Understanding Acral Lentiginous Melanoma: From Clinic to Guidelines

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Learning Points

- Acral lentiginous melanoma (ALM) is a rare but aggressive melanoma subtype that disproportionately affects individuals with skin of colour.
- ALM often presents late due to its location on acral sites and a lack of public and clinician awareness.

- Dermoscopy and histopathology remain essential tools for early and accurate diagnosis of ALM.
- Surgical excision with appropriate margins is the mainstay of treatment, with limited roles for sentinel lymph node biopsy.
- Recent studies suggest ALM may respond less effectively to conventional immunotherapy due to a lower tumour mutational burden.
- Improved awareness, timely recognition, and further research into tailored treatments are crucial for better outcomes in ALM.

Abstract

Invasive acral Lentiginous Melanoma (ALM) is a distinct subtype of melanoma, primarily affecting non-sun-exposed extremities such as the palms, soles, and nail beds. First described by Reed in 1976. ALM is characterised by lentiginous proliferation of atypical melanocytes along the basal layer of glabrous skin. While “acral melanoma” refers broadly to melanomas arising on acral sites, “acral lentiginous melanoma” specifically denotes this lentiginous subtype. ALM is disproportionately represented among individuals with richly pigmented skin, including Black, Hispanic and Asian populations, in whom it accounts for a higher proportion of melanoma cases than in White populations. Although it represents only 2–3% of all melanomas, ALM carries a poorer prognosis, with five-year melanoma-specific survival rates averaging 80.6%. The pathogenesis of ALM remains incompletely understood. It is not primarily UV-induced but often associated with mechanical stress on weight-bearing or high-friction areas. Recurrent mutations in KIT, NF1, TERT and TP53 are frequently observed, particularly in older and Asian patients, underscoring its distinct molecular profile. Diagnosis is often delayed due to its subtle presentation as irregularly pigmented macules or patches. Histologically, ALM demonstrates lentiginous basal proliferation with dermal invasion. Management typically involves wide local excision, though advanced disease may require lymph node surgery, radiotherapy or systemic therapy. Prognosis is influenced by tumour thickness, ulceration, and sentinel lymph node involvement.

Persistent disparities in outcomes highlight the need for improved awareness, earlier diagnosis, and targeted management strategies to address the biological and sociodemographic complexities of ALM.

History

Invasive ALM was first described by Richard J.Reed in 1976 as a distinct histopathological subtype of melanoma, commonly found on the extremities, particularly the palms, soles, and nail beds [1]. John H. Arrington III [2] first noted ALM was the most common type of melanoma in Black ethnic groups in the United States, who had a poorer prognosis, thus underscoring early recognition of racial disparities in melanoma presentation and outcomes

The term "acral" derives from the Greek for "extremities," while "lentiginous" derives from the Latin word "lentil", a type of plant seed. By the 1990s, ALM histopathologic criteria were further refined; Saida et al identified specific dermoscopic patterns such as parallel furrow and fibrillar patterns, aiding in early diagnosis [3].

Throughout, we will be using "ALM" to refer to *invasive* acral lentiginous melanoma as opposed to ALM *in situ,* which carries a different prognosis and management

Epidemiology

National data for England from 2013-20, showed a mean of 192 cases per year, a crude incidence rate of 0.35 per 100,000 person-years and a male: female ratio of 0.64:1 [4]. In the USA, between 1986 and 2005, the age-adjusted incidence rate of ALM across 17 different cancer registries was 0.18 per 100,000 person-years [5]. A multi-centre retrospective study looking at diagnoses of acral melanoma between 2000 and 2017 in China found the overall median age at diagnosis was 56 [6]. ALM incidence increases with age, especially after 80 years [7].

Between 2006 to 2010, the USA melanoma age-adjusted incidence rate was 21.1 per 100,000 population compared to ≤ 1 per 100,000 in East Asian countries, including Taiwan, China and Japan (among others)[8]. In these countries, the most common subtype was ALM (approximately 54% of cutaneous melanoma). By contrast, ALM only made up 2-3% of all melanoma diagnoses in Western countries [8] with a mean age at diagnosis of 62.8 years across both male and female populations. Epidemiological patterns, therefore, show marked regional and ethnic variation, with ALM representing a minority of melanomas in Western populations but the predominant subtype in Asian and Black populations. Table 1 below summarises the reported incidence and demographic characteristics across regions.

These data highlight that although ALM accounts for only a small fraction of melanomas overall, it represents a disproportionately high proportion of cases among individuals of Asian and Black descent. Variations likely reflect a combination of genetic, environmental, and healthcare access factors.

