

**NEUROPATHIC ULCER
OF DIABETIC FOOT PATIENT
THESIS**

Submitted for partial fulfillment of M.Sc Degree

In General surgery

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2010

ACKNOWLEDGEMENT

First of all thanks to God to whom I relate any success in achieving any work

I am greatly grateful to **Professor Dr. Ahmed ELSharkawy**, professor of general surgery, Cairo University, for suggesting the field of this work his advice and assistance.

I wish to express my deepest gratitude and thanks to **Professor Dr. George Abd ELfady** Assistant Professor of general surgery, Cairo University, for his great help and supervision throughout this work.

Also, my great appreciation to **Prof .Dr.Ahmed Nada** Assistant Professor of General surgery Faculty of medicine. Cairo University for his valuable advice and real assistance .

Lastly ;I wish to thank & express my appreciation to my family, my friends ,my colloques &every one who help me in this work.

ABSTRACT

The most frequent underlying etiologies are peripheral neuropathy, peripheral arterial disease and infection; and these factors are investigated for and used for evaluation and classification of the defects. Investigations should also extend to identification systemic diseases and other complications of diabetes that need to be properly assessed and managed prior to any surgical procedure. Strict glycemic control is mandatory.

KEY WORDS

ULCER

DIABETIC

PATIENT

List of figures

Figure (1):	pages
Skeleton of the foot	4
Figure (2):	
Arches of the foot	5
Figure (3):	
1 st layer of muscles in the sole of the foot	7
Figure (4):	
2 nd layer of muscles in the sole of the foot	8
Figure (5):	
3 rd layer of muscles in the sole of the foot	9
Figure (6):	
4 th layer of muscles in the sole of the foot	10
Figure (7):	
Fibrous digital sheaths	11
Figure (8):	
Arteries in the sole of the foot	13
Figure (9):	
Dorsalis pedis artery	14
Figure (10):	
Extensor retinacula	17
Figure (11):	
Muscles of the dorsum of the foot	18

Figure (12):

Nerve supply of the dorsum of the foot 20

Figure (13):

Branches of dorsalis pedis artery 21

Figure (14):

Circulation around the lateral malleolus 21

Figure (15):

Perfusion to the plantar soft tissue is through

Posterior tibial artery and medial and lateral branches 22

Figure (16):

Arteries of the foot 22

Figure (17):

Veins of the foot 22

Figure (18):

Patient with peripheral with drawing pin in her foot 30

Figure (19):

Neuropathic ulcer 32

Figure (20):

Infection of a foot ulcer 41

Figure (21):

Neuropathic ulcer through debridement and healing 45

Figure (22):

Total contact cast 46

Figure (23):

Removable cast walker (Air cast) 48

Figure (24):

Scotch-cast Boot 49

Figure (25):

Healed plantar skin graft with callus formation which 58

Needed regular debridement

Figure (26):

Negative pressure therapy 59

Figure (27):

Toe fillet flap: design and dissection 60

Figure (28):

Infected gangrenous ulcer leading Gangrenous of 2nd and 3rd toe 62

Figure (29):

Removal of necrotic tissue down to healthy bleeding tissue 62

Figure (30):

Non-healing wound located over the heel with osteomyelitis 69

Figure (31):

Partial calcanectomy 70

Figure (32):

Infected foot ulcer with purulent discharge 79

Figure (33):	
Purulent discharge indicate infection	79
Figure (34):	
Doppler occurred for detection if vascular affection	80
Figure (35):	
X-ray show intact distal phalanx of the 2 nd toe.	81
Figure (36):	
Destruction of phalanx (osteomyelitis)	81
Figure (37):	
Non specific inflammation with atrophic changes	82
Detected by the pathological report	
Figure (38):	
Debridement of ulcer as a mode of surgical intervention	85
Figure (39):	
Rays amputation followed by a split- skin graft	86
Figure (40):	
Toe fillet flap	87
Figure (41):	
Rotational flap	88
Figure (42):	
Full thickness skin graft	89
Figure (43):	
Removal of sesamoid bone promote healing	90

List of tables

Table (1):	page
Clinical classification of diabetic neuropathies	33
Table (2):	
Grades of neuropathic ulcer	36
Table (3):	
Grades and stage of ulcers	37
Table (4):	
Comparison between neuropathic and ischemic ulcers	38
Table (5):	
Choice of antibiotic according to symptoms	43
Table (6):	
The useful antibiotics according to culture and sensitivity results	44
Table (7):	
Number of patients according to the general conditions.	76
Table (8):	
Number of patients according to duration of diabetes.	76
Table (9):	
Number of patients according to method of control diabetes.	77
Table (10):	
Number of patients according to site of ulcers.	77
Table (11):	
Number of patients according to size of the ulcer	77

