

The Role of Podiatrists in Cancer Care

Early identification & Diagnosis - part 1

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Introduction

This article focuses on the opportunity for the podiatrist to develop a role in the cancer pathway, from detection through to treating patients. This can be during their anticancer therapies, rehabilitation post treatment or surgery and also helping cancer survivors. This article focuses on detection of benign and malignant tumours that can affect the foot. It should be appreciated that podiatry as a discipline is changing constantly and that medicine has to adapt with how health care professionals can support optimal patient management in an ever-changing health economy with new priorities.

Cancer treatment remains a niche area within podiatry practice, with relatively few podiatrists specialising in this field. With a growing need for the profession to take a more active role in the cancer care pathway, half of the population will likely to have suffered from some form of cancer by 2030. In developing our expertise new opportunities for podiatrists in this area of treatment could open up.



Key messages:

- 1 Initial identification and early referral is the baseline objective for all podiatrists**
- 2 Podiatrists will have different skills and competencies to refine their initial diagnosis by screening using imaging to biopsy**

Epidemiology

Whilst tumours in the foot and ankle are less commonly found than other forms of cancer, 2% of sarcomasⁱ arise in the foot and Toepfer et alⁱⁱ documented in their study of MSK tumours in the body; 5.52% of tumours were in the foot and of those 64% involved bone. With more than 360,000 new cancer patients diagnosed in the UK in 2016ⁱⁱⁱ this could translate to almost 20,000 new cases a year.

It is also well documented^{iv vii} that early diagnosis and proper management are 'key factors in increasing life expectancy and functional outcomes of these patients^{viii}. It is therefore important for podiatrists to be alert to unusual or suspicious lesions. As a profession, we are likely to see a patient for multiple appointments and through this continuity of care we are uniquely placed to identify subtle changes in an unusual lesion or one where delayed healing is apparent. Early detection with an ideal rapid referral of a suspicious tumour can increase the chances of recovery for some patients. Often specialist centres are distributed widely in the UK.

Who is at risk?

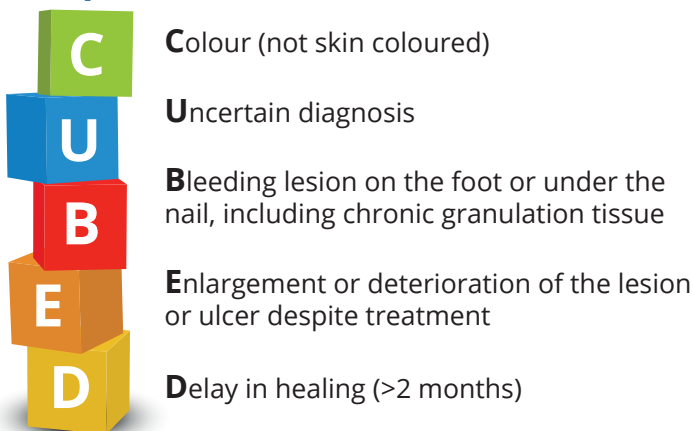
Benign and malignant tumours may present to us in all podiatry clinical settings so we should all be alert, whatever our particular specialism. Whilst many tumours are more prevalent in middle and older aged patients, 10% in the paediatric population^{ix} can also be affected. Skin cancer does not only affect caucasians or especially fair skinned or redheads, melanomas occur in all races and affect all skin types and colours. In terms of identifying higher risk groups, they are mainly diagnosed in 40 to 70-year olds.

One of the key risks is misdiagnosis of foot pain. A publication has cited the fact that a patient with lung cancer was seen by two physicians and an orthopaedic surgeon who had missed the diagnosis when providing treatment and by the time the cancer was detected, it was too late^x

How should we approach potential tumorous growths?

A systematic approach to the examination of the foot and ankle should include a methodical investigation of the site. Differentiation between possible malignant and benign tumours can be challenging. The CUBED acronym^{xi} helps identify changes in the case of any suspicion of malignancy.

CUBED acronym for investigating suspicious lesions on the foot



In my experience I have used a particular approach and these 10 vital steps are set out below for you to use in your initial assessment:

- 1 Assess the deformity itself
- 2 Consider the duration and history of the appearance
- 3 Check if the area has become painful
- 4 Investigate and evaluate any tenderness on movement of the involved joints
- 5 Investigate sensory and motor neurological status and any deficits detected
- 6 Investigate the depth of the growth and consistency of the surrounding bone and soft tissue
- 7 Review the area if possible, with transillumination or a dermatoscope
- 8 Note deeper tissue adhesions and involvement
- 9 Document any clinical characteristics
- 10 Use non-abnormal detected (NAD) to note where no lesions were present

Tips for assessing lesions

My adage is 'better safe than sorry'. If any of the following features are present in a suspicious growth do something about it^{xii}

- a) lump size is more than 5cm
- b) sudden increase in size
- c) a source of continual or deep-seated pain
- d) recurrent swelling

With experience, lesions such as fibromas and innocent skin changes can be excluded. Unfortunately, with cancers there is no absolute assurances until biopsies can be undertaken. So you will need to refer to a particular cancer centre. When highlighting any concern when referring to the centre, provide as much relevant background as possible. This would include any changes you have noted over time and any family history of cancer that you are aware of. This will help the cancer centre to understand the rationale for the referral and prioritise where appropriate.

