

# A History of Phlebology – Warts and All

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*The following is the first in a 3-part series dealing with the history and contemporary status of phlebology*

Although the terms “Phlebology” and “Sclerotherapy” were coined by Raymond Tournay and H.I. Biegeleisen, respectively in the 20th century, attempts to both understand and treat venous disorders, initially varicose veins and their sequelae, have undergone a fascinating, controversial, and thoroughly disorganized history spanning millennia. For more than 3,500 years, an astonishing array of imperfect modalities have been employed involving surgical extirpation and ligation as well as in modern times, increasingly precise surgical and non-surgical endovenous approaches. Treatment protocols have been proposed, explored, forgotten, reinvented, condemned, abandoned and rehabilitated. Credit for “New discoveries,” has been repeatedly conferred upon individuals who independently rediscover long forgotten procedures and concepts.

## EVOLUTION AND VARICOSE VEINS — NO FREE LUNCH

### Background

Varicose veins and their sequelae, thrombosis, venous ulcers, pain, and disability, which have plagued humankind since the dawn of time, provide a stunning example of an evolutionary trade off. Apparently, no one told the Creator that humanoid, would at some point in time, assume an upright status as part of their ascent into a dominant life form. Genetic analysis of gene expression in the walls of varicose veins reveals activation of pathways associated with fibrosis and wound healing, which promote the growth and remodeling of blood vessels. Thus, the occurrence of varicose veins may represent the long-term disadvantages of what once was a survival benefit involving angiogenesis. “Sufferers are better at forming various types of collateral blood vessels”. Just as hypertrophic scars and keloids reflect poor control of the fibroblastic phase of wound healing, the occurrence of varicose veins

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reflects an abnormally vigorous and prolonged angiogenic phase of wound healing. The occurrence of neovascularization (matting) following sclerotherapy and other forms of trauma also represents a minor manifestation of “hair-trigger angiogenesis,” which produces cosmetically unattractive proliferation of highly resistant telangiectasia.

### Protophlebotical anlage

While the first recorded commentaries dealing with lower extremity venous disorders and the risks of treating them appeared in the Ebers papyrus, circa 1550 BCE; it was Hippocrates 11 centuries later (460 BCE) who articulated both the empirical principles and many of the treatment options, which became the foundation for 21st century approaches. In his treatises he proposed “What cannot be cured by medicaments is cured by the knife, what cannot be cured by the knife is cured by the searing iron, and whatever this cannot cure must be considered incurable.” Stripped of their overlay of theoretical and technological advances (most of which are of relatively recent origin), contemporary practices represent easily identifiable analogues of ancient therapeutic concepts.

### Hippocratic faux pas

Hippocratic espousal of Pythagorean bloodletting whose speculative efficacy was based upon “Ridding the body of

**TABLE 1. AN ABBREVIATED OUTLINE OF THE CHRONOLOGICAL DEVELOPMENT OF CURRENT PHLEBOLOGICAL PRACTICES**

<b>4th Century BCE</b>	Treatment of varicose veins using heated iron rods followed by compression
<b>2nd Century CE</b>	Phlebectomy
<b>7th Century</b>	Ligation of the greater saphenous vein
<b>1500 – 1800s</b>	Phlebectomy hooks, thrombectomy, Physiologic and anatomic principles, First attempt injection sclerotherapy, Phlebectomy with cautery, Hollow needle, Anesthesia and asepsis, Hypodermic syringe, Development of Unna boot Hot needles, electrodesiccation
<b>1900 – 2000s</b>	Sclerotherapy introduced in US, glass syringe, disposable plastic syringe, Cryo-stripping, refinements in surgical stripping, ambulatory phlebectomy, phlebography, thermal ablation by electrocoagulation, high temperature steam, venography, foam sclerotherapy, ultrasound, repair of venous valves, echomatography, CT, MRI, Endovenous thermal vein ablation, endovenous surgery, adhesives, photophlephismography, muscle function testing, thermal testing, cosmetic sclerotherapy, treatment of telangiectasias, angioscopic techniques, chemical cautery, surgical innovations, saphenous valvuloplasty, valvular reconstruction, mechanochemical ablation, graduated elastic compression (hosiery), perforating vein surgery, alternate suction and pressure for vascular disease, compression sclerotherapy, photoplethysmography, experiments with foam sclerotherapy using detergent sclerosants. D Dimer test for pulmonary emboli, venous refilling time, pump ejection fraction (MPEF)
<b>2000 – 2014</b>	Laser intravascular ablation, foam sclerotherapy with ultrasound imaging, combined foam and mechanical ablation, Echosclerotherapy using foam tumescent anesthesia, radiofrequency, 3D MR venography, molecular pharmaceuticals, vascular bio-printing, genome reprogramming, coil implantation occlusion

