# Non-Invasive Arterial Vascular Testing

### Providing these diagnostic services benefits both the patient and your bottom line

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A combination of lower reimbursement and increased pre-certification requirements for many medical/surgical procedures has resulted in many physicians of all specialties seeking alternative sources of reimbursement. Dermatologists often market OTC cosmetics and cosmetic medical/surgical procedures. Plastic surgeons for years have derived a huge percentage of their income from non-covered cosmetic surgical procedures, which are paid for directly by their patients.

Podiatrists have always provided non-reimbursable services such as foot orthotics and non-covered routine foot care to their patients. Recently, podiatrists have added other non-traditional sources of income by incorporating DME and retail sales of over-the-counter products to the services they provide. All specialists, including podiatrists, are also actively providing more diagnostic testing in house, rather than referring patients to off premises diagnostic facilities in order to augment the financial health of their practices.

## In-office Diagnostic Testing

As computer technology has become less expensive, many physician specialties now have the ability to provide a vast array of in-office diagnostic testing once only available at large dedicated diagnostic facilities. This allows patients to avoid long delays in scheduling and diagnosis, simultaneously providing them with the “one stop shopping" their hectic lives demand.

Non-invasive vascular testing, radiology, diagnostic ultrasound, nerve conduction
studies and computerized gait analysis are the most common diagnostic services most common diagnostic services many podiatrists are providing “in-house” to their patients. The epidemic of diabetes and diabetic foot pathology, the aging baby boomer population, and the explosion of sports medicine has contributed to the overall demand for these diagnostic services. The increased frequency of these services by all medical/ surgical specialists, however, has resulted in an increased scrutiny by payers to ensure proper utilization and adaptation of stricter polices regarding coverage and payment.

The purpose of this and some future articles will be to review those previously noted technologies, and those on the horizon. Simultaneously, we will provide these services, along with coding and utilization guidance.

This first article will discuss basic non-invasive arterial vascular testing with the next installment exploring basic non-invasive venous testing. Future articles will review duplex arterial and venous testing, diagnostic ultrasound, nerve conduction studies, gait analysis and computerized gait analysis.

## Vascular Testing

Various non-invasive imaging techniques are currently available. These include non-invasive arterial Doppler, pulse volume, and photoplethysmography, color or black and white arterial duplex, venous Doppler and photoplethysmography, venous duplex, and MRA. Invasive studies include CT and MR angiography (which include contrasts agents), as well as standard invasive angiography. There are no side effects from non-invasive testing; therefore, these should always be preformed prior to any invasive studies.

## Why perform arterial testing?

As any podiatrist with a large wound care practice can attest, non-invasive arterial testing is an essential diagnostic tool. Lower extremity Doppler, pulse volume (PV) arterial and photoplethysmography (PPG) are first line diagnostic vascular tests which may provide essential information without the threatening unfamiliar surroundings of a hospital or radiology facility. These tests should be done prior to duplex scanning or referral for either MR or CT angiography or invasive arteriography.

A number of recent studies have linked a high incidence of death from stroke and myocardial infarction amongst those with silent asymptomatic peripheral vascular disease. The American College of Cardiology, 1 in a recent study, concluded that many more patients should have ABI testing as a means by which to screen patients for more serious silent heart disease.

The low cost of conducting basic non-invasive arterial testing (in comparison with screening cardiac examination; i.e., stress testing, etc.) along with the magnitude of diabetic and ischemic patients seen by podiatric physicians, is sufficient evidence to mandate that all podiatric physicians provide this type of diagnostic service in their offices.

Less than ten years ago, the large cumbersome analog units cost in excess of $10,000. Today, most units are compact, costing an average of between $3500 and $5,000 [2].

Additionally, these units are digital and many include software, eliminating hand pasting of paper printouts. These digital units allow for easy preparation of professional appearing reports, complete with wave form analysis, and provide automatic calculation of ABI's and TBI's. Many also allow for measuring peak velocity on Doppler, previously only available with far more advanced duplex scanning. Others allow for measurement of changes on the PV Arterial and PPG.

These easy-to-produce reports can be used as both a way of communicating your findings to the local primary care physicians and as a marketing tool for your practice (figure 2).

**Diagnostic Vascular Laboratory**

**John Doe DPM**
**123 Main Street**
**Anywhere USA**
**Phone (111)123-4567**
**Fax (111)234-5678**

***Arterial and Venous Diagnostic Testing***

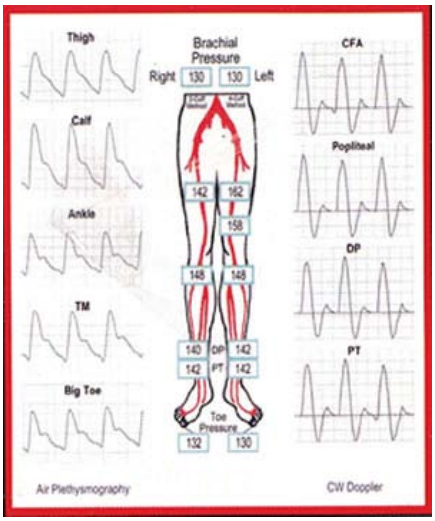



**Figure 2: Sample Chart Form**

## How does one go about learning how to use a vascular analyzer and which unit is right for my practice?

As with any medical procedure, proper analyzing and used of the data is essential. Many manufacturers and teaching hospitals provide seminars which will teach you and your staff:

