

Vascular Wounds

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Objectives

- Explain and discuss presentation and symptoms of arterial vs venous stasis ulcers.
- Understand the imaging required to diagnose the type of wound
- Identify appropriate medical treatments for venous and arterial wounds



Disclosures/Conflict of Interest

No Disclosures or Conflicts of Interest to Disclose

Arterial wounds



ABI

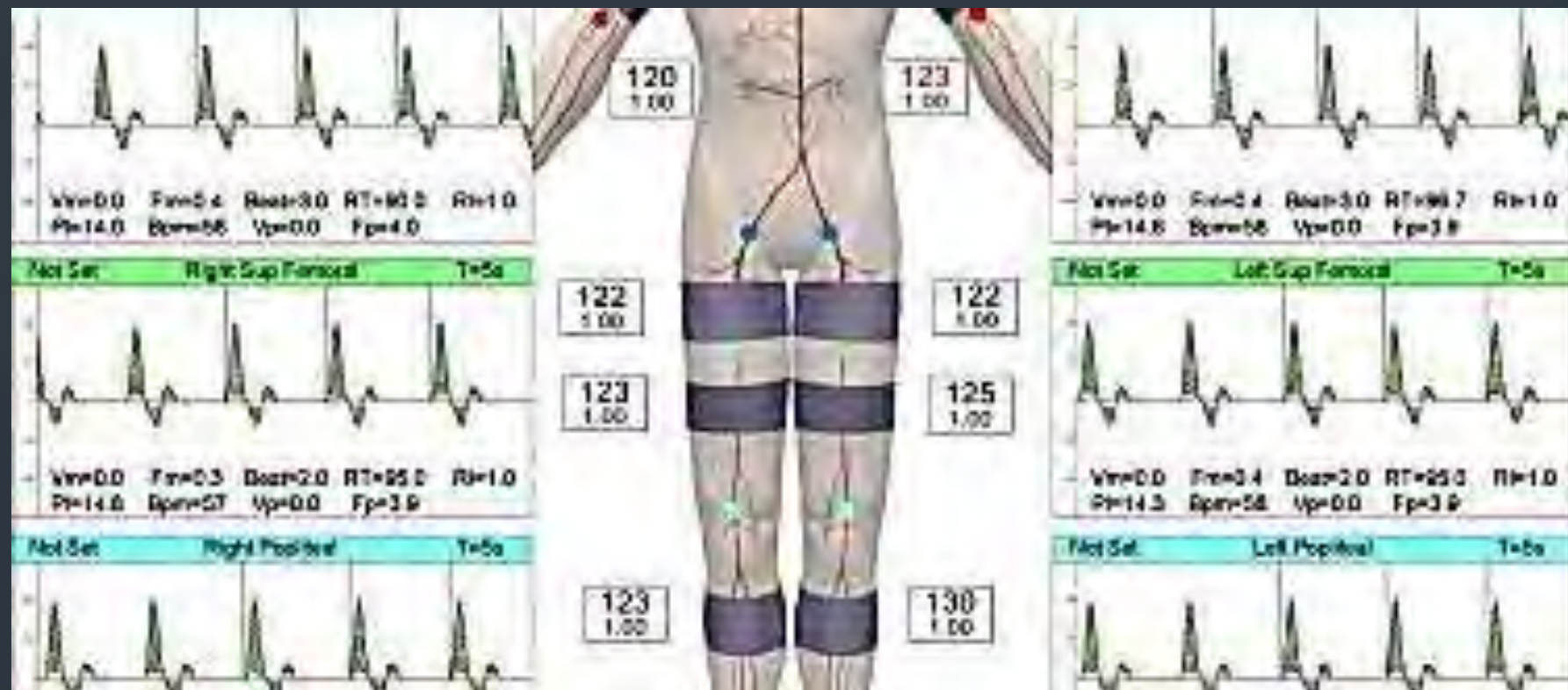


Segment	Right				Left			
	Waveform	Pressure	Index	PVR	Waveform	Pressure	Index	PVR
Brachial A	Triphasic	121	1	Good	Triphasic	113	0.93	Good
CFA Above Knee		159	1.31			144	1.19	
POP A	Triphasic	254	2.1	Good	Triphasic	254	2.1	Good
Below Knee								
Ankle (PT) Posterior Tibial	Triphasic	160	1.32	Good	Triphasic	157	1.3	Good
Ankle (DP) Dorsalis Pedis	Triphasic	139	1.15	Good	Triphasic	130	1.07	Good
Big Toe				Good				Good

Time Interval	Rt BP	Lt BP	Right				Left			
			Ankle (PT) Posterior Tibial		Ankle (DP) Dorsalis Pedis		Ankle (PT) Posterior Tibial		Ankle (DP) Dorsalis Pedis	
