



Where's the *vein*?



No more Rubber Hose & a Thump!

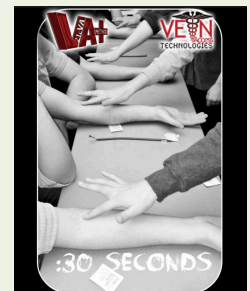
From the 5th-19th century
ghoulish bloodletting with the barber's razor,



to the 20th century strangling
with the tourniquet,



to the 21st century gentle, gentle, gentle
STEM 21cVA way.....



How To Locate A Healthy Vein!

The vein itself holds all of the secrets to a simple and uneventful vein access. The vein can tell us exactly how to locate it, dilate it, grade it, and, finally, how to access it - all without pain, without fear, without all of the bad stuff that usually goes with the old ways of drawing blood, starting IVs, injecting x-ray contrast, kidney dialysis, blood donations and transfusions, plasma collections, and/or Factor VIII injections for the hemophiliacs.

The answers are in the STEM of it all – Science, Technology, Engineering, and Math. How can STEM help us locate a vein – every time – and determine if that vein is a healthy vein, a vein that will tolerate the stick and the procedure? Let’s investigate.

History of Vein Access Procedures And how they located veins.....

The *History of Vein Access* has never been described like this before!

PAST 5TH - 19TH CENTURY	PRESENT 19TH - 20TH CENTURY	FUTURE 21ST CENTURY
 <p>BLOODLETTING the past.</p> <p><i>Bleedings</i></p> <p>BLOODLETTING - with a razorblade, a tourniquet, and a bowl. This lasted 1400 years! This was considered TREATMENT! Bleeding. True "prehistory". Bleeding to death was a common occurrence - that is how the Tourniquet came to be used in bloodletting - to prevent bleeding to death due to draw a vein!</p>	 <p>PHLEBOTOMY - Blood Drawn when the needle replaced the razorblade, Treatment (Bloodletting) became diagnostic blood testing. The blood draw, the IV, the injection of contrast, the blood donation, and the kidney dialysis procedures evolved into its current form. And note that the Tourniquet was brought forward into a needle access procedure where there was no threat of bleeding to death and therefore, no need for a Tourniquet.</p>	 <p>Where Tech, Technique and Science Meet. 21st Century - the ALL SCIENCE-BASED TECHNIQUE for ALL vein access procedures.</p> <p>Blood Drawn * Blood Donations * No Injections of Contrast * Kidney Dialysis</p> <p>It's still a needle in the vein, but everything else has changed.</p> <p>Because you ALL have said it or thought it, "There must be more to this than what I was taught!"</p>
 <p>THE PAST <i>Bleedings</i> ARCHAIC BARBARIC MEDIEVAL</p>	 <p>THE PRESENT <i>Blood Drawn, Phlebotomy</i> 200 years old. No new technique. <i>The tools changed & advanced. Techniques did not.</i></p>	 <p>THE FUTURE VAA+ 21st Century Science Applied. <i>New Name, Same Quality</i> QUALITY PATIENT CARE. <i>Predictable. Repeatable. Successful.</i></p>

5th – 19 century

The first era of vein access - Bloodletting Era.



The babers used a razor, a bowl, and a tourniquet. Yikes!

When the surgeons joined in, they replaced the razor with a scalpel instead. Still yikes!

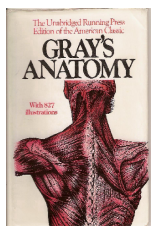


P.S. That is is what the Barber's Pole advertised – **Bloodletting** – not a haircut or shave!

The red was for the blood, the white was for the tourniquet, and the pole was used to squeeze to force the blood out. The razor was used to 'cut' the extremity; the bowl collected the blood; and the tourniquet was applied to prevent 'bleeding to death'.

Bloodletting, the draining of blood from the body, was done to 'remove bad humors' from the body. It was believed back then that people were sick from "bad humors", bad elements in the blood and body. And the barbers thought that if you remove some of the 'bad blood' people would then get well. The problem is, or was, they didn't know how much blood to drain. Yikes!

And they didn't know where the veins were actually located because the ANATOMY of the body had not been diagramed yet. Sir Henry Gray did not write



Gray's Anatomy until 1858 – the very last six years of the

19th century – so the barbers (and the surgeons) had no clue

as to where to cut. So they cut a very large area of the arm thinking that

surely they would cut a vein, or two, by that method. They did!



The cuts were not precise, because they were barbers, because it was the 5th-19th century, because they didn't know any anatomy, and the surgeons were not like the surgeons of today, they didn't know any anatomy either.....they were all 'hoping' to be helpful.

And they also didn't know that there was only 5 quarts of blood in the human adult body, and that all of that massive bleeding sometimes killed the 'customer' (the patient) – the customer 'bled to death'. And that is how the tourniquet came to be used in this vein access procedure, to **prevent bleeding to death**.