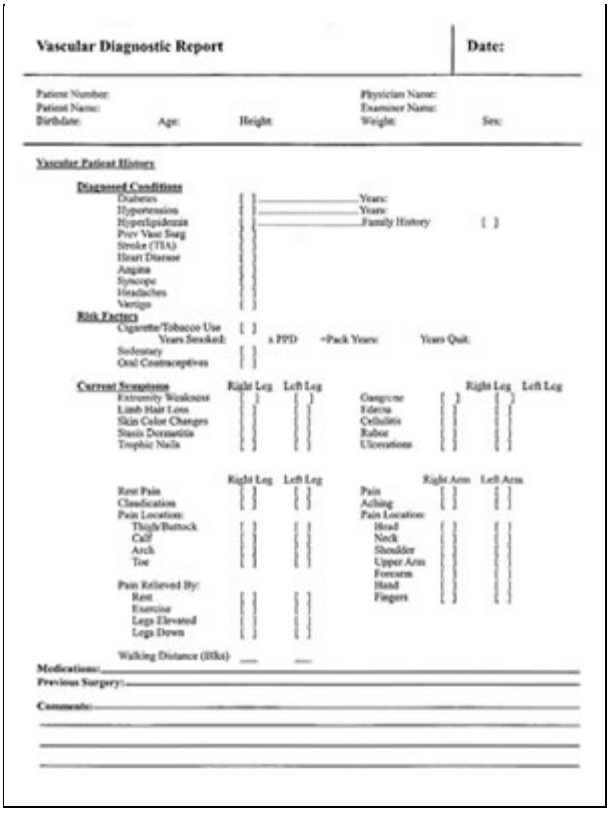
1. How to effectively utilize non-invasive diagnostic vascular equipment.
2. How to select a suitable system which will fit your practice's budget.
3. How to properly interpret the data you have obtained.

## Medicare LCD's

Prior to purchasing and thereafter, one must also take into account third-party and Medicare
local carrier decision ("LCD") policies which stipulate the diagnoses and frequency coverage as well as the qualifications of personnel necessary to perform these tests.

## What is the medical justification for performing diagnostic vascular testing and who should undergo non-invasive?

A detailed vascular patient history may substantiate the need to perform a non-invasive arterial study on patients with risk factors (Table 1). Patients experiencing one or more of the listed diagnosed conditions and who have other listed risk factors and physical findings should be considered candidates for non-invasive arterial studies.



**Vascular Diagnostic Report** | **Date:**

Patient Number: Physician Name:
Patient Name: Examiner Name:
Birthdate: Age: Height: Weight: Sex:

Vascular Patient History

Diagnosed Conditions

| | | | |
|---|---|---|---|
| Diabetes | [ ] | Years: | |
| Hypertension | [ ] | Years: | |
| Hyperlipidemia | [ ] | Family History | [ ] |
| Prev Vasc Surg | [ ] | | |
| Stroke (TIA) | [ ] | | |
| Heart Disease | [ ] | | |
| Angina | [ ] | | |
| Syncope | [ ] | | |
| Headaches | [ ] | | |
| Vertigo | [ ] | | |

Risk Factors

Cigarette/Tobacco Use [ ] Years Smoked: x PPD =Pack Years: Years Quit:
Sedentary [ ]
Oral Contraceptives [ ]

Current Symptoms

| | Right Leg | Left Leg | | Right Leg | Left Leg |
|---|---|---|---|---|---|
| Extremity Weakness | [ ] | [ ] | Gangrene | [ ] | [ ] |
| Limb Hair Loss | [ ] | [ ] | Edema | [ ] | [ ] |
| Skin Color Changes | [ ] | [ ] | Cellulitis | [ ] | [ ] |
| Stasis Dermatitis | [ ] | [ ] | Rubor | [ ] | [ ] |
| Trophic Nails | [ ] | [ ] | Ulcerations | [ ] | [ ] |

| | Right Leg | Left Leg | | Right Arm | Left Arm |
|---|---|---|---|---|---|
| Rest Pain | [ ] | [ ] | Pain | [ ] | [ ] |
| Claudication | [ ] | [ ] | Aching | [ ] | [ ] |
| Pain Location: | | | Pain Location: | | |
| Thigh/Buttock | [ ] | [ ] | Head | [ ] | [ ] |
| Calf | [ ] | [ ] | Neck | [ ] | [ ] |
| Arch | [ ] | [ ] | Shoulder | [ ] | [ ] |
| Toe | [ ] | [ ] | Upper Arm | [ ] | [ ] |
| | | | Forearm | [ ] | [ ] |
| Pain Relieved By: | | | Hand | [ ] | [ ] |
| Rest | [ ] | [ ] | Fingers | [ ] | [ ] |
| Exercise | [ ] | [ ] | | | |
| Legs Elevated | [ ] | [ ] | | | |
| Legs Down | [ ] | [ ] | | | |
| Walking Distance (Blks) | ___ | ___ | | | |

Medications:
Previous Surgery:
Comments:

**Table 1: Vascular Diagnostic History**

## What are the components of a non-invasive arterial testing?

### Doppler

The Doppler component of non-invasive arterial studies utilizes a high frequency sound wave in order to elicit arterial pulses.

