Chapter 1
An Approach to the Clinical Diagnosis of Melanoma, Its Precursors, and Its Clinical Mimics

Introduction

Before the 1960s, melanoma was considered a single, monotypic disease with an ominous prognosis. It was during this decade that systematic study of patients with melanoma first began at the Massachusetts General Hospital (MGH) in Boston, Massachusetts, and at the Royal Prince Alfred Hospital in Sydney, Australia. The opportunity to systematically analyze large patient series flowed directly from the establishment of focused multi-disciplinary clinics, of which the seminal example is the Pigmented Lesion Clinic of Massachusetts General Hospital founded by Drs Wallace H. Clark, Thomas B. Fitzpatrick, Martin C. Mihm, Jr, and John W. Raker on April 6, 1966. A primary goal of this clinic was to empha-size clinical diagnosis and to correlate clinical findings directly to histopathology. It was thus that Dr Fitzpatrick was first able to recognize the implication of, and to draw attention to, variegations in the color and border mor-phology of melanocytic neoplasms (Fitzpatrick and Clark, 1964). As a direct result of these clinical and histopatho-logic studies, melanoma was shown to be a disease with several distinct subtypes (Clark et al., 1969; McGovern, 1970). Features of early diagnosis gleaned from systematic analytic methods were published in an atlas of pigmented lesions (Mihm et al., 1973) that was widely distributed. The formation of the Melanoma Clinical Cooperative Group, which included the Pigmented Lesion Clinic at the Massachusetts General Hospital and the subsequently formed pigmented lesion clinics of New York University, Temple University in Philadelphia, and the University of California at San Francisco, led to fruitful clinical, epide-miologic, pathologic, and prognostic studies of nevi and of melanoma and its precursors. Among the many contri-butions that came out of this group effort was an apprecia-tion of the diagnostic features by the clinical practitioner, as encompassed by the mnemonic: "A, B, C, and Ds" of melanoma diagnosis (Friedman et al., 1985), as well as:

1. The addition of acral lentiginous melanoma to the clas-sification scheme.
2. The studies that led to the recognition of a variety of clinical and pathologic factors in prognosis based on mul-tivariate analysis of a variety of different attributes.
3. The recognition of microscopic satellites as a prognos-tic factor and as a predictor of microscopic deposits of melanoma in clinically negative draining lymph nodes.
4. The recognition, at the University of Pennsylvania Pigmented Lesion Clinic, of the dysplastic nevus and of familial clusters that expressed both multiple dysplastic nevi and melanoma.

The references for this chapter cite merely a fraction of the published contributions that flowed from the many studies that subsequently came from a group led by Drs. T. B. Fitzpatrick, W. H. Clark, A. W. Kopf, S. Blois, and A. J. Sober, who directed the effort for 6 years at their institutions, and their teams of dermatologists, surgeons, oncologists, epidemiologists, statisticians, pathologists, and basic scientists (Day et al., 1982a–d, 1983; Harrist et al., 1984). Pigmented lesion clinics are now active in many centers in the United States and throughout the world, coordinating the scientific study of this complex and deadly neoplasm, its precursors, its epidemiologic features, its treatment and basic research into its biology. With respect to the latter, recognition of a heredofamilial basis for some cases of melanoma and its precursors was a key event in the history of clinical oncology and one that led indirectly to the Human Genome Project, which will, ultimately, have the most profound impact on medi-cine and the science of human genomics.

Incidence and risk

The remarkable increase in the incidence of melanoma has led to increased interest in the disease from diagnos-tic, management, and basic science perspectives. In 1935

the risk of developing melanoma in the United States was roughly 1 in 1500. The risk is closer to 1 in 87 in the modern era. This is a worldwide phenomenon (Pizzaro Redondo et al., 1998).

Analysis of the risk of developing melanoma helps to identify those individuals who must be more closely examined and followed. One of the most important risk factors is the presence of a changing mole, which is associated with a higher probability of melanoma, emphasizing the importance of self-examination so as to facilitate prompt presentation to a physician for evaluation. Certainly, the presence of many nevi is in itself a risk factor and necessitates follow-up. The risk associated with dysplastic nevi rises according to the number of dysplastic nevi present in a given patient, the presence of a prior melanoma, and a family history of dysplastic nevi and melanoma. A patient who has multiple dysplastic nevi, a prior history of melanoma, and a family history of melanoma may have a risk several hundredfold higher than a person without these characteristics. Siblings with dysplastic nevi in the setting of familial melanoma have a very high lifetime risk of developing melanoma if another sibling similarly affected develops melanoma (Greene et al., 1985). A person with a single dysplastic nevus without any history of melanoma in the family may have a several-fold increased risk of melanoma compared with someone who has no dysplastic nevi. In contrast, a history of sun sensitivity or multiple blistering sunburns does not, in isolation, confer more than a three- or four-fold increase in risk compared with persons without these factors. Risk has been discussed by several authors in several series and varies according to the series (Lewis and Johnson, 1968; Rhodes and Melski, 1982; Doherty and MacKie, 1986; Rhodes et al., 1987; Rigel et al., 1988, 1989; Garbe et al., 1989; Grob et al., 1990; Rhodes, 1994). The striking variation in the number of melanomas associated with nevi deserves comment. Series have been reported with incidences varying from 15% to 85% (Stadler and Garbe, 1990; Elder et al., 1981). In patients with dysplastic nevi, as many as 70% or more of melanomas arise in association with precursor dysplastic nevi (Elder et al., 1981). A striking association between plantar nevi and melanoma was observed decades ago (Lewis and Johnson, 1968).

The issue of sun exposure as it impacts melanoma risk is both intriguing and controversial. First, one must realize that there are different skin types with markedly different responses to sunlight that impact photoaging or "dermatoheliosis." Skin types can be classified according to skin color and, more specifically, according to the response of buttock skin to short sun exposure. The first group comprises roughly 1.5 billion people with pure white, white, and beige skin. These patients are divided into so-called phototypes. Phototype I skin in response to short periods of sun exposure exhibits tender sunburn and does not tan. Phototype II exhibits a tender sunburn and tans only minimally and with difficulty. Phototype III shows nontender sunburn and tans uniformly to a light brown color. Type IV skin, which exhibits a light brown color in non-sun-exposed areas, manifests a minimal sunburn and tans well to a moderate brown color. Patients with brown skin are designated as type V. Their skin rarely burns and tans profusely to a dark brown color. Those patients with black skin are considered type VI and also exhibit no sunburn and a dark tan. Patients with phototypes I and II skin are the most sensitive and are at relatively higher risk of developing melanoma than are the other phototypes (Fitzpatrick TB, *Soleil et peau*, as cited in Barnhill et al., 1995; Pathak and Fitzpatrick, 1993). Despite the interest in sun exposure and melanoma, the question is still open to debate. One interesting aspect of the sun exposure story is that it appears that intermittent recreational exposure places a person at greater risk for developing melanoma than prolonged sun exposure. However, the complexity of the nature of sun exposure, including the impact of different latitudes, different types of sun exposure, and other different patient risk factors, makes the entire issue difficult to resolve clearly (Armstrong, 1988; Gallagher et al., 1989; International Agency for Research on Cancer, 1990; Autier, 1994).

Precursors to melanoma

From the above discussion of risk, it is clear that nevi are one of the precursors of this disease. Certainly, the fact that even an increased number of small nevi can be associated with increased risk implies that even the common acquired nevus can be imputed as a potential precursor, as are the dysplastic nevi or large atypical moles. Lynch et al. (1978) gave the latter appellation to the lesion as part of the "familial atypical mole syndrome". In addition, the congenital melanocytic nevus has been associated with the development of melanoma and thus documented as a cause of death in children (Trozak et al., 1975). Malignant transformation of a cellular blue nevus has rarely been reported. This extremely rare eventuation occurs in a morbidly growing nodule that often ulcerates at the site of a pre-existing, usually nodular cellular blue nevus (Connelly and Smith, 1991).

We also consider lentigo maligna as a precursor of invasive melanoma. The actual incidence of malignant transformation has been disputed, mainly because most series of lentigo maligna melanoma were biased by the nature of patients referred to tumor centers. However, one assessment put the lifetime risk of developing invasive melanoma in lentigo maligna at 2.2–4.7%, depending on the age of the patient at the time of initial clinical appearance of the lesion (Weinstock and Sober, 1987). Other

lesions considered to be precursors, but with a much lower relative frequency of malignant transformation, are the nevus of Ota and the nevus of Ito, the nevus spilus, and the spindle and epithelioid cell nevus (Alegre and Aliaga, 1989; Rhodes, 1994; Williams and Pennella, 1994; Clark et al., 1995; MacKie, 1995; Ruiz-Maldonado and Orozco-Covarrubias, 1997).

Approach to the patient

Initial encounter
There are two case scenarios whereby a pigmented lesion may come to the attention of the examining physician. The first occurs when the patient presents to the physician with a concern regarding a pigmented lesion. The second is when a physician in the course of a routine examination discovers a pigmented lesion that raises his or her suspicion or curiosity. In either scenario, the underlying basic message to physicians is that a patient who comes in for a specific pigmented lesion and/or a routine general examination should be disrobed and a complete skin examination should be performed. The physician must always offer the patient the opportunity to refuse, and if he/she does, this should be documented in the patient's chart. This practice is one that is exercised by all pigmented lesion clinics in the United States and many centers throughout the world. We regard this as a medicolegal imperative. Dermatology residents are instructed to perform complete examinations at the time of initial visit regardless of the presenting complaint.

History
Critical in the historical evaluation is a determination of the duration of the lesion in question and any symptomatology associated with it, such as pain or other sensations such as pruritus, and any history of change in color, size, or shape, all of which should be documented. The findings of oozing, crusting, and bleeding are all significant and are usually late signs. It should also be established whether there has been any prior trauma or surgery to the lesion. A sunburn history should be obtained; such patients appear to have some increased susceptibility to skin cancer and have very sensitive skin in most instances. This piece of information is helpful in assessing the skin type of the patient. In addition, recent sunburn may produce a histomorphology that may mimic a high-grade melanocytic dysplasia when in fact the proliferation represents a chronic or subacute photoadaptive alteration. In women and girls, an alteration of the hormonal status should be investigated, be it in the context of pregnancy or the use of exogenous hormones. The exposure of the skin to plant products in cosmetics, or to droplets of fruit juices such as lime juice, in concert with intense sun exposure, can produce a pigmented lesion with melanocyte

hyperplasia, termed a *phytophotodermatitis*, with a most worrisome clinical and histologic appearance. Immunosuppressive therapy and/or chemotherapy may also contribute to the clinical course and light microscopic appearance of the pigmented lesion and hence a history regarding the aforesaid should be obtained. A review of the patient's personal history of skin disease is necessary. In cases where skin lesions have been removed, it is advisable to have available the laboratory reports, especially if the patient reports that he/she has had "skin cancer." Also critical to the clinical assessment is the family history of melanoma, atypical moles, or skin cancer (Barnhill et al., 1995).