bad humors”, prolonged the use of this dangerous and ineffective form of therapy for over three centuries. Sometimes, the stature of proponents outweighs the merits of their ideas.

**Historical legacies**

For the treatment of varicose veins and ulcers, Greek, Roman, and Middle Eastern protophlebologists employed stripping, cauterization, and compression. Phlebectomy is at least 1400 years old. Galen (131-201 CE), who was probably not a physician, carried out both varicectomies and phlebectomies (with a little red wine for anesthetic). Contemporary surgeons would recognize the phlebectomy hooks employed by Galen, which have been reinvented repeatedly for several thousand years. They would also recognize the scalpels with blunt handles used to dissect varicose veins without anesthesia carried by Roman surgeons. Ligation of the long saphenous trunk (Greater Saphenous Vein, GSV), was carried out by the Greek, Paulus Aeginaad (625 – 690 CE), centuries before Trendelenburg, who has typically been credited for its creation. To this day, phlebectomy, extirpa-

tive and ligatory surgery, as well as thermal endovenous coagulation, employing a much-enlarged and infinitely more comprehensive suite of therapeutic alternatives are still treatment mainstays.

**CONTROVERSIES**

Published controversies regarding the relative merits and risks of varying treatment approaches began with The Ebers papyrus. In it, the authors recommended cauterization for venous ulcers and exhorted practitioners to avoid surgery, which could lead to exsanguination. Their recommendations include the admonition, “Thou shall not touch something like this.” Surgical approaches were again condemned by Paracelsus, a visionary renaissance physician (1493-1541), who proclaimed after burning Galen’s commentaries, “Thus all bad things go up into smoke”. Although Paracelsus respected the accomplishments and wisdom of ancient teachers, in radical defiance of medical practices of the era, he refused to accept reasoning based upon uncritical copy of ancient teachings. His intellectual intransigence proved to be his most enduring achievement presaging modern

# The Price of Progress

The availability of needles, syringes, and injectable opiates in the mid-1800s followed by the synthesis of cocaine shortly afterwards affords unimpeachable validation of biblical proclamations, which link knowledge to sorrows. While opiates and cocaine provided blessed pain relief, they simultaneously spawned a ghastly and totally unexpected epidemic of addiction, disease transmission, corruption of societal and governmental institutions, and geopolitical upheavals of apocalyptic proportions.

Heroin addiction may have been born on that inauspicious day when Christopher Wren (1632-1723), used an animal bladder as a syringe and a goose quill as a needle to inject a “hapless hound” with an opiate solution. Wren also attempted an intravenous injection into a human. To do this he used the “delinquent servant” of a foreign ambassador, but “it didn’t go well”. “The victim either really or craftily fell into a swoon and the experiment had to be discontinued”.

Alexander Wood (1817- 1885), was credited with devising the first glass syringe which permitted visual assessment of its contents. He was also the first to employ injectable opiates to relieve his wife’s disabling neuralgia. Predictably, both he and his wife became addicted and ultimately she succumbed to a fatal opiate overdose, the first on record. “In 2011, and for the fourth year in a row, the number of US citizens whose deaths were drug-related exceeded the number of fatalities in road traffic accidents (33,561). Almost five people per hour died of drug overdoses in the US in 2011”.