But, back to 'locating veins'.

As with all things in life, things progress, as did the vein access procedure. Discoveries and developments were made. And one of those was the invention of the needle.

A new era of vein access began.

19th-20th + century Scientific Revolution

The 2nd era of vein access - Venipuncture



In 1853, Drs. Woods and Pravaz (in different parts of the world) both came up with a version of the needle that we use today for venipuncture procedures. Yes, the needle replaced the razor and the scalpel. Yea, no more bleeding to death. [Remember that.]

The barbers and surgeons quit doing bloodletting and an entirely new group of people started doing vein access: the phlebotomist, the nurse, the paramedic, the x-ray tech, and, on rare occasion, the doctor.

But this 2nd era was and is not without its problems – it has a lot of problems.

#1 They still don't know where the vein is at - most of the time. And it just got harder because the target, in essence, got smaller; it's now a vein they have to insert a teeny tiny tipped needle into – not a razor slash across the arm that was sure to hit something.

#2 And even though bleeding to death is no longer a problem, because you can't bleed to death from a tiny microscopic needle stick into a vein, they keep using that tourniquet – for all the wrong reasons. They use it to **force a distention** of the vein, hoping to be better able to locate a vein.

In fact, many patients today call this procedure the *'rubber hose and a thump'* – because of the rubber tourniquet and the flicking of the finger; and some medical people call it the *"poke and hope"*. This author calls it the *"stick and hope you hit something and keep sticking until you do"* method. And, as if this wasn't complicated enough, the medical industry today has a gazillion names for this vein access / venipuncture procedure:

- Venipuncture
- Venepuncture
- Peripheral Vascular Access
- Peripheral Intravenous Access
- Peripheral IV Cannulation
- Intravenous Catheterization
- IV Cannulation
- PICC Line Insertion
- Central Venous Access
- Blood Draw / Phlebotomy
- Injection of Contrast
- IV
- Factor VIII Injection
- Plasmapheresis
- Blood Donation
- Kidney Dialysis AV Fistula Access

A needle in a vein, by any other name....

is still the same...

if you

*Locate a vein, and then
Insert a needle into that vein*

*It's **VEIN ACCESS!***

But whatever it is called, this second era still has some archaic, barbaric and medieval practices to it, still, to this day: the tourniquet, the smacking, slapping, flicking, and tapping, the pain, the fear, the bruise, the multiple stick event – just to name a few.

P.S. That tourniquet was DESIGNED to prevent bleeding to death. It NEVER was designed to force a distention of the vein (or, as they call it 'dilating the vein'). This mean forced distention causes all kinds of compromises, complications, injuries, and failures – but that is another story for another day.

Back to locating veins.

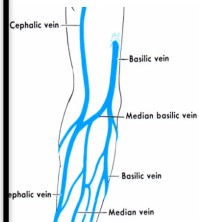
Here are the current 19th-20th century methods for locating veins.



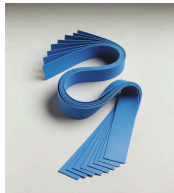
They LOOK for a vein.



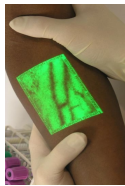
They smack, slap, flick, and tap.



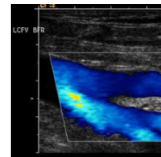
They use the vascular diagram as a map overlay.



They use a Tourniquet to '*dilate a vein*' to make it easier to SEE the vein.



They use a vein finder tool or the ultrasound machine - to LOOK for a vein -



They palpate with a glove on; or they tear the tip off and palpate.

#1



They can **LOOK** all they want for a vein;

But you can't always **SEE** a vein;

- no matter how big your magnifying glass is OR how good your eyesight is,
- no matter how wonderful that vein finder tool is, it can only penetrate so far,
- no matter how sophisticated that Ultrasound Machine is, it too is limited.

#2

And even if you could see a vein, have you heard the expression

“You can't judge a book by its cover”?

That expression means that – you have to **read** the book to know what it's about, the cover can be deceiving.

The vein is the exact same way –
even IF you could SEE a vein,
you can't judge a vein by its appearance either because:

Not all veins are created equal!

So, if all of the current methods don't work, how are they going to find that vein?

The STEM Venipuncture way.

First, think of the vein as a long skinny water balloon –not over distended! Almost full.



Second, are you right handed or left handed? You will be using the PAD of your dominant hand index finger. Which finger, which hand, and what part of the finger?

Third, we are going to place that **pad of the dominant hand index finger** on the real water balloon provided to you. Stay in one spot on that balloon and slowly press up and down, or in-and-out, keeping the finger in **constant contact** with the balloon. We are feeling (Palpating) for the water balloon bounce – the sensation of water rebounding back to the pad of your finger.