Physical examination
The complete examination should be carried out in a well-lit room. We highly recommend that a nurse be in attendance for all complete cutaneous examinations. The patient must be examined anteriorly and posteriorly to detect the number and distribution of pigmented lesions. By this examination, one can assess the skin characteristics of the patient and also the mole phenotype. The hair coloration is helpful in this regard. A basic estimate of the number of nevi and the assessment of the presence of multiple atypical moles can be easily carried out in this way (Barnhill et al., 1995). It is imperative to follow this general examination with a more detailed and comprehensive skin assessment. This examination should include the scalp, glabrous skin, axillae, inframammary folds, umbilicus, genitalia including the intergluteal or natal cleft, palms and soles, and the interdigital areas and nails, focusing on the detection of clinically suspicious lesions. Scalp examination can be facilitated with the use of a hair dryer or a pair of cotton-tipped applicators to separate the hairs. Examination of the face should include the conjunctiva, mouth, and postauricular skin. The use of side lighting may be helpful in evaluating whether a lesion is raised, and a Wood's light can be very helpful to detect haloes of hypopigmentation or areas of partial regression in a lesion. The use of a magnifying lens can be an important clinical diagnostic adjunct. Similarly, the technique of epiluminescence can be helpful, but should only be carried out by physicians familiar with this technique.

For many years, magnification has been used to allow for better inspection of clinical lesions and thus as an aid to diagnosis. As cited by Gilje et al. (1958), J.C. Kolhaus in 1663 used magnification to study the vessels of the nailfold. Saphier was among the very first to use magnification under the title dermatoscopy in 1920 and published a series of seminal observations concerning its application (Saphier, 1920, 1921a–c)). Dr Thomas Fitzpatrick in the late 1960s began to use a fixed binocular microscope to study skin lesions, especially melanocytic lesions. Professor Rona MacKie (1971) reported on the usefulness of magnification in evaluating pigmented

lesions in 1971. One of the difficulties in assessing the pattern of skin lesions is the scattering of incident light by the skin surface components. The application of mineral oil to the skin greatly reduces the light scattering and allows for a better viewing of the clinical features in their three-dimensional aspect. Also, one can appreciate some of the features of the deeper aspects of the lesions. Thus, patterns created by the various cutaneous structures and their infiltration by pigmented cells can be observed and formulated. This technique is given several names, among them epiluminescence microscopy (ELM), dermoscopy, and dermatoscopy (Steiner et al., 1987, 1993; Braun-Falco et al., 1990; Kenet et al., 1993; Pehamberger et al., 1993; Soyer and Kerl, 1993; Stolz et al., 1994; Binder et al., 1994; Wolff et al., 1994; Barnhill et al., 1995; Binder et al., 1995, 1997; Argenyi, 1997; Kittler et al., 1998; Carli et al., 2000). With the application of ELM the presence of a diffuse, delicate network of pigment can be seen to characterize benign melanocytic lesions. The darker areas represent pigmentation of the rete ridges and the lighter areas the dermal papillae. Areas of pale interruption of the pattern resulting in a patchy multifocal appearance of the network are observed in many dysplastic nevi. In contrast, melanomas are found to have multiple components, including a coarse network pattern, a nodular pattern, and border changes. The latter include a pseudopod-like appearance, evidence of the radial growth phase, very sharp network margins, and a whitish or blue–gray veil (Steiner et al., 1987; Kenet et al., 1993; Pehamberger et al., 1993; Barnhill et al., 1995). In our hands we estimate that we remove approximately 30% fewer pigmented lesions than before the use of the dermatoscope as an aid in clinical diagnosis. When combined with conventional clinical analysis, dermoscopy enhances the accuracy of prediction of melanoma thickness (Argenziano et al., 1999). It is important to note that this technique is best used after a training period. It is clear that the application of dermoscopy by the untrained physician can result in increased errors in diagnosis (Binder et al., 1995, 1997). On the other hand, when used in conjunction with conventional clinical examination, dermoscopy may enhance the diagnostic accuracy of the less experienced clinician (Argenziano et al., 1998).

Computerized analysis of pigmented lesions has been a focus of study by many groups. This type of assisted diagnosis is useful according to some studies but is costly and time consuming. However, in the hands of persons experienced in the technique, it can be a useful adjunct to diagnosis (Seidenari et al., 1998, 1999; Landau et al., 1999). Typically, accuracy rates rise by 5% when trained dermatologists use computer-assisted videomicroscopy to augment their clinical acumen (Landau et al., 1999).

In general, those pigmented lesions that are round or oval in shape, have regular borders, and are uniformly pigmented with a size no greater than 5 millimeters are not considered suspicious and therefore do not warrant removal. Such a lesion should only be removed for two reasons: the patient requests its removal for cosmetic reasons or desires it because it is of personal concern. We routinely remove, at the patient's request, lesions that appear to us clinically benign. However, we have all encountered cases of melanoma in which the patient's request for removal of a lesion was declined by the physician because of its benign appearance and that same patient presented at a later date with metastatic disease. Listen to the patient.

Lesions that are greater than 5 mm have a limited differential diagnosis. If flat, they may be congenital nevi, congenital lentigines including a café-au-lait spot, ink spot lentigo, nevus spilus, genital melanosis, or pigmented spindle cell nevus of Reed. Many of these lesions usually have a characteristic clinical picture and do not require excision unless there is a reported area of abnormal pigmentation. The dysplastic nevus, if solitary, should be removed for histologic confirmation. If the patient has multiple dysplastic nevi, only those showing significant atypia or reported to have manifested a change in size, shape, or color should be removed. Solar lentigo, superficial pigmented actinic keratosis, clonal seborrheic keratosis, de novo intraepidermal melanocytic dysplasia, lentigo maligna, or other forms of melanoma in situ are sometimes clinically indistinguishable and therefore must be biopsied or removed in their entirety. Lesions that are greater than 5 mm and raised include the congenital nevus, compound dysplastic nevus, blue nevus, cellular blue nevus, deep penetrating nevus, combined nevus, Spitz nevus, pigmented spindle cell nevus of Reed, atypical Spitz tumor, and melanoma and its borderline variants. The clinical index of suspicion for these lesions must be high, and if there is any doubt about the nature of any given lesion, it should be removed.

Approach to the individual pigmented lesion

A useful mnemonic is the so-called "ABCDEs" of clinical pigmented lesions (Friedman et al., 1985; Stolz et al., 1994).

"A" refers to asymmetry. Atypical pigmented lesions are usually asymmetrical. This description particularly applies to lesions of dysplastic nevus, lentigo maligna, lentigo maligna melanoma, superficial spreading melanoma, and acral lentiginous melanoma. However, some benign pigmented lesions are also asymmetrical, such as the Albright pigmented macule, nevus spilus, and the ink spot lentigo. Conversely, not all symmetrical melanocytic proliferations are benign. Specifically, nodular melanomas or minimal deviation melanomas are usually symmetrical lesions that are expansile, round growths. They require evaluation of other parameters, which will be alluded to presently.

"B" refers to border. The borders of most dysplastic melanocytic proliferations, be they in the context of a dysplastic nevus or melanoma, are irregular. The radial growth phase components of the various types of melanoma all have highly irregular borders. In general, the greater the degree of border irregularity, the greater is the degree of melanocytic atypia. An important aspect of borders of melanomas is that irregularity includes notching, indentation, and irregular convolution. The actual border itself may be pronounced or exaggerated because of induration and/or color prominence, the latter typically reflecting either excessive melanophage accumulation or accelerated tumor growth in the lateral edge. However, in a minority of cases, lesions manifesting irregular borders may be benign, such as the Albright melanotic macule, the solar lentigo, the ink spot lentigo, and the nevus spilus.

"C" refers to color. The colors of melanoma are highly variable within a given lesion. The radial growth phase of superficial spreading melanoma demonstrates the most striking variation in color, whereby a given lesion may exhibit hues of red, white, blue, brown, black, and gray. The colors of radial growth phase lentigo maligna melanoma, acral lentiginous melanoma, and mucosal melanoma show a similarly striking variegated coloration; however, the colors are mainly limited to shades of brown, gray, and black. Areas of white, blue, or gray signify foci of regression and may appear in all the radial growth phases. In vertical growth phase melanoma, the colors of the excrescence may be black, purple, reddish-brown, gray, or amelanotic, the latter imparting a pinkish-white hue. Pure vertical growth phase melanoma, or nodular melanoma, presents as a single, rapidly appearing growth of the skin. Because of the clinical similarity to a hemangioma/pyogenic granuloma and a blue nevus, we recommend the prompt removal of any such colored lesion of recent onset. History is often helpful in distinguishing, for example, a blue nevus present from childhood from a recently appearing, rapidly growing nodular melanoma. Irregularities in color pattern can be observed in benign lesions; however, they are usually "regular irregularities." For example, congenital nevi have a regular pattern of hyperpigmentation around follicular orifices. Likewise, nevus spilus often shows a reticulated pattern of darker pigmentation on a pale brown background. Dysplastic nevi can manifest irregularity in pigmentation, but the colors are primarily in the brown color range. Melanomas, on the other hand, show an irregular, haphazard pattern of coloration and include greater shade ranges, including red, purple, and black, the latter resulting in a dramatic clinical presentation.

"D" is for diameter. In general, most benign common acquired nevi have a diameter no greater than 4 or 5 mm. As discussed above, there is a rather extensive differential diagnosis for lesions greater than 5 mm that includes certain benign lesions. However, careful consideration to complete removal must be given to any lesion of an increased diameter that manifests any of the other A, B, C, or E features.

"E" is for elevation. Many melanomas show surface irregularities with asymmetrical foci of palpable nodularity. The radial growth of the lentiginous melanomas is more commonly flat. Rarely, a deeply invasive acral lentiginous melanoma may be flat because of its proliferation from eccrine ducts into the surrounding dermis and subcutaneous fat. Benign lesions are typically uniformly and/or symmetrically elevated.