List of tables

Table (12):

Number of patients according to colour of the ulcer	78
---	----

Table (13):

Number of patients according to surrounding tissues	78
---	----

Table (14):

Number of patients according to appearance of diffuse redness of surrounding tissue	78
---	----

Table (15):

Number of patients according to discharge from the ulcer	79
--	----

Table (16):

Number of patients according to appearance of bone affected	80
---	----

Table (17):

Number of patients according to result of Histopathological Examination	81
---	----

Table (18):

Number of patients according to the methods of management	82
---	----

Table (19):

Details of conservative treatment and its results.	83
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Table (20):

Details of surgical management	84
--------------------------------	----

Introduction

Diabetic foot ulceration represents a major medical, social and economic problem all over the world. While more than 5% of diabetic patients have a history of foot ulceration, the cumulative life time incidence may be as high as 15% [Boulton, 2004].

Foot ulceration is a predisposing factor to amputation, and is present in over 80% of all diabetes-associated amputations [pecoraro et al., 1999]

The pathogenesis of diabetic foot ulceration is multifactorial, the main underlying causes being peripheral neuropathy and ischemia. [Katsilambros et al., 2003]

Management of diabetic foot defects should be performed in a multidisciplinary manner involving plastic and vascular surgery, endocrinology, orthopedic surgery and podiatry [colen, 2000]

Diabetic ulcers are commonly found on the plantar aspect of the foot, more specifically under the metatarsal heads, and heel [Birke et al., 2000]

The ulcer is surrounded by hyperkeratotic tissue with a pink granulation tissue base. The ulcers tend to bleed easily and are non tender to palpation or debridement. This description corresponds to a purely neuropathic ulcer without an ischemic component.[Boyko et al .,1999]

Once the ulcer has developed, management includes wound assessment and classification, off loading, debridement, dressings, and management of infection .surgeons are involved in more radical debridement [keyser, 1993]

The lack of effective off loading is perhaps the single most important factor contributing to non healing neuropathic ulcer. All anti biotic in world will not heal an ulcer if weight is not taken off.[Armstrong et al .,2001]

Surgical management is indicated for ulcers or infections that do not improve with non surgical treatment .diabetic foot defects present a challenging problem to the reconstructive surgeon .the concept of

amputation in the presence of wide wound has been changed by the availability and use of different reconstructive techniques. However, amputation may still be resorted to in certain cases [Yildirim *et al.*, 2002]

Aim of work

With a problem of this magnitude, either in terms of disability or through its socioeconomic impact; it seems worthwhile to review the different lines suggested for the management of neuropathic ulcer of the diabetic foot

The problem of neuropathic ulcers in the diabetic foot have been encountered at our hospitals ,At the end of the review are illustrated case presentations of patients who suffered from diabetic foot ulcers on different areas of the foot and how they were managed successfully using various reconstructive techniques .

Anatomy of the foot

A sound knowledge of the anatomy of the foot is required to understand the pathology of diabetic foot ulcer as well as to propose a plan for management.

It also has a great importance in understanding the dynamical movement with stability of the foot as well as the whole body

Osteology and biomechanics explain how forces are exerted on the foot, while the description of contents of the sole and dorsum casts light on anatomical pathways for spread of infection and provides an inspiration for coverage of defects.

It is important also to appreciate the specialized anatomy that makes the foot architecture so well adapted to its function. [*Sinnatamby,1999*].

Osteology of the foot

The skeleton of the foot is made up of tarsus, metatarsus and phalanges. The tarsus consists of seven bones arranged in proximal and distal rows the proximal row comprises the talus and calcaneus. in the distal row are the medial, intermediate and lateral cuneiforms and the cuboids most laterally medially the navicular lies between the talus and the medial cuneiform .

Only one of the tarsal bones, the calcaneus, rests on the ground. The metatarsus articulates with the tarsus; and the metatarsal heads, specially the first and fifth rest on the ground

. The toes lie free to move in front of the metatarsal heads , which are weight –bearing ,the first taking more weight than the other (fig:1)[*sinnatamby,1999*].