Aetiology

Acral melanoma refers to melanomas that arise on acral sites such as the palms, soles, digits, and nail units. Among these, acral lentiginous melanoma (ALM) is the predominant histopathologic subtype, occurring almost exclusively on glabrous acral skin [10].

The aetiology of ALM is poorly understood and is less strongly associated with UV exposure than other melanoma subtypes. An elevated melanoma risk exists for those with first-degree relatives affected by any major melanoma subtype, including ALM, suggesting genetic susceptibility [11].

ALM has a unique molecular profile. Unlike other cutaneous melanomas that are commonly driven by BRAF mutations, ALM more frequently exhibits alterations in KIT, NF1, TERT promoter and TP53 genes [12]. This has been corroborated in international cohort studies and is particularly relevant in older patients and in studies involving Asian populations [11,12]. Approximately 15–20% of ALM cases present KIT mutations, associated with increased cell proliferation and disease progression, a pattern observed in mucosal melanomas, which also arise in UV-shielded areas [13]. Mutations in NF1 impact the Ras pathway, essential for cell growth regulation [14], while abnormalities in TERT promoter and TP53 genes indicate disruptions in cellular senescence and DNA repair, further defining ALM's distinct genetic landscape [15].

Recent large-scale genomic studies have deepened insight into ALM pathogenesis. Wang et al. mapped the temporal evolution of genetic events in ALM, revealing that early disease is dominated by structural rearrangements and copy-number alterations rather than UV-signature point mutations [16]. Amplifications of CCND1, TERT, and MDM2, along with deletions of CDKN2A/B, occur early and drive aberrant cell-cycle regulation, while later mutations in KIT, NF1, TP53, and TERT promoter regions promote invasion and metastasis. Transcriptomic analyses confirmed dysregulation of MAPK, PI3K–AKT, and p53 pathways as molecular hallmarks of ALM. Lu et al. similarly emphasised copy-number instability as a defining feature and highlighted the potential for targeted therapies directed at KIT and cell-cycle regulators[17]. Together, these findings support a model of ALM as a non-UV-induced melanoma subtype characterised by genomic instability and stepwise molecular evolution.
Beyond genetic alterations, environmental and mechanical factors have also been implicated in ALM pathogenesis. Mechanical stress in high-pressure areas, such as the palms and soles, may contribute to ALM development. Repeated trauma may create a microenvironment encouraging melanocyte activation and mutations. Observational data support this, showing higher ALM incidence in weight-bearing foot areas and in individuals with frequent hand or foot use [18–21]. Delayed recognition of subungual ALM remains a major diagnostic challenge, particularly in individuals with richly pigmented skin, where early lesions may mimic benign nail conditions.

Overall, ALM appears to arise from a multifactorial interplay of genetic susceptibility, mechanical microtrauma, and site-specific environmental influences.

Histology

The histological characteristics of ALM involve a complex interplay of atypical melanocytic proliferation unique to acral skin. In normal acral skin, melanocytes are primarily found in the lower part of the epidermis, positioned as single units, spaced evenly along the basement membrane, with small, oval nuclei that are darker than surrounding keratinocyte nuclei [22]. The

density of these melanocytes typically ranges from 40 to 270 per millimetre along the epidermal-dermal junction, an area characterised by undulating crests and furrows, particularly in acral skin [22].

In ALM, melanocytes often display spindle or epithelioid morphology. These atypical melanocytes can initially present as scattered cells along the basal layer but eventually proliferate, aligning linearly along the basement membrane in a "lentiginous" pattern (see figure 1 below). With disease progression, these melanocytes may coalesce into nests, signifying an advanced histological hallmark of ALM.

Typical histological features of ALM also include epidermal acanthosis (thickening), elongation of rete ridges, and melanocyte extension along the sweat ducts. These features, specific to ALM, contrast with those in other melanoma subtypes, aiding in differential diagnosis [23]. Immunohistochemistry further supports diagnosis, with ALM cells frequently testing negative for S100 but positive for HMB45, helping distinguish it from other melanocytic lesions [22,23].

Presentation

ALM typically presents as a slow-growing, tan-black pigmented lesion, commonly flat at first, with irregular, asymmetric borders. Over time it can develop into a nodular lesion, often signalling a shift from radial to vertical growth, increasing invasive potential [24]. Difficulty in differentiating from fungal infections, talon noir, haematoma or melanocytic nevi can delay diagnosis [25].