What are the key types of tumour for podiatrists to look for?

Carcinomas and sarcomas are differentiated by their tissue. The former is more common and relates to skin and lining tissue of organs. Sarcomas are associated with connective tissue and tend to be less common.

Some tumours have a greater predilection for younger patients e.g synovial sarcoma. These can affect middle aged adults and typically present as a firm fixed mass, which has been latent for a long time and then expands. Its presentation varies and the patient might simply report pain instead of swelling alone. Testing for associated pain in the local lymph glands is an important diagnostic test as regional lymph nodes can be affected. Carcinomas affect older people as a generalisation.

There are also malignant bone tumours which include Ewing's sarcoma, osteo- and chondro-sarcomas. Ewing's sarcoma presents as a lytic expansible mass in the metatarsals with an onion peel appearance and affects teenagers. Meanwhile chondrosarcomas are slow growing tumours that typically present in middle aged and older patients. Sub-ungual osteochondromata affect younger patients and distort toe nails and should be differentiated. The nail is grossly distorted with a discoloured expansible nail bed. It is not unusual for histologists to use a cancer centre for secondary opinions as in rare cases sub-ungual chondromata can develop into malignancy.

The hand is the site of a great variety of benign lesions and rarely of malignant lesions. Frequently these lesions present in a similar way to benign conditions leading to erroneous diagnosis and inappropriate treatment.

Awareness of the possibility of metastatic disease during orthopaedic assessment is essential to decrease patient morbidity. For example a case that was referred to an institution with a single metastasis in a digit from occult gastric adenocarcinoma is used to illustrate the way these lesions are managed. The diagnostic difficulties are summarised and an overview of literature was performed to determine management pathways to aid others in the treatment of these cases.^{xii}



Acrometastasis

Benign growths in the feet include ganglions and plantar fibromatosis which may share presentational aspects with a malignancy. Acrometastasis can be the first manifestation of occult malignancy. Patients may have unresolved musculoskeletal problems. This can be a sign of an undiagnosed type of (occult) cancer of unknown primary site that is already metastatic.

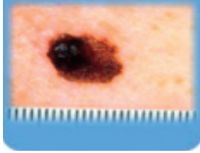
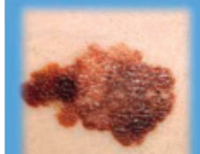
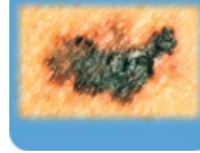
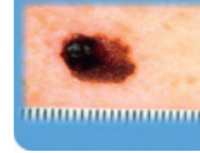

Other malignant secondary lesions of the bones located in the hand or feet can affect every age group but are predominantly found in males, perhaps due to links with prostate cancer. Acrometastasis are not uncommon and can be found in patients with primary tumours in lungs, colon and genitourinary regions^{xiii xiv xv xvi}. Due to the fact the cancer is already spreading prior to diagnosis, the patient's prognosis is

normally poor and immediate action is essential. It is therefore important to be vigilant for any such cases.

What about skin cancer?

In addition to growths, there is now greater awareness amongst podiatrists of melanomas. They are not uncommon in the foot and ankle^{xvii, xviii} and must be thoroughly investigated. In addition to the CUBED acronym highlighted earlier, the ABCDE detection classification^{xix} is a good guide for monitoring these and how they develop.

ABCDE CLASSIFICATION

	A	B	C	D	E
Asymmetry	Asymmetry	Border	Color	Diameter	Evolving
Borders					
Colour (varied)					
Diameter (> 5mm)					
Evolving (shape, size)					

At first appearance, it can sometimes be hard to differentiate between more common issues (including nail trauma) and a malignant melanoma or non-melanoma squamous cell carcinoma. Some of these are set out below and further investigation of the nail plate and bed should help in differentiating these conditions. It is nevertheless worth bearing a melanoma in mind and making appropriate notes for future reference, particularly if the patient is unresponsive to initial treatment or has a clinical history that might suggest a higher risk of cancer.

