ORIGINAL PAPER

RJME
Romanian Journal of Morphology & Embryology
http://www.rjme.ro/

Digital dermoscopic follow-up of 1544 melanocytic nevi

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Abstract

The use of dermatoscopy increases melanocytic nevi diagnostic accuracy, and is important for dermoscopic monitoring of atypical lesions, allowing to find significant changes in the earliest stage. Dermoscopic diagnosis of melanocytic nevi type in a group of patients and their follow-up with the assessment of changes occurred during dermoscopic monitoring. Dermoscopically, we followed the nevic size and pattern, the color and pigment distribution. Follow-up visits were scheduled depending on the type of the melanocytic lesions and the patient's compliance. The nevi that have shown significant dermoscopic changes were excised and histopathologically examined. The study was performed on a group of 92 patients, mostly females (56.5%), mean age of 29.1 years. Of the total of 1544 melanocytic nevi examined, 27.4% were atypical and 72.6% common nevi. The average dermoscopic examination interval was 14.1 months. During monitoring, 35.5% atypical nevi and 22.5% common nevi have modified, especially changes in pigmentation and color (31% atypical nevi and 9.9% common nevi) and the appearance of new dermoscopic structures (12.7% atypical nevi and common nevi 8.5%). Of the total nevi monitored, 3% showed significant changes and were excised and examined pathologically, without diagnose of any malignant transformation. In our study, dermoscopic changes appeared in atypical as well as in common nevi. The dermoscopic monitoring of melanocytic-pigmented lesions remains an accessible method of assessment the evolution of nevi and can reduce the risk of appearance of malignant melanoma in the general population.

Keywords: atypical melanocytic nevi, common nevi, dermoscopic follow-up, significant change.

Introduction

The use of dermoscopy as non-invasive method in dermatological examination increases the accuracy of melanocytic-pigmented lesions diagnosis, including melanoma, as it is demonstrated in several studies [1–3]. Individuals with multiple melanocytic nevi, especially with atypical nevi, initially described as melanocytic dysplastic nevi (MDN) [4] or atypical mole syndrome (AMS) have high risk for melanoma occurrence, therefore the melanocytic pigmented lesions should be dermoscopic monitored [5]. On the other hand, the natural evolution of the nevi is influenced by physiological periods such as growth, adolescence, pregnancy [6]. It is known that children predominantly have the globular or homogenous pattern, with changes in the follow-up to the mixed pattern, especially on larger nevi [7, 8]; in teenagers, many nevi show central reticular pattern surrounded by a peripheral rim of globules, sign of a growing nevus [6, 9]. Other factors that may influence the pattern and the natural evolution of the nevi are phototype of the skin. The pigmentation of the nevus is usually correlated with the degree of pigmentation of the skin [10] and with the skin reaction to exposure to natural or artificial UV radiation. Also, PUVA (psoralen ultraviolet A) or NB–UVB (narrow-band ultraviolet B) treatments can increase both, pigmentation of the nevi and the number of dots and globules, especially after exposure to NB–UVB [11]. Most individuals with melanocytic-pigmented lesions have common nevi, and, approximately between 7–18%, have multiple atypical nevi [12] with an increased risk of developing melanoma, as the number of atypical nevi is higher [13]. Both, common nevi and atypical melanocytic lesions, may change during dermoscopic monitoring, that is during the lifetime, with a period of growth and structural re-arrangement of the nevus to the stabilization and even "physiological" regression with maturity and aging [6]. Patients with melanocytic-pigmented lesions appear to the dermatologist without making a distinction between common and atypical nevi. Often common papillomatous nevi are self-considered by the patient as "risky", and atypical macular nevi being ignored.

Currently, there are significant dermoscopic criteria [14], which evaluate whether a lesion is suspected of malignant transformation and requires excision, as a preventive method for melanoma incidence. Transformation of a mole into melanoma is not predictable, but, periodical dermoscopic follow-up of melanocytic nevi, can ascertain their significant changes. Thus, the dermatologist has the responsibility to maximize the performance of the diagnosis and, by selection of atypical melanocytic lesions, reducing the number of unnecessary excisions of moles [15].