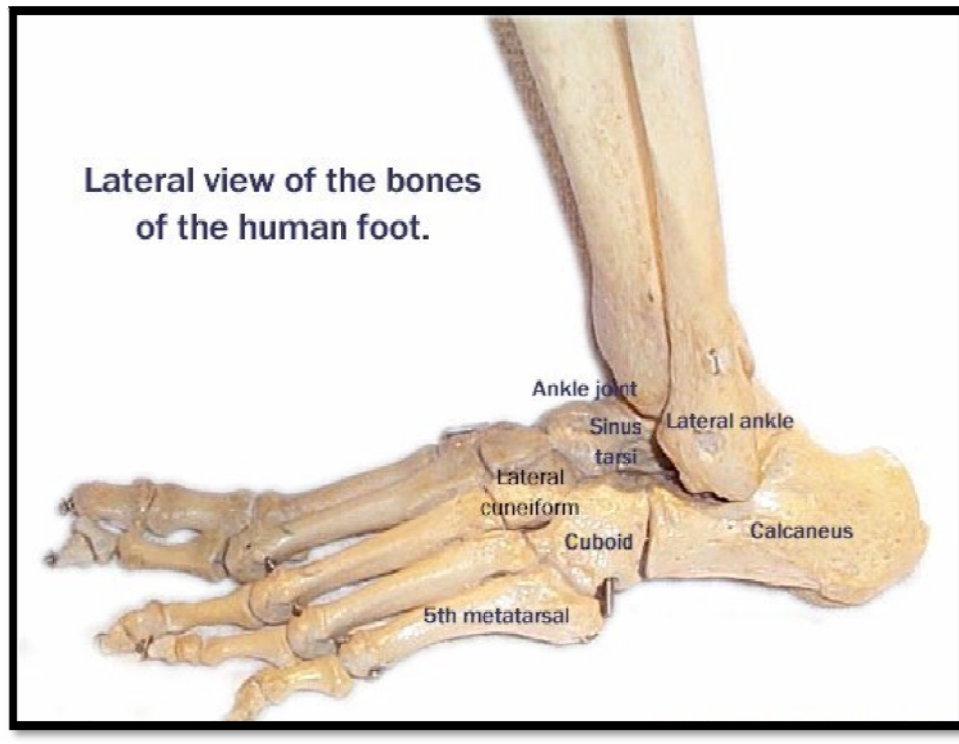


Fig (1) Skeleton of the foot [Colin. 2005]

Arches of the foot

The bones of the foot do not lie in a horizontal plane. Instead, they form longitudinal and transverse arches relative to the ground (fig 2a, b, and c) which absorb and distribute downward forces from the body during standing and moving on different surfaces.

Longitudinal arch

The longitudinal arch of the foot is formed between the posterior end of the calcaneus and the heads of the metatarsals, it is highest on the medial side where it forms the medial part of the longitudinal arch and lowest on the lateral side where it forms the lateral part.

Transverse arch

The transverse arch of the foot is highest in a coronal Plane that cuts through the head of the talus and disappears Near the heads of the metatarsals where these bones are Hold together by the deep transverse metatarsal ligaments. [Colin. 2005]