In subungual ALM, longitudinal melanonychia is a hallmark finding, together with Hutchinson's sign—pigmentation of the proximal nail fold [10,26]. Subungual hematoma can be distinguished by appearance after trauma and showing homogenous pigmentation without nail fold involvement. Onychomycosis may cause thickening and discoloration but lacks Hutchinson's sign [27].

Dermoscopy has specific ALM patterns, such as the parallel ridge pattern (PRP) and irregular diffuse pigmentation (IDP) (see figure 2 below). PRP, a linear pigmentation aligned with acral skin ridges, is particularly common in palmoplantar ALM, while periungual pigmentation, or Hutchinson's sign (see figure 3), often signals ALM in the nail bed [28,29]. These dermoscopic features help distinguish early-stage ALM from benign acral melanocytic naevi, which tend to show lattice-like, parallel furrow, or fibrillar patterns.

Compared to other melanomas, ALM often exhibits more complex dermoscopic structures, including PRP with irregular brown or black dots, IDP across much of the lesion, and other features like atypical vascular patterns, blue-white veils, and ulceration, which point to deeper growth [28,29,32] (see figure 4 below). IDP, found in about 85% of ALM cases, is more characteristic of advanced disease, with more varied pigmentation from tan to black [28].

27% of ALM can also appear amelanotic compared to < 10% in other subtypes[36]. Dermoscopy of amelanotic lesions may reveal faint pigmentation or present with vascular patterns, milky-red areas, irregular linear vessels, dotted vessels, and hairpin vessels[28].

Management/Guidelines

Due to the limited availability of ALM-specific trials, current management generally aligns with established melanoma guidelines, though anatomical and biological differences necessitate tailored considerations. According to UK NICE guidelines[37], staging of cutaneous melanoma involves sentinel lymph node biopsy (SLNB) for stage IB-II disease, and whole-body CT or MRI for stages IIB-IV. Excision margins are typically determined by Breslow thickness, with ≥0.5 cm for in situ melanoma, 1 cm for stage I, and 2 cm for stage II or higher disease. Topical imiquimod is offered for stage 0 when surgery poses significant risks. For stage III melanoma, routine lymph node dissection is not recommended unless the disease is challenging to manage. [37]

Excision margins in ALM can be difficult to achieve due to anatomical constraints on the palms, soles and nail unit. In these cases, specialised surgical techniques or reconstructive procedures may be required to maintain functionality and aesthetic integrity [38,39]. For subungual ALM, achieving clear margins often necessitates digital amputation.

SLNB plays a particularly important role in ALM. Large population-based analyses have demonstrated higher SLNB positivity rates in ALM compared with non-acral melanomas of equivalent Breslow thickness, particularly in plantar and subungual sites.[40]. Lee et al. further identified SLNB positivity as an independent predictor of metastasis and melanoma-specific survival[41]. Although the direct survival benefit of SLNB has been debated, Hsu et al. reported improved overall survival in Asian melanoma patients undergoing SLNB[42], supporting its prognostic and potentially therapeutic role. The complex lymphatic drainage of acral sites and frequent delay in diagnosis may further complicate nodal assessment[17]. Incorporation of SLNB into management algorithms is therefore recommended for ALMs ≥1 mm thick or with ulceration, as accurate nodal staging is critical for guiding adjuvant therapy.

In patients with stage IIB and IIC melanoma, adjuvant PD-1 blockade has become the standard of care. Pembrolizumab, supported by the KEYNOTE-716 trial, and nivolumab, as evidenced by the CheckMate 76K trial, offer options for high-risk, resectable cases, potentially reducing recurrence risk post-surgery[43,44]. This is now approved by NICE as the standard of care for melanoma; however, its role in acral lentiginous melanoma is not yet fully explored [37].

For unresectable, locally advanced, or metastatic ALM, immune checkpoint inhibitors such as anti-PD-1 and anti-CTLA-4 therapies remain first-line treatments. Response rates, however, are generally lower than in non-acral melanoma, reflecting ALM's low tumour mutational burden, distinct genetic drivers and immunologically "cold" tumour microenvironment. [45,46]. Combination checkpoint blockade targeting PD-1 and LAG-3 has recently demonstrated

enhanced efficacy; reported median progression-free survival of 10.1 months with relatlimab plus nivolumab versus 4.6 months with nivolumab alone (HR 0.75, p = 0.006) [47]. Given the immune-resistant biology of ALM, such dual-target approaches may hold promise. Due to ALM's lower somatic BRAF mutation burden, targeted molecular therapies, while promising in other melanoma subtypes, are less frequently applicable in ALM cases[48].

