

# Nerve Damage and Bondage

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## Overview

- Anecdotally, nerve damage seems to be the most common serious injury (as opposed to minor injuries like rope marks, bruising, etc) that occurs in bondage scenes.
- Danger signs for nerve damage include pain (generally described as sharp/shooting), weakness, tightness, stress, tingling, and numbness. These generally occur QUICKLY, sometimes instantly, and should be acted on immediately to prevent long term damage.
- Nerve damage can occur by stretching of the nerve (for instance by over-extending the arms over the head for extended periods of time) and by compression (for instance rope pressing up against the armpit). The more force and the longer the time, the greater the damage will be.
- Nerve irritation that is immediately resolved leads only to temporary nerve damage (numbness that goes away quickly). Any prolonged irritation can lead to semi-permanent damage (nerves need weeks or even months to heal!) or to permanent loss of function. Recovery of nerve function is more likely with a mild injury and shorter duration of compression.

## More on the signs and symptoms of nerve damage

It's possible for nerve damage to occur without any warning/symptoms at all, and even with an experienced top who does "everything right."

Generally, the type of bondage pain that is going to cause long term damage is a type of pain that will set off alarm bells in the bottom's head. It will not feel erotic, it will just hurt! Bottoms must also be alert to numbness and tingling (which also doesn't feel erotic to most people), not just to sharp shooting pain. If you've ever hit your "funny bone" then you know where your ulnar nerve is and how it feels to have trauma to it - not sexy for anyone I know.

Sometimes nerve damage may be focused on a particular area rather than the entire limb. For example, the ulnar nerve covers, among other areas, the pinky and half of the ring finger. So, if a bottom reports numbness and tingling only in a specific "zone" rather than an entire limb, that's a good clue that the symptoms are due to nerve compression. HOWEVER the fact that the entire limb is numb/tingling [should not be taken to mean that the damage is NOT due to nerve damage.

Even "minor" nerve damage can have major consequences. A relatively mild injury to the radial nerve, if on the bottom's dominant arm, can easily render them unable to write or type for days or weeks - a major problem for most people.

## When a limb "falls asleep" in bondage

We have all had a limb "fall asleep" in a non-bondage context, and we all recovered. That sensation is usually caused by a combination of reduced circulation and minor nerve injury (they are inseparable to some extent - reduced circulation reduces circulation to everything, including the nerves, which causes them to go a bit haywire when circulation is restored). Despite the fact that most of the time your body will recover when you experience these symptoms, the damage that can be done by bondage is a bit different than the type caused by crossing your legs for too long (it's more focal compression, for one thing). Also, you \*can\* suffer from nerve damage just from crossing your legs for too long or too often. Thus, in a bondage context, I would never dismiss complaints of limb numbness as "just" being a "sleeping" limb.

## How to address signs of nerve damage during the scene

As a top, what should you do if your bottom reports numbness, tingling, tightness, or pain? You need to immediately take steps to address it. If the bottom's symptoms are minor, experienced bondage tops may sometimes address the problem by removing

or redirecting tension, shifting ropes, or changing the bottom's position. A key component of this is making adjustments, then quickly checking back in with the bottom to be sure the problem has resolved.

In the following cases it is recommended that you immediately untie the effected limb:

- If you or your bottom are beginners with rope
- If symptoms the bottom reports are severe and/or sudden - "I feel my right arm just went numb." "I have sharp pains going down my left leg" etc.
- If initial steps taken (loosening the rope, changing position, etc) don't resolve the problem
- Anytime you have any doubt, err on the side of caution and untie.
- If untying the limb still doesn't solve the problem (symptoms are ongoing a few minutes later), stop the scene immediately and get medical help.

## As a top, what can I do to prevent my bottom from getting nerve damage?

The bad news about nerve damage is that the top really has no way to know when it is happening, other than communicating with their bottoms! This means that rope tops have a serious responsibility to educate their bottoms to alert them when they have bad pain/sensations so that they can release/adjust the bondage.