The normal audible sound wave is a crisp sounding wave which repeats on a regular basis, in concert with the sinus rhythm of the cardiac systolic beat. Pauses or rapid beats are indicative of bi- or trigeminy or other cardiac arrhythmias. If previously undiagnosed, the podiatrist performing the peripheral Doppler Study may be the first physician to be alerted to signs of a cardiac arrhythmia. In these situations, the patient should be referred back to the primary care physician or cardiologist as soon as possible. High pitched Doppler sounds are usually indicative of a more proximal stenosis. In conjunction with a very high arterial pressure, this is indicative of an arterial wall calcification.

### Ankle Brachial Index Chart (ABI)[3]

ABI is calculated by ankle systolic pressure/brachial systolic pressure.

Above 0.96-Normal
0.71-0.96-Mild Obstruction.
0.31-0.70-Moderate Obstruction
0.00-0.30-Severe Obstruction

Significantly, an above normal ABI would indicate a false elevation of the lower extremity pressure due to vessel calcification. Analysis of the arterial wave form will confirm abnormal blood volume and flow. Use of PV Arterial and PPG may also provide more clinical information.

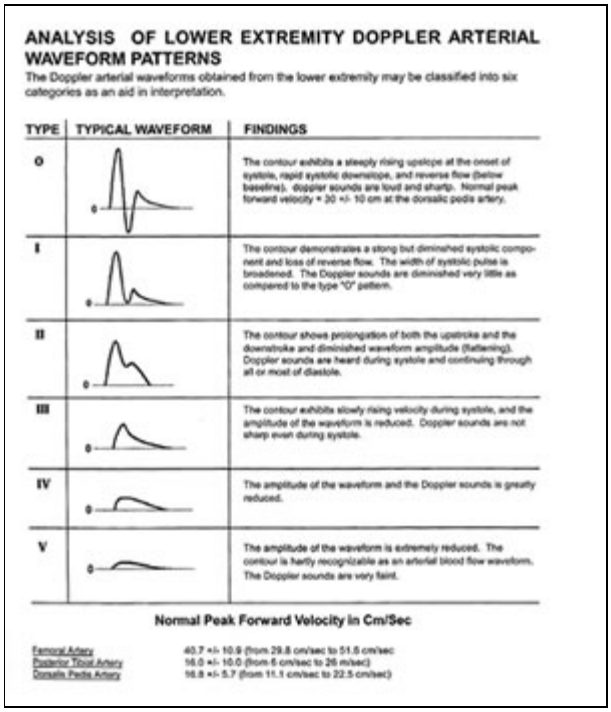
## TBI: Toe Brachial Index [4]

TBI is calculated by dividing the toe systolic pressure (measured with either a PPG or Doppler)/brachial
systolic pressure.

0.64 .20 in a asymptomatic limbs
0.52 .20 in claudicating limbs
0.23 .19 in limbs with ischemic rest pain or ulcers

A toe pressure of greater than 30 mmHg may be an indicator of healing potential in the diabetic foot ulcer [5]. In addition, a PPG wave form without a swift recovery is also indicative of poor perfusion.

Normal wave form patterns follow a similar pattern to a basic EKG sinus rhythm found. In Table 2, one will find an analysis of a variety of Doppler wave patterns.



**ANALYSIS OF LOWER EXTREMITY DOPPLER ARTERIAL WAVEFORM PATTERNS**

The Doppler arterial waveforms obtained from the lower extremity may be classified into six categories as an aid in interpretation.

| TYPE | TYPICAL WAVEFORM | FINDINGS |
|---|---|---|
| 0 | | The contour exhibits a steeply rising upstroke at the onset of systole, rapid systolic downslope, and reverse flow (below baseline). doppler sounds are loud and shartp. Normal peak forward velocity = 30 +/- 10 cm at the dorsalic pedis artery. |
| I | | The contour demonstrates a stong but diminished systolic compo-nent and loss of reverse flow. The width of systolic pulse is broadened. The Doppler sounds are diminished very little as compared to the type "O" pattern. |
| II | | The contour shows prolongation of both the upstroke and the downstroke and diminished waveform amplitude (flattening). Doppler sounds are heard during systole and continuing through all or most of diastole. |
| III | | The contour exhibits slowly rising velocity during systole, and the amplitude of the waveform is reduced. Doppler sounds are not sharp even during systole. |
| IV | | The amplitude of the waveform and the Doppler sounds is greatly reduced. |
| V | | The amplitude of the waveform is extremely reduced. The contour is hartly recognizable as an arterial blood flow waveform. The Doppler sounds are very faint. |

**Normal Peak Forward Velocity in Cm/Sec**

| | |
|---|---|
| Femoral Artery | 40.7 +/- 10.9 (from 29.8 cm/sec to 51.5 cm/sec |
| Posterior Tibial Artery | 16.0 +/- 10.0 (from 6 cm/sec to 26 m/sec) |
| Dorsalis Pedis Artery | 16.8 +/- 5.7 (from 11.1 cm/sec to 22.5 cm/sec) |

**Table 2: Analysis of Lower Extremity Doppler Arterial Wave Form Patterns**

## Segmental Pressures

Any pressure difference between two adjacent levels of less than 20 mmHg. is considered within normal limits. Any pressure difference between two adjacent levels exceeding 20 mmHg. is considered abnormal [6].