Anti-angiogenic therapy is emerging as a complementary strategy. The VEGF/VEGFR axis plays a central role in melanoma angiogenesis and tumour progression, and monoclonal antibodies or tyrosine-kinase inhibitors such as bevacizumab and axitinib have shown modest activity in advanced melanoma. VEGF blockade may also enhance immunotherapy by improving T-cell infiltration and vascular normalisation [49]. Although data specific to ALM are limited, these findings support the rationale for combination anti-angiogenic and immune-checkpoint therapy in future studies.

Oncolytic viral therapy with talimogene laherparepvec (T-VEC) has demonstrated durable responses and improved survival in advanced melanoma, primarily through immune activation within the tumour microenvironment[50]. While data in ALM remain sparse, T-VEC's immune-priming potential supports its exploration as an adjunct in immunotherapy-refractory or low-immunogenic subtypes

A study assessing the effectiveness of KIT therapy in metastatic melanoma has found that melanomas with genetic alterations of KIT do respond to treatment with imatinib mesylate [13], particularly in exons 11 and 13 [17]. Although these have not yet been clinically proven to be effective and thus are not mentioned in guidelines, more are in the process of being developed and have the potential to be used in the management of ALM associated with KIT mutations. A recent international cohort study emphasised the importance of considering ethnicity in ALM. The study identified notable differences in therapeutic response and survival outcomes across ethnic groups. For example, Asian patients had significantly shorter progression-free survival (PFS) and overall survival (OS) than White patients, while Hispanic/Latino individuals demonstrated improved outcomes.[51] These disparities may reflect underlying variations in mutation profiles, such as differing frequencies of KIT, NRAS, and BRAF mutations, which could influence response to targeted therapies. Such findings support the need for ethnicity-specific research to improve prognostication and personalised treatment approaches for ALM. c-Kit inhibitors are valuable for patients with KIT-mutant melanoma, particularly for mutations of exons 11 and 13[52]

Overall, ALM management is evolving towards more tailored, multimodal approaches. The combination of unique anatomical challenges, distinct genomic architecture and variable therapeutic responses highlights the ongoing need for subtype-specific trials and equitable access to novel therapies.

Prognosis

ALM prognosis is worsened by older age, greater Breslow thickness, and ulceration. Delayed detection typically results in a worse prognosis [29,53,54]. The presence of positive sentinel lymph nodes predicts disease recurrence and increased mortality, with multivariate analyses identifying it as the strongest predictor of adverse outcomes in ALM [6,55].

Compared to other types of cutaneous melanoma (CMM) at similar stages and depths, ALM generally exhibits lower survival rates [54,56,57]. Five-year melanoma-specific survival (MSS) rates for ALM were on average 80.6% compared to 93% for CMM. This difference in 5-year MSS controlled by stage was more pronounced for patients diagnosed at stages I and III ALM. This disparity is partly because ALM often presents at a more advanced stage. The delayed diagnosis of ALM is multifactorial, including social factors, which are discussed later in this section; one key factor, however, is that ALMs are frequently found in discrete locations such as the palmoplantar surfaces, which are less noticeable and may not be examined as thoroughly as other body areas.

Huang et al found ALM prevalence varied by racial demographics. It is the most common melanoma subtype in Black individuals (32.6%), followed by Asian/Pacific Islanders (18%), and Hispanic Whites (9%). For non-Hispanic Whites, ALM is rare, making up just 1% of cases [53]. ALM 5-year MSS is lower for Black (66.9%), Hispanic White (72%), and Asian populations (76.6%), compared to non-Hispanic Whites (84.3%)[53] The same study also showed that black individuals show the lowest five-year ALM MSS rates and often present with more advanced, thicker, and ulcerated tumours [53]. This disparity in MSS for ALM persists between ethnicities even after adjusting for the stage at presentation, with significant differences between Black and non-Hispanic White patients at stages I and III, emphasising the substantial impact of racial and demographic factors on prognosis[58]. This significant gap, although likely multifactorial due to underlying genetic differences, highlights inequities in early detection, diagnosis, and access to appropriate care, emphasising the need for tailored public health initiatives and education to address these disparities effectively. These findings are supported by a recent international cohort study by McGillivray et al., which identified Black ethnicity—particularly among males—as an independent predictor of worse disease-specific survival in ALM. Black males were found to have nearly double the mortality risk compared to their White counterparts (adjusted hazard ratio 1.97; 95% CI 1.36–2.87), reinforcing the urgent need for more inclusive research and targeted public health strategies.[51] Inequities in early detection, diagnosis, and access to appropriate care, emphasising the need for tailored public health initiatives and education to address these disparities effectively[59]. This delay in presentation is partly attributed to a lack of awareness, limited clinical images, and inadequate education regarding melanoma in individuals with skin of colour[6061].