Summary

A complete evaluation of the patient must be systematically performed, and any pigmented lesions should be evaluated according to the "ABCDE" rules given above. Any suspicious lesion must be biopsied or removed in its entirely. It is our consummate recommendation that any lesion that is suspicious enough to be removed be excised rather than biopsied. A partial biopsy of a lesion can often result in an incorrect diagnosis because the area chosen, although perhaps clinically most suspicious, may not be representative of the most biologically aggressive portion of the lesion. The classic case scenario is a biopsy procured from an area of regressed radial growth phase-confined melanoma that produces a histomorphology cognate to a benign lichenoid keratosis. In fact, we suggest that any clinically suspicious pigmented lesion that is biopsied and whereby such a diagnosis is rendered pathologically should be removed in its entirety for full histologic evaluation. The only setting in which we recommend a biopsy is where the lesion is so large that complete removal is not practical for initial evaluation, e.g., a large lesion of lentigo maligna or solar lentigo. In intermediate-sized and giant congenital nevi or lesions of nevus spilus, it is likely that biopsies from abnormal areas only are warranted. We will now present clinical examples of specific lesions that are discussed in detail in the text that follows.

ATLAS OF CLINICAL LESIONS CORRELATING TO VARIOUS ENTITIES DISCUSSED IN THE TEXT

Chapter 2: Freckles and Lentigines
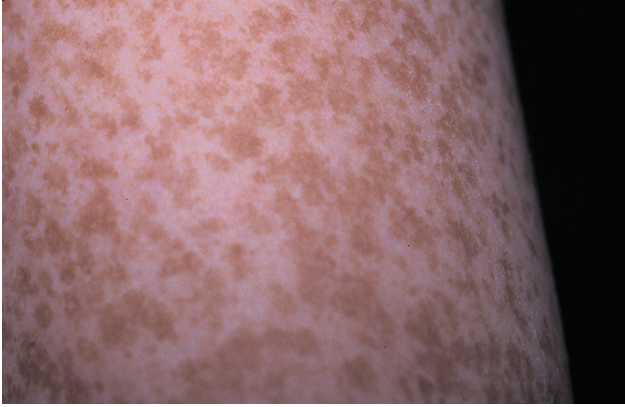
Atlas Figure 2.1 Freckle. Freckles manifest as multiple tan macules typically in the 2–4-mm size range, some with irregular borders but none with irregular pigmentation, that characteristically fade in the winter to reappear in the summer. This sun-related behavior helps to differentiate them from other flat pigmented lesions.

Atlas Figure 2.3 Acral reticulated pigmentation of Kitamura. A diffuse, reticulated pigmentation of the extremities with occasional involvement of the trunk characterizes this variant of lentiginosis.

Atlas Figure 2.2 Lentigo simplex. The typical appearance is that of an oval 2–3-mm lesion that is light tan to dark brown. Although common in childhood, these lesions may appear at any time in life, do not evolve, and may affect any surface, including those of the mucosae. (Courtesy of Dr M. DuPree, Albany, NY.)

(A)

(B)

(C)

Atlas Figure 2.4 (**A–C**) Lentiginosis of Laugier–Hunziker. Multiple lentigines of the lips, sides of the fingers, and feet characterize this disorder that is often confused with Peutz–Jeghers syndrome. The acral distribution is the distinguishing clinical cutaneous manifestation of the Laugier–Hunziker disorder. This 18-year-old African–American youth was referred for evaluation for Peutz–Jeghers syndrome; after careful dermatologicl examination the correct diagnosis was made.
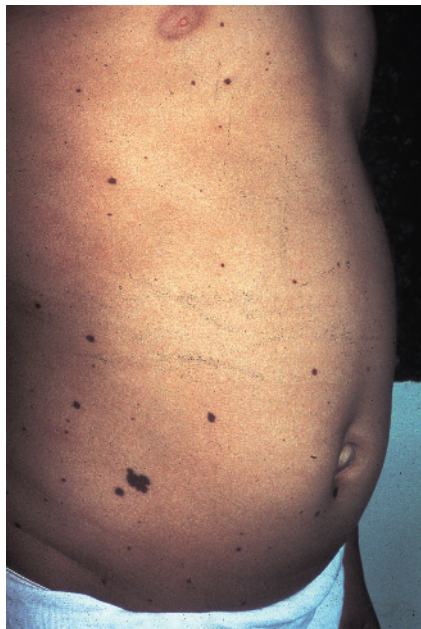
(A)

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Atlas Figure 2.5 (**A**, **B**) LEOPARD syndrome. Tan to dark brown macules on the trunk characterize the cutaneous manifestations of this 10-year-old boy with LEOPARD syndrome (**A**). Note the multiple punctate pigmented lesions, which represent the characteristic lentigines associated with LEOPARD syndrome (**B**). (**B**, courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 2.6 Peutz–Jeghers syndrome. Tan to dark brown macules on the lips and buccal mucosa are the characteristic mucosal and perioral skin manifestations of the syndrome.


(A)

(B)

Atlas Figure 2.7 (**A**, **B**) Labial melanotic macule. (A) A uniformly pigmented dark brown, often symmetrical, lesion is usually found on the lower lip, placed centrally or just off center. Occasionally, these lesions also appear on the upper lip. Lower labial macules tend to be stable and do not evolve. If progressive increase in size or alterations in color are noted, biopsy is recommended to rule out lentigo maligna or a mucosal lentiginous melanoma. (**B**) Shows a lower labial macule present, as is characteristic, in the midportion of the lower lip. (**A**, courtesy of Dr Steven Oberlander, Boston, MA; **B**, courtesy of Dr Anthony Benedetto, Philadelphia, PA.)
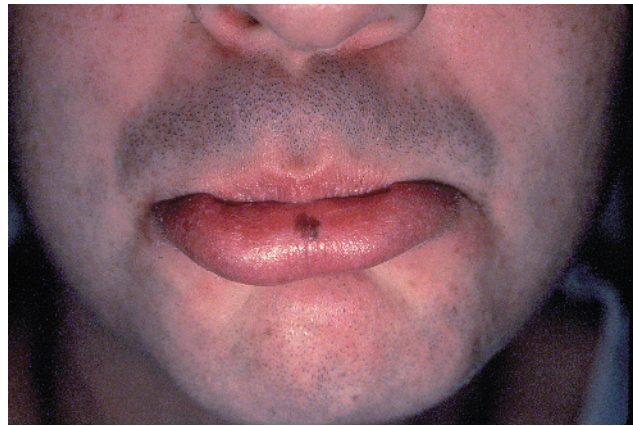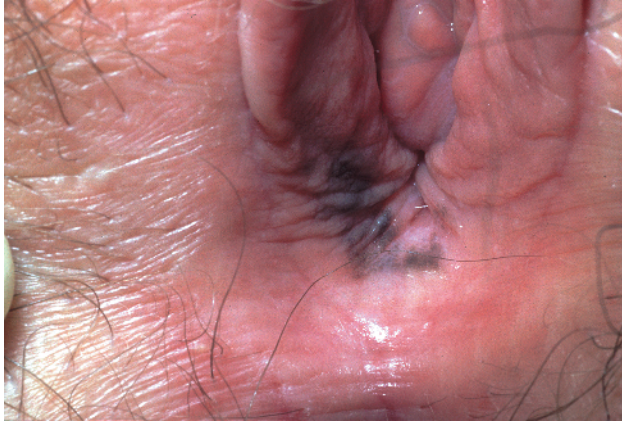
(A)

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Atlas Figure 2.8 (**A**, **B**) Vulvar melanosis. These lesions characteristically are uniformly tan to brown colored and may affect large areas of the vulvar skin. They must be biopsied to rule out an atypical melanocytic proliferation and should be carefully followed clinically. (**B**) An extensive, darkly pigmented macule extends from the labium majus into the vaginal vault. This lesion is impossible to distinguish from a radial growth phase superficial spreading melanoma on clinical grounds and so must be biopsied. (**A**, courtesy of Dr S. Oberlander, Boston MA; **B**, courtesy of Dr M. Dupree, Albany, NY.)

Atlas Figure 2.9 PUVA lentigines and nail pigmentation. Patients who have received chronic therapy with psoralen and ultraviolet A light often exhibit freckling of the exposed and even nonexposed skin, the latter a well-observed, but as yet unexplained, phenomenon. In this patient, pigmentation of the nails was likewise noted.
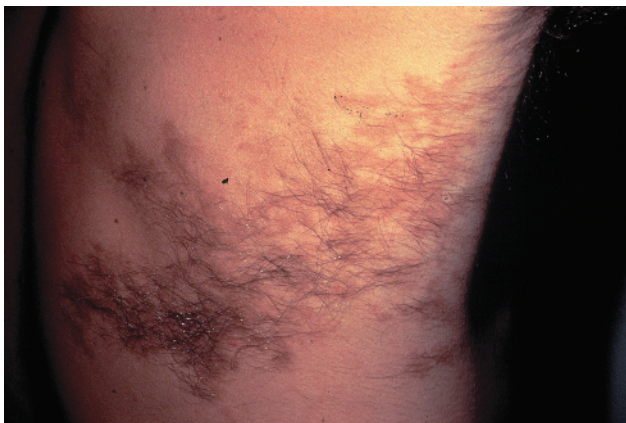
(A)

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(C)

(D)

(E)

Atlas Figure 2.10 (**A–E**) Becker's nevus. This pigmented lesion (**A**) with a verrucous surface appeared in late childhood and progressed from the areola to the adjacent skin. The histology was characteristic of Becker's nevus. (**B**) Shows a lesion from the sternal region of an adolescent boy; the lesion has numerous hairs protruding from it, which attest to a follicular component and are a clue to the hamartomatous nature of the lesion and to the diagnosis. (**C**) An example is shown of a Becker's nevus that has a striking hairiness in a characteristic distribution pattern with well-demarcated pigmentation. (**D**) Becker's nevus may present as an extensive, irregularly-disposed lesion on the trunk. As in this lesion, there can be a variable numbers of hairs. (**E**) Demonstrates a giant pigmented Becker's nevus with a plaquelike central zonal coloration and multiple small satellites. It exhibits relatively little hair growth. (**B**, courtesy of Dr M. Dupree of Albany, NY; **C–E**, courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 2.11 Café-au-lait macule. These lesions have symmetrical shapes with smooth borders and uniform tan pigmentation. They are typically greater than 5 mm in size. When there are more than five such lesions greater than 5 mm in diameter, the presumptive diagnosis is peripheral type I neurofibromatosis.
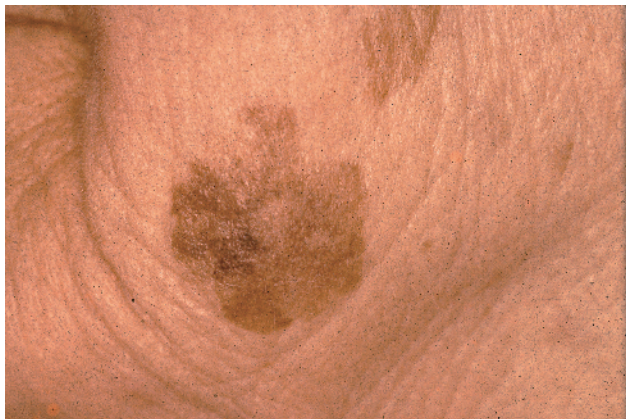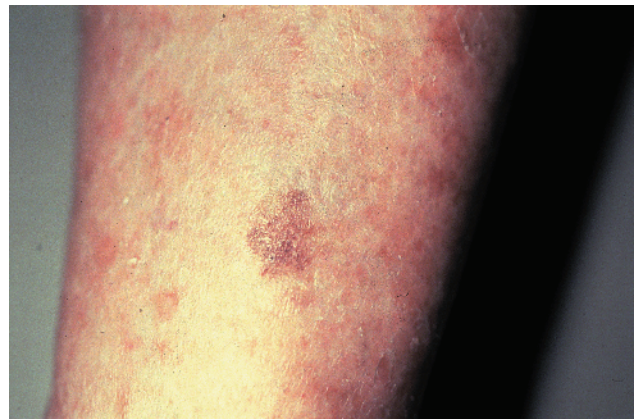