Don't jump around or move around on that balloon – stay in one spot. And definitely don't roll the balloon – because, contrary to popular belief, **veins don't roll**.

There's not even a word in the medical dictionary to describe a 'rolling vein' because it does not exist. Let's prove or disprove this statement with the dictionary. (Exercise.)

There is a word called **phlebectopia** – which means a 'displaced' vein - and a human displaced it, the vein did not displace itself.

Fourth, do you have that sensation of a water balloon bounce in your brain? Can you feel the rebound of the fluid against the pad of your finger? Good. Keep that image and that sensation in your brain.

Fifth, now let's improve your sense of touch with some **STEM Chemistry** and **STEM Physics**. Our sense of touch is pretty amazing and usually very sensitive. But when we try to feel (palpate) something, we create a sensation of 'grab and drag' as we move our pad across the skin of the arm. Let's try it and feel it. [Exercise: Feel a human arm with an obvious vein.] Did you notice the 'grab and drag'?

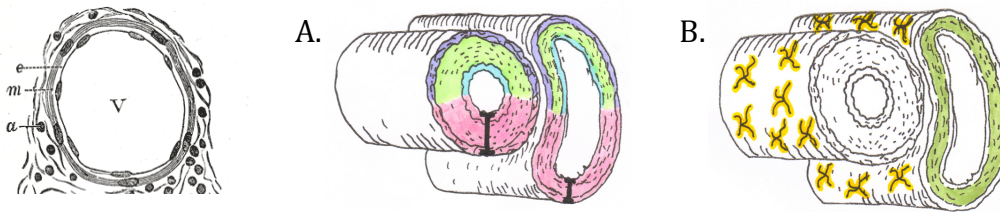
Now let's add 70% Isopropyl Alcohol (Chemistry) to the picture. Alcohol is currently used to prep the site, to clean it of microorganisms, before the stick. We are going to use it **to enhance our sense of touch**. When we wet the surface of the skin with the 70% IPA, and now move across the skin with the pad of our finger, our finger now GLIDES, no more grab and drag.



That 'grab and drag' is called FRICTION in Physics. And that friction is **noise** to the brain, tactile noise, touch noise – so we don't have a CLEAR touch signal – we have a noisy touch signal. We can't get a 'clear picture' with a noisy signal. Well, the 70% IPA prevents FRICTION. Yea for Chemistry! Yea for Physics! Yea for us!

Can you feel the 'water balloons' in the human arm better with this method?

Now it's time to learn the **Anatomy of the Vein** – the **CLUEs** to finding the vein.



A. All blood vessels, arteries and veins, have three layers of tissue in the wall:

- The inner most layer is called the intima – and it is all connective tissue – a very thin layer, like your skin;
- The outermost layer is called the adventitia – and it is all connective tissue – a very thin layer, like your skin.
- **And it has a middle layer, the most important layer, called the MEDIA, that is all MUSCLE, smooth muscle to be exact.**

B. The wall and muscle of the vein is innervated. That means it has **nerve endings** running through it - just like nerve endings in your skin. And your skin can feel hot, cold, touch, and pain. So can your vein. And we react to hot, cold, touch, and pain. So does the vein.

- ✓ Hot (heat) – tells your nerve endings to tell the muscle to relax.
- ✓ Cold – tells your nerve endings to tell to muscle to contract.
- ✓ Touch (gentle touch) – tells your nerve endings to tell the muscle to relax.
- ✓ Pain – tells your nerve endings to tell to your muscle to contract.

A Relaxed Muscle can stretch – this allows the vein to fill with blood, to DILATE.

Contracted Muscle – causes the vein to CONSTRICT.

GEE, how did I just teach you to LOCATE a vein – gentle touch - gently glide and gently press. Gentle, gentle, gentle. And when you are gentle, the muscle relaxes and the vein DILATES – to the size that nature intended for it to distend to. [Vs. the tourniquet that forces an over distention.]

Let's see if gentle touch really does tell those nerve endings to tell that muscle in the wall of that vein to RELAX, allowing the muscle to stretch, allowing the vein to fill with more blood – allowing the vein to naturally dilate.

1. Use the pad of your dominant hand index finger.
2. Locate a vein.
3. Gently press/release, press/release, press/release for 7-15 seconds.
4. You will feel the muscle relax first, then you will feel the vein start to fill.
5. Yea! A naturally dilated vein – to the size that nature intended for it to distend to – not an OVER distention (like with the tourniquet).

Hmm. Did we need a tourniquet to locate that vein? NO. Did we need a tourniquet to dilate that vein? NO.

So, now we know how to **LOCATE** and **DILATE** veins – **USING STEM**.