In 2024, Hernandez et al identified notable survival disparities in patients with ALM: females had better 5- and 10-year disease-specific survival (DSS) rates compared to males (78.0% vs. 66.0% at 5 years, respectively; $p < 0.001$). Multivariate analysis revealed male sex and Black race as independent predictors of worse DSS, with adjusted hazard ratios of 1.54 and 1.97, respectively, compared to their female and White counterparts [62,63].

Consequently, there is an urgent need to enhance medical education and public health messaging to address these disparities and improve early detection efforts in diverse populations [64]

Future development

Ongoing research continues to unravel the molecular complexity of ALM and its implications for targeted treatment. While the molecular landscape of ALM has historically been defined by mutations in KIT, NF1, TERT promoter and TP53, recent large-scale genomic and multi-omic studies have provided new insights into its stepwise evolution and therapeutic vulnerabilities.

In a landmark analysis, Wang et al. mapped the temporal sequence of genetic events from early precursors to metastatic ALM [16], demonstrating that the disease is driven primarily by structural rearrangements and copy-number alterations rather than UV-signature point mutations. Early events included recurrent amplifications of CCND1, TERT and MDM2, and deletions of CDKN2A/B, driving aberrant cell-cycle progression. Later-stage mutations affected KIT, NF1, TP53 and TERT promoter regions, promoting invasion and metastasis. These findings redefine ALM as a genomically unstable, copy-number-driven melanoma subtype with potential therapeutic targets distinct from those of UV-induced cutaneous melanomas.

Complementary transcriptomic data confirm dysregulation of the MAPK, PI3K–AKT and p53 pathways as hallmarks of ALM biology. Key cellular pathways implicated in ALM pathogenesis include MAPK, PI3K/AKT/PTEN, JAK/STAT3 and p53, offering potential targets for future combination therapies. Integration of genomic and immune-profiling data has also revealed a profoundly immunosuppressed tumour microenvironment, explaining the comparatively limited responsiveness to PD-1 blockade. These observations provide a foundation for exploring novel therapeutic approaches such as dual-pathway inhibition (e.g. KIT + MAPK blockade), oncolytic-immunotherapy combinations, and the rational use of anti-angiogenic agents to remodel the tumour vasculature and enhance immune infiltration.
Lu et al further emphasised the clinical implications of these molecular insights, noting the prognostic relevance of copy-number instability and ethnic variation in genomic architecture. As precision oncology continues to evolve, incorporating ALM-specific biomarkers into diagnostic algorithms could improve early detection, guide systemic therapy selection and reduce survival disparities between populations.

A lack of public awareness of ALM and delayed diagnosis may occur not only because of its rarity but also due to the poor representation of darker skin tones in educational materials, such as clinical textbooks, online medical resources, and public health campaigns. A recent campaign has highlighted the importance of including more diverse images in clinical education and health promotion to address these disparities [65]. Public health information on skin cancer presentation and risk factors is often tailored to the more common presentations seen in white ethnic groups, which may not adequately reflect the needs of individuals with darker skin tones. Although these skin cancers are less common in the UK population, they remain underserved in terms of public and clinician education, as well as access to healthcare.

A growing consensus calls for a shift in practice to better support these underserved groups. Recent media campaigns and publications emphasize the need to improve diversity in medical images used in public health education, medical textbooks, dermoscopy image databases, AI image banks, pathology image repositories, cancer genome atlases, and clinical trial recruitment.[34,66–78] Addressing this gap is essential to foster equitable healthcare practices and to ensure earlier diagnosis and improved outcomes for individuals with darker skin tones.

Conclusion

ALM is a distinct and biologically complex subtype of melanoma with unique epidemiological, histopathological, and clinical characteristics. It disproportionately affects individuals with richly pigmented skin and frequently arises in less visible acral sites such as the palms, soles, and nail units. These anatomical locations contribute to diagnostic delays and poorer outcomes compared with other cutaneous melanoma subtypes. Prognostic indicators, including age, Breslow thickness, ulceration, and sentinel lymph node involvement, remain key determinants of survival and guide treatment decisions.