Further analysis of wave form variations will assist the examiner in determining the level of obstruction (Table 3). Treadmill or reactive hyperemia studies (analyze how long it takes for flow to resume to normal after cuff deflation) will assist in determining the extent of obstruction.

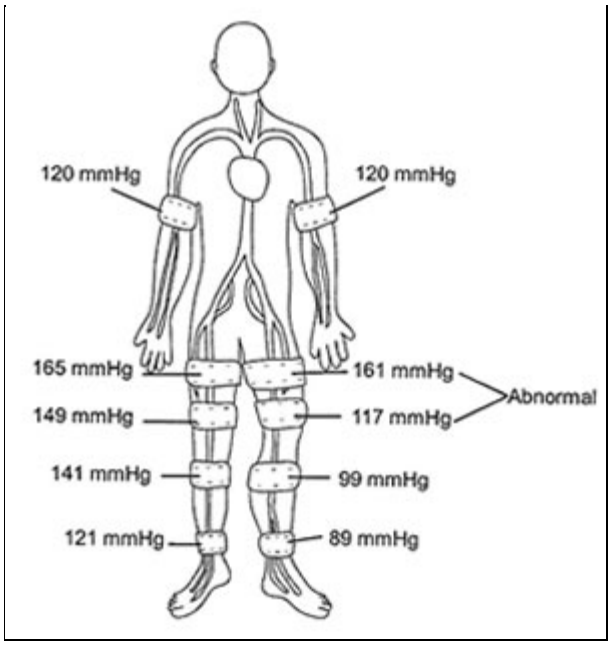



**Table 3: Segmental Pressure Evaluation**

## Photo Plethysmography

Photoplethysmography (PPG) is based on the determination of the optical properties of a selected skin area. For this purpose, non-visible infrared light is emitted into the skin. More or less light is absorbed, depending on the blood volume changes can then be determined by measuring the reflected light using the optical properties of tissue and blood.
Characteristics of a normal arterial wave form (Table 4) are:

1. A sharp rise in the upstroke (A) representing the systolic pulse.

2. A more gradual decline (B) during diastole, sometimes with bowing during diastole.

3. A dicrotic notch in the diastolic down stroke (C).

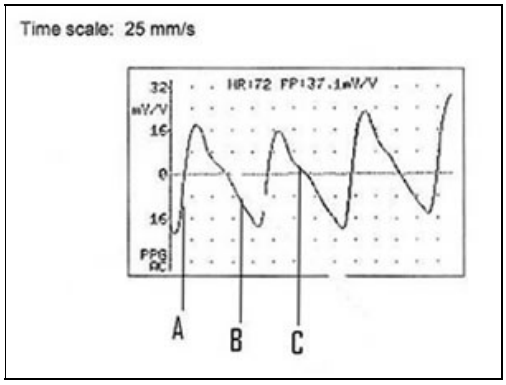



**Table 4: Normal PPG**

Early abnormalities are noted by a gradual decreased inclination and declination of the upstrokes and downstrokes, loss of the dicrotic notch, and some rounding of the peaks (Mild Abnormal PPG, Figure 3). Compare the right side, which is fairly normal (except for loss of the dicrotic notch), with the left side, which has lower amplitudes, flattening of the up and down stroke and rounding of the peaks. Severe late-stage disease would be noted by an absence of any upstoke or downstroke and no discernable peaks (Abnormal PPG, Figure 4). Note: the patient in Figure 4 has already undergone a right-sided TMA and digital amputations of the 1-3 left.

