# Dermatoscopy in the early detection, control and surgical planning of basal cell carcinomas

A dermatoscopia na detecção precoce, controle e planejamento cirúrgico dos carcinomas basocelulares

## ABSTRACT

**Introduction:** Dermatoscopy can help practitioners analyze details that are imperceptible to the naked eye, such as basal cell carcinoma arboriform vascularization patterns, which can be linked to the tumoral limit. Clinical examinations might yet fail in the early detection and demarcation of the extension of such lesions.

**Objective:** To study the use of dermatoscopy in basal cell carcinomas, aiming at early detection and delimitation of their extension. Method: Basal cell carcinomas (n = 123) were studied prospectively and not randomly, using dermatoscopy, at the author's private practice. Suspect areas, mainly the nose, underwent dermatoscopic scanning. If the vascular pattern was identified, the tumor was delimited by dermatoscopy, and the incision was carried out using that marking. Surgical margins were checked using conventional cuts, cross sections or micrographic surgery.

**Results:** The vast majority of the tumors (92%) were located in the face, of which 59% were not well delimited, 21% were well delimited, and 20% were clinically undetectable. Although the vascular pattern was not observed in 18% of the tumors, in cases with a positive identification, it correctly delimited the tumors in 84% of cases (of which 44% were verified with conventional sampling, 48% with micrographic surgery and 8% with cross sections).

**Conclusion:** Dermatoscopy is an important tool in the early detection and delimitation of the superficial extension of basal cell carcinomas, and is helpful in the surgical planning and clinical control of such lesions.

**Keywords:** dermoscopy; carcinoma, basal cell; mohs surgery; blood vessels; capillaries.

## **RESUMO**

**Introdução:** A dermatoscopia observa detalhes imperceptíveis a olho nu, como os padrões de vascularização arboriforme dos carcinomas basocelulares, que podem estar relacionados com o limite tumoral. O exame clínico pode falhar na detecção precoce e delimitação da extensão dessas lesões.

**Objetivos:** Estudar a utilização da dermatoscopia nesses tumores visando a sua detecção precoce e à delimitação de sua extensão.

**Métodos:** Estudaram-se 123 carcinomas basocelulares com dermatoscopia, prospectivamente, de forma não randomizada, em clínica privada, efetuando varredura com o dermatoscópio em áreas suspeitas, principalmente no nariz. Caso o padrão vascular fosse identificado, o tumor seria delimitado pela dermatoscopia. A incisão se daria nessa marcação. Observou-se a margem cirúrgica com amostragem convencional, cortes seriados ou cirurgia micrográfica.

**Resultados:** 92% dos tumores se localizaram na face. Destes, 59% eram mal delimitados, 21% bem delimitados, e 20% clinicamente imperceptíveis. O padrão vascular não foi observado em 17,9% dos tumores, mas quando identificado, delimitou o tumor corretamente em 84% dos casos (destes, 44% verificados com amostragem convencional, 48% com cirurgia micrográfica, e 8% com cortes seriados).

**Conclusões:** A dermatoscopia é importante instrumento na detecção precoce e na delimitação de sua extensão superficial, auxiliando no planejamento cirúrgico e controle clínico dos carcinomas basocelulares.

**Palavras-chave:** dermatoscopia; carcinoma basocelular; cirurgia de Mohs; vasos sanguíneos; capilares.

## Original Article

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## INTRODUCTION

Although it is the most common cancer in humans, the clinical diagnosis of basal cell carcinoma (BCC) is not always straightforward. Presser and Taylor's 1987 study carried revealed only a 70% success rate in diagnosing the condition in an academic setting when using only clinical criteria.<sup>1</sup> In addition to difficulties in diagnosis, it can also be hard to delimit BCC tumors on a purely clinical basis – especially those of predominantly infiltrative growth, which require micrographic surgery since the safety margin concept is inadequate.<sup>2</sup>

