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How Fingerprints are Collected on Different Diseases

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Abstract: ***"Everything gets contacts leave trace''. How fingerprints are important in someone while the diseased people can't use fingerprint devices but don't worry, we do have different techniques to trace the evidence. Many people are there who suffer from some of the skin diseases. These types of diseases have a strong influence on the process of fingerprint recognition. For conducting the successful investigation there should be proper planning, People with fingerprint diseases are unable to use fingerprint scanners, which is discriminating for them, they are not allowed to use their fingerprints for the authentication purposes in any place where biometrics is used as a personal identity of a person. Dactyloscopic card and electronic sensors this is followed by some examples of diseased finger fingerprints, acquired both from. Before fingerprints were adopted as a recognition method, bone measurement was performed by the Bertillon method, named after the French policeman Alphonse Bertillon. He claimed each person has different body proportions thus body measurements and photographs were enough for individual identification.***

Keywords: Fingerprints, Diseases, Authentication, Skin diseases, Dermatology, Biometrics, Evidence

1. Introduction

Skin diseases represent a really important, but often neglected factor of the fingerprint acquirement. It is impossible to say in general how many people suffer from skin diseases, because there are so many various skin diseases but we must admit that such diseases are present in our society. The fingerprint recognition technology is very helpful solution capable to resolve all our security problems, we should always always confine mind those potential users that suffer from some skin disease.

After successful recovery of a potential user the situation from such skin diseases is, however, very important for the possible further use of fingerprint recognition devices. If the disease has attacked and destroyed the structure of papillary lines in the epidermis layer of the skin, the papillary lines will not grow in the same form as before and therefore such user could be restricted in his/her future life by being excluded from the use of fingerprint recognition systems, though his fingers don't have any symptoms of a skin disease any more.

Skin Diseases

A lot of skin diseases there are which can affect palms and fingers. We find out the plenty of skin diseases which include description of their influence on the structure and color of the skin in specialized medical literature. In following chapters we describe some of these diseases together with photographs. This is clearly shows that diseases may cause many problems in automatic biometric systems.

Diseases Causing Histopathological Changes of Epidermis and Dermis

These are so many diseases which may cause problems for the most types of sensors.

Fingertip eczema (1) it is very dry, chronic form of eczema of the palmar surface of the fingertips which may be result of an allergic reaction or occur may be in adults and children as an isolated phenomenon of unknown cause. Several fingers or one finger may be involved. The skin may be moist initially and then become dry, cracked, and scaly. The skin peels from the fingertips distally, exposing a very dry, red, cracked, fissured, tender, or painful surface without skin lines – see Figure 1.

Figure 1: Fingertip eczema (1)

Pyoderma (2) is a sign of bacterial infection of the skin. It is caused by Staphylococcus aureus or Streptococcus pyogenes. The Blistering distal dactylitis is a type of pyoderma and this is special characterized by tense superficial blisters occurring on a tender erythematous base over the volar fat pad of the phalanx of a finger (see Figure 2). It is more common for children, and some people are more susceptible to these diseases (such as diabetics, alcoholics, HIV patients, etc.).

Figure 2: Pyoderma (2)

Psoriasis (3) is characterized by silvery-white scaly papules and plaques, sharply demarcated. It occurs in 1% to 3% of the population. This disease is transmitted genetically, and sometimes environmental factors are needed to precipitate the disease. The disease is characterized by chronic life long and, recurrent exacerbations and remissions that are emotionally and physically debilitating. The palms of Psoriasis and fingertips are characterized by red plaques with thick brown scale and may be indistinguishable from chronic eczema or tinea. The scales of lamellar are more adherent than those on other parts of the body, and only their removal will reveal the reddish inflammatory base. There may be cracking and painful fissures and bleeding (see Figure 3).

Figure 3: Psoriasis (3)

2. Conclusion

The skin of the color or the structure of papillary lines on the fingertip could be influenced by the skin diseases. If the color has changed only, some of optical fingerprint scanners might be influenced, and so this change is not crucial. On the other hand, if papillary lines are damaged, the change of skin structure is very significant. It is impossible to find the minutiae and therefore to recognize the person. The fingerprints are prepared with skin diseases from patients, oriented not only on dactyloscopic fingerprints but on live fingerprint images from different fingerprint scanners. For quality assessment resulting images will be used and, if the quality will be acceptable, for minutiae extraction and comparison based on minutiae. Maybe, we will consider other methods, based not only on minutiae but on correlation or other methods as well.

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