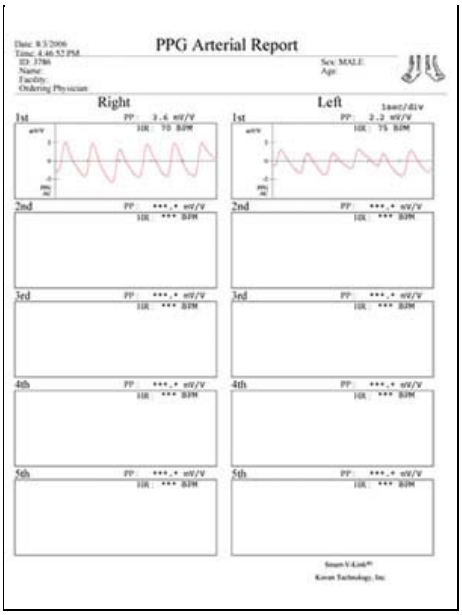



**Figure 3: Mild Abnormal PPG**

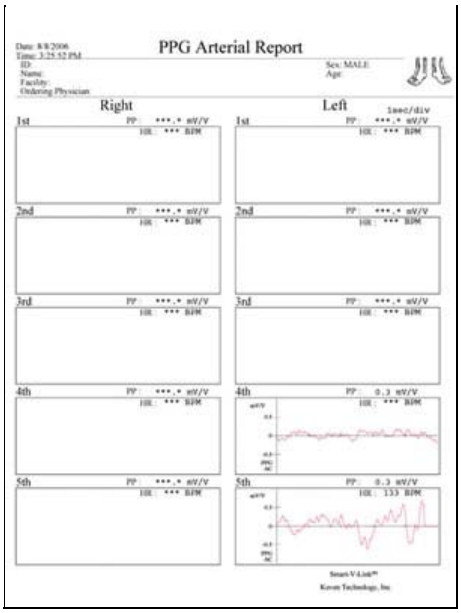



**Figure 4: Abnormal PPG**

## Pulse Volume (PV) Arterial

PV Arterial is useful in detecting arterial occlusive conditions in the lower extremities solely through analysis of waveform patterns Table 5 [8]. This method is sufficiently sensitive even for distal digital studies, and is useful in patients in whom vessel wall calcification prevents accurate Doppler signal processing and occlusion-cuff pressure measurements.

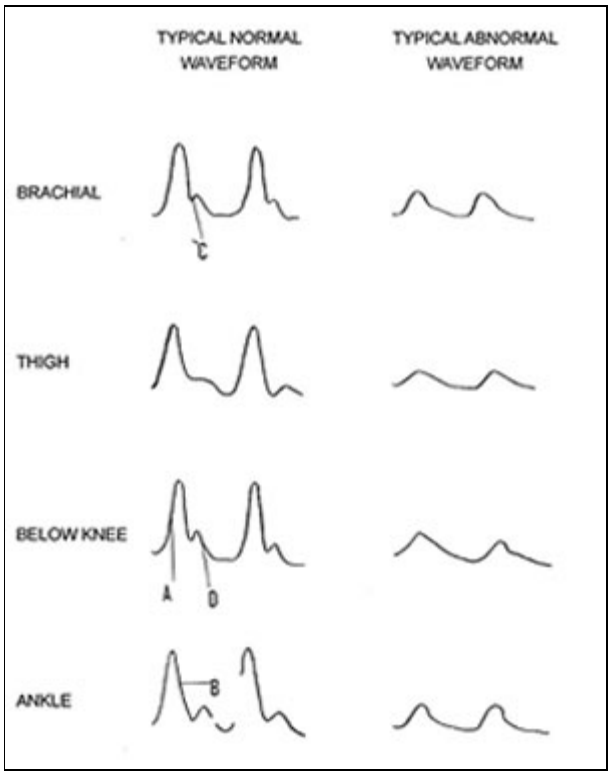



**Table 5: PV Arterial Patterns**

They typical appearances of a normal PV Arterial are characterized by:

1. Rapid upstroke (A) during systole with a sharp peak at maximum amplitude.

2. A more gradual down stroke (B) following peak amplitude.
3. A dicrotic notch (C) midway in the down slope. The dicrotic notch is a particularly prominent feature of PV waveforms obtained from arm arteries.
4. After the dicrotic notch, the pattern curves or bows (D) toward the baseline.

The first sign of abnormality is the absence of the dicrotic notch (C). Distal to more significant occlusions, the slope of both the ascending and descending segments of the trace decreases and rounding of the systolic peak is noted. As the obstruction increases, the waveforms will become flatter.

## Peak Velocity [7,8]

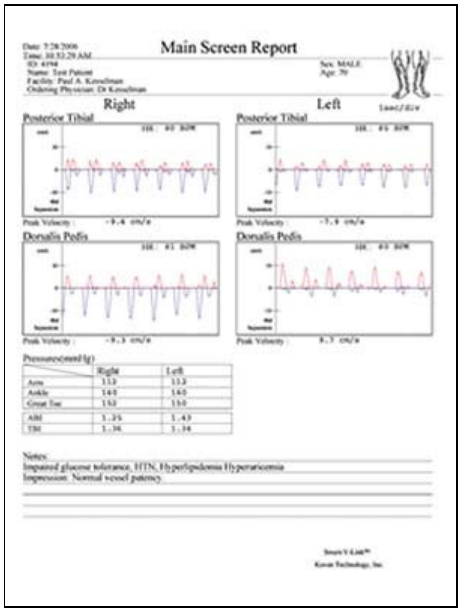
- Femoral = 29.8 cm/sec to 51.6 cm/sec
- Posterior Tibial = 6 cm/sec to 26 cm/sec
- Dorsal Pedal = 11.1 cm/sec to 22/5 cm/sec
- Normal peak is 30± 10

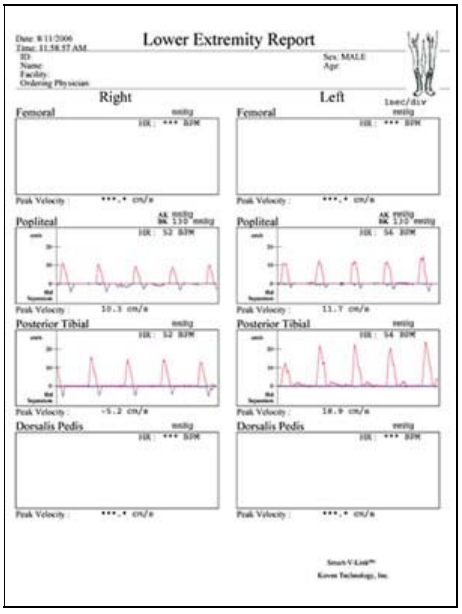
Abnormalities in the peak velocity may be indicative of stenosis and occlusion. In early stages of stenosis and occlusion, the peak velocity distal to the occlusion may actually increase. Therefore, any significant abnormality should be noted and compared with other components of the non-invasive study prior to drawing any conclusions [7].