Dermatoscopy has already demonstrated its great value in the evaluation of cutaneous tumors; it is an indispensable tool in daily dermatological practice.3 Initially used to examine pigmented skin lesions, it is increasingly being applied to all types of cutaneous tumors. However, since most BCCs are not pigmented, dermatoscopy can identify these tumors by their vascularization. In their study of the vascularization of cutaneous tumors, Kreusch and Koch described arboriform vessels in 95% of the examined BCCs.4 Additionally, Kreusch suggests that the tumorous limits of BCCs can coincide with the limit observed in their vascularization; the capillaries of such tumors emerge in the periphery of the lesions, crossing over the lesion.<sup>5</sup> Since the vascular pattern in BCCs differs substantially from that of telangiectasias of normal skin - often visible even to the naked eve - the isolated detection of that type of vascularization through dermatoscopy can signal the presence of a lesion in its initial stages, which is practically imperceptible in a clinical examination. Taking into account that patients with a history of BCCs are 40% more likely to develop a new BCC than the population in general,6 with lesions occurring mostly in the face (especially in the nose),<sup>7</sup> the early detection of new tumors, when they are not yet clinically visible, would be very helpful in treating those patients.

While dermatoscopy has already demonstrated its utility in evaluating pigmented lesions, there has been little attention devoted to its use in non-pigmented lesions – particularly in BCCs. This study demonstrates the importance of dermatoscopy in the early detection and delimitation of BCCs, which could have an enormous impact on their control and surgical planning.

#### **METHODS**

BCCs (n = 123) were examined using dermatoscopy in a prospective, open study carried out at the author's private practice between September 2007 and July 2010. For tumors that could be identified clinically (i.e., without dermatoscopy), dermatoscopy was used to delimit the lesion in order to better plan the surgical treatment. The whole tumoral region, identified by the presence of the arboriform pattern, was marked. The incision was carried out using this marking, with no additional safe-ty margin.

The decision to choose conventional or micrographic surgery was based more on the clinical situation than the accuracy of the dermatoscopic data. If micrographic surgery was indicated, the Munich method would be used so that the ratio of tumor/margin could be examined. In this method, the whole surgical piece – and not only the outer edge (surgical margin) – is studied using sequential parallel cuts carried out each 50-100 micra, extending from the bottom to the epidermal border of the specimen. In that way, even if the tumor has been totally extirpated without touching the surgical margin, it can still be seen in relation to the latter. If it was not possible to clinically identify the tumor, a dermatoscopic screening would be carried out in the suspected area, aiming to identify the characteristic vascular pattern. For patients with a history of BCCs who returned periodically for routine examinations, a dermatoscopic evaluation would be conducted all over the nose, even in the absence of clinical suspicion.

All cases were photographed both clinically and dermoscopically. A stereoscopic dermatoscope of great magnification (up to 60x) was used (Kocher GmbH, Mössingen, Germany) (Figure 1). The pictures were captured with a Sony Cybershot DSC F717 camera with an Optiview adapter (Optiview Ltda., São Paulo, Brazil) or with a Fotofinder® (Fotofinder Systems GmbH, Germany).

## RESULTS

Of the 123 tumors observed, 92% were located on the face. Of those, 59% were clinically poorly delimited, 21% were well delimited, and 20% were clinically imperceptible. Among the latter (a total of 25 tumors) only five were not located on the nose, and were discovered using dermatoscopic screening in an area indicated by the patient as suspicious for having already presented a small amount of bleeding or desquamation. Nonetheless, there were no clinical indications of a BCC in these other areas.