The objectives of our retrospective study have been to establish the dermoscopic diagnosis of the type of nevi in a group of patients with multiple melanocytic lesions and their follow-up with assessment of dermo-

scopic changes both of atypical and common melanocytic nevi occurred during monitoring.

Patients and Methods

The study was performed on a group of 92 patients, enrolled and examined between January 1, 2008, and December 30, 2012, with multiple melanocytic lesions presented at clinical examination. The total number of nevi examined and dermatoscopic followed was 1544. All patients were examined by the same dermatologist after obtaining the informal consent of the patients. The examination was performed using a Heine Delta 20 Dermatoscope attached to a Canon A570IS camera. Later on, the images with resolution of 3072×1728 pixels were stored in a database. Clinically, we have followed the location and the type of nevi and dermoscopically we followed the size of the nevic lesion, the nevic pattern, the coloration and the pigment distribution. We have supported the diagnosis of atypical nevus *versus* common nevus by the presence of dermoscopic characteristics common in atypical nevi, according to the pattern analysis proposed by Pehamberger *et al.* [16]. Follow-up visits were scheduled at different intervals depending on the type of the melanocytic lesions (dermoscopic atypia) and the patient's compliance. During each visit, we have examined the whole body to detect newly appeared pigmented melanocytic lesions. We have looked for changes of the size, pigmentation and color of the nevi lesions, the pigment network changes and the occurrence of new dermoscopic structures. The nevi that have shown significant dermoscopic changes during dermoscopic monitoring were excised and pathologically examined. The patients were questioned about personal or family history of melanoma. Patients who did not present at dermoscopic follow-up visits were excluded from the study.

Results

The study group consisted of 92 patients: 52 (56.5%) women and 40 (43.5%) men. The mean age of the patients was 29.1 years, the median age 29.5 years (range 5–64 years) (Figure 1).

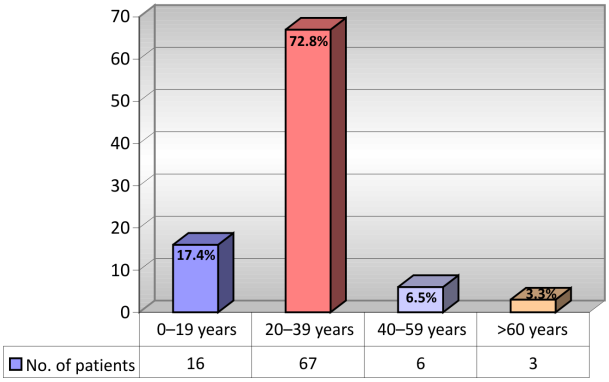

Figure 1 – ***Distribution of patients by age groups.***

9.8% patients had a history of melanoma: five (5.4%) patients personal history and four (4.4%) patients with family history.

The total number of nevi lesions dermoscopically examined was 1544, with an average of 16.7 nevi/patient (range 1–33 nevi/patient). Of the total number of nevi, 423 (27.4%) were atypical nevi and 1121 (72.6%) common nevi. Most nevi were located on the trunk – 1209 (78.3%), the rest being placed on the limbs – 295 (19.1%), face – 34 (2.2%), and in the acral region – six (0.4%) nevi. The dermoscopic examination interval, with an average of 14.1 months, median interval of follow-up 12 months (range 1–48 months), varied depending on the presence and number of atypical nevi and the patient's compliance (Table 1).