## Clinical Examples [8,9]

### Example #1: No symptoms, no abnormalities noted

A patient presents with no peripheral symptoms, but because of this age (72) and comorbidities (diabetes, hypertension, hyperlipidemia and gout), may not be covered for non-invasive arterial testing by his commercial insurance carrier (Figures 5A & B).




**Figures 5A & 5B: Normal ABI**

Due to his medical history and the recent findings of the ACC and others, it appears that performing such a test is sound medical judgment. While his ABI is normal, further testing did reveal some other minor abnormalities. Comments on coding this test will follow after the clinical presentations.

### It is important for the podiatric physician to understand the following data from the above example:

1. Normal Doppler wave from patterns and ABI.
2. Abnormal peak velocity flow as it pertains to the dorsal pedal artery and the significant difference in peak velocities between the right and left posterior tibial arteries as noted in Figures #5A and 5B. There are also deviations from the normal Doppler wave forms. While the patient has a seemingly normal ABI, this points out why one should look further for other abnormalities, as this patient's studies do reveal some early signs of ischemia.
3. Less than 20 mmHg decrease in pressure from adjacent segments. (See Figure 3 Normal Segmental)
4. Normal wave from patterns and changes in volume (as indicated in changes in mmHg) with PV Arterial as noted in Figure 6 (Normal PV Arterial).
5. The negative velocity flows are due to position of the Doppler probe during examination, and may be considered a positive number.

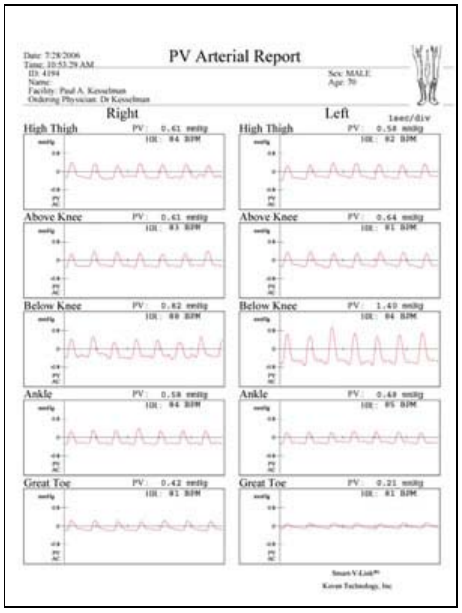



**Figure 6: Normal PV Arterial**

## Clinical Example #2

The patient results as reflected in Figures 4, 7 and 8 is of a 64 year old insulin-dependent diabetic who underwent a transmetatarsal amputation of the right foot after undergoing femoral bypass surgery. He underwent amputations of digits 1, 2 and 3 of the left foot within the last 1.5 years (having previously refused invasive arterial testing and vascular surgery on the left lower extremity). He currently has an ischemic ulcer of the left fourth toe. As of this writing he is scheduled for an open bypass of the left lower extremity, followed by a transmetatarsal amputation and Achilles tendon lengthening.

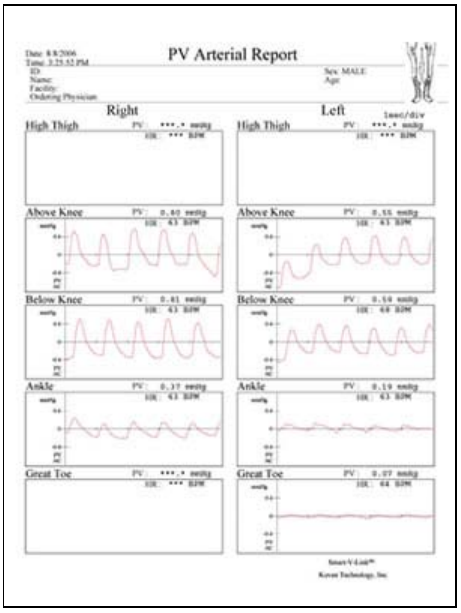



Figure 7: Abnormal PV Arterial

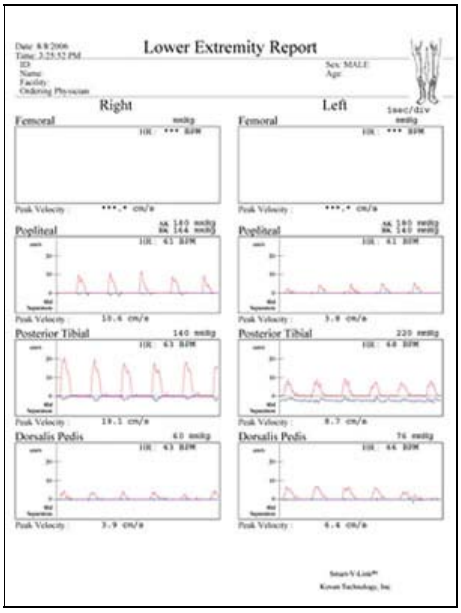



Figure 8: Abnormal Doppler

## From Figures 4, 7, and 8, one should be able to deduce:

1. Abnormal PV Arterial, Doppler and PPG wave forms.
2. Abnormal Peak Velocity of arterial PT and DP.
3. Abnormal TBI and ABI.
4. The proximal nature of the let side occlusion.
5. A greater than 20 mmHg difference in pressures between adjacent segments and/or equal level segments of opposing limbs.