While management traditionally mirrors that of non-acral melanoma, recent advances in molecular profiling have revealed unique genetic and immunologic features that demand tailored approaches. The emergence of targeted and immune-based therapies—particularly PD-1/LAG-3 blockade, KIT inhibition, and combination regimens integrating anti-angiogenic or oncolytic agents—marks a shift toward precision oncology for ALM. However, the high degree of intra-tumoural heterogeneity and lower immunogenicity continue to limit therapeutic efficacy.

Looking ahead, improving outcomes for ALM will require simultaneous progress: scientific and societal. Expanding multi-ethnic genomic studies and conducting subtype-specific clinical trials will be crucial to refining therapeutic strategies, while increasing public and clinician awareness through inclusive medical education will help promote earlier recognition. Through the integration of molecular innovation and equitable healthcare practice, the outlook for patients with ALM can continue to improve in the coming years.

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Figure legends

Figure 1: ALM on histology with haematoxylin and eosin stain. Courtesy of DermNet [23]

Figure 2: Parallel ridge pattern, asymmetrical structure and diffuse pigmentation. Courtesy of DermNet (https://dermnetnz.org/topics/acral-lentiginous-melanoma-dermoscopy)[30]

Figure 3: Hutchinson's sign seen in ungual melanoma. Courtesy of DermNet (https://dermnetnz.org/cme/dermoscopy-course/dermoscopy-of-the-nail)[31]

Figure 4- Acral melanoma: blackish macule on the hallux (b). Dermoscopic appearance (a). Courtesy of Morgado de Abreu et al [33]

Figure 5 - Melanoma arising in the nail bed of a black male. Courtesy of Hugh Gloster [34]

Figure 6 - Acral lentiginous melanoma on the sole of the foot in a 30-year-old Black woman. This lesion was 2 mm in depth with a positive sentinel lymph node biopsy. Courtesy of Richard P. Usatine [35]

Region / Country	Study Period	Incidence (per 100,000 person-years)	Demographics & Clinical Features	Key Findings / Notes	Ref
England	2013–2020	0.35 (crude); mean 192 cases/year	M:F ratio 0.64:1	Stable annual case rate	[9]
USA	1986–2005	0.18 (US age-adjusted, 17 registries)	M:F ratio 0.85:1; mean age 62.8 y; feet and toes most common	Males presented with more advanced disease (regional/distant 37.3% vs 26.3%) ALM accounts for 2-3% of melanomas	[5,8]
China	2000–2017	≤ 1 (rate type not documented)	Median age 56 y	ALM most common subtype (~54% of all melanomas). ALM affecting the sole had worst prognosis	[6,8]
Taiwan, China, Japan, Korea, Hong Kong, and Singapore	2006–2010	≤ 1 (rate type not documented)	–	ALM predominant subtype (~54%); contrasts with Western rates	[8]

Table 1. Reported incidence and demographic characteristics of acral lentiginous melanoma (ALM) across global regions. Incidence expressed per 100,000 person-years unless stated.

CPD Questions

Learning objective: To improve understanding of the clinical presentation, diagnostic strategies, histopathology, treatment challenges, and population disparities associated with Acral Lentiginous Melanoma.

Question 1

A 62-year-old woman of African descent presents with a slow-growing, irregular pigmented lesion on the sole of her foot. On dermoscopy, parallel ridge pattern pigmentation is noted. Histopathology confirms acral lentiginous melanoma.

Which of the following factors is most likely to contribute to the delayed diagnosis of this melanoma subtype?

(a) Aggressive vertical growth phase
(b) Amelanotic presentation
(c) High tumour mutational burden
(d) Location on acral skin surfaces
(e) Rapid metastatic spread

Question 2

A dermatology trainee observes that patients with acral lentiginous melanoma have poorer outcomes with PD-1 inhibitor therapy compared to those with cutaneous melanoma.

Which of the following best explains this observation?

(a) Enhanced vascular invasion
(b) Higher levels of PD-L1 expression
(c) Lower tumour mutational burden
(d) More frequent BRAF mutations
(e) Predominant epidermal growth pattern

Question 3

Which of the following dermoscopic features is most strongly associated with acral lentiginous melanoma?

(a) Central blue-white veil
(b) Diffuse hypopigmentation
(c) Parallel furrow pattern
(d) Parallel ridge pattern
(e) Polymorphous vascular structures

Question 4

In which patient population is acral lentiginous melanoma most disproportionately represented?

