

CASE REPORT

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A partially mummified corpse with pink teeth and pink nails

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Abstract A female corpse in a state of advanced decomposition and putrefaction with pink teeth and an equivalent discolouration of several fingernails was found by a group of hunters in a forest. A combination of trimipramin intoxication, hypothermia and pneumonia could be established as the cause of death. Autolysis or blood congestion can only favour the occurrence of a pink discoloration. Pink phenomena depend on special anatomical features such as the existence of porous structures protected by a dense material, which explains the occurrence of a pink discoloration in teeth and fingernails. The non-specificity of congestion, its genesis and reinforcement by exogenous factors does not allow pink phenomena to be used as specific forensic evidence.

Key words Pink teeth · Pink fingernails · Haemoglobin · Putrefaction

Introduction

Bell (1829) described a pink discoloration of teeth which occurs after a period of degradation of the corpse and called it the “pink teeth phenomenon”. While he made his observations in cases of drowning and hanging, Miles et al. (1953) stressed the occurrence of this phenomenon in cases of strangulation and carbon monoxide intoxication in connection with the Christie murder case. However, the pathognomic value of pink teeth is more than doubtful since it has been described in a variety of unnatural causes of deaths (Van Wyk 1987; Kirkham et al. 1977; Borrmann et al. 1994). We report the occurrence of pink teeth in the corpse of a female because similar changes in colour were also found in the fingernails. To our knowledge, the combination of pink nails and pink teeth has not previously been reported.

Case report

In December 1995 a partially clothed female corpse was found lying face up with the hands on the abdomen by a group of hunters in a forest close to a small town in Westphalia. The corpse was in a state of advanced decomposition and putrefaction and additional clothing was found in the vicinity. The police and the medical examiners noticed the pink teeth at the scene (Fig. 1 a).

On the basis of a missing persons report the corpse was soon identified by dental comparison to be that of a 39-year-old depressive woman who had been released from psychiatric treatment in October and had not attended the out-patient care. At autopsy, Wischnewski hemorrhagic petechiae were found in the stomach mucosa as a sign of hypothermia and hyperdensities in the lungs. Despite the considerable putrefaction pneumonia could be demonstrated histologically in all lobes of the lung but there were no signs of aspiration.

Autopsy findings and forensic stain investigations did not reveal any signs of violence or a sexual offence. Toxicological examinations established a lethal concentration of the tricyclic antidepressive trimipramin. Therefore, the cause of death was determined to be a trimipramin intoxication in combination with hypothermia and manifestation of a pneumonia over a protracted course.

The pink discolouration was most pronounced at the neck of the teeth, however not all of the teeth were affected and the extent of the pink discolouration varied from tooth to tooth. Microscopy of decalcified histological sections showed that the dentinal tubules, particularly in the root area, were filled with hemoglobin derivatives (haemoglobin staining according to Okajima and immunohistochemistry using anti-haemoglobin antibody, DACO, ABC method). The enamel was free of discolouration and the pulp was largely empty (Fig. 1 b). A comparable band-like pink discolouration of the fingernails was seen especially on both thumbs and the left little finger (Fig. 2 a). The discolouration clearly differed from the multicoloured remnants of the livores in other body

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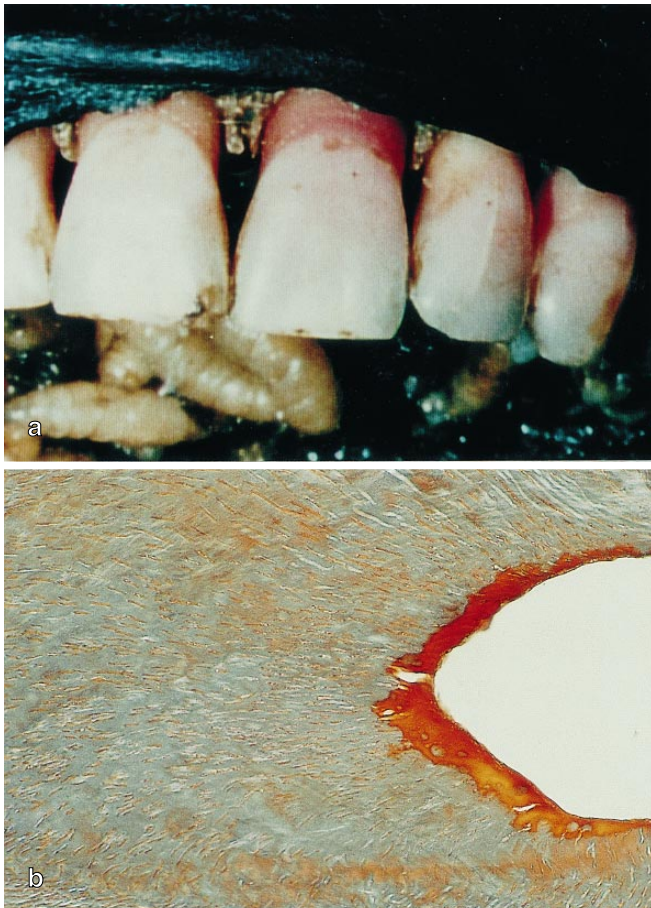