## Where can I find out more information on wave form interpretation?

May of the references noted at the end of the article are excellent resources for further information. Many medical schools and large hospital centers also hold frequent seminars on non-invasive vascular diagnostic imaging.

## What are the lower extremity non-invasive extremity arterial testing codes?

**CPT 93922:** Non-invasive physiologic studies of upper or lower extremity arteries, single level, bilateral (e.g., ankle/brachial indices, Doppler waveform analysis, volume plethysmography, transcutaneous oxygen tension measurement).

**CPT 93923:** Non-invasive physiologic studies of upper and lower extremity arteries, multiple levels or with provocative functional maneuvers, complete bilateral study (e.g., segmental blood pressure measurements, segmental Doppler waveform analysis, segmental volume plethysmography, segmental transcutaneous oxygen tension measurements, measurements with postural provocative tests, measurements with reactive hyperemia).

Screening ABI's (as was performed in clinical example number one) would be coded as CPT 93922 (but subject to coverage limitations of the carrier).

Testing performed on patients with symptomatic disease or who have disease

noted after a screening ABI, and performed on multiple limb segments would be coded appropriately as CPT 93923. Most carriers will not pay for CPT 93922 and CPT 93923 on the same date. For many carriers, billing CPT 93922 on one day and CPT 93923 on a subsequent date without medical justification may also result in a rejection. Other information your Medicare (or third-party payer's) LCD may provide you with is how often you may test your patients.

### ABN's

A patient with Medicare may be required to sign an advanced beneficiary notification (ABN), dependent on your local carrier's LCD. Pre-operative screening prior to elective surgery may also be a medically justifiable reason to perform non-invasive arterial studies, but often is not covered by many third-party payers and Medicare. This type of patient may also be required to sign an ABN, and the CPT code would be amended with the GA modifier.

### Typical Testing Scenario

Some Medicare LCD policies allow for the performance of screening examinations once per six months. In the following scenario, the frequency part of the policy would be tested:

A 63 year old IDDM male patient underwent a 1st ray resection three months ago after undergoing an endovascular angioplasty of the superficial femoral artery. The patient's last non-invasive arterial study performed in your office several days after his angioplasty shows patency of his distal lower extremity vessels with normal ABI's, Doppler, PV and PPG wave forms.

The patient twisted his ankle a few days ago and now presents to you with a gangrenous forefoot. Under these circumstances, the performance of a new non-invasive arterial study is medically appropriate as the disease process has clearly deteriorated. Rejections based on a frequency of performance alone should be appealed.

### What are the general reimbursement issues for non-invasive arterial testing? [10]

An excerpt of a typical Medicare LCD follows:

1. The use of simple hand held or other Doppler devices that do not produce hard copy output, or devices that do not permit analysis of the bi-directional vascular flow are not covered by most Medicare and third-party carriers. Calculation of the ABI by this means should be added to the amount and complexity of data in the medical decision-making portion of the E&M service. It however is not eligible for separate reimbursement under CPT codes 93922 or 93923.
2. Ancillary Personnel: In many Medicare jurisdictions, the use of ancillary personnel is restricted to those who are credentialed vascular technicians. In the case of most podiatric offices, the podiatrist him/herself would need to perform this test.
3. It is seldom necessary to perform arterial and venous studies during the same encounter. Documentation should be available to support the medical necessity for both studies.
4. Peripheral arterial studies are considered for Medicare coverage when

there are significant signs and/or symptoms of possible limb ischemia. This includes patients who may be a candidate for invasive therapeutic procedures, as indicated by at least one of these conditions:
    - Claudication of such severity that it interferes significantly with the patient's occupation or lifestyle
    - Rest pain (typically including the forefoot), usually associated with absent pulses, which becomes increasingly severe with elevation and diminishes with placement of the leg in a dependent position.
    - Tissue loss defined as gangrene or pre-gangrenous changes of the extremity, or ischemic ulceration of the extremity occurring in the absence of pulses.
    - Aneurysmal disease.
    - Evidence of thrombo-embolic events.
    - Blunt or penetrating trauma (including complications of diagnostic and/or therapeutic procedures).
    - Follow-up after bypass graft (this would include angioplasty).
5. The podiatrist may choose to bill the test in its entirety (globally) or only for the technical (TC) or professional component.

### What about billing only the technical component?

Many vendors will lease the equipment to you, whereby you, via modem, submit patient data to an expert who renders an opinion and submits a report to your office. In reality, you are paying for a lease on equipment and only eligible for reimbursement on the technical component of the test (approximately 60% of the global payment).

For those who are uncomfortable rendering an opinion, this may be a viable option, as the lease payments are generally lower. It would, however, seem prudent to obtain the necessary training which would increase one's comfort level, and bill for the test in its entirety. While the lease payments may be slightly higher for this type of arrangement, this is more than offset by a much higher global reimbursement.