			Pressure (mm hg)	BPI	Pressure (mm hg)	BPI	Pressure (mm hg)	BPI	Pressure (mm hg)	BPI
At Rest	121	113	160	1.32					157	1.3
Post Exercise	140		181	1.29					171	1.22

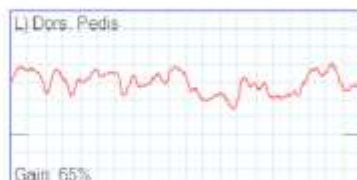
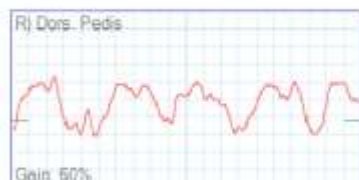
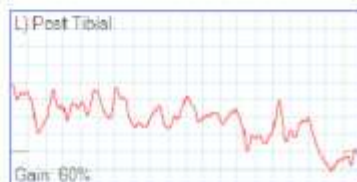
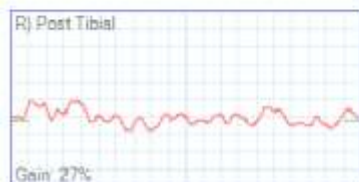
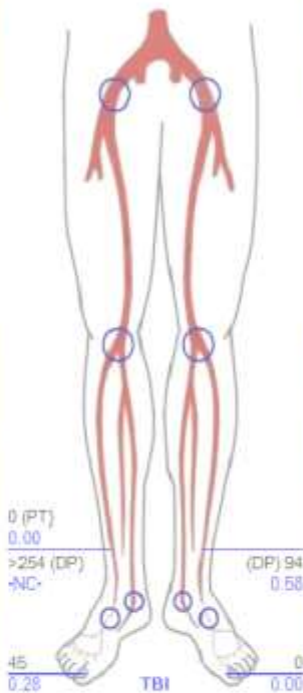
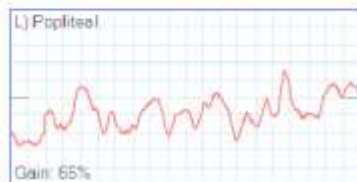
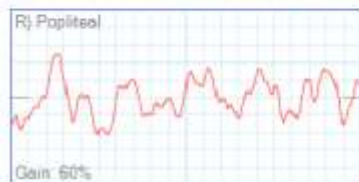
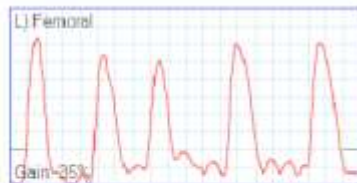
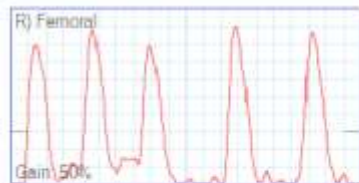


Arterial duplex





Segment	Right				Left				
	Waveform	Pressure	PI	PVR	Waveform	Pressure	PI	PVR	TCPO2
Brachial A		163	1			157	0.96		40
CFA	Triphasic				Triphasic				
POP A	Monophasic				Monophasic				
Below Knee									33
Ankle (PT) Posterior Tibial	Absent	0	0	Poor	Absent	0	0	Poor	
Ankle (DP) Dorsalis Pedis	Monophasic	255	1.56	Poor	Monophasic	94	0.58	Poor	
ForeFoot									33
Big Toe		45	0.28	Poor		0	0	Flat	



Ankle/Brachial Index 0.58



What to do next?