(A)
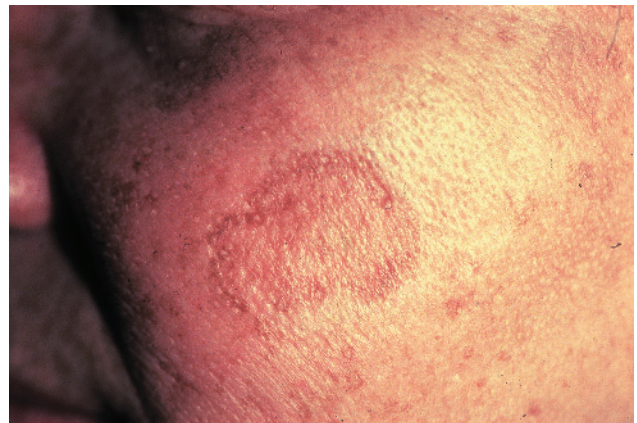
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Atlas Figure 2.12 (**A–D**) Solar lentigo. (**A**) This pigmented macular and focally slightly raised lesion suggests, at first glance, a lentigo maligna. However, the presence of a slightly raised area that exhibits discrete flecks of pigmentation and a dull surface speaks strongly for a solar lentigo. Biopsy was performed to confirm the clinical impression. (**B**) This is a solar lentigo that has assumed the size of a few centimeters. They can be very difficult to differentiate from lentigo maligna but usually have less surface reflectance in the adjacent skin and will have some slight scaliness, as in this case. Nevertheless, biopsies of these lesions are recommended to confirm the diagnosis. (**C**) This actinic lentigo is a tan lesion, oval in shape, with the characteristic appearance seen in lesions in sun-exposed skin of an elderly person. In contrast, although simple lentigines can appear at any time in life, they are rare in adults, especially in the elderly, and should be observed or biopsied. (**D**) Demonstrates a coexistent actinic lentigo and superficial pigmented actinic keratosis. This lesion has a dull reflectance compared to adjacent skin and thus can be differentiated from lentigo maligna. (**B–D**, courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 2.13 Ink-spot lentigo on right anterior chest. This deeply pigmented reticulated black lesion occurs more characteristically on the upper back of fair-skinned individuals in late adolescence or early adulthood. Men are affected more frequently than women; the lesions are stable but to the uninformed suggest melanoma. The spiderlike extensions are characteristic and helpful in diagnosis. This irregularly-pigmented macular lesion shows the characteristic reticulated pigmentation of the ink spot lentigo. (Courtesy of Dr A. W. Kopf, New York, NY.)

Atlas Figure 2.15 Bleomycin hyperpigmentation. The characteristic pattern of pigmentation is in parallel lines suggestive of whip marks, thus the designation "flagellate hyperpigmentation." (Courtesy of Dr M. DuPree, Albany, NY.)


Atlas Figure 2.14 Postinflammatory hyperpigmentation. Postinflammatory hyperpigmentation resulting from a hypersensitivity response to flea bites is punctate in character, often shows a central pustule, and assumes a linear array, reflecting the transit of the insect through "breakfast, lunch, and dinner." For some obscure reason, these lesions often come in threes, of which this would appear to be a classic example. (Courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 2.16 Hypomelanosis of Ito. Note the striking patchy linear hyper- and hypo-melanosis characteristic of hypomelanoma of Ito. (Courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 2.17 Melasma, treated. This patchy brown pigmentation surrounding the eye and on the right cheek is characteristic of predominantly epidermal melasma. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)
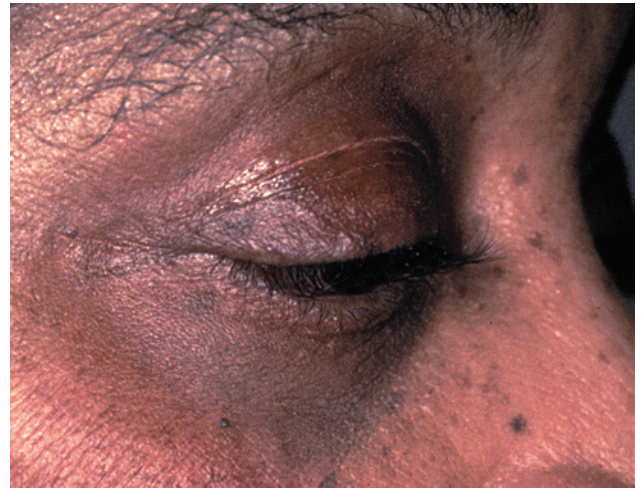
Chapter 3: Benign Acquired Nevi

Atlas Figure 3.1 Acral junctional nevus. This small, oval, uniformly dark brown lesion is slightly raised and has the characteristic morphology of a junctional nevus. The clinical picture is indistinguishable from that of a junctional nevus in any anatomic location, although the histology may be distinctive. (Courtesy of Dr Mirek Stranc, Winnipeg, MB.)

(A)

(B)

Atlas Figure 3.2 (**A**, **B**) Junctional nevus. The slightly raised, uniformly pigmented dark brown lesion (**A**) has a roughly oval shape and was histologically confirmed to be a junctional nevus. Such lesions may vary in color from tan to dark brown but are uniform in their pigmentation. Typically, they reach a maximum diameter of 3 mm, but some will range up to 5 or 6 mm. Although unusual, junctional nevi may appear on the doubly covered areas, where lesions of this size and shape are often a clue to dysplasia. These lesions are difficult to distinguish from lentigines, but, in contrast to lentigines, usually become raised. The junctional nevus (**B**) is oval and irregularly pigmented, showing superimposed punctate brown pigmentation on a light tan background. The punctate foci usually reflect junctional nests in a background of a lentigo. (**A**, courtesy of Dr M. Stranc, Winnipeg, MB; **B**, courtesy of Dr A. Benedetto, Philadelphia, PA.)


(A)

(B)

(C)

Atlas Figure 3.3 (**A–C**) Compound nevus. This uniform dark brown raised lesion (**A**) has well-defined borders and a central organized pattern of flecked pigmented characteristic of the compound nevus. The lesion measures 4 mm in diameter. Some compound nevi in the early stages are flesh colored (**B**), whereas others may have a reddish hue (**C**). (**B**, **C**, courtesy of Dr S. Oberlander, Boston MA.)

(A)

(B)
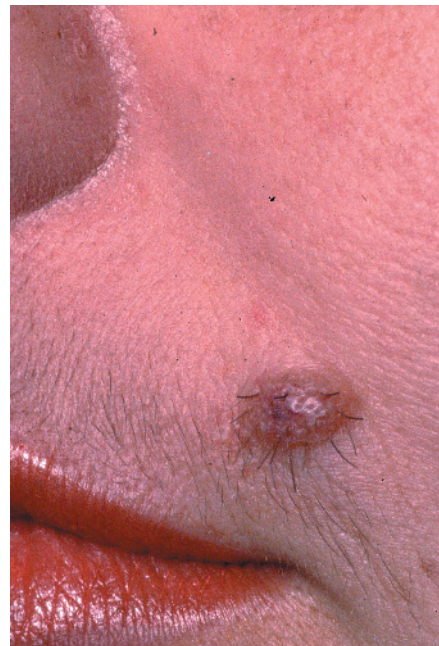
(C)

Atlas Figure 3.4 (**A–G**) Dermal nevus. Various clinical morphologies of dermal nevi include a dome-shaped type (**A–C**), a polypoid type, a verrucous type (**D**), and a papillomatous type, among others. Their color may vary from flesh tones (**A**) to brown (**C**), to dark brown, to blue (**E**). They usually show a symmetrical round or oval shape with a well-demarcated border and uniform color and elevation. Lesions may manifest a cerebriform polypoid architecture and reach considerable size, as in the scalp lesion (**F**). The flesh-colored dome-shaped dermal nevus is typical of those that occur in the head and neck region (**G**). (**A**, courtesy of Dr S. Oberlander, Boston MA; **B**, **C**, courtesy of Dr M. Stranc, Winnipeg, MB; **F**, courtesy of Dr M. Dupree, Albany, NY; **G**, courtesy of Dr A. Benedetto, Philadelphia, PA.)
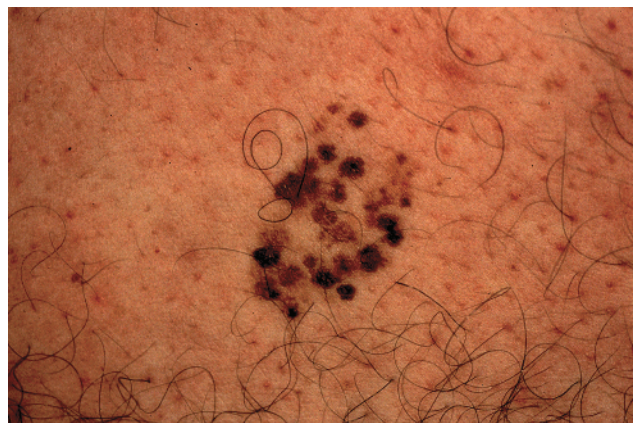
(D)

(E)
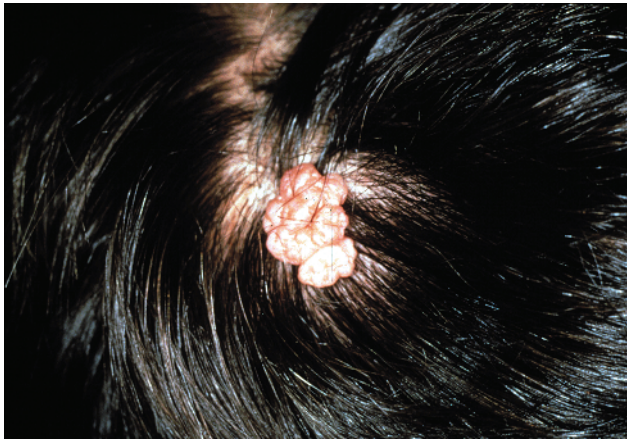
(F)

(G)

Atlas Figure 3.4 (*Continued*)

(A)

(B)

Atlas Figure 3.5 (**A**, **B**) Nevus spilus. This flat pigmented congenital lesion exhibits flecks of pigmentation in an orderly pattern (**A**). Note the striking, dark punctate pigmentation (**B**). Although the great majority of these lesions are quiescent, some will develop other melanocytic proliferations, such as compound nevus of Spitz or, rarely, melanoma. Therefore, surveillance is recommended. (**A**, courtesy of Dr George Murokawa of Albany, NY; **B**, courtesy of Dr M. Dupree of Albany, NY.)

