

## **Tourniquet: 200 mm Hg vs. 20 mm Hg** **'Bleeding to Death' Prevention vs. 'Dilating a Vein'**

### The Past 5<sup>th</sup>-19<sup>th</sup> century

1. The **Tourniquet** was used to **prevent bleeding to death** from bloodletting with a razor (because frequently the cut was so deep it cut through Arteries and Deep Veins, and patients were bleeding to death).
2. The **Tourniquet** was, therefore, **applied TIGHT** to get to the deeply seated Artery and Deep Veins.
3. The 'bloodletters' didn't know this then, because the sphygmomanometer device wasn't invented by Samuel Siegfried Karl Ritter von Basch until 1881, but the **Tourniquet** was applied at an external pressure of >120 mmHg pressure - usually up to 200+ mm Hg [as tight as a pumped up blood pressure cuff] to get to the deeper seated vascular structures AND to cut off the flow of Arterial blood which was pulsing at 80-120 mm Hg pressure (*Blood Pressure 120/80 mm Hg*).

And while bloodletting doesn't make sense to us NOW, it made sense back then - they did NOT have the benefit of the science that we have today. But using the Tourniquet the way that they did make PERFECT sense and was the absolute CORRECT thing to do and the right way to use it – to **prevent bleeding to death**.

### The Present 19<sup>th</sup>-20<sup>th</sup> century

1. The **Tourniquet** is now used to '*dilate a vein*'. [But that wasn't what it was DESIGNED to do.]
2. AND the **Tourniquet** is STILL applied **TIGHT**. [Still reaching DEEP vascular structures at an externally applied pressure of >120-200 mm Hg pressure. Even though 'bleeding to death' is no longer an issue, not from a needle stick.]
3. When the majority of vein access procedures today access **Superficial Veins, not Deep Veins**. [SUPERFICIAL: Surface Sitting, beneath the Skin, in the Subcutaneous tissue.]
4. Now, today's healthcare (vein access) providers don't know it because they were never taught it, but the pressure of the blood in the Superficial (and Deep) Vein system is only 10-20 mm Hg pressure (not 120/80 mm Hg). [Did they really need to apply the Tourniquet TIGHT?]
5. There are several reasons why that **Tourniquet** does not need to be applied TIGHT, if at all:
  - i. The **Tourniquet** was designed to **cut off the flow of blood** – Arterial and Deep Vein blood), to **prevent bleeding to death**. Not needed here.

- ii. The **TIGHT Tourniquet** reaches DEEP vessels. We are accessing SUPERFICIAL vessels (usually).
- iii. The **Tourniquet** is applying an external pressure of >120-200 mm Hg when the pressure of the blood in the superficial vein is 10-20 mm Hg – STRANGLING the vein.
- iv. The strangling **Tourniquet** causes a FORCED DISTENTION of the vein, increasing the venous BP to greater than (>) 10-20 mm Hg pressure, over distending the vein, thinning the venous system wall (vein, venule and venous part of the capillary bed membranes), disturbing Starling's Equilibrium, causing an instant 'INFILTRATION'. [This is an 'Artificial Dilatation' of the vein; this is a SIDE EFFECT to the use of the Tourniquet.]
- v. The **TIGHT Tourniquet** is crushing subcutaneous tissue, superficial veins, muscles, tendons, Arteries and Deep Veins. These crushed tissues dump their cellular 'guts' OUT into the blood stream - altering blood that is sometimes collected for testing.
- vi. The vein can be dilated 'naturally' – to the size that nature intended for it to distend to – by using the vein's own anatomy and physiology (SCIENCE information that today's healthcare vein access providers are NEVER taught). A natural dilatation maintains the integrity of the vein wall, without injury, and without 'infiltration'.
- vii. The tight **Tourniquet**, applied in the 'wrong place', can cause a Volkmann's Contracture – another condition never taught about.

The Future 21<sup>st</sup> century

### **21cVA Technique**

1. The **Tourniquet** is not used (or very, very rarely) to 'distend the vein'.  
[Gentle Touch and the vein's A&P are used to dilate a vein.]
2. If and when the **Tourniquet** is applied, it is applied at 20 mm Hg. This allows the artery (at a pressure of 80-120 N) to continue to flow – we need arterial blood to make venous blood. There is now a veniCuff to replace that tourniquet.
3. There is no tissue damage and no cellular debris contributions to blood sampling.
4. There is no infiltration.
5. There is no pain.
6. There is no vein rupture upon venipuncture.
7. There is no bleeding or bruising.
8. [There are only two types of patients who (may) need a Tourniquet applied:
  - i. the patient who is hypotensive/hypovolemic, and
  - ii. the patient who has a 'neurovascular anomaly' or vasoneuroses: a condition that has NEVER been identified or described before in vein access or the venous system procedures. ]