Some of the key issues that may present similarly to a melanoma include nutritional deficiencies – these can cause several changes to the shape and surface of the nail bed such as:

- subungual haematomas – a collection of blood under nail, this can be very painful and can cause the nail to look slightly deformed
- paronychia - infections that affect the cuticle and sides of the nail. It can cause nails distortion, inflammation and exudate but should respond to appropriate treatment within a few weeks
- pseudomonas infections - give a dark blueish green discolouration under the nail. Can sometimes look mottled
- fungal moulds infections (such as *Scytalidium*, *Scopulariopsis* and *fusarium*) – can produce a melanin-related pigment in the nail
- pyrogenic granuloma - a benign vascular lesion that appears as an overgrowth tissue due to trauma, irritation or hormonal factors. They can look like a spot of cherry jam and are common in young patients and pregnant women

Examples of nutritional deficiencies affecting the nail:

Deficiency	Features
Vitamin B	Appear like beads of wax dripping down the nail
Vitamin B12	Can give nails a brown- grey discoloration
Folic acid or protein	Can cause nail plate ridges and cause koilonychia
Iron	Nail plate ridges and can also cause the nails to be brittle and a deep central groove and they can look pink or red
Biotin	Can cause discoloration and increase risk of fungal infections
Zinc	Can cause discoloration and in severe cases cause beau's lines

Melanomas ^{xx}

Finally, there are three types of melanomas that can affect the nail apparatus each with different characteristics. An urgent referral stating your findings in the report is vital. The following are the different types of melanomas.



Subungual melanoma

A subungual melanoma originates from the nail matrix and develops over weeks or months.

In its most common form, it starts as a pigmented band which is visible the length of the nail plate (melanonychia). The pigment band becomes wider, especially at its proximal end and becomes more irregular in pigmentation. It can extend to involve the skin of the adjacent proximal or lateral sulci - this is known as Hutchinson sign. The nail may develop a nodule, ulcerate or bleed and the nail plate may become thin, cracked or distorted.



Ungual melanoma

An unguinal melanoma originates from under the nail plate and can form a non-pigmented nodule under the nail plate. This can sometimes cause onycholysis and look verrucoid. They are normally painless but an advanced tumour infiltrating into underlying bone may cause severe pain.



Periungual Melanoma

A periungual melanoma originates from skin beside the nail plate and presents as a melanocytic naevus of the nail matrix. The pigmented band tends to be narrower than 3mm and has a uniform brown or dark

brown colour. Benign pigmentations can be observed in the cuticle or sulci and these are referred to as pseudo-Hutchinson sign.

Summary

With cancer impacting, either directly or indirectly on the population, podiatrists can contribute significantly as primary screeners or active participants working with oncology units. By assisting those actively undergoing anticancer treatment, even though some cases are not curable, patients surviving cancer still require assistance in managing some of the side effects as part of their recovery.

It could be argued that the chance of survival and quality of life during and after treatment comes down to timely detection. This can be greatly enhanced where the same practitioner is already seeing an at-risk patient on a regular basis. Even in a busy practice or the NHS, where patients may not see the same podiatrist on each visit, detailed notes from the clinician recording key features (e.g. using the CUBED acronym) can provide a continuity of care that facilitates swift intervention and potentially saves lives.

Greater awareness of issues such as secondary acrometastasis as well as the warning signs of other malignancies will help reduce the incidence of such cases. Aligned to this, an improved understanding of the links between cancer and podiatric issues helps to avoid misdiagnosis or suboptimal treatment and ultimately could save lives.