### How can I find out about coverage information?

Some HMO's and third party payers will only reimburse credentialed vascular laboratories or vascular surgeons for non-invasive arterial testing whereas others require pre-authorization.

The website of most Medicare carriers and other third-party payers can provide your office with an exhaustive amount of information concerning coverage, including a list of diagnosis codes which are eligible for reimbursement. Contacting insurers, whose policies are unfamiliar to you, should be done prior to performance of any of these procedures.

### How does one choose which unit to purchase?

Your budget is obviously the key component which may drive your purchasing decision. Because most podiatrists have multiple offices, more compact lightweight units may also be worth looking into. While these may be slightly higher prices, this is more than offset by limiting your purchase to only one unit. Many manufacturers can link their hardware directly to your laptop, thus making a sophisticated vascular laboratory as close as the nearest computer.

Small handheld units along with necessary Doppler, PVR and PPG probes and blood pressure cuffs can also fit in your laptop bag. Inquire from various representatives in your area about borrowing equipment for a few days or weeks to see if it suits your needs and ask for a list of doctors who are using their equipment in your area. Ask you colleagues if equipment they currently own or lease is easy to use, and how well they were trained and serviced by the manufacturer. Of course, you should also inquire how the local payers reimburse for 93922 and 93923.

**Purchase price:** There are many units available, with some starting as low as $2,500 without software. Some units are available for as low as $5,000 complete with software.

### Are there accessories I can do without?

I do not believe one should skimp on the cost of software because connecting the vascular modules to a computer enables the examiner to perform these tests faster, creates an EMR, and allows for the preparation of a highly professional report. Software, however, may always be purchased at some future time. One may choose to order fewer pressure cuffs, and not purchase the automatic inflator often available on higher end units. Some manufacturers offer PPG and PV units as add-on modules which may be purchased separately after one has become comfortable with the basic Doppler unit.

Since podiatrists are only performing tests on the lower extremities, purchase of multiple Doppler probes is unnecessary.

### What is the reimbursement for CPT 93922 and CPT 93923

Under Medicare, CPT codes 93922 and 93923 are reimbursed with an RVU of 3.09 and 4.75, respectively. Using the national coverage reimbursement conversion factor of 37.8975 would bring the average reimbursements of $117.10 and $180.13, respectively. This does not include the local conversion factors which may results in payments which are significantly higher (e.g., in NYC Region I, CPT 93923 reimburses $232). One should review local Medicare and third party payers' websites and contracts for further reimbursement and policy issue information.

### Which code (CPT 93922 or CPT 93923) should I be billing?

If you are only performing ABI's, PV arterial and PPG testing of the foot, and not performing segmental testing above the ankle, then CPT 93922 would seem to be most appropriate. One should check with the local Medicare carrier and third party payers for further confirmation.

### Conclusion

The combination of high incidence of diabetic foot pathology, ischemic ulcerations, symptomatic claudication, and silent peripheral arterial disease among podiatric patients provides a large population of patients who require non-invasive arterial testing. Podiatric practices would therefore best serve both their patients and their financial bottom line by providing this essential service.

I would like to thank Koven Technology for their assistance in the preparation

of this article:

**Disclaimer:** While this brief article cannot serve as a comprehensive primer on non-invasive arterial testing, it may serve as a starting point for those contemplating performing such procedures and purchasing the necessary instrumentation. It may also serve as a brief refresher course for those already utilizing basic vascular equipment. Corroboration with your equipment's specifications and local insurance carriers are strongly advised. The references which follow this article may also serve to enhance one's knowledge and understanding on non-invasive vascular studies. A thorough understanding of the vasculature of the lower extremity from the aorta distally is necessary in order to properly interpret these tests.

## References


[1] ACC/AHA Guidelines for the Management of Patients with Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary A Collaborative Report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients with Peripheral Arterial Disease) Journal of the American College of Cardiology 2006© by the American College of Cardiology Foundation and the American Heart Association

[2] Personal Communication: Koven Technology and personal review of the marketplace

[3] Arterial Disease of the Lower Extremities: Buchbinder D; Flanigan, DP; Diagnosis, September 1986

[4] Physiologic Assessment of Peripheral Arterial Occlusive Disease, Zierlier, RE; Sumner, DS; Vascular Surgery, Vol. 1, 4th Edition; WB Saunders, Co., PA, USA, 1995

[5] Arterial Diseases of the Lower Extremities, Buchbinder, D; Flanigan, DP; Diagnosis, September 1986- Toe pressures of greater than 30

[6] Vascular Studies of the Legs for Venous or Arterial Disease, Weiss, RA; Dermatologic Clinics, Volume 12, Number 1, January 1994

[7] Non-invasive Vascular Laboratory for Evaluation of Peripheral Arterial Occlusive Disease: Part I - Hemodynamic Principles and Tools of the Trade. Journal of Vascular and interventional Radiology 11:1107-1114 (2000)

[8] Examples of Normal Wave forms Courtesy of Dr. Paul Kesselman DPM and Koven Technology

[9] Clinical Cases: Courtesy of Dr. Paul Kesselman using a Smartdop 45 with Smart-V-Link Vascular Software V 1.3

[10] www.empiremedicare.com



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The reimbursement information provided by Dr. Kesselman is subject to individual Medicare provider policies. Please review the individual requirements for your state.