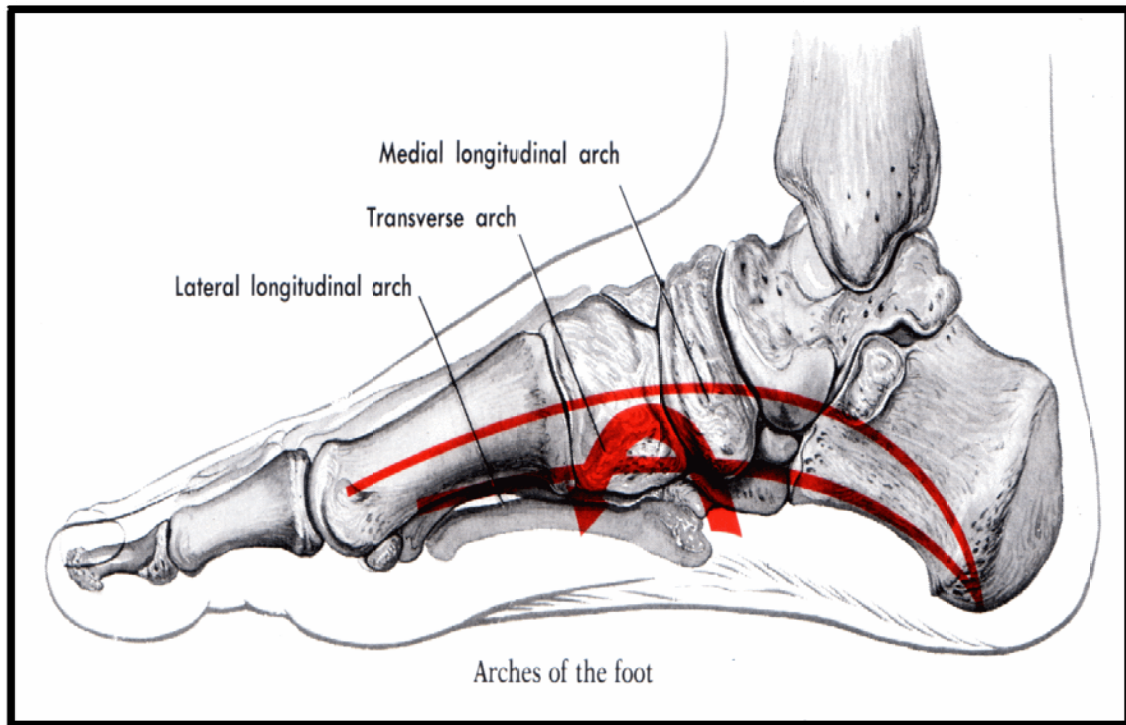


Fig (2a) arches of the foot [Colin. 2005]

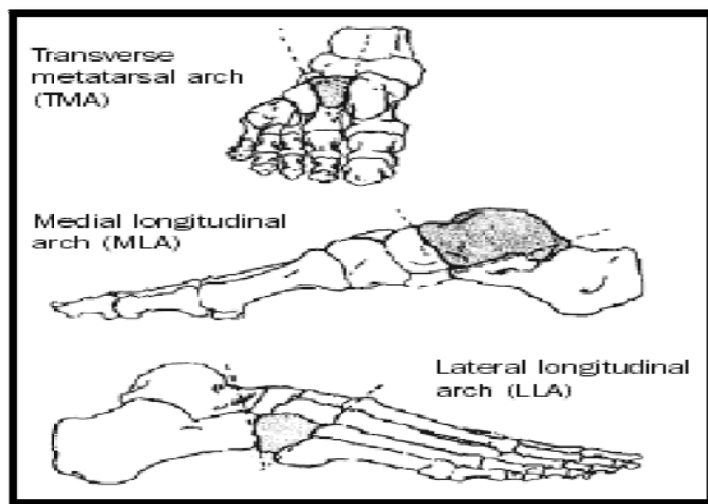


Fig (2b) arches of the foot [Colin. 2005]

The sole of the foot:-

Skin:

The skin of the sole of the foot is thick and hairless .The skin shows few flexure creases at the site of skin movement. Sweat glands are present in large numbers. The sensory nerve supply to the skin of the sole of the foot is derived from the medial calcaneal branch of the tibial nerve, which innervate the medial side of the heel; branches from the medial plantar nerve, which innervate the medial two thirds of the sole; and branches of the lateral plantar nerve, which innervate the lateral third of the sole [*snell, 2004*].

The subcutaneous tissue in the sole, as in the palm, differs from that of the rest of the body in being more fibrous. Fibrous septa divide the tissue into small loculi, which is filled with fat under tension, this makes a shock-absorbing pad, especially over the heel, the septa anchor the skin to the underling plantar aponeurosis and limit the mobility of the skin [*sinnatamby, 1999*]

Deep fascia

The plantar aponeurosis is triangular and occupies the central area of the sole; it is a thickening of the deep fascia. The deep fascia covering the abductors of the big and little toes is thinner

The apex of the plantar aponeurosis is attached to the medial and lateral tubercle of the calcaneum. The base of the aponeurosis divides at the bases of the toes into five slips. each slip divides into two bands, one passing superficially to the skin and the other passing deeply to the root of the toe; here, each deep band divides into two, whew diverge around the flexor tendons and finally fuse with the fibrous flexor sheath and the deep transverse ligaments .the medial and the lateral borders of the thick aponeurosis are continuous with the thinner deep fascia covering the abductor of the big and little toe. From each of these borders, fibrous septa pass superiorly into the sole and take part in the formation of the fascial spaces of the sole [*snell, 2004*]

The function of the plantar aponeurosis is to give firm attachment to the overlying skin; to protect the underling vessels, nerves, and tendons