(a) Elderly Caucasian men with sun-damaged skin
(b) Middle-aged patients with a history of actinic keratosis
(c) Immunocompromised patients with fair skin
(d) Individuals with skin of colour across all ages
(e) Young adults with multiple dysplastic naevi

Question 5

Which of the following histopathological findings is most characteristic of acral lentiginous melanoma?

(a) Migration of small round lymphocytes into epidermis
(b) Junctional nests of uniform melanocytes
(c) Loss of maturation with downward growth
(d) Spindle-shaped cells in dermal sheets
(e) Pagetoid scatter of Langerhans cells

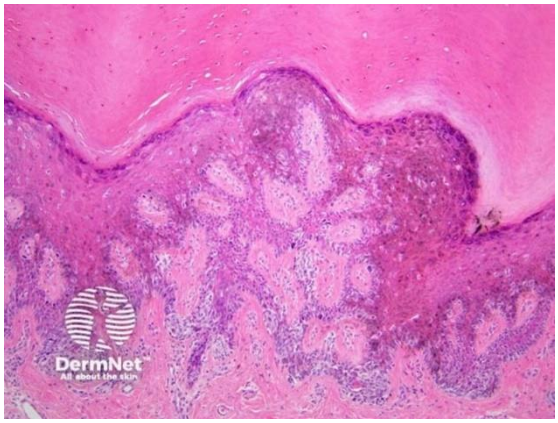

Figure 1
73x55 mm (x DPI)

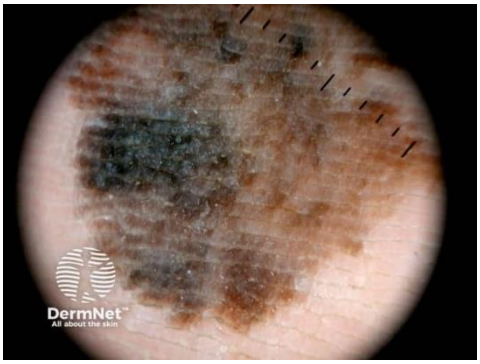

Figure 2
63x47 mm (x DPI)

Figure 3
62x46 mm (x DPI)