Atlas Figure 3.6 Nevus spilus. This oval-shaped lesion is congenital and on biopsy proved to be a nevus spilus. These lesions usually exhibit a more pronounced pattern of punctate pigmentation. They must be differentiated from congenital nevus and Becker's nevus. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 3.8 Nevus spilus. This overall oval-shaped and irregularly-pigmented lesion on truncal skin shows the characteristic clinical picture of nevus spilus. (Courtesy of Dr Benedetto, Philadelphia, PA.)

Atlas Figure 3.7 Nevus spilus, with agminated compound and Spitz nevi. This unusual nevus spilus exhibits a light tan background and is associated with the appearance of compound nevi and a pink–tan Spitz nevus. These lesions are considered agminated nevi appearing in nevus spilus. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 3.9 Nevus spilus. This flat pigmented congenital lesion of the buttock and thigh skin exhibits flecks of pigmentation in an orderly pattern superimposed on a tan macular background. (Courtesy of Dr M. Dupree, Albany, NY.)

Atlas Figure 3.10 Nevus spilus. Nevi spilus can occasionally reach a considerable size, as in this lesion of the shoulder and upper arm of a young man. (Courtesy of Dr M. Dupree, Albany, NY.)
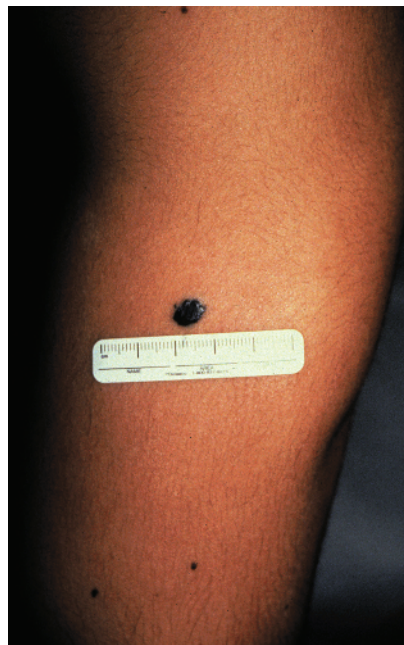
Chapter 4: Dermal Dendritic Melanocytic Proliferations/Dermal Melanocytoses

(A)

(B)

(C)

Atlas Figure 4.1 (**A–C**) Blue nevus. (**A**) This 3-mm diameter lesion shows symmetry and a blue color typical of a blue nevus and the related dermal melanocytoses. Sometimes these lesions cannot be distinguished on clinical grounds from a nodular melanoma or metastatic melanoma. (**B**) Shows a blue nevus of the scalp with the often characteristic royal blue coloration. Lesions such as this that are palpable and prominent, usually have an atypical histologic appearance in our experience. (**C**) This blue nevus has the classical dark blue coloration and is present on the extremity of an 8-year-old child. (**B**, courtesy of Dr A. Benedetto, Philadelphia, PA; **C**, courtesy of Dr M. DuPree, Albany, NY.)

(A)

(B)

Atlas Figure 4.2 (**A**, **B**) Cellular blue nevus. Pale gray nodules surmount a rim of blue coloration typical for the blue nevus (**A**). The nodular cellular zones can gradually increase in size and occasionally ulcerate as part of their growth history. Recurrence is common if the lesions are not completely removed. In contrast, rapid growth and ulceration characterize the rare phenomenon of malignant transformation of these lesions. The cut surface of the surgical specimen shows the deep extent to the base of the subcutis and into the galea aponeurotica. (**A**, **B**, courtesy of Dr M. Stranc, Winnipeg, MB.)

Atlas Figure 4.3 Congenital giant "blue" nevus. This African–American child was born with this protuberant nodule in the temporal–occipital area. The lesion composed of heavily pigmented melanocytes was considered a type of blue nevus. By today's criteria, such a lesion would probably be diagnosed as a pigment synthesizing, anima- type melanoma. Patients with congenital nevi of the occipital area may exhibit leptomeningeal melanocytosis, involvement of perforating arteries of the brain, and involvement of the choroid plexus. These changes are often associated with internal hydrocephalus and are then designated as Touraine's syndrome.


(A)

(B)

Atlas Figure 4.4 (**A**, **B**) Malignant blue nevus. This deeply pigmented nodule arose on the dorsal surface of the upper arm in a 65-year-old man. Note the large blue area of cutaneous discoloration that supervened on a blue nevus that had been present for years. Rapid growth of the large nodule and bleeding led the patient to seek medical advice (**A**). (**B**) A surgical excision specimen of a malignant blue nevus showing penetration of the full thickness of the subcutis (**A**, courtesy of Dr. M. Stranc, Winnipeg, MB.)
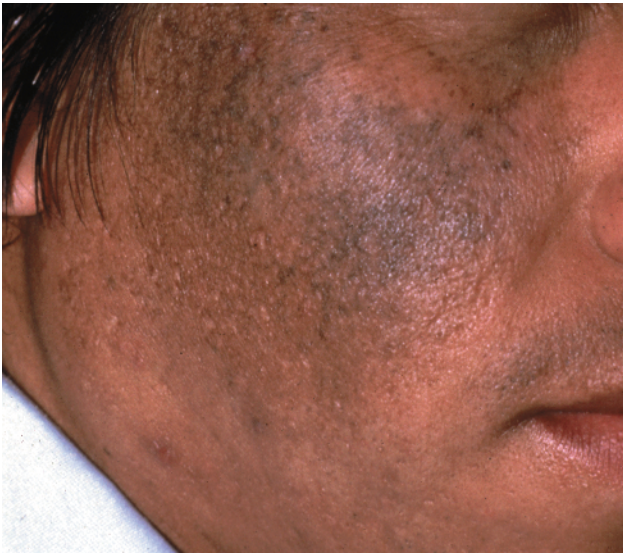
Atlas Figure 4.5 Nevus of Ota. A blue-colored congenital macule surmounted by many papules extends from the forehead and almost completely covers the cheek of this young man. Note also the bluish discoloration of the sclera. The nevus of Ota characteristically affects the distribution of the trigeminal nerve.

Atlas Figure 4.7 Mongolian spot. The Mongolian spot is a slate gray macule that characteristically appears in the lower sacral area. This child exhibited multiple macules of slate gray pigmentation in a classic location. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 4.6 Nevus of Ota. This lesion shows the characteristic distribution involving the bulbar sclera and the periorbital skin with slight gray pigmentation. Ocular melanocytoses are often more cellular than their counterparts in other anatomic locations (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 4.8 Ectopic Mongolian spot. The Mongolian spot is a slate gray macule that characteristically appears in the lower sacral area. This child exhibited, in addition to one in the classic lower sacral location, other macules of slate gray pigmentation on the shoulders and trunk, which are designated as ectopic Mongolian spots. This diagnosis was proven by biopsy.

Chapter 5: Spitz Nevus

Atlas Figure 5.1 Compound nevus of Spitz. This well-defined reddish-tan, irregularly-raised symmetrical nodule appeared in 4 weeks on the cheek of this child. Compression of the lesion with a glass slide allowed an appreciation of a brown color to the lesion. This procedure, diascopy, allows demonstration of this characteristic feature of the Spitz nevus. (Courtesy of Dr M. Stranc, Winnipeg, MB.)


Atlas Figure 5.3 Pigmented spindle and epithelioid cell nevus. This pigmented spindle and epithelioid cell nevus appeared on the calf of a 22-year-old woman. Because of the changing color, she sought medical advice. (Courtesy of Dr S. Oberlander, Boston, MA.)

Atlas Figure 5.2 Spitz nevus, compound type. This compound nevus of Spitz shows a characteristic pink–tan coloration on the back of a child. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Chapter 6: Combined Nevus, Deep Penetrating Nevus, and Plexiform Spindle Cell Nevus


Atlas Figure 6.1 Combined nevus. This 28-year-old sailor was referred because his primary care doctor noted an expanding nodule with a blue coloration supervening on a brown mole. (Courtesy of Dr M. Dupree, Albany, NY.)

Chapter 7: Recurrent Melanocytic Nevus
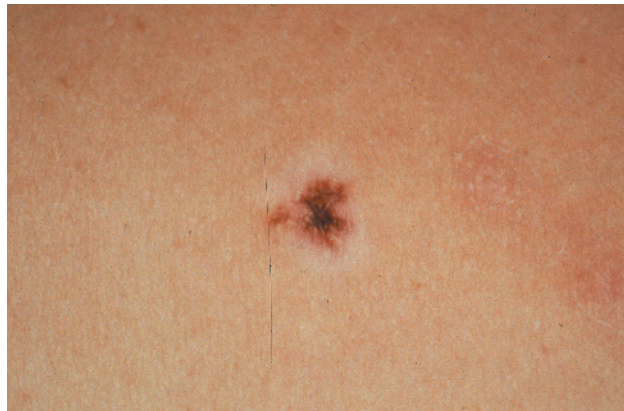
Atlas Figure 7.1 Recurrent nevus. Note that a streak of pigment is present in an eccentric fashion in the previously biopsied compound nevus. (Courtesy of Dr M. Dupree, Albany, NY.)

Chapter 8: Congenital Nevi
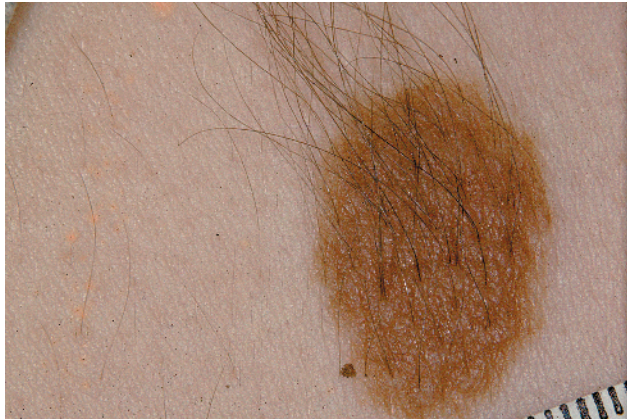
Atlas Figure 8.1 Congenital nevus, small type. This 2-cm hairy uniformly brown lesion was present at birth as a tan macule that gradually grew and became raised and progressively more hirsute throughout life.