Table 1– ***Distribution of nevi according to the clinical and dermoscopic type and the interval of dermoscopic examination***

	Total No.	One month	Three months	Six months	12 months	24 months	36 months	48 months
Atypical nevi	423 (27.4%)	1 (0.2%)	12 (2.8%)	106 (25.1%)	203 (48%)	81 (19.2%)	20 (4.7%)	–
Common nevi	1121 (72.6%)	4 (0.4%)	7 (0.6%)	212 (18.9%)	600 (53.5%)	272 (24.3%)	23 (2%)	3 (0.3%)

Dermoscopic features prevailed in atypical nevi were: size >5 mm – 274 (64.8%), reticular pattern – 202 (47.7%) nevi, 225 (53.2%) nevi with three colors and 159 (37.6%) showed central hyperpigmentation (Table 2).

During monitoring, 150 (35.5%) atypical nevi had dermoscopic modifications, as follows: changes of size – 19 (4.5%), changes of pigmentation and color – 131 (31%), pigment network changes – 13 (3.1%), and appearance of new dermoscopic structures 54 (12.7%) nevi (Table 3).

In the range of dermoscopic common nevi follow-up, 206 (22.5%) nevi presented dermoscopic changes like: changes of size – 32 (2.8%), changes of pigmentation and color – 111 (9.9%), pigment network changes one (0.1%), nevus and appearance of new dermoscopic structures – 95 (8.5%) nevi (Figures 2–5) (Table 3).

Of the total number of monitored nevi, 47 (3%) showed significant dermoscopic changes, which for we recommended surgical excision and histopathological examination of these nevi. The histopathological results confirmed 15 (1%) atypical and 32 (2%) common nevi.

Table 2 – ***Distribution of atypical nevi according to dermoscopic features***

Dermoscopic features		No. of nevi (%)
Pattern	Reticular	202 (47.8%)
	Globular	14 (3.3%)
	Homogenous	74 (17.5%)
	Combined	133 (31.4%)
Pigment distribution	Uniform	102 (24.1%)
	Central hyperpigmentation	159 (37.6%)
	Central hypopigmentation	33 (7.8%)
	Peripheral hyperpigmentation	68 (16.1%)
	Peripheral hypopigmentation	2 (0.5%)
	Multifocal hyperpigmentation	20 (4.7%)
	Multifocal hypopigmentation	39 (9.2%)
Color	Two colors	44 (10.4%)
	Three colors	225 (53.2%)
	Four colors	154 (36.4%)
Size	≤5 mm	149 (35.2%)
	>5 mm	274 (64.8%)

Table 3 – ***Distribution of dermoscopic changes occurred in atypical nevi versus common nevi***

	No. of atypical nevi (AN)/common nevi (CN) dermoscopic changed	One month AN/CN 0/2	Three months AN/CN 5/1	Six months AN/CN 34/21	12 months AN/CN 66/102	24 months AN/CN 36/71	36 months AN/CN 9/6	48 months AN/CN 0/3
Size changes	Symmetrical increase	0/1		1/3	2/9	3/3	1/1	
	Asymmetrical increase			0/1	3/5	7/7	2/1	0/1
Pigmentation and color changes	Symmetrical accentuation of pigmentation and color		1/0	2/1	5/9	4/9		
	Asymmetrical accentuation of pigmentation and color		2/0	12/1	23/16	7/8	6/0	0/1
	Symmetrical depigmentation		1/1	3/1	11/15	2/6	1/0	0/1
	Asymmetrical depigmentation		2/0	15/10	22/15	12/14	0/3	
Pigment network changes	Pigmented network changes		1/0	1/0	4/1	6/0	1/0	
Appearance of new dermoscopic structures	Appearance of grey-blue areas		1/0	6/0	12/1	2/2	0/1	
	Appearance of white-colored structures			1/0	4/1	5/0		
	Appearance of red-colored structures	0/1		0/3	0/21	0/22	0/1	
	Appearance of peripheral dots/globules	0/1		2/0	6/10	3/7		
	Appearance of central dots/globules			1/2	4/4	1/3		0/1
	Appearance of peripheral and central dots/globules				3/7	3/7		

