Role of dynamic optical coherence tomography for in vivo investigation of nails

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Introduction & Objectives

Nail diseases are often very troublesome to the patient and may present a diagnostic challenge even for an expert dermatologist. Pathologies of the nail bed may be either indistinct or hidden by the nail plate. Currently, nail disease diagnosis is based mainly on clinical examination and dermoscopy assessment although the nail bed can be examined visually only partially. Therefore, in some cases a nail biopsy is required, but it may be unpleasant to the patient, time-consuming and leave scarring and potentially permanent disfigurement of the nail. Non-invasive imaging technologies are of high interest in the study of nails, can facilitate differential diagnosis of pathologies in the nail unit, reduce the number of nail biopsies and may delineate tumours. The main objective of this study was to describe the typical aspect of healthy nail in Dynamic OCT (D-OCT) and assess the morphological changes that occur in different affected nails. Secondary objective was to detect the main characteristics of each nail disease.

Material & Methods

This was an observational, retrospective study carried out in our dermatology center from January 2016 to June 2018. Consecutive patients affected by nail diseases and volunteers with healthy nail were recruited. There were no limitations in age or gender. Standardized clinical and dermoscopic images were acquired per patient. D-OCT (VivoSight®: Michelson Diagnostics, Maidstone, UK) was performed on the surface of any nail investigated at three different distances: proximal nail fold, proximal and distal part of the nail plate. In case of suspicious nail tumour, for a better identification of the lesion and its borders, more D-OCT acquisitions were executed.

Results

25 nail diseases from 126 patients were evaluated and divided in six main groups: nail changes, ungual infections, ingrowing toenails, nail pigmentation, nail neoformations and inflammatory nail

disorders. Mean age of our patient population was 45.7 years (range 9-87) and the majority were female (81 cases, 64.3%). Moreover, 2 healthy nails from 5 volunteers (2 men and 3 women) with a mean age of 34.4 years (range 26-56) were collected.

Conclusions

D-OCT provides the opportunity to evaluate dynamic changes in the nails over time and without interfering with the tissue, and therefore have the potential to provide data superior to sequential biopsies. Therefore, D-OCT is a very useful non-invasive tool that allows an early diagnosis of nail disease, reduces the number of nail biopsies, helps for the biopsy site selection, detection of the nail tumours borders and for the treatment monitoring.