## Everybody wants to feel good Coke, The Popes, and Coca-Cola – The popularization of cocaine

When Angelo Mariani, a French chemist, first added cocaine leaves to Bordeaux wine (and some extra alcohol for enhanced solubility), his eponymous product, Vin Mariani, made him the first cocaine millionaire. John Pemberton, an Atlanta pharmacist, suffered a saber wound in 1865 while serving as a Lieutenant Colonel in the Confederate army. Following treatment for pain, he became addicted to morphine. He is best known as the inventor of Coca-Cola, which was preceded by his first invention, “Pemberton’s French Wine Coca” registered as Coca nerve tonic in 1885. There are two historical versions regarding his motivations. It isn’t clear whether his inventions were inspired by the financial success of Van Mariani, or represented an attempt to “cure” his opiate addiction” (cocaine was reputed to “have that effect” by Sigmund Freud). In 1886,

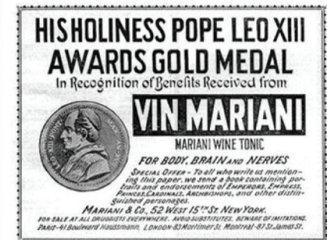
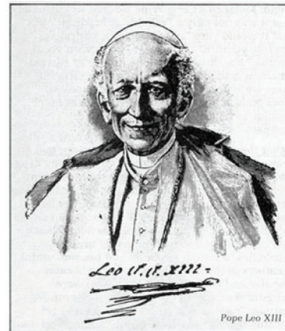


Figure 1.

when two Georgia counties passed prohibition, he responded by developing Coca-Cola, a non-alcoholic version of French Wine Coca. Initially, sold as a patent medicine for five cents a glass at soda fountains. It was mixed with carbonated water, which was supposed to be good for health. Claims included curing morphine addiction, dyspepsia, neurasthenia, headaches, and impotence. Cocaine was removed from Coca-Cola in 1903 when its use became controversial. Cocaine’s legality, low cost (it was cheaper than alcohol), and stimulatory effects seduced people from diverse social strata into believing that it provided nirvana without penalties.

Two popes were perhaps the most morally prestigious advocates of Mariani wine. Pope Leo XIII, carried a hip flask containing Mariani Wine employed when “Prayer wasn’t quite enough”. Pope Leo’s enthusiasm for the tonic effects of this elixir led him to award a Vatican gold medal to its creator and allow his portrait to grace posters advertising its use (Fig. 1). Pope Pius X (who was later canonized), was also a fan. Cocaine and opiates were available in over the counter patent medicines, topical opiates were also available for toothaches. Laudanum, an opiate containing compound, was routinely employed as a sedative for babies. Parke Davis sold cocaine cigarettes, pills, and powder in a kit, which included a syringe and needle for self-injection. It took until 1920 when a barrage of state and federal legislation culminating in a Pure Food and Drug Act curbed the unregulated use of these powerful and addictive drugs. A list of prominent supporters included Thomas Edison, Presidents McKinley, and Ulysses S. Grant, Queen Victoria, Prince George of Greece, and a raft of important intellectuals, writers and show business luminaries. Although there is no

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recorded record of William Shakespeare using cocaine, residue found in fragments of tobacco pipes, buried in his garden contained cocaine and other drugs. The list of famous addicts includes Sigmund Freud (who initially lauded it in a lengthy dissertation), Sir Arthur Conan Doyle, and William Halstead, an iconic American physician, who was addicted to both opiates and cocaine. At a much later date, Adolf Hitler was addicted to cocaine.

### Cocaine and racism

African Americans were singled out as being particularly susceptible to violence and sexual crimes following the use of cocaine. The press supported the idea that cocaine imbued them with superhuman strength and deadly accuracy with firearms. Based on these fears, police in the Deep South adopted larger caliber handguns and were formally advised to shoot first in questionable circumstances.

In 2005, the estimated U.S. cocaine market exceeded US\$70

billion in street value exceeding revenues by corporations such as Starbucks. The only logical solution to the problem of cocaine addiction may be in the offing in the form of immunologic research, which is concentrated on development of vaccines employing anti-cocaine antibodies.