Atlas Figure 8.3 Melanoma arising in a congenital nevus of the scalp. A blue–black nodule appeared rather rapidly in this congenital nevus that covered most of the scalp and was diagnosed as melanoma, minimal deviation type. This presentation and appearance of apparent dermal or subcutaneous cysts are the commonest mode of presentation of melanoma in these giant nevi.

Atlas Figure 8.2 Congenital nevus, giant type. This bathing trunk nevus extended into the anal canal. Note the variation in pigmentation. The darker lesions were more raised than the intervening tan skin. Any area in such a lesion that manifests a different color, nodularity, and/or texture should be considered for biopsy.

Atlas Figure 8.4 Congenital nevi. This patient afflicted with a giant congenital nevus of the trunk has, in addition, multiple small congenital nevi scattered on the extremities.

Atlas Figure 8.7 Congenital verrucous nevus of scalp. This type of lesion often is combined with elements of a blue nevus, sometimes with an atypical histology. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 8.5 Pigmented hairy nevus, lateral knee. This pigmented congenital nevus shows slight nodularity in its surface, a common finding in these lesions. Such a nodule, when of recent origin or showing continuous growth, should be biopsied, as it may herald the development of a nodule of melanoma. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 8.8 Halo congenital nevus. Congenital nevi rarely show halos of hypopigmentation as they become inflamed and can regress partially or completely. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 8.6 Giant pigmented congenital nevus. This congenital nevus of the scalp extends into the occipital area. Lesions such as this raise the possibility of Touraine's syndrome, which is the association of an intracranial proliferation of nevus cells in the meninges and in the perforating arteries of the brain; internal hydrocephalus may result from the presence of proliferating nevus cells, and, rarely, malignant degeneration is seen in melanocytes within the leptomeninges or the parenchyma of the brain. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Chapter 9: Dysplastic Melanocytic Nevi, De Novo Intraepidermal Epithelioid and Lentinginous Melanocytic Dysplasias, and Nevi at Specific Anatomic Sites


(A)

(B)

(C)

Atlas Figure 9.1 (**A–E**) Compound nevi versus dysplastic nevi. (**A**) The "normal" patient exhibits freckling of the shoulder skin and nevi, slightly raised and of uniform color, with overall sizes of less than 4 mm in diameter scattered randomly over the back. This distribution and morphology of the lesions is characteristic of common acquired nevi. They have symmetry of shape and uniformity of color and pattern. The patient with dysplastic nevus syndrome (**B**) has, in contrast, irregularly-shaped lesions of different sizes, scattered over the upper back, shoulders, and posterior aspect of the upper arms. Some lesions form irregular patterns in whorls and lines. These findings are typical of the manifestations of this syndrome. (**C–E**) This patient has multiple dysplastic nevi that erupted in crops. He has developed several melanomas and is a member of the third consecutive generation of his family to suffer from multiple dysplastic nevi and melanoma. Note the striking irregularities in size, shape, and color, and also the pattern distribution (**D**).
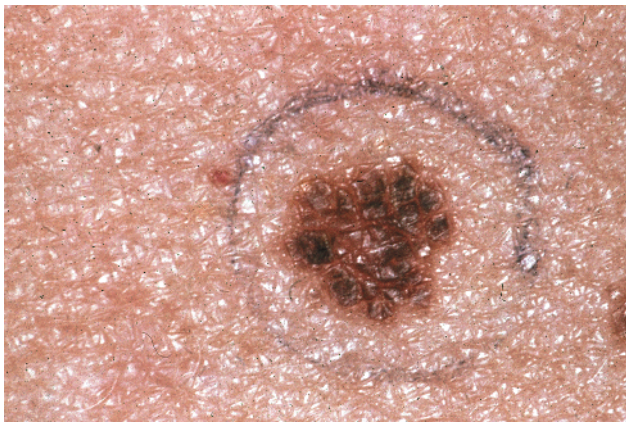
(D)
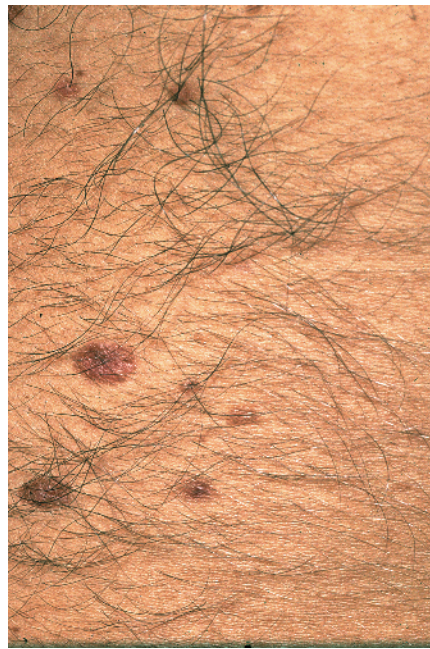
(E)

Atlas Figure 9.1 (*Continued*)

(A)

(B)

Atlas Figure 9.2 (**A–E**) Dysplastic nevus. An irregular border is seen with irregular shades of tan and dark brown surrounds a central raised papule, a site of pre-existing common acquired compound nevus in the lesion (**A**). (**B**) Two nevi are present in the inguinal fold. Lesions in the inguinal area often histologically show features of milk line nevi, with prominent intraepidermal nests. The other lesion is an oval, flat dysplastic nevus that has some slight irregular coloration of dark brown in the background of tan coloration. (**C**) This patient presents with a characteristic picture of multiple large nevi scattered irregularly over the surface of the back. Each nevus is different from the others, a finding characteristic of dysplastic nevi. (**D**) This dysplastic compound nevus shows a flare of irregular tan pigmentation with an irregular border surrounding a pre-existing banal common acquired compound nevus on which it was superimposed. (**E**) This is a large lesion of 8 mm in diameter with irregular pigmentation. (**B–D**, courtesy of Dr A. Benedetto, Philadelphia, PA.)

(C)

(D)

(E)

Atlas Figure 9.2 (*Continued*)

Atlas Figure 9.3 Vulvar compound nevus. Genital nevi are frequently larger in diameter than common acquired nevi but share characteristic morphology, including a tan, round or oval, flat or slightly raised background component with a central darker papule. This lesion, however, exhibits overall symmetry and is dome-shaped in its raised portion.

(A)

(B)
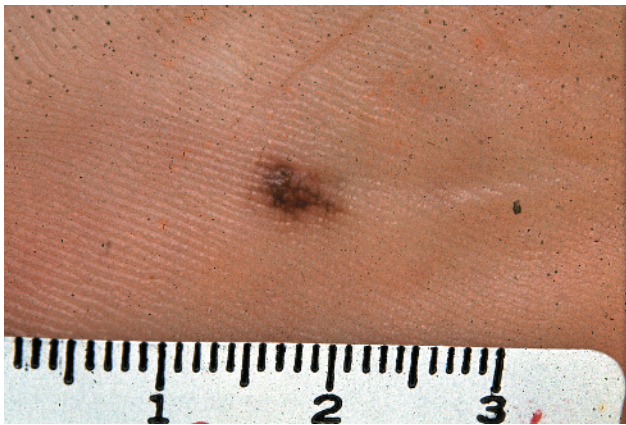
Atlas Figure 9.4 (**A**, **B**) Acral nevus. (**A**) Note the extension of pigment in streaks in skin furrows, a change that is characteristic of benign nevi. Acral melanoma, in contrast, involves both the furrows and the ridges. It is believed that the latter reflects involvement of the acrosyrinx by malignant melanocytes. The acral compound nevus (**B**) demonstrates the slight irregularity in the border associated with pigmentation following the grooves rather than the ridges in benign melanocytic proliferations of calves and soles. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

(A)

(B)

(C)

Atlas Figure 9.5 (**A–C**) Acral compound nevus. This dome-shaped acral compound nevus in a child had a significant dermal component. (Courtesy of Dr G. Murokawa, Albany, NY.) (**B**, **C**) Melanonychia striae. A linear, longitudinal band of pigmentation is present in the nail plate in this patient with a dysplastic subungual nevus (**B**). Note the absence of pigmentation of the cuticle and proximal nailfold (Hutchinson's sign) that, if present, would have been a clue to malignancy. (**C**) Shows melanonychia of the left thumbnail. A single uniformly colored pigmented streak is characteristic of a lentigo or a benign junctional nevus of the nailbed. Multiple irregularly-colored streaks suggest an atypical nevus or melanoma. (**B**, courtesy Dr Phillip Liloong, Port Louis, Mauritius, formerly of Brandon, MB; **C**, courtesy Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 9.6 Halo nevus. This halo nevus developed on the back of a 17-year-old boy. Characteristically, the nevus lies in the center of a round to oval halo of depigmentation, unlike the regressing melanoma, in which the placement of the central dark spot is eccentric in an irregularly-shaped halo of cutaneous depigmentation.


Atlas Figure 9.7 Acral congenital nevus. Acral congenital nevi often exhibit quite striking dark pigmentation, especially when located on the palms or on the soles. This uniform pattern of pigmentation is a sign of benignancy. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)

Chapter 10: Melanoma

Atlas Figure 10.1 Superficial spreading melanoma. Border irregularities with extensive notching are typical of radial growth phase melanoma as are the asymmetry and the variegations in color with scattered dark zones highlighting the dark reddish-brown background pigmentation. Note the irregularities in the raised portions of the lesion. (Courtesy of Dr M. Dupree, Albany, NY.)
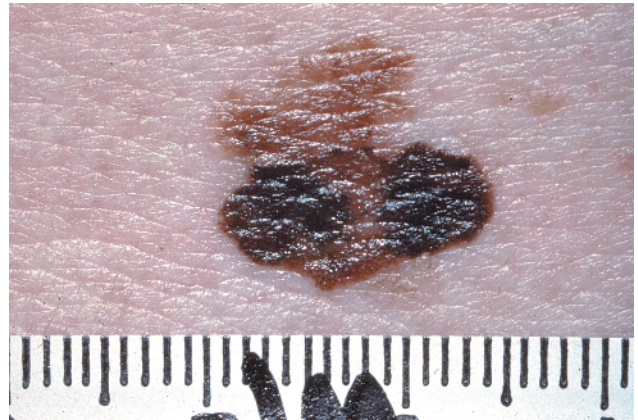
Atlas Figure 10.2 Superficial spreading melanoma, radial growth phase with focal regression. An asymmetrical patch or plaque with an irregular and slightly raised border is composed of multiple, small papules. There is striking variation in pigmentation, surface irregularity, and border with prominent notching. Focal regression often presents as gray or pale areas, such as the whitish area at the notch on the righthand side.