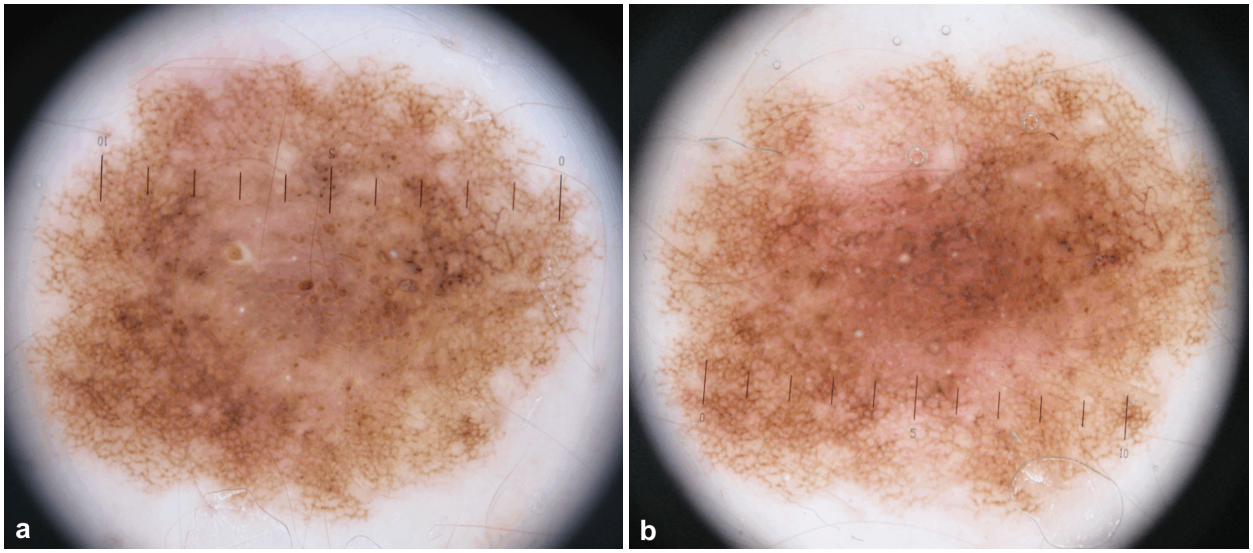

Figure 2 – ***The first dermoscopic visit (a) and three months after (b): asymmetrical depigmentation, pigment network changes and appearance of the pink-red colored structures.***

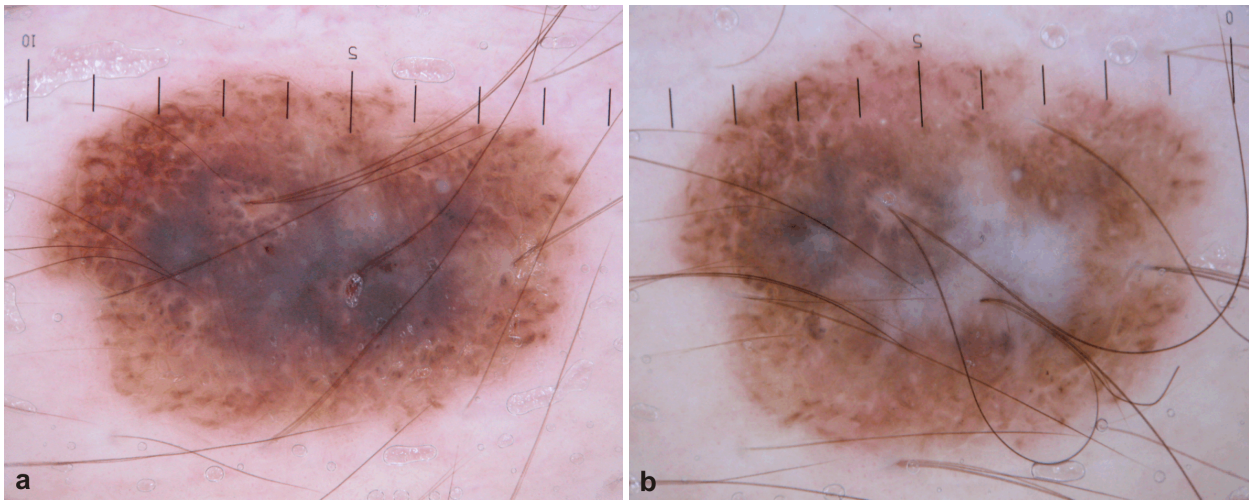

Figure 3 – ***The first visit (a) and 12 months after (b): appearance of white-colored and blue-gray structures (regression area).***