Other than educating and empowering their bottoms, tops can help prevent these injuries by knowing basic nerve anatomy. Anecdotally, it seems that most problems with bondage are caused by damage to the radial nerve (aka "honeymoon palsy" or "Saturday night palsy"), in most cases due to tight or load bearing ties across the upper arms. The radial nerve wraps around the upper arm and is close to the surface around the bottom of the deltoid, where people love to put rope (especially in box ties and the like). Other forearm nerves include the medial and ulnar nerves. Note that the exact location of these nerves varies from person to person, and both location and degree of exposure will vary based on position!

Tops should watch for signs of trouble- signs like wiggling fingers and adjusting ropes are good cues that it's time to check in with the bottom and adjust the bondage.

During the scene a bondage top can check CSM (circulation, sensation, and movement) in all sorts of fancy medical ways (capillary refill, point differentiation, etc) if it makes them feel better. However, the main predictor of bad outcomes seems to be the bottom's subjective experience in the bondage. Pay attention to body language and check in frequently.

The best "test" that a top can do, is to ask the bottom to squeeze their (the top's) fingers and \*maintain\* a grip. If the bottom cannot do this, that is an indication that they have some nerve impairment and should be untied. However "passing" this test is NOT an "all-clear" that would indicate everything is definitely OK.

Making frequent shifts in the rope - just a slight reposition, adjusting the tension, or temporarily releasing the pressure to allow the underlying tissues to readjust - can make all the difference. This may be as simple as running fingers under the rope or as complicated as rearranging a suspension so the bottom is in an entirely different position.

## Rope placement to help prevent nerve damage

Avoid wrapping any rope that will bear load or be under more than a minor amount of tension around the bottom's knees, elbows, groin, and armpits - these are places that major arteries, veins, and nerves are near the surface.

Studies have documented nerve damage to both the radial and medial nerves caused by blood pressure cuffs positioned too distally on the arm (not high enough, overlapping with the elbow area) - the recommendation of these articles was to be sure blood pressure cuffs are placed proximally (close to the centre of the body) enough to avoid overlap with the bend of the arm. Try to stay on the "meaty" parts of the extremities.

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Another thing that may help is to multiply the points of tension to spread the pressure over a wider area (in rope-speak: use more wrapping turns!).

Often, hands are the first area where the bottom experiences problems. If possible, arrange the bondage so the hands can be easily released without having to undo everything else first.

As was previously mentioned, the radial nerve in the mid upper arm area is a common site of nerve injury for bondage. When you are first learning bondage, or just getting started with suspension, consider completely avoiding tight and/or load bearing ties around this area.

### Signs of nerve damage after a scene

Signs of nerve damage that may be noticed after a scene include weakness (often focal depending on the affected nerve), numbness, tingling, pain, difficulty with fine motor control, and specific signs like "wrist drop" (which generally indicates radial nerve damage). It is possible for these symptoms to resolve over an hour or so. It is also possible that recovery could take months or years, or that the injury could be permanent.

### Pre-disposing factors for nerve damage

Diabetes is a serious risk factor for nerve injury. About half of diabetics develop nerve damage ("peripheral neuropathy") due to their diabetes, and pre-existing/chronic nerve damage is an important predisposing factor for acute nerve damage.

Very thin people are at higher risk for acute compression nerve injury.

Other conditions that can make people more prone to nerve damage include: alcoholism, poor nutrition or vitamin deficiency (especially vitamins B6 and B12), thyroid disease, kidney disease, and autoimmune diseases like lupus or MS.

### The following terms might be helpful in interpreting medical texts:

- Anterior – The front side
- Posterior – The rear side
- Lateral – Away from the midline of the body
- Medial – Towards the midline of the body
- Proximal – Towards the centre of the body
- Distal – Away from the centre of the body
- Pronation – To rotate the arm inward so that the thumb points towards the body
- Supination – To rotate the arm outward so that the thumb points away from the body
- Extension – When a joint is held straight out (opposite of flexion)
- Flexion – When a joint is bent (opposite of extension)

### Nerve damage duration

Times involved are hard to estimate, but will partly depend on the spread of focussing of the compression, the weight of the person suspended, and the concurrent presence of blood vessel compression. Be aware that serious nerve damage can happen very quickly and often without warning. Incident reports have shown this damage can occur in seconds. Consider this before you experiment with suspension or tight bondage.