Aspirin 81 mg daily

Statin therapy

Betadine Paint twice daily and let dry

Avoid unroofing stable eschar (especially prior to revascularization)

CTA runoff

Endovascular vs open surgical intervention

Protect feet with off-loading shoes and avoid walking



Diabetic shoes with custom orthotics



After three weeks (26 HBOT sessions) his wound showed considerable healing.

HBOT

Forces oxygen through the skin for patients with minimal arterial supply to heal foot wounds

Heart Failure is a CONTRAINDICATION



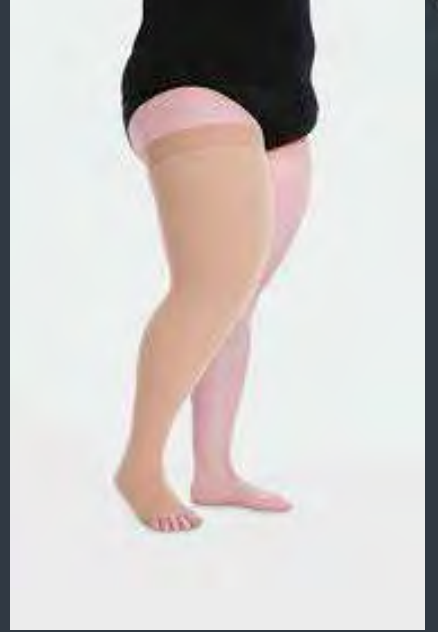
Venous stasis ulcers



Where is your patient sleeping?



Compression therapy



Lymphedema Therapy



Multilayer wrapping



Lymphedema pumps



Lymphedema Staging



Table I. Clinical stages of lymphedema according to the International Society of Lymphology⁵

Stage 0	Latent or subclinical; no evidence of swelling; subjective symptoms
Stage I	Early accumulation of fluid; usually pitting; subsides with elevation
Stage II	Swelling rarely reduced with elevation; pitting still present in early stage II, whereas pitting is absent in later stages as fibrosis and fat deposition begin
Stage III	Lymphostatic elephantiasis; nonpitting with trophic skin changes, further deposition of fat and fibrosis, and warty overgrowths

Advanced compression



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The clinically proven compression wrap.

- Mixable compression
- NEW Juxtalite fabric enhances fit & adjustability
- Can be used day and night for maximum benefit
- Drip prevention and odor resistance
- Compression and shock for foot & ankle control

Juzo COMPRESSION WRAP
Low to High Compression

Removes & Releases Turbidity
The new Juzo Compression Wrap uses effective and versatile garments delivering unique features which include:

- REVERSIBLE** - Wear or Store as you like
- Use over or under your cast
- Use under or over your brace
- Good traction and control provides maximum support and hold
- Just Compression technology made in the U.S.A.

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80 yo male with BLE new wounds



ABI



Segment	Right				Left			
	Waveform	Pressure	PI	PVR	Waveform	Pressure	PI	PVR
Brachial A		161	1			160	0.99	
CFA	Biphasic				Biphasic			
POP A	Monophasic				Monophasic			
Ankle (PT) Posterior Tibial	Monophasic	97	0.6	Fair	Monophasic	84	0.52	Fair
Ankle (DP) Dorsalis Pedis	Monophasic	92	0.57	Fair	Monophasic	71	0.44	Fair
Big Toe		34	0.21	Fair		30	0.19	Poor

Impression

Single - level lower extremity arterial single-level pressures and PVR waveforms were performed.