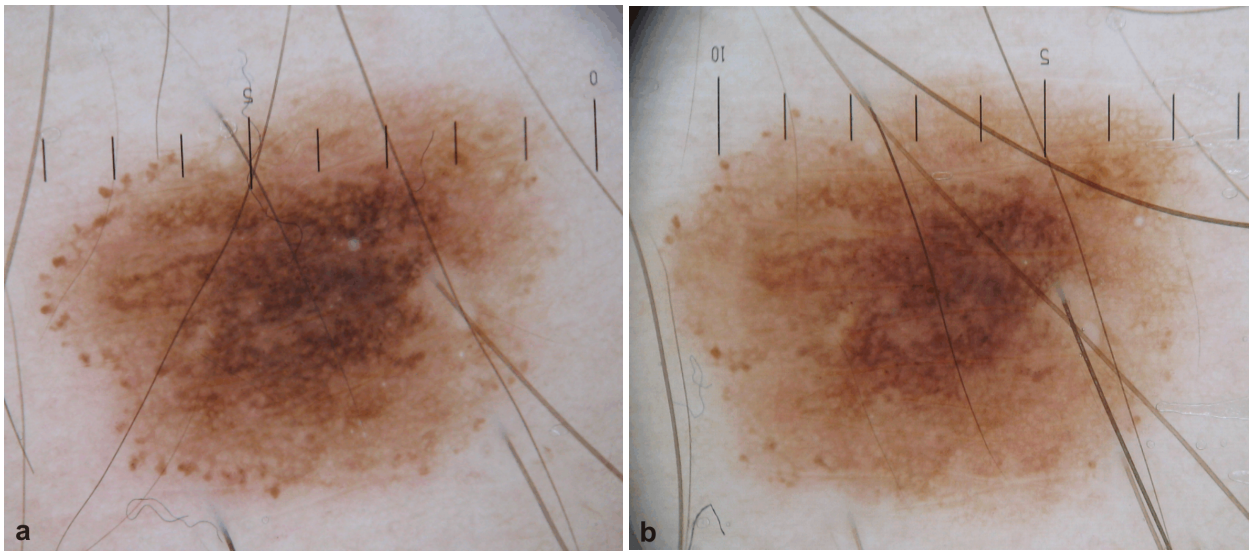

Figure 4 – ***The first visit (a) and 12 months after (b): disappearance of peripheral brown globules and increase in size.***