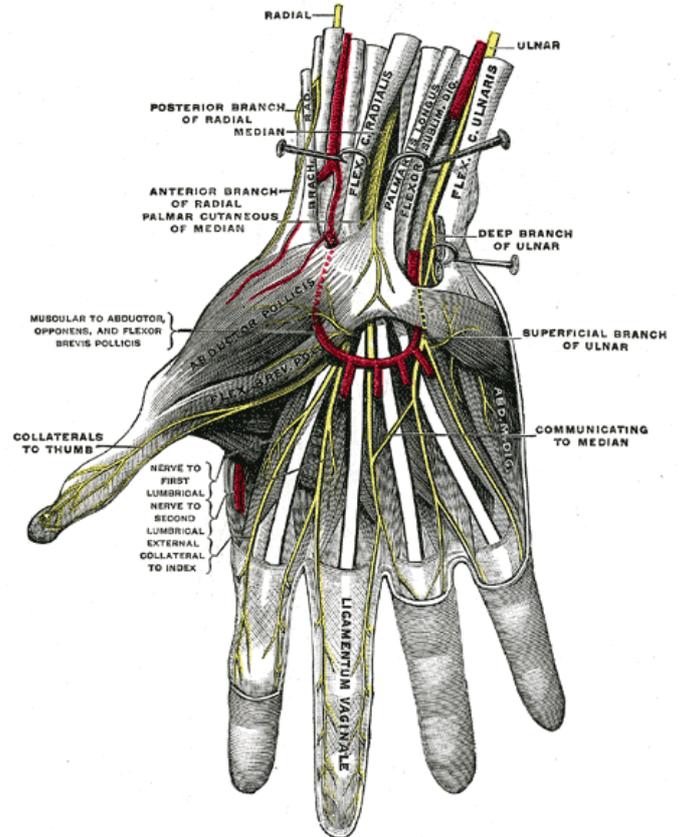
- Short term compression – tingling and loss of sensation.
- Longer term (minutes) – loss of motor function (neuropraxia).
- Longer still – longer recovery time.
- Even longer – possibility of permanent injury (neurotmesis)

Recovery time depends a lot on how badly the nerve is damaged. It may just take a very short time if the nerve is mildly compressed. However, if the structure of the nerve is damaged, it can take weeks or months. A nerve is made up of thousands of nerve fibres held together in a bundle.

Each fibre that has been disrupted will die back along its track to where the body of the cell is located which is right back to the spinal cord. It can regrow from there usually at a rate of about a millimetre a day. If the nerve sheath is not disrupted, then the individual nerve fibres should be able to find their way back to

the sensory or muscle ending that they were originally connected to. In severe cases, surgery might be required to regain use.

### A sketch of a dissected body, showing the nerves of the hand

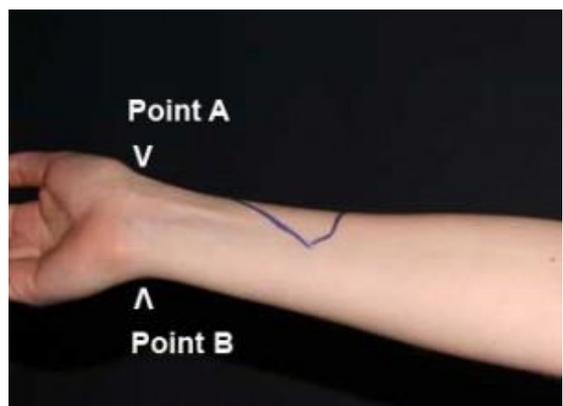


Starting at the wrists, you have three main nerves: ulnar (little finger side), median and radial (thumb side). The median isn't easily compressed by ropes, even under suspension as it lies deep within the carpal tunnel running up the middle of the wrist. People with Carpal Tunnel Syndrome are probably the exceptions as fibrous tissue fills the tunnel and leaves less room for the nerve.