Fig. 1a, b Pink teeth in a corpse found in the woods. **a** Macroscopic appearance. **b** The dentinal tubules of the decalcified dentin demonstrate a positive haemoglobin staining. The pulp seems empty except for positive stained remnants on the cavity wall



Fig. 2a Pink nail with a band-like subungual discolouration of the right thumb. **b** Cross section of the discolored zone reveals dilated blood vessels filled with homogeneous substance under a inconspicuous nail (right side, HE)

regions. After the nails were cleaned with acetone it was obvious that the discolouration was not caused by remnants of pink nail varnish. After the nails were removed, the discolouration could be demonstrated in the nail beds but not in the nail itself. Histologically, dilated blood vessels in these areas were found to be tightly packed with a homogeneous reddish substance (Fig. 2b). Positive haemoglobin staining including anti-Hb immunohistochemistry identified this substance to be haemoglobin or its derivatives presumably from haemolysed blood. Spectrophotometric CO-Hb quantification yielded 3% COHb in the heart blood possibly due to smoking, but in the subungual tissue CO-Hb could not be detected by gas chromatography. Cigarettes and a lighter were found at the scene.

Discussion

The pink discolouration of teeth postmortem obviously results from an imbibition of haemoglobin and haemoglobin breakdown products into the dentinal tubules. The haemoglobin could originate from intravasal erythrocytes or from extravasated erythrocytes in congestion bleedings

(Van Wyk 1987). Exogenous factors such as a latent period (at least 1 week autolysis) active or passive blood congestion from a head-down position or an agonal congestion and a damp environment can favour the formation of pink teeth (Borrman et al. 1994). The occurrence and the long time stability of the pink colour seems to depend on the special anatomical conditions of dentin such as the existence of porous structures in the form of dentinal tubules in the hard and dense dentin. The enamel is more compact than dentin and did not show a pink discolouration in our case. Van Wyk (1988) has already stressed that the enamel will not be discoloured.

Adjacent hard and dense tissue could also play a role in the occurrence of pink nails. The congested blood vessels of the nail beds and the surrounding tissue could be protected from drying and possibly from (oxidative) degradation similar to the blood substances in the dentinal tubules of pink teeth. It can be assumed that this protective effect was also responsible for the occurrence and the long time stability of the pink discolouration of the fingernails in the case presented.

Ikeda et al. (1995) pointed out the remarkable stability of the pink teeth phenomenon. The teeth in our case did

not show any considerable fading of the pink colour after storage for 2 days at room temperature or after storage for 6 months at -18°C and protection from air contact. With reference to Sjöstrand (1952) and White (1970), Beeley and Harvey (1973) assumed that the pink discolouration of the teeth could be produced by the postmortem production of COHb. The negative result of the examination of the subungual tissue for COHb in the case described, however, does not allow such a conclusion. It should also be stated that a change in colour typical for COHb will only occur at relatively high COHb concentrations.

The postmortem occurrence of pink nails has not been reported in the literature, but the non-specificity and the long-time stability of the pink discolouration suggests that pink phenomena are not completely uncommon in putrefied corpses.

In conclusion, blood congestion and autolysis are prerequisites, but the occurrence of a pink discoloration in certain body regions may be due to special anatomical conditions and may be largely independent of the cause of death. Consequently, the non-specificity of congestion events and the possibility of postmortem congestion genesis or reinforcement by exogeneous factors does not allow pink phenomena to be used as specific forensic evidence.

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