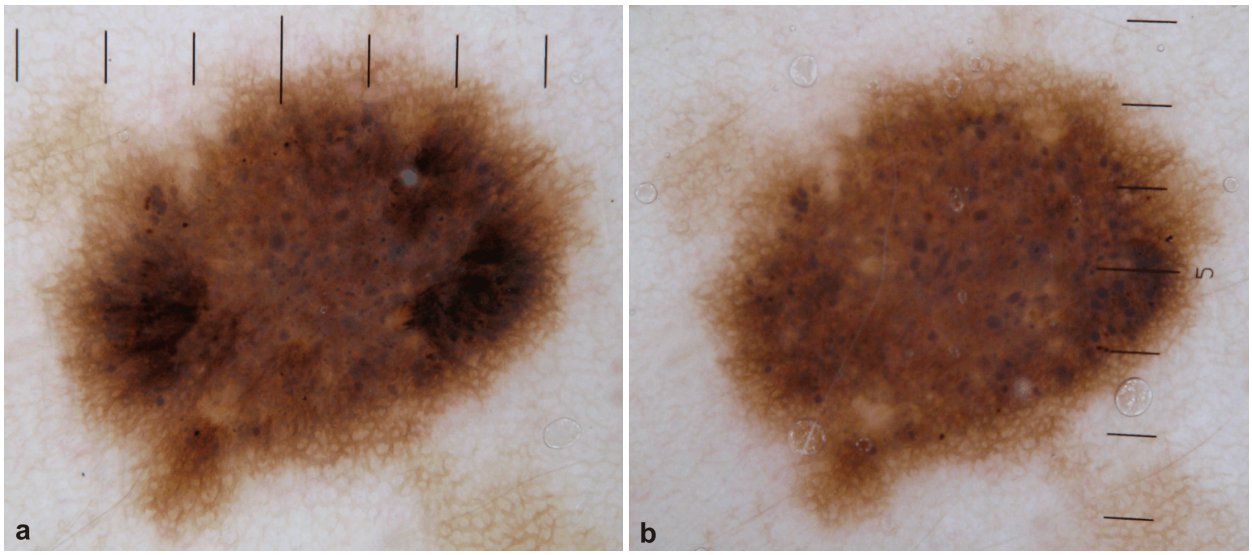

Figure 5 – ***The first dermoscopic visit (a) and three months after (b): asymmetrical depigmentation with homogenization of pigment network.***

Discussion

The clinical distinction between benign and malignant pigmented lesions may be challenging in some cases [17], but the introduction in recent decades of dermoscopy improved the accuracy of the diagnosis of melanocytic skin lesions.

The dermoscopy makes a link between the dermatological clinical examination and the dermatopathology, providing additional morphological details, recently bringing its contribution in understanding the mechanisms of nevogenesis [18]. A meta-analysis of 27 studies showed that dermoscopy improves the accuracy of the diagnosis of melanoma by 49% compared to the clinical naked eye examination [3].

There are studies showing that if a person has 100 to 115 nevi, the risk of developing melanoma is 7 to 12 times higher than a person with a maximum of 10 to 15 common nevi. The risk that a person with five atypical nevi develops melanoma is six times higher than in a person without atypical nevi [13].

In our study, we started from the premise that the existence of more nevi in a person, especially atypical nevi may represent a risk factor in the development of melanoma [13, 19–21], and the periodical follow-up of atypical nevi (AN) may detect at an early stage their transformation into melanoma *in situ*. On the other hand, people who come voluntary, to clinical and dermoscopic examination of melanocytic lesions usually have common melanocytic nevi, while atypical nevi are present in a smaller percentage [12], except for the atypical mole syndrome (AMS). Thus, on our group of patients, we have made clinical and dermatoscopic examination of 92 individuals, with a total of 1544 pigmented melanocytic lesions, without selecting cases, respectively of atypical or common melanocytic nevi types.

The epidemiological data of patients in our study were as follows: women (56.5%), mean age of 29.1 years (Figure 1), the mean interval of follow-up of moles being 14.1 months (1–48 months), relatively similar data with other studies. Thus, in a study published by Kittler *et al.* who dermoscopically monitored 1612 common nevi, the study group was composed of 55.6% women, with mean

age of 34.2 years and the average monitoring period of 11.4 months (1–23 months) [22]. Schiffner *et al.* [23] have followed dermoscopic 272 melanocytic nevi, for an average period of 24 months (4–45 months), the group studies consisted of 54% women with the mean age of 28 years.

Of the total of 1544 melanocytic lesions examined and recorded, atypical nevi represented 27.4%. The recommended interval between examinations was 12 months for most of the lesions and for some atypical lesions "ugly-duggly" three or six months. The patient's compliance was different, which led to the dispersion of the follow-up interval from one month in more anxious patients up to maximum 36 months for 4.7% of atypical moles and 48 months for common nevi, in 0.3% of the cases. This demonstrates that the follow-up visit depends more on the patient's awareness and fear, than on the advice of the dermatologist.