Right lower extremity ABI: 0.60

Left lower extremity ABI: 0.52

When compared to previous exam done on 07/18/2022 this exam is changed.

IMPRESSION: ABNORMAL RIGHT LOWER EXTREMITY EXAM DEMONSTRATES MODERATE INFRAINGUINAL ARTERIAL DISEASE.

ABNORMAL LEFT LOWER EXTREMITY EXAM DEMONSTRATES SEVERE INFRAINGUINAL ARTERIAL DISEASE.

Arterial duplex



Segment	Right				
	SI	PSV	PStructure	PSurface	Waveform
CFA	<50%	172	heterogeneous	irregular, calcified	Biphasic
DFA PROX	<50%	174	heterogeneous	irregular, calcified	Biphasic
SFA PROX (1)	<50%	156	heterogeneous	irregular, calcified	Monophasic
SFA MD (1)	<50%	119	heterogeneous	irregular, calcified, shadowing	Monophasic
SFA MD (2)	<50%	222	heterogeneous	irregular, calcified, shadowing	Monophasic
SFA MD (3)	<50%	487	heterogeneous	irregular, calcified, shadowing	Monophasic
SFA DIST (1)	<50%	185	heterogeneous	irregular, calcified, shadowing	Monophasic
POP A	<50%	78.1	heterogeneous	irregular, calcified, shadowing	Monophasic
BK Popliteal (1)	<50%	66.3	heterogeneous	irregular, calcified, shadowing	Monophasic
BK Popliteal (2)	<50%	236	heterogeneous	irregular, calcified, shadowing	Monophasic
Prox PTA	<50%	57.1	heterogeneous	irregular, calcified	Monophasic
Mid PTA	<50%	69.4	heterogeneous	irregular, calcified	Monophasic
Distal PTA	<50%	42.1	heterogeneous	irregular, calcified	Monophasic
Prox ATA	<50%	111	heterogeneous	irregular, calcified	Monophasic
Mid ATA	Occluded	0			Absent
Distal ATA	<50%	19.6	heterogeneous	irregular, calcified	Monophasic

Segment	Left				
	SI	PSV	PStructure	PSurface	Waveform
CFA	<50%	113	heterogeneous	irregular, calcified	Biphasic
DFA PROX	<50%	227	heterogeneous	irregular, calcified	Biphasic
SFA PROX (1)	<50%	114	heterogeneous	irregular, calcified	Biphasic
SFA PROX (2)	Occluded	0			Absent
SFA MD (1)	<50%	207	heterogeneous	irregular, calcified, shadowing	Monophasic
SFA DIST (1)	<50%	34.7	heterogeneous	irregular, calcified, shadowing	Monophasic
SFA DIST (2)	<50%	246	heterogeneous	irregular, calcified, shadowing	Monophasic
POP A	<50%	46	heterogeneous	irregular, calcified, shadowing	Monophasic
BK Popliteal (1)	<50%	45.4	heterogeneous	irregular, calcified, shadowing	Monophasic
BK Popliteal (2)	<50%	130	heterogeneous	irregular, calcified, shadowing	Monophasic
Prox PTA	<50%	39.5	heterogeneous	irregular, calcified, shadowing	Monophasic
Mid PTA	<50%	45.2	heterogeneous	irregular, calcified, shadowing	Monophasic
Distal PTA	<50%	36.4	heterogeneous	irregular, calcified, shadowing	Monophasic
Prox ATA	<50%	36.7	heterogeneous	irregular, calcified, shadowing	Monophasic
Mid ATA	<50%	26.0	heterogeneous	irregular, calcified, shadowing	Monophasic
Distal ATA	<50%	12.4	heterogeneous	irregular, calcified	Monophasic