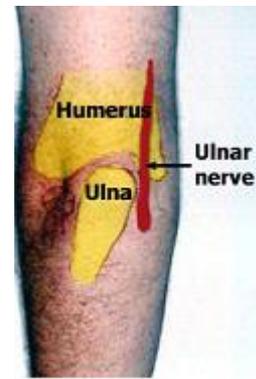
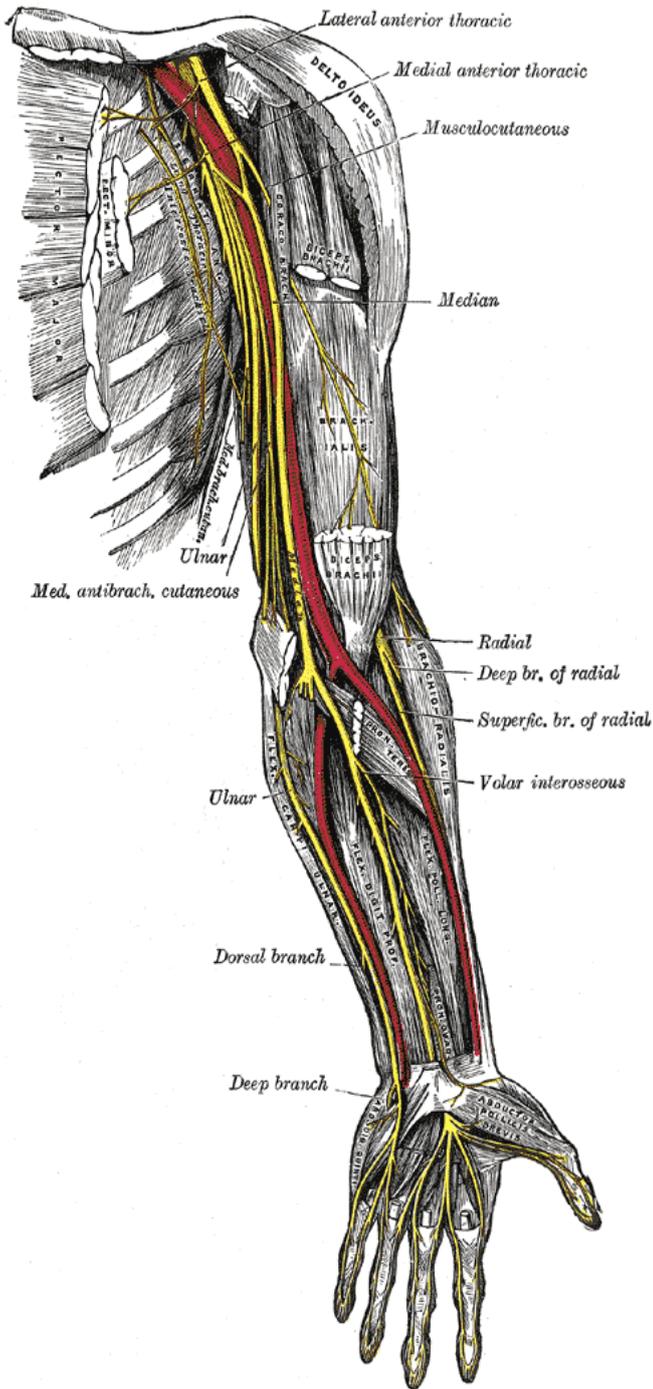
The real problems are the other two nerves, radial and ulnar. Avoid the notch at the base of the thumb (Point A) and the notch you'll feel just at the end of the ulnar bone where the forearm ends and the hand starts (Point B). At both these points the nerves are running near the surface over bony prominences, making the nerve compressible by overly tight or thin, i.e. narrow diameter rope or insufficient wraps, wrist bindings cutting into this area.

On a more general note, one should be aware of the vulnerabilities at the wrist when applying any ties that might come under load, e.g. hands behind head, hog-tie, tied overhead. The load can cause the bindings to cut into these sensitive areas, as can escape attempts or other struggling.

### Showing vulnerable points on wrist



A sketch of a dissected body, showing the nerves of the arm, can be seen below.



Location of ulnar at elbow

Moving up the arm, avoid the "funny bone", aka humerus, where the ulnar nerve runs over the bony prominences of the ends of the humerus and top end of the ulna. Compressing here gives similar symptoms to whacking it (the "funny bone") i.e. tingling in the inner (little finger) half of the hand, and importantly with time and degree of injury also leads to weakness in the fingers and both loss of grip strength and precision. Injuries to the ulnar nerve may also occur if the arm is very tightly bent (>90 degrees) at the elbow for prolonged periods; if the arm is twisted inward so the thumb faces the body tension on the ulnar nerve is further increased (think of the way you hold your arm while imitating a chicken wing or as in a wrist to upper arm tie).

