibilisations are reported and among patients treated with penicilline 10 percent.

Usually allergens are big-molecular products with a proteine structure. However sensitiation for small-molecular products, even for metals, is not a rare occurrence. Chromium eczema among cement workers is very frequent. Vapours of sodium and ammonium chlor-platina salts are very strong allergens both for the skin as when inhaled. **Hunter, Milton** and **Perry** report that among 91 workers, 52 suffered from asthma and 13 from contact eczema and urticaria. This are so called half-allergens which must combine in the human body with an other big molecule — a carrier substance — in order to be able to act as an allergen.

Several allergins which are supposed to be responsible for sensitisation in factories, are in our normal surroundings also present such as house-dust, molds, bacteria, textile, paper, tobacco, wood-dust and animal material. Thus the industrial physician has to decide whether the complaints originated in the factory or are only aggravated because of the more intensive exposure to the allergen. It was found by **Turiaf, Marland** and **Tabart** that among 277 asthma patients in 1/3 the complaints started or aggravated because of occupational allergens. Especially textile-factories and farming proved to be dangerous for these patients.

In the dutch bulb- and flower nurseries nasal allergy and asthma is often caused by certain pollen, scales and molds. Among the flowers the com-

positae-chrysanthemum and asters-are feared as well for asthma as for contact eczema.

If a person in a factory will be sensitized or not, depends on several factors concerning the individual disposition and on the other hand the grade of exposure and the nature of the allergen.

1. It appeared from investigations of **Fowler** that among 32 patients suffering from printers-asthma (caused by ink) only 6 had allergy in their family. Among sensitized bakers, **Pestalozzi** and **Schnijder** found 25% with a positive family anamneses, against only 10% among the not sensitized group. Similar numbers were found by us. All bakers suffering from hay-fever proved to be sensitized by flour. From these and similar observations one may conclude that heredity is a minor factor, but that an active allergy is of more importance in the decision whether a candidate worker should be admitted in surroundings where he is apt to be sensitized.

2. According to the contact-rule of **Hansen** the allergic symptoms develop in the organ where the allergen has its first contact, thus for inhalants in the nose, for chemical substances on the hands etc. The local disposition of these organs probably is of great importance as well for the primary sensitisation as for the secondary allergic reactions. In this respect, in the nose the fast removal of the inhaled allergen by ciliar activity, secretion and sneezing and also the reactivity of the autonomous nervous system must be considered. These factors might be also responsible for the great changes in reaction in one person from one day to another.

3. There are weak and strong allergens. House-dust and pollen, our most common sensitisations, are relatively weak allergens. Examples of strong allergens are ricinus beans and chinese primula. **Karrer** succeeded in sensitizing 8 normal individuals with the last allergen. According to **Ancona** in a certain year all the farm hands of an italian village developed bronchial asthma due to a mold in the cornfields.

Thus sensitisation with a strong allergen may occur very quickly in a great number of persons, whereas with a weak allergen high concentrations and a long exposure time is required. With a relatively weak allergen as flour we found that the number of sensitized workers increased with the number of years of employment and with unhygienic conditions as in the small bakeries. If we live long enough perhaps we will all be sensitized against different products, even against the dandruff of the hair of our close companions, as some hair dressers are with regard to their customers.

LES MALADIES PROFESSIONNELLES DU NEZ

Le nez forme la première ligne de défense pour les poumons. Sa capacité de retenir les particules inhalées et sa faculté de détection de vapeurs nuisibles sont indispensables dans les mines et les usines. D'autre part, le nez est fortement exposé à être endommagé pour cette raison par les procédés suivants:

1. Irritation chronique par des particules autrement inoffensives, qui provoquent de la sécrétion, de la tuméfaction et finalement de l'infection (vanadium, osmium, soda).
2. Burinage des membranes muqueuses avec destruction de l'épithélium ciliaire, formation de cicatrices et perforation du septum (verreries).
3. Intoxication par inhalation d'un poison tissulaire provoquant une nécrose locale (arsenic).
4. Inflammations prolifériques (silice, asbeste, talc, granit) et non-prolifériques (fer, anthracite, bitume, étain) principalement dans les poumons, causées par des particules pénétrantes.
5. Actions carcinogènes (goudron, substances radio-actives).
6. Sensibilisation allergique.

L'allergie est la maladie professionnelle la plus fréquente. Parmi les exemples classiques de ces allergies: les boulangers, les hussards, les fourreurs, les éleveurs, les chimistes; à présent une grande variété de produits et d'usines peuvent y être ajoutée, nous citons les antibiotiques, les plastics, les textiles etc. etc.

La sensibilisation éventuelle d'un employé dans une usine dépend de sa disposition individuelle, de la concentration et de la nature de l'allergène. Si l'allergène est relativement faible (comme la poussière des maisons) la concentration doit être forte et le temps d'exposition long, souvent plusieurs années. On connaît également des allergènes très agressifs qui sensibilisent presque tout le monde en peu de temps comme les faséoles de ricin et la primevère chinoise (Karrer). La tare héréditaire est de peu d'importance, par contre une sensibilisation préliminaire est très importante.

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