Next, we want to know if that vein is ‘healthy’ or not – because, recall, not all veins are created equal.

Sixth – And here is the rule: the veins closest to the heart have the thickest walls (that has to do with blood pressure); and the veins furthest from the heart have the thinnest walls. The hand veins are furthest from the heart, are very small, and have the thinnest walls. The veins in the bend of the arm, the Antecubital Region, are closer to the heart, bigger in size than the hand veins, and have a thicker wall – they are usually pretty good, usually.

Let’s grade vein wall thickness using tools of the trade (the glove and the tourniquet) and applying this information to the veins in the antecubital region and in the hand.

The rule is: if the wall is 5 or greater (on a scale of 0-10), then you can stick it. If it is less than 5, don’t stick it, it will probably not hold or even rupture. Let’s feel this distinction in the human vein.

Seventh – Now we want to know what direction the vein is running, so we know which direction to point the needle. That's easy. Place your finger on that balloon going the same direction as the balloon. Can YOU feel the balloon the entire length of the pad of your finger? Now you know what direction the vein is running.

You now have the **Firmness**, the **Size**, and the **Direction** that the vein is running. The only characteristic left to identify is the **Depth** –

- does the vein sit on the surface where you can easily feel it by gliding and can even SEE the blue of the vein, (10% of the healthy veins are in this group)
- does the vein sit a little deeper beneath the skin to where you can still feel it by gliding but you can't see blue, (80% of the healthy veins are in this group)
- or does it require that you press (not glide) your way across the region feeling for the water balloon bounce. (10% of the healthy veins are in this group).

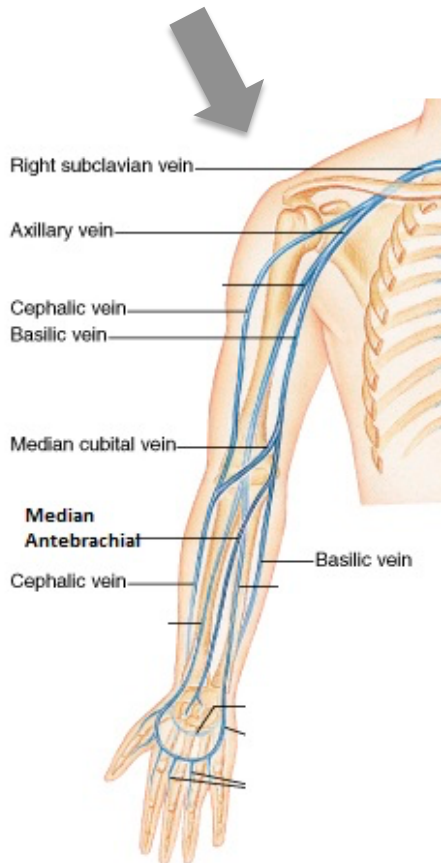
Ninty percent (90%) of the healthy veins are not visible to the naked eye, not even with a magnifying glass – so don't look – **FEEL** – the STEM way.

This is the STEM Venipuncture Technique – the 21cVA way – 21st century Vein Access.

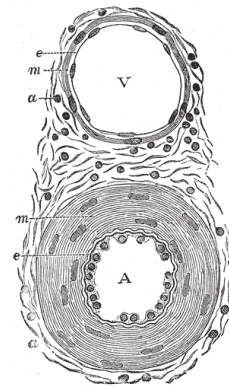
That's **How To Locate a Healthy Vein**

How to Locate A Healthy Vein using the **Anatomy of the Vein**

Here's the Diagram that is currently used to teach every nurse, phlebotomist, x-ray tech, paramedic, and every other healthcare person who performs venipuncture.



Here's the diagram that **should be** used and the Anatomy that **should be** taught – but is not.....



Gray's Anatomy of the Artery and **Vein**

From Anatomy Study Buddy

<https://anatomystudybuddy.wordpress.com/2012/09/21/veins-of-the-arm/>

Using the Vein's anatomy will help us Locate, Dilate, and Grade a Vein.

If you know where the vein is at – you have laid a foundation for a successful stick.



STEM + M



This is a STEM lesson on *How To Locate A Healthy Vein*.

Blood draws, IVs, injections of contrast, blood donations, kidney dialysis, plasma donations, and Factor VIII injection for hemophiliacs all have the first two steps in common: Step #1 - locate a vein and Step #2 - insert a needle into that vein. This is called vein access – venipuncture.

Well, locating that vein is not only the 1st step in every venipuncture procedure, it is **THE #1** cause of venipuncture failure – *they don't know where the vein is - for sure*. The average venipuncture failure rate is 53%. Not any more!

The *STEM Venipuncture Technique (21cVA)* locates a *healthy vein* 100% of the time.

And I am going to use the *Vein's Anatomy* to teach you this simple and effective method.