Atlas Figure 10.3 Superficial spreading melanoma, radial and early vertical growth phase, with regression. In this asymmetrical patch with an irregular and raised border there is striking variation in pigmentation and surface irregularity. There is a central area of regression presenting as gray or pale discoloration. There is an early vertical growth phase that presents as an irregularly-raised plaque with focal prominent papules visible in the border of the lesion.

Atlas Figure 10.5 Superficial spreading melanoma, vertical growth phase. The advanced vertical growth phase is ulcerated and lies in the middle of the arciform, very asymmetrical, radial growth phase, formed by extensive regression with resultant gray–white coloration of the inferior portion of the lesion. This variegation in color is typical of this type of lesion.

Atlas Figure 10.4 Superficial spreading melanoma, vertical growth phase. This small melanoma had a 1-mm deep vertical growth phase that metastasized widely.

Atlas Figure 10.6 Superficial spreading melanoma, vertical growth phase. Much of the radial growth phase is partially regressed, with multiple nodules of vertical growth phase surmounting the remaining plaque and highlighting the regressed areas. Note the striking alteration in color pattern of the asymmetrically placed nodules with a reddish, amelanotic appearance of the central excrescence.

(A)

(B)

(C)

Atlas Figure 10.7 (**A–C**) Pigmented superficial basal cell carcinoma. This type of pigmented basal cell carcinoma presents one of the most difficult diagnostic problems in cutaneous oncology. Clues to the diagnosis of this lesion can best be gleaned by use of a magnifying lens. The multiple papules of the border of the lesion are blue in color. Superficial spreading melanoma, on the other hand, will always exhibit areas of brown in the border and usually throughout the lesion. For definitive diagnosis, biopsy must be performed. (**B**) Shows a pigmented basal cell carcinoma (BCC). In pigmented BCC, melanin in the tumor cells and stroma results in a picture that, when combined with the nodular neoplasm distending the dermis, is clinically indistinguishable from nodular melanoma. (**C**) A nevus sebaceus of Jadassohn with coexistent pigmented BCC is demonstrated. This lesion, which shows a verrucous surface surmounted by a bluish nodule, raises the differential diagnosis of a pigmented BCC or a melanoma arising in a verrucous nevus of the scalp. This lesion was proven by biopsy to be a pigmented BCC. (**B**, Courtesy of Dr M. DuPree, Albany, NY; **C**, courtesy of Dr A. Benedetto, Philadelphia, PA.)

Atlas Figure 10.8 Lentigo maligna. An asymmetrical macule, several centimeters in size, with varying shades of tan–brown with irregular borders and the same reflectance as the adjacent skin without surface alteration is characteristic of lentigo maligna. Lentigo maligna resembles a stain in the skin when viewed with incident light. It thus can be differentiated often from pigmented keratoses and solar lentigines, which have a dull reflectance compared to adjacent skin. (Courtesy of Dr M. Stranc, Winnipeg, MB.)


(A)
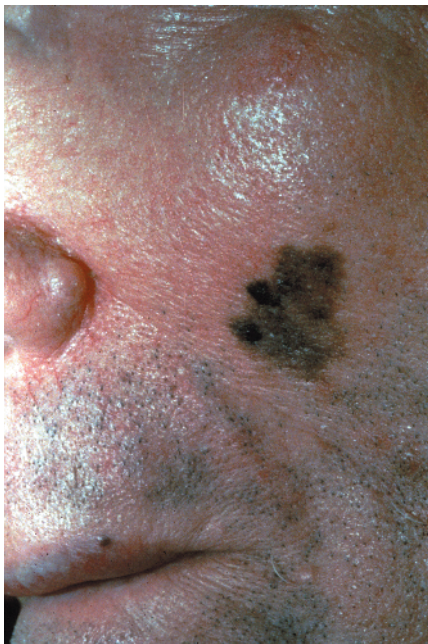
Atlas Figure 10.9 Lentigo maligna. This lesion, highly irregularly-shaped, asymmetrical, and greater than 2 cm in size, shows principal variations in colors of tan and brown. The lesion is asymmetrical and is located on sun-damaged skin of an elderly patient. The lesion is flat without areas of palpable nodularity.


(B)

Atlas Figure 10.10 (**A**, **B**) Lentigo maligna melanoma. (**A**) There is a flat dark-brown, asymmetrical, and irregularly-shaped patch surrounding a blue–black nodule, often mistaken for a seborrheic keratosis, on the sun-exposed preauricular skin of this octogenarian. (**B**) Shows a lentigo maligna melanoma that is relatively amelanotic; this pink- to slightly tan-colored lesion was shown at biopsy to represent an invasive lentigo maligna melanoma. Amelanotic melanoma is usually confused with Bowen's disease or with extramammary Paget's disease. (Courtesy of Dr A. Benedetto, Philadelphia, PA.)
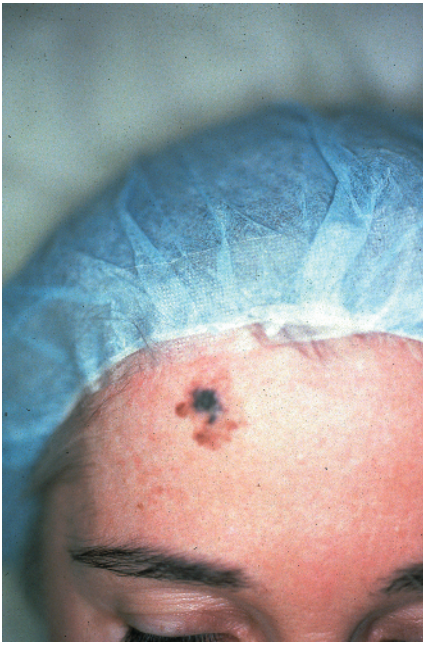
Atlas Figure 10.11 Melanoma, lentigo maligna type with desmoplastic response. A firm, irregularly-shaped nodule, representing the desmoplastic vertical growth phase, highlighted this irregularly-shaped brown–black asymmetrical freckle-like lesion on the forehead. Note the irregularity of the surface component.


(A)
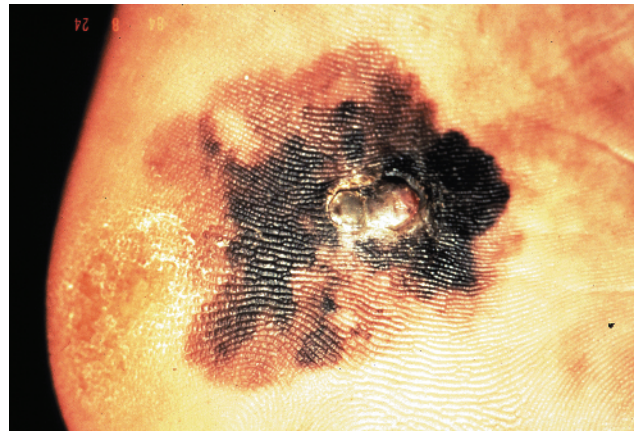
(B)

Atlas Figure 10.13 (**A**, **B**) Acral lentiginous melanoma. Ulcerated nodules of reddish–brown color represent the vertical growth phase and are eccentric to the extensive, flat, and asymmetrical radial growth phase. The darkly pigmented brown–black radial growth phase with irregular borders is characteristic, as is the manner in which it uniformly affects both the ridges and the furrows of the skin surface. Pigmentation in acral nevi tends to accentuate the furrows, in our experience, with the formation of delicate lines of pigment in a background of tan. In acral melanoma, prominent involvement by tumor of the acrosyringium, which opens on the ridges, may explain this pigmentary pattern. (**B**) The highly irregular pigmented plaque of acral lentiginous melanoma shows marked asymmetry, an irregular border, highly irregular coloration, and prominent, irregular elevation. (**A**, courtesy of the late Dr Wallace Clark, Boston, MA; **B**, courtesy of Dr M. DuPree, Albany, NY.)
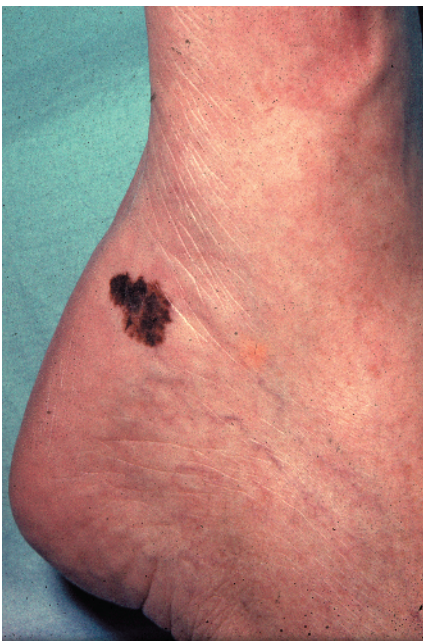
Atlas Figure 10.12 Acral lentiginous melanoma. This lesion was present for several years as an asymptomatic macule that became slightly raised and itchy. Histology revealed an acral lentiginous melanoma in radial growth phase.

Atlas Figure 10.14 Acral lentiginous melanoma with prominent excrescent component. This advanced-stage acral melanoma has expressed satellite nodules along the arch. (Courtesy of Dr M. Stranc, Winnipeg, MB.)

Atlas Figure 10.15 Acral lentiginous melanoma with prominent excrescent component. This black, bosselated, irregularly-raised large nodule is associated with pigmentation of the radial growth phase extending onto the great toe. The patient sought relief because of discomfort and bleeding of the lesion. (Courtesy of Dr M. Stranc, Winnipeg, MB.)

Atlas Figure 10.16 Talon noir. Traumatically-induced focal hemorrhage on acral areas can often be confused for a benign or malignant pigmented nevus.

Atlas Figure 10.17 Acral lentiginous melanoma, subungual presentation. Characteristic clinical features include pigmentation of the cuticle, the so-called Hutchinson's sign. There is also an irregular coloration of the nailbed surmounted by an ulcerated russet-colored nodule representing vertical growth phase melanoma arising in the background of an extensive radial growth phase component.

Atlas Figure 10.18 Acral lentiginous melanoma, subungual type. The pigmentation of the cuticle is clearly visible in this lesion that has resulted in a dystrophy of the nail with irregularities in the raised portion and striking variegation in color.