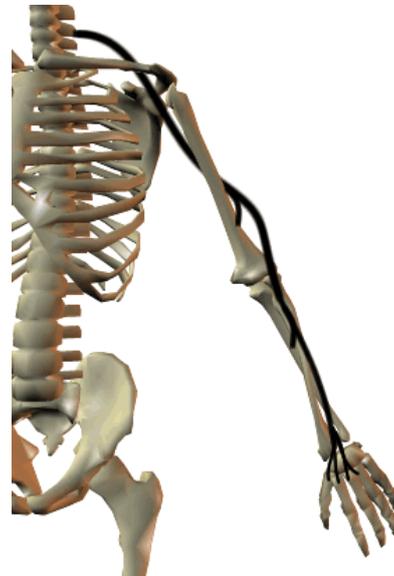
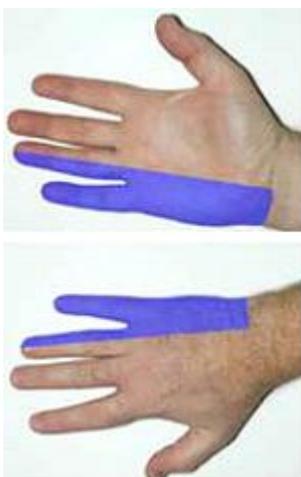


Diagram shows path of radial nerve.

**Symptoms of ulnar nerve injury:**

- Abnormal sensations in the 4th or 5th fingers
- Numbness, decreased sensation
- Tingling, burning sensation
- Pain
- Weakness of the hand



Blue areas are served by ulnar nerve

Again, the median nerve, in the middle of the front of the elbow is difficult to compress, as it's deep and surrounded by soft tissue, but with enough pressure the radial artery can be compressed, leaving the lower arm short of blood & oxygen. This point is just proximal to the bony parts of the wrist with the hand supine, where the pulse is normally taken. This remains vulnerable in a straight line up to about half way to the elbow, at which point the increased muscle bulk around the deeper running artery will be protective. This is both painful in itself, and after a few minutes can start to cause early tissue damage. Releasing the pressure the causes more pain as the blood supply returns.

Avoid the back/inner upper humerus (2-3 inches below the armpit) as the lower branches of the brachial plexus are compressed against the bone of the upper arm here, this time including the median nerve (causing major functional problems for the elbow and hand).

### The radial nerve

The radial nerve is vulnerable at the wrist as mentioned above. In addition, it is also prone to injury where it twists around the outside of the arm between the deltoid and triceps. It is at its most exposed in the 'valley' between these two muscles. Since it is included in the brachial plexus, compression in this area can occur.

### Symptoms of radial nerve injury can affect the following:

- The hand or forearm (dorsal surface, the "back" of the hand)
- The "thumb side" (radial surface) of the dorsal hand
- The fingers nearest the thumb (2nd and 3rd)

### The following symptoms may occur:

- Numbness, decreased sensation, tingling, or burning sensation
- Pain
- Abnormal sensations
- Difficulty extending the arm at the elbow
- Difficulty extending the wrist

If the injury is at the wrist, patients complain of isolated sensory changes and paresthesias (unusual sensations) over the back of the hand without motor weakness, e.g. wrist drop, inability to grasp firmly. If the injury is high above the elbow, then numbness of the forearm and hand may be an additional complaint.

### Brachial plexus

In the armpit, all the major nerves to the upper limb are branching after emerging from the neck and upper thoracic spine.

They pass through the soft tissues beneath the shoulder joint. This is pretty well protected from above by the joint itself, behind by deltoid and trapezius, and from the front by the pectorals. Underneath, though, these nerves are vulnerable. Restraints should never be placed around the armpit as this will almost certainly lead to compression of all of the nerves that supply the arm. It's not just compression, but also excessive stretching, which can happen if the body is suspended with arms above the head. This is also a risk if the arms are pulled behind the back, when the head is turned to the opposite side, and when there is downward pressure on the shoulder. Obviously, the risk, and speed of onset of any injury, is greater in those who weigh more.