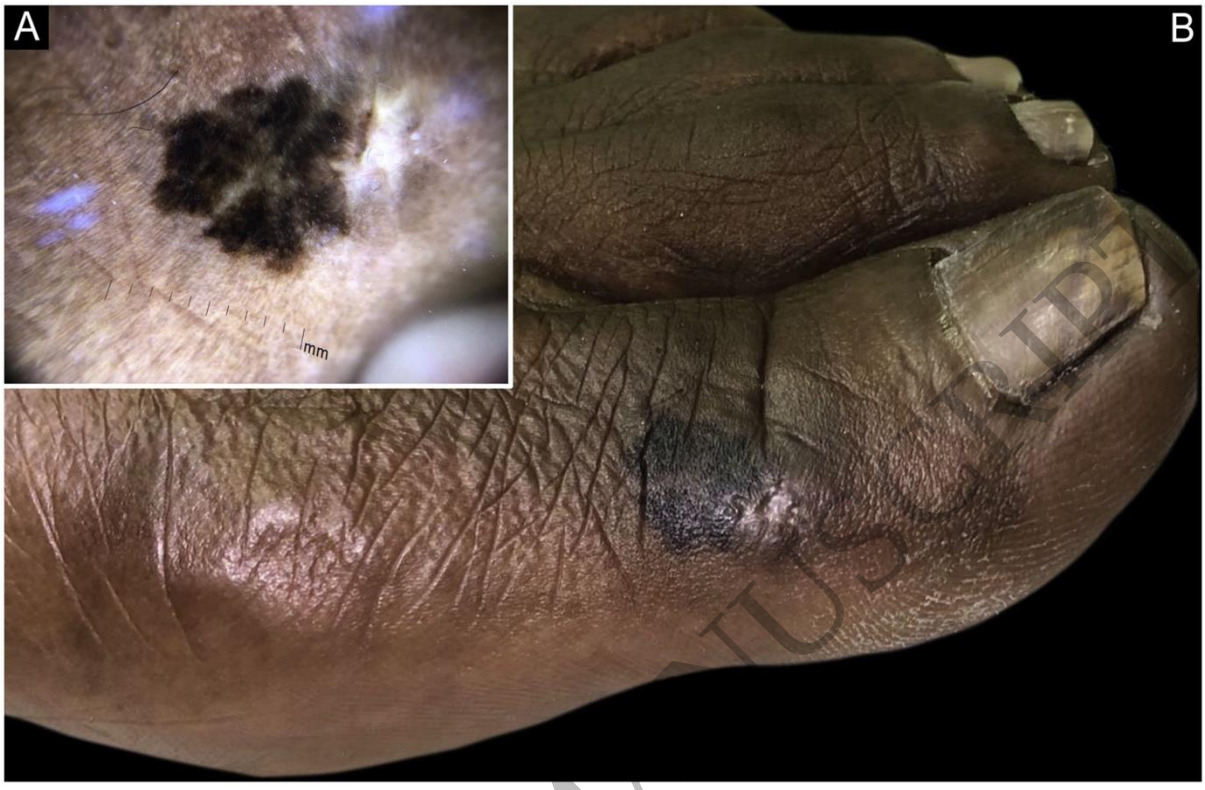

Figure 4
159x103 mm (x DPI)

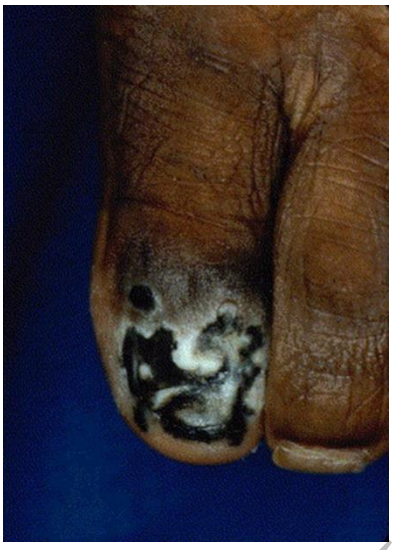

Figure 5
51x71 mm (x DPI)

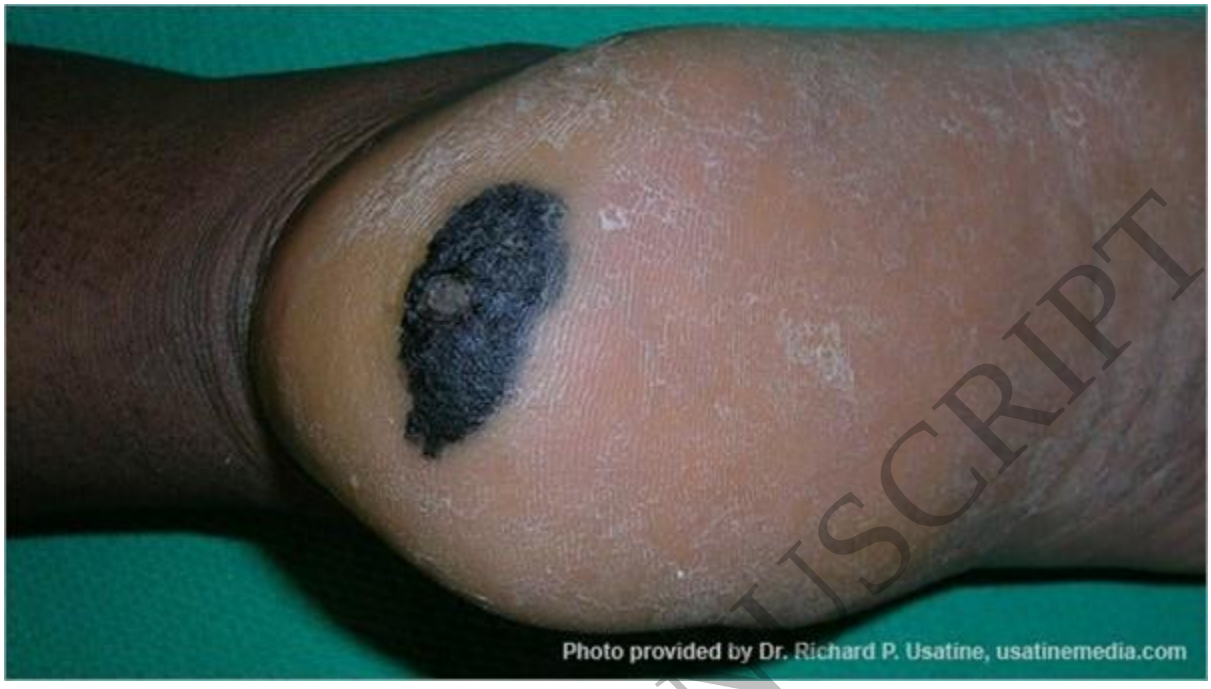

Figure 6
159x89 mm (x DPI)