### Syringes, needles, and disease transmission

In 1960, a widely publicized hepatitis outbreak involving the deaths of 15 patients occurred when a New Jersey psychiatrist, Albert Weiner, used contaminated syringes to inject sedatives into all of his patients. Concerns regarding the transmission of hepatitis B, and resulting lawsuits occurring when doctors using inadequately sterilized reusable syringes led to the domination of the market by plastic disposable syringes, which had been invented in 1956. A 1998 article in the San Francisco Chronicle, entitled "Healthcare and needle stick injuries" quotes a Becton Dickinson executive, Joseph Welch, as saying in 1990 of hepatitis B, "It's probably the reason that BD is a 2 billion dollar company today."

day emphasis on independent and empirical approaches to research and teaching. Trendelenburg (1802-1872), was Paracelsus' spiritual descendent. He emphatically introduced the concept of evidence-based medicine.

More than three thousand years later, the occurrence of sepsis, thrombotic complications, scarring and deaths resulting from unacceptably toxic sclerosants led the congress of Lyons to ban the use of sclerotherapy in 1894. The adventitious discovery of venous fibrosis following the intravenous use of less toxic drugs employed for non-phlebological purposes led to its rehabilitation in 1932 at the Medical Congress of International Surgery.

Current controversies involve methodological disputes, i.e. surgery vs. sclerotherapy and other minimally invasive approaches. The importance of reticular veins and venous hypertension upon the development and treatment of telangiectasia and the need for compression following the treatment of both large and small vessels is still being contested. Concerns are increasingly being voiced regarding the cost benefit ratio of expensive, technologically more complex treatment regiments.

### CONTEMPORARY THERAPIES

Elements indispensable for the safe, comfortable, and effective treatment of vascular disorders have evolved at different rates, times, and places. With the passage of time and the gradual introduction of era specific technologies,

the slender heated rods of iron employed by Hippocrates to thrombose veins and cauterize ulcers were supplanted by the technologies du jour. Agents employed have included hot needles, galvanic current, electrodesiccation, and the IV injection of liquid cauterants (sclerosants). Today's armamentarium vastly fortified by asepsis, anesthetics, and antibiotics includes thermal energy in the form of endovenous ablative lasers of various wavelengths, radiofrequency, and non-coherent light. Adhesives, steam, and cryotherapy are also employed.

Within the last few years, innovative therapies have developed which combine multiple modalities. These include mechanochemical ablation, which abrades endothelium coupled with lasers or sclerotherapy. Foam sclerosants, which are two to three times more potent than their liquid equivalents can be prepared by agitating modern detergent liquids. Their increased potency allows them to successfully treat large varicose veins. They are also more easily visualized under ultrasonic guidance than liquids. For lower extremity telangiectasias and reticular veins, percutaneous lasers and non-coherent light, heavily financed and promoted by commercial interests, are often the driving force behind lectures at prestigious meetings and lengthy peer-reviewed articles. These modalities are less effective, more costly, and a great deal more painful than sclerotherapy, which is still the gold standard for the treatment of small lower extremity veins. Surgical procedures have expanded to include sapheno-

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valvuloplasty, and novel embolic therapies to treat AV malformations. The most recent modality to appear combines mechanical obstruction of the saphenous vein, using platinum coils followed by foam sclerotherapy. The effectiveness of most contemporary therapies is heavily dependent upon highly evolved diagnostic modalities.

### EMERGING TREATMENT PHILOSOPHIES

An awareness that all therapies employed for the treatment of lower extremity venous disorders were essentially palliative created a new emphasis on the avoidance of radical procedures associated with long convalescence, severe pain and disfigurement. Lack of concern for comfort and cosmesis probably reached their apogee in the early 1900s, when the Rindfleisch-Friedel operation was employed for varicose veins. This procedure involved cutting a deep spiral gutter (at the level of the deep fascia), which wrapped around the leg six times bringing into view a large number of superficial veins, each of which was ligated. The wound was left open to heal by secondary intention, a process necessitating prolonged bed rest, a great deal of pain and permanent disfigurement. The Linton procedure, introduced in the 1930s, which removed incompetent vessels and interrupted perforating veins subfascially, wasn't much better. ■

*This series is adapted from a chapter originally written by Dr. Duffy at the request of a friend and colleague who, unfortunately passed away before the book could be published.*

*Look for parts 2 and 3 to appear in the November and December editions, and for the full series PDF to be posted at [PracticalDermatology.com](http://PracticalDermatology.com) in December.*

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