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Risks and Health Effects from Tattoos, Body Piercing and Related Practices

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recent study⁷³. Black lymph nodes that clinically resembled metastatic disease were identified. Subsequent histological examination revealed normal lymph node architecture with a heavy collection of black pigment. Mass spectrophotometry showed this pigment to be consistent with tattoo dye. A patient who had undergone dermabrasion for removal of decorative tattoos developed malignant melanoma in the same extremity. Clinically suspicious black lymph nodes were identified during ELND. Histological examination did not reveal metastatic disease. Additional therapy was not considered intra- or postoperatively even though the clinical suspicion of metastatic disease was high. The patient was not subjected to any unnecessary emotional or physical distress pending histological confirmation. Tattoo pigment in the lymph nodes may clinically mimic metastatic melanoma. Histological confirmation of metastatic disease should always be obtained before additional therapy is considered.

3.3.9 Risks of the laser treatment of tattoos

The absorption of the light pulses in the tattoo pigments is the first and important step to tattoo removal using Q-switched lasers. The absorbed energy is converted to heat (photothermal effect) or breaks chemical bonds inside the pigment (photochemical effects). After the ultrashort heating of the pigment surface shock waves are induced leading to a mechanical destruction of the pigments. As a response, a multitude of mechanisms may occur at the same time. Large aggregates and agglomerates break down into smaller crystals. Particles pulverize and form a solution of pigment molecules. Molecules can break up, resulting in decomposition products or molecular structure change. Due to fragmentation of the tattoo pigments, small pigment particles, unknown decomposition products and newly generated chemical compounds may be then removed from the skin via blood vessels or the lymphatic system. On the other hand, the pigments remaining in the skin may exhibit different chemical characteristics as compared to non-irradiated pigments. Thus, there might be again a reaction of the immune system. Moreover, it was shown that carcinogenic amines are generated by a laser-induced cleavage of azo dyes⁷⁴.

3.3.9.1 Allergy

As described above the laser treatment induce old/new chemical compounds in the skin leading to allergic reactions.

- A) Cinnabar (mercuric sulphide) is the most common cause of allergic reactions in tattoos and is probably related to a cell-mediated (delayed) hypersensitivity reaction. The purpose of these case presentations is to describe a previously unreported complication of tattoo removal with two Q-switched lasers. Two patients without

⁷³ Anderson LL; Cardone JS; McCollough ML; Grabski WJ: Tattoo pigment mimicking metastatic malignant melanoma, *Dermatol Surg.* 1996 Jan;22(1):92-4

⁷⁴ Baeumler et al.: *Lasers in Surgery and Medicine*, Volume 30, Issue S14, 2002