May 2023 after arterial intervention





Exercise ABI

Segment	Right					Left				
	Waveform	Pressure	Index	PVR	Press PS	Waveform	Pressure	Index	PVR	Press PS
Brachial A	Triphasic	157	1		175	Triphasic	153	0.97		
Above Knee				Fair					Fair	
POP A	Biphasic					Monophasic				
Below Knee				Fair					Fair	
Ankle (PT)	Monophasic	122	0.78	Fair		Monophasic	110	0.7	Fair	126
Posterior Tibial										
Ankle (DP)	Monophasic	125	0.8	Fair	145	Monophasic	105	0.67	Fair	
Dorsalis Pedis										
Big Toe		98	0.62	Fair			47	0.3	Fair	

Time Interval	Rt BP	Lt BP	Right				Left			
			Ankle (PT) Posterior Tibial		Ankle (DP) Dorsalis Pedis		Ankle (PT) Posterior Tibial		Ankle (DP) Dorsalis Pedis	
			Pressure (mm hg)	BPI	Pressure (mm hg)	BPI	Pressure (mm hg)	BPI	Pressure (mm hg)	BPI
At Rest	157	153	138		125	0.8	185	0.7		
Post Exercise	175	170	149		145	0.83	186	0.72		

April 2024



ABI



Segment	Right				Left			
	Waveform	Pressure	PI	PVR	Waveform	Pressure	PI	PVR
Brachial A		170				172		
CFA	Biphasic				Biphasic			
POP A	Monophasic				Monophasic			
Ankle (PT) Posterior Tibial	Monophasic	144	0.84	Good	Monophasic	123	0.72	Fair
Ankle (DP) Dorsalis Pedis	Monophasic	119	0.69	Good	Monophasic	102	0.59	Fair
Big Toe		72	0.42	Fair		70	0.41	Fair

Impression

Single - level lower extremity arterial single-level pressures and PVR waveforms were performed.

Right lower extremity ABI: 0.84

Left lower extremity ABI: 0.72

When compared to previous exam done on 10/5/2023 this exam is improved.

IMPRESSION: ABNORMAL RIGHT LOWER EXTREMITY EXAM DEMONSTRATES MILD INFRAINGUINAL ARTERIAL DISEASE.

ABNORMAL LEFT LOWER EXTREMITY EXAM DEMONSTRATES MODERATE INFRAINGUINAL ARTERIAL DISEASE.

Varicose vein duplex



Segment	Right								
	Spont	Ph	Aug	Compr	Reflux Time	Reflux	Thromb	SI	D-AP (cm)
CFV	Normal	Phasic	Normal	Complete	1.44	Present	None	Normal (Patent)	
DFV	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
FV Prox	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
FV Mid	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
FV Dist	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
POPV	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
PTV	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
PERV	Normal	Phasic	Normal	Complete	0	Absent	None	Normal (Patent)	
SFJ	Normal	Phasic	Normal	Complete	0.74	Present	None	Normal (Patent)	0.68
GSV - Mid Thigh					2.44	Present			0.48
GSV - Dist Thigh					3.13	Present			0.5
GSV - Prox Calf					2.72	Present			0.58
GSV - Mid Calf					2.08	Present			0.27
GSV - Ankle					0	Absent			0.2
Anterior Saph								Not Visualized	
Tributaries Thigh 1					0	Absent			0.28
Tributaries Thigh 2					2.09	Present			0.28
Tributaries Thigh 3					2.95	Present			0.21
Giacomini					0	Absent			0.34
SSV - Prox Calf					0	Absent			0.38
SSV - Mid Calf					1.12	Present			0.32
SSV - Ankle					0	Absent			0.08
Tributaries Calf 1					1.98	Present			0.21
Tributaries Calf 2					0	Absent			0.29
Tributaries Calf 3					2.61	Present			0.53
Tributaries Calf 4					2.57	Present			0.29
Tributaries Calf 5 (1)					2.1	Present			0.44
Tributaries Calf 5 (2)					1.53	Present			0.27
Perforator Calf 1					0	Absent			0.24
Perforator Calf 2 (1)					0.76	Present			0.35
Perforator Calf 2 (2)					0	Absent			0.25

New wound-improving



Questions?





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