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APPENDIX

Cancer Care and tumours affecting the feet or ankle

Clear cell Sarcoma of the soft tissue	It is a rare malignancy but this type of form is most common in the feet. It may be noticed as lump that arises from deep tissues of the distal extremities. It is more prevalent in Caucasians than in African Americans or Asians. The tumour might interfere with the function of the tendons as it grows and invades nearby tissue and is painful in 30-60% of patients. It has similar characteristics to melanomas. This tumour is commonly found in the extremities especially around the knee, feet and ankle. Patients diagnosed are normally between the ages of 20-40 ¹ .
Non-melanoma cell carcinoma	Can look like open sores, warts or elevated growth with a central depression. They may crust or bleed.
Epithelioid Sarcoma	Are slow growing, innocuous, relatively painless tumours but as a result can sometimes be misdiagnosed as a persistent wart or benign process. Adult patients have an increase rate of lymph node involvement. The lungs are often the most common site of distant organ metastasis. Local reoccurrence often occurs within 1-2 years after treatment. Unusual nodules on distal extremities of young men should be closely investigated. ²
Haemangioepithelioma	Is a rare vascular tumour that occurs in the soft tissue of the lower limb. They typically occur in young patients. ³
Ganglions	Found in areas of high physical stress and they present as a firm subcutaneous lump that may rupture or disappear. They cause pain/tenderness on areas correlated to its subsequent location and footwear.
Plantar fibromatosis (also known as Ledderhose disease)	An aggressive, benign hyper proliferative disorder of the plantar aponeurosis. It is common in males and prevalent in middle age and older patients. It can be associated with Dupuytren's and Peyronie's disease. As a slow growing fibroma that forms nodules in the plantar fascia which can be extremely painful when weight bearing on the arch of the foot, it has many properties in common with malignant tumours and appropriate tests will be needed to confirm this diagnosis as a benign case.
Plantar fibromatosis (also known as Ledderhose disease)	Fibroblastic tumours found in thick collagen fibres. They exhibit subcutaneous, firm, localised nodules and are normally not tender. Tend to affect males more than females.
Giant cell tumour of the tendon sheath	4% of these types of tumours are found in the foot and ankle ⁴ . Most don't cause pain unless footwear is causing the patient pressure pain. They are formed of giant cells, foam cell and reticulum cells. They look like well defined firm nodules and may disappear spontaneously. They occur in patients aged between 20-40 and are slightly more common in females.
Pigmented villonodular synovitis	A locally aggressive tumour which can cause bony erosions and can affect the ankle and knee as well as the foot (normally multiple bones within the midfoot). It presents as swelling and effusion along the area with discomfort over the involved joints. On an x-ray you can see bony erosion near the joints involved. They can occur in both paediatric and geriatric patients but is most common in patients aged 20-50. 2.5% of this type occur in the foot and ankle. ⁵
Lipomas	They are encapsulated lesions of an adipose tissue which subcutaneous. They feel doughy and are generally pain free unless pressure aggravates it. They are commonly found on the dorsum of the foot.
Schwannomas	Are rare, well encapsulated solitary tumours of the nerve sheath. They have a positive response to a percussion test and occur in patients aged between 20-50 years ^{6,7}
Glomus tumour	Usually presents as a dark discolouration under the nail. They are found to be sensitive to cold and pressure.

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Malignant tumours	
Osteosarcomas	Presents as a painful, enlarging hard mass. Less than 1% occur in the foot region.
Osteochondromas	Accounts to 30-40% of all benign tumours. It is normally solitary, either sessile or pedunculated lesions found in the metaphyseal region growing away from the physis. It often has hyaline cartilage on the cap of it. It is a painless bump under the joints. Pain can be aggravated with activity. They may be part of a dominant condition called hereditary multiple exostosis. It is common in patients under age of 20 and more common in females. Malignant changes can happen in 1% of these lesions. ⁸
Enchondromas (Ollier's disease)	Are intramedullary, cartilaginous tumours which are usually solitary. However, in some cases there can be multiples. They are mostly found in tubular bones in the hands and feet and can sometimes present as a pathological fracture. Ollier's disease can be associated with another soft tissue tumour haemangioma. In these cases a risk of malignant transformation occurring is 30%.
Osteoid osteoma	Self limiting neoplasm. Mainly presents as non-activity related pain in younger patients (5-30 years old) and can be nocturnal. It affects the long bones. The pain normally responds well to NSAIDs. This is a good diagnosis sign.
Osteoblastoma	Less common than osteoid osteoma. They present near the growth plate (dorsal talar neck) in 15-30 age group. They don't respond well to NSAIDs. ⁹
Simple bone cysts	Are benign fluid filled lesions that enlarge over time and result in the bone thinning. They formed due to medullary bone malformation. They primarily affect paediatric patients and are more in boys. They affect long bones particularly femur. 80% of these cysts are painless unless a pathologic fracture is involved. Where there is no history of trauma, mild pain / tenderness may be exhibited with possible swelling. ¹⁰
Aneurysmal bone cysts	Are common in under 20s and mainly affects the metatarsals but are quite rare. Local pain and possible fracture. ¹¹
Giant cell tumours	Present as a painful mass in the epiphyseal region usually within the os calcis and talus. Common in 30-40 year olds. It has a high risk of reoccurrence (50%) and a 2% risk of being systemic metastasis. ¹²
Giant cell tumours	
Subungual Exostosis	Very Common, often bony dorsal growth of the distal phalanx of the hallux covered by a fibrocartilage. 13 Patients may exhibit onycholysis and nail deformity as the nail tries to grow over it. It is common in patients between 20 and 40.



About the author

Afni Shah-Hamilton runs **Tiptoe Foot Care**, a private podiatry practice in Barnet, London. Afni graduated from University College London in Podiatry BSC (Hons) and completed her master's degree at Kings College London.

She currently sits on the Macmillan AHP advisory board and has previously been a member of the national patient safety campaign, Sign up to Safety, advisory group.

Afni has worked for Southwark Foot Health Department in conjunction with Guy's and King's College Hospital as well as working for the Society of Chiropodists and Podiatrists (now the College of Podiatry) as a Learning fund Project Worker, promoting learning and development across the profession.

Afni has significant experience of dealing with high risk patients through her close relationships with oncologists and a local cancer charity. She is passionate about the role that podiatrists can play in improving the quality of life for both cancer sufferers and cancer survivors.



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