Figure 1: Stereo dermatoscope with 60x magnification capacity, manufactured by Kocher GmBh (Mössingen, Germany), used in most exams

It was impossible to observe the vascular pattern in 22 (17.9%) of the 123 BCCs, even though a previous biopsy and the surgery itself demonstrated the histological presence of carcinoma. Among those 22 tumors, only one was clinically well delimited, and in only two cases a small amount of pigment was detected in the dermatoscopy. Of the 101 BCCs with arboriform vessels that were identifiable using dermatoscopy (82.1% of the total), all had their lateral limits demarcated by the dermatoscopic results; surgical margins were uncompromised in 84% of the cases. Of these 101 BCCs, 44 cases (44%) were verified using conventional sampling, 9 (8%) through serial cuts and 48 (48%) with the Munich method of micrographic surgery.

When analyzing only tumors excised with micrographic surgery, 16 (33%) cases presented compromised margins in the first stage, and five cases did not demonstrate the presence of a tumor in the second stage. In eight cases, the tumor was present until the second stage. In three cases there was residual BCC until the third stage.

One false positive case was observed, with dermatoscopic findings of arboriform vessels and histopathologic findings of an intradermal melanocytic nevus associated with sebaceous hyperplasia in a lesion located in the nose.

## DISCUSSION

In this study, the percentage of BCCs that presented an arboriform vascular pattern was well below the one found by Kreusch and Koch.<sup>4</sup> This can perhaps be explained by the different sampling methods used in the two sites where the study was carried out. The author's private practice receives a great number of referrals for micrographic surgery of lesions that have recurred, in general, one or more times. Usually, the tumor is either hidden by flaps or does not present the usual clinical characteristics of BCCs anymore, or has lost its more visible and diagnosable characteristics in a previous surgery. Patients come in search of a solution to the problem of a compromised surgical margin, clinically presenting only a scar from a previous surgery. Four of the 25 cases of clinically imperceptible tumors had a similar history.

With the first dermatoscopic findings yielding negative results, the lesions were treated as cases where the surgical margins had been compromised, with the absence of clinically perceptible symptoms except for the scar. Since the histopathologic examination sample that had yielded a report of a compromised margin suggested a possible false positive case (specimen without dye in the margin, artefacts originated in the handling of the surgical sample, etc),<sup>2</sup> it was decided that the case would be periodically observed. Within six months to one year, still in the absence of clinical signs, the emergence of the vascular pattern could progressively be perceived by observation (scanning examination) of the suspicious site, suggesting the need for micrographic surgery. Such cases were not recorded as yielding negative results from the dermatoscopic perspective, but as examples of the 25 clinically imperceptible tumors found using dermatoscopy. It is important to note that, unlike dermatoscopes that are more commonly used, the equipment used in this study generates

stereoscopic images of great magnification. The thin and delicate arboriform vascularization detected by that equipment may sometimes pass unnoticed by dermatoscopic examinations with lower optical resolutions, which may hamper or even prevent the identification of a tumor that is still clinically imperceptible.<sup>5</sup> Even the captured photographic images can be difficult when compared to the clearer and more direct visualization available using the dermatoscope used in the present study.

In the studied sample, only 21% of the BCCs were clinically well delimited. Only one tumor did not present the characteristic arboriform vascular pattern, meaning that 79% of the sample was composed of tumors without reliable clinical characteristics for the correct delimitation, which was made exclusively using dermatoscopy. Unlike the markings described in some publications<sup>8,9</sup> or communications issued in medical meetings,10 those carried out in this study were based almost exclusively on the interruption of the vascular pattern, which was detected using dermatoscopy (imperceptible in clinical examinations). This pattern was not perceptible in the pictures published in the literature. The observed dermatoscopic pattern from this study is aligned with that described by Kreusch and Koch<sup>4</sup> and more recently revised by Zalaudek,<sup>11</sup> which was the only criterion used to delimit the tumors - rather than the presence of pigment, which was observed in only two cases.<sup>5</sup> Literature on the subject is still scarce, and the author is not aware of similar data published previously about using these vascular patterns for dermatoscopic delimitation of the lesions or even for early diagnosis. This may be due to the type of dermatoscope used (Figures 2 and 3).