While certain scenes may require positioning that puts stretch tension on the brachial plexus, moving the person in bondage to the position slowly and steadily (without sudden movements) and minimizing the aforementioned pressures may help make arm restraint safer.

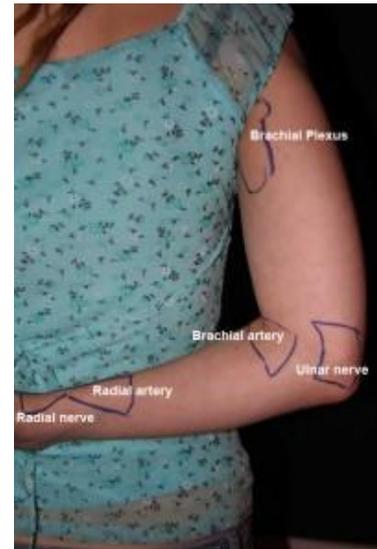
The illustrations show the main points where nerves are likely to be vulnerable. This is only a guide as anatomy varies and nerves will move according to position. The markings enclose the areas which should be treated with caution.

However, while nerve damage to the areas discussed may appear to be the source of change in sensation, in fact there are times that the pain is actually the result of compression of the nerve points around the vertebra. For instance, suspension with the head in a plane that might deform the natural position of the vertebrae; thus, pinching the nerves coming out at the vertebra. This situation is very highly probable in horizontal suspension when the head is unsupported. Often the sensation of pain from the cervical pain is manifested at a distance from the vertebra and could include sensation along the radial nerve right to the finger tips.

There are many variables, knock-on effects and bio-mechanical issues; there is no magic formula which avoids all risks. Furthermore, there is no medical specialisation in bondage related injuries, so creating this expertise is down to us. In spite of all the best care and knowledge, shit happens. All we can do is be aware of the risks and how to minimise them.

### Important note:

*The following photos show the approximate positions of nerves in most people. The areas marked are not precise and may vary considerably in some individuals.*



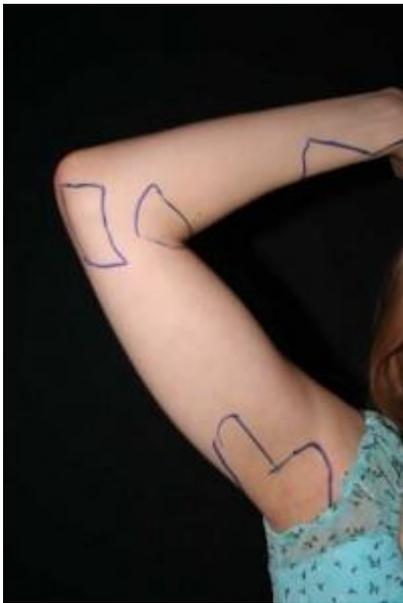
*View from rear with arm in typical position*



*View from front, arm lifted to show brachial plexus in armpit.*



*View from side with arm in typical position showing radial nerve*



*View from front, arm lifted to show brachial plexus in armpit.*

*The following illustrations show a typical takate-kote. The marked area should be considered vulnerable.*

As can be seen from the following two illustrations, the bindings largely avoid the area on the outer arm, although the upper binding does clip the top edge. As previously mentioned, the markings are not intended to be rigid demarcations and the latitude/sensitivity will vary from person to person. Arguably, the lower binding could be slightly higher or the upper one lower than placed in this picture. Attention should be paid to the risk of either of these bindings slipping into the danger area when under load or due to a change in position.



Due to the reluctance of people to discuss their experiences, I have little to go on beyond the 'grapevine' and a few individual reports. However, I have noted a preponderance of injuries, usually affecting the radial nerve, and often relating to sideways suspension. In the latter, the tendency is for this to affect the lower arm (nearest the ground), which will be under the greater load.

I would like to speculate upon some causes, apart from incorrect construction:

- The upper binding moving into the danger area (shown above).
- Failure to run a finger under the upper binding to allow underlying tissue to 'settle'. This ensures nerves