(A)

(B)

Atlas Figure 10.19 (**A**, **B**) Superficial spreading melanoma. Two lesions of melanoma have arisen in a patient with keratoderma. Both the lesion on the dorsal surface of the ankle and that on the elbow exhibit irregular shapes, asymmetry, and irregular coloration. The former is an irregularly-raised plaque, which exhibits a peripheral flare of brown–black with central blue–

white areas and ulceration. The latter is a reddish–brown patch surmounted by blue eccentric nodules with marked asymmetry, variation in color, large size, and elevation. Note the striking diffuse scaling of the skin, evidence of the associated keratoderma. (Courtesy of Dr M. Stranc, Winnipeg, MB.)
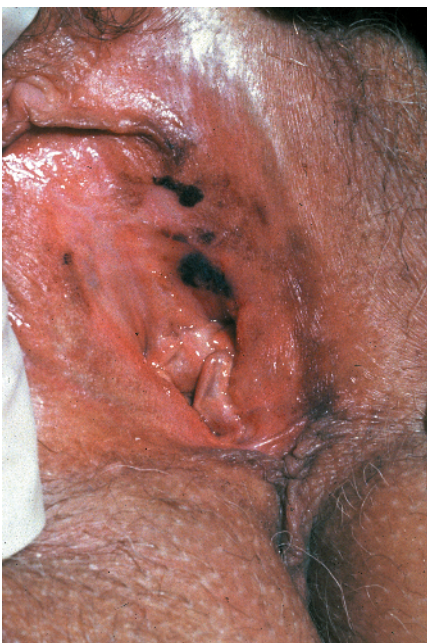
Atlas Figure 10.20 Vulvar melanoma. Striking, extensive, and asymmetrical pigmentation of the labium major and labium minus exhibits marked irregularities in color and shape caused by partial regression. This deeply invasive lesion was firm and irregularly raised to palpation well beyond the pigmented areas because of a desmoplastic vertical growth phase.

(A)

(B)

Atlas Figure 10.21 (**A**, **B**) Nodular melanoma. (**A**) The rapidly growing exophytic lesion has a reddish–brown color and shows no surrounding lateral flat pigmentary flare as seen in superficial spreading melanoma. (**B**) The ulcerated excrescent mass shows striking irregularities in color and a sharply demarcated border that is irregularly elevated. The lesion was present for several months. Intermittent bleeding caused the patient to seek medical advice. (Courtesy of Dr M. DuPree, Albany, NY.)
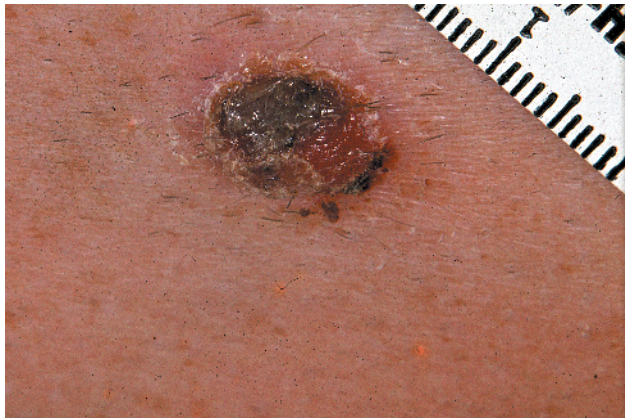
Atlas Figure 10.22 Nodular melanoma. This ulcerated nodule grew rapidly over a few months and bled. The patient already had evidence of nodal metastases when she presented to the Pigmented Lesion Clinic of the Massachusetts General Hospital.

Atlas Figure 10.23 Differential diagnosis: pigmented basal cell carcinoma, nodular type. This lesion, which shows striking nonuniform blue–black and reddish discoloration, is indistinguishable from a nodular melanoma. Only biopsy or excision will resolve the differential diagnostic dilemma. (Courtesy of Dr M. Stranc, Winnipeg, MB.)

Atlas Figure 10.24 Complications of melanoma: multiple metastases. This 34-year-old woman presented with multiple subcutaneous and cutaneous nodules on the trunk. Such a presentation usually heralds imminent death as in this case and is often associated with cerebral metastases. (Courtesy of Dr Gassan M. Joundi, Winnipeg, MB.)
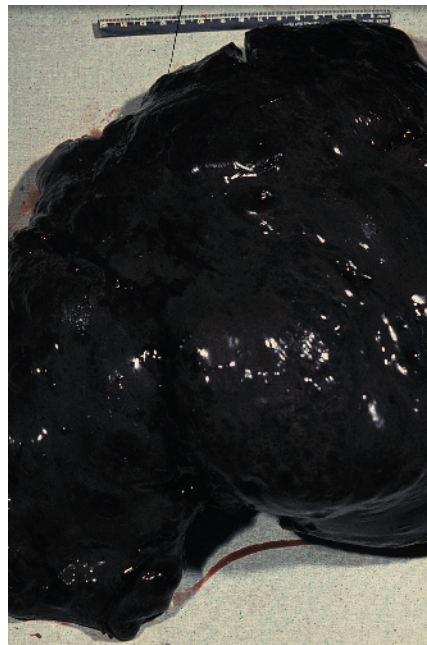

Atlas Figure 10.25 Complications of melanoma: metastatic melanoma en cuirasse. This reddish spreading plaque in the axilla of a 65-year-old patient was a clue to the presence of endolymphatic permeation by metastatic melanoma, analogous to inflammatory carcinoma of the breast. (Courtesy of Dr M. Stranc, Winnipeg, MB.)


(A)

(B)

Atlas Figure 10.26 (**A**, **B**) Complications of melanoma: diffuse melanosis secondary to widespread metastatic melanoma. This patient developed extensive metastases to the liver and other viscera. She gradually noticed a diffuse gray–brown pigmentation of the skin and sclera and eventually voided brown urine. (**A**) The striking degree of pigmentation is evident when her hands are compared to the hands of one of the authors (MCM). (**B**) The gross photograph shows the diffuse involvement by melanoma of this patient's liver obtained at postmortem examination.
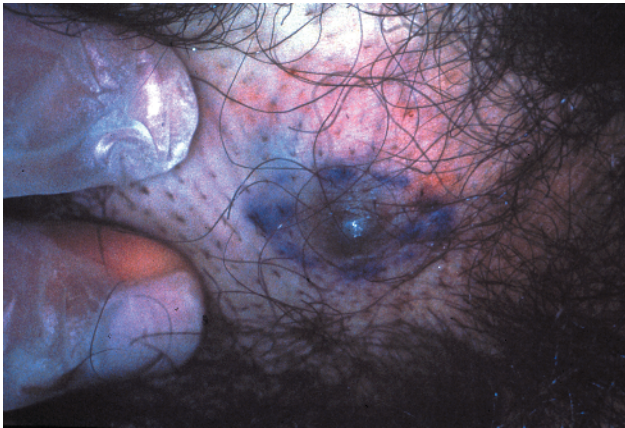
Atlas Figure 10.27 Epidermotropic metastatic melanoma. This lesion, an epidermotropic metastasis, cannot be differentiated easily by either clinical or histologic criteria from a primary melanoma of superficial spreading type. (Courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 10.29 Complications of melanoma: multiple metastases of the lower extremity (chronic limb melanoma). This patient demonstrated multiple metastases in the limb of the primary nodular melanoma that recurred after perfusion therapy, all confined to the lower limb below Poupart's ligament. This phenomenon can persist for years before widespread metastases and death occur and may reflect a local immunologic reaction causing confinement of the recurrent metastatic and in-transit lesions to one limb. We have seen several examples of chronic limb melanoma.

Atlas Figure 10.28 Poliosis. This patient first developed amelanotic lentigo maligna melanoma of the cheek. Pigmented metastases appeared subsequently in cervical lymph nodes followed by the development of vitiligo and poliosis.

Atlas Figure 10.30 Argyria. This patient, who used silver-containing nose drops for many years, exhibited a slate-gray pigmentation.

(A)

(B)

Atlas Figure 10.31 (**A**, **B**) Differential diagnosis: pigmented seborrheic keratosis. This lesion (**A**) had repeatedly bled after trauma. The presence of a scaly surface and multiple horn cysts in the upper half of the lesion is a reassuring sign. However, only a biopsy would completely exclude a melanoma with verrucous surface. We have observed a lentigo maligna melanoma on the cheek of a man of advanced age that was dome-shaped, had multiple horn cysts on its surface, and was clinically diagnosed by every physician in the Pigmented Lesion Clinic of the Massachusetts General Hospital as a seborrheic keratosis. On biopsy the correct diagnosis was made. (**B**) The jetblack nodule of pigmented seborrheic keratosis is indistinguishable from nodular melanoma or a pigmented basal cell carcinoma; the correct diagnosis was established by biopsy. (**B**, courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 10.32 Differential diagnosis: Kaposi's sarcoma. This patient had a spindle cell tumor that was originally diagnosed as metastatic spindle cell melanoma 2 years after a primary melanoma had been removed from the calf. Subsequent studies with immunoperoxidase stains revealed that the lesion was an example of Kaposi's sarcoma.

Chapter 11: Conjunctival Melanocytic Proliferations
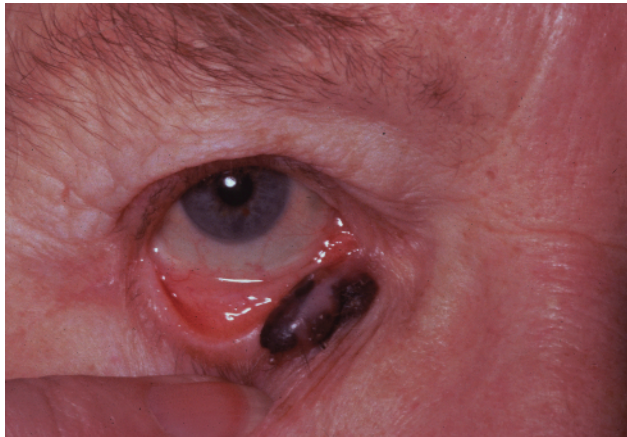
Atlas Figure 11.1 Conjunctival melanoma. A highly irregularly-shaped, asymmetrical, and irregularly-colored lesion has a corona of vessels surrounding the tumor.

Atlas Figure 11.3 Conjunctival melanoma. This patient noted a gradual increase in pigmentation of the eye but failed to seek medical attention until a nodule appeared in the conjunctiva that obscured her vision. (Courtesy of Dr M. DuPree, Albany, NY.)

Atlas Figure 11.2 Conjunctival blue nevus. This lesion appeared as a wedge-shaped blue–black area of eyelid discoloration involving the skin surface and the palpebral conjunctiva. The lesion also has an overall symmetry and sharp circumscription.

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