The micrographic surgery method adopted for the verification of the surgical margin is particularly useful, for the Munich method can be used to assess the ratio of tumor/margin. Even with free surgical margins, the site where the tumor was located can be observed - which is not possible in peripheral methods of micrographic surgery.12 When analyzing only cases that used micrographic surgery, residual tumors could not be found in the second phase in five out of 16 cases that had margins compromised in the first phase. In this manner, it is supposed that, for those cases, having found a tumor in the margins might have characterized what is known as 'coincident margins'. This paradox in the analysis of surgical margins has been described in another study,2 however it was instrumental in demonstrating that the marking of the lateral margin using dermatoscopy was correct. Of the 48 cases that had micrographic surgery, only 11 (23%) presented margins that were compromised (of which eight cases presented two phases and only three presented three phases). Micrographic surgery was not indicated in order to double check the dermatoscopy, but rather was influenced by the clinical situation, mainly recurrences, poorly delimited borders or compromised margins in the previous surgery. The 84% rate of negativity of the surgical margins can be challenged, because this was verified through micrographic surgery in 48% of the sample. In comparison, Caresana and Giardini obtained 98.5% of negativity in their cases, yet there was no verification through micrographic surgery. Additionally,



**Figure 2: A.**Poorly clinically delimited infiltrative BCC; **B.** Dermatoscopic aspects of the arboriform vascularization (arrows) and marking (\*); **C.** Delimited lesion; **D.** Histologically, the tumor did not touch the border (arrows) (Munich method of micrographic surgery) (H&E, 100x)

they excluded sclerodermiform BCCs from their sample; all 200 tumors from their study were of the nodular type.<sup>8</sup>

This study's sample contained 79% poorly delimited or clinically imperceptible tumors, with an 84% negativity rate verified through micrographic surgery in almost half of these. It would be interesting to observe the real condition of the surgical margins of all cases through micrographic surgery, studying primary and recurrent tumors in separate groups of patients. This is the only way to more accurately evaluate the precision of tumor delimitation using dermatoscopy. Therefore, although the information collected using dermatoscopy can help, it should not function as an indication as to whether micrographic surgery should be performed. Dermatoscopy works more as a propaedeutic element that is complementary to the patient's complete clinic picture.



**Figura 3: A.** Recurrent, poorly clinically delimited infiltrative BCC; **B** and **C.** Dermatoscopic aspect of the arboriform vascularization (arrows) and marking (\*); **D.** Lesion delimited using dermatoscopy (the tumor was not detected in the second phase of micrographic surgery)



**Figure 4:** Patient with a history of multiple BCCs. In a routine control examination she underwent dermatoscope-based scanning in the nasal region. Despite the absence of any lesion clinically compatible with that diagnostic, an incipient BCC was found.

The discovery of 25 cases of clinically imperceptible tumors, discovered only by scanning, calls attention to the specificity of the arboriform vascular pattern as a predictive factor for BCCs. Since only five cases were not located on the nose, the study suggests that the dermatoscopic scan examination in that part of the body can reveal the presence of incipient tumors in patients with a history of several BCCs, especially because the nasal area is not extensive, and is the location of highest incidence for that type of lesion. Early detection allows more successful control and handling of BCCs (Figures 4 and 5).

## CONCLUSIONS

Identifying the arboriform vascular pattern characteristic of BCCs using dermatoscopy is an important factor in the surgical planning and control of these tumors, for it contributes to their early detection, and is also helpful in determining the clinically obscure borders of the tumors.



**Figure 5: A.** The dermatoscopic scanning of the nose of the patient depicted in Figure 4 showed thin isolated arboriform vessels (arrows). This type of vascularization could not be seen in the rest of the nose; **B.** Marking of the site (compare with Figure 4); **C.** Vascular pattern found (arrows) and marking (30x); **D.** Histopathologic picture confirming the finding (H&E, 100x)

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