In our study during follow-up, from a total of 423 atypical nevi a number of 150 (35.5%) have undergone one or more dermoscopic changes, as follows: changes of size – 19 (4.5%), changes of pigmentation and color – 131 (31%), pigment network changes – 13 (3.1%) and appearance of new dermoscopic structures – 54 (12.7%) of nevi.

A study conducted by Fikrle *et al.*, published in 2013 [24], showed that of 1027 melanocytic lesions with risk of transformation, a higher percentage of nevi have presented dermoscopic changes compared to our study, (49.9% *versus* 35.5%), implicitly color and pigmentation changes (42.3% *versus* 31%). Two major elements have been noted in the Fikrle *et al.* study: first that 46.6% of the patients monitored had personal history of melanoma compared to the patients in our study group (only 9.8% with personal or family history of melanoma) and the second is that 86% of the patients had a history of repeated sunburns.

Exposure to UVB may generate morphological changes of melanocytic nevi, especially changes of pigmentation and coloration [11, 25]. In our study, atypical nevi monitored had changes of pigmentation and coloration significantly higher than the common nevi (31% *versus* 9.9%) possibly after UV exposure recognized in the patient history.

In the case of common nevi, 206 (22.5%) presented dermoscopic changes during monitoring, as follows: changes of size – 32 (2.8%), changes of pigmentation and color – 111 (9.9%) nevi, pigment network changes – one (0.1%) nevus, and appearance of new dermoscopic structures – 95 (8.5%). The study coordinated by Kittler *et al.* [22] on 1612 common nevi showed that 5.3% of the nevi increased in size and 31.2% of the nevi had other dermoscopic changes.

In our study group, significant dermoscopic changes, such as: change of shape, color, increase in size, regression and appearance of epiluminescence microscopy (ELM) structures known to be associated with melanoma, were found in 47 (3%) moles of the total monitored nevi, result close to other studies.

A particular aspect of our study is the fact that during the dermoscopic monitoring, out of a total 1544 melanocytic lesions, we have not detected any malignant transformation of the followed melanocytic lesions. Other similar studies have published follow results: Kittler *et al.* [14] found eight cases of melanoma of 1862 melanocytic lesions, and Fikrle *et al.* [24] detected 11 cases of melanoma of 1027 melanocytic lesions. We believe that the difference comes from the appearance of the melanocytic lesions; most nevi monitored being common moles (72.6%), without selecting cases and mean age of 29.1 years of our study group. In other studies mentioned, patients with atypical nevi were selected (Kittler *et al.* study [22]), with increased risk of malignant transformation, and the mean age of the patients in Fikrle *et al.* study [24] was 40.4 years. Similar results regarding the detection of melanoma have been published by Schiffner *et al.*, in 2003 [23], in a study conducted on 145 patients (75% of patients with low risk, 25% with high risk), following dermoscopic changes of 272 melanocytic nevi for an average period of 24 months. They did not detect any melanoma.

Conclusions

Dermoscopic monitoring of pigmented melanocytic lesions is important for identification the nevi with a risk of transformation into melanoma and deciding their excision as a preventive method for melanoma occurrence; it also has a major role to detect, among the existing melanocytic lesions, sometimes multiple, other pigmented lesions occurring *de novo* that could be melanoma *in situ*, mistaken for melanocytic nevi. Atypical melanocytic lesions and common nevi, as well, could modify during dermoscopic monitoring, also during lifetime and need to be recognized as significant or not. There were a total of 1544 monitored dermatoscopic melanocytic lesions. During monitoring 35.5% of atypical nevi and 22.5% of common nevi suffered dermoscopic changes. During dermoscopic monitoring period, no melanoma was diagnosed.

Conflict of interests

The authors declare that they have no conflict of interests.

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Received: March 18, 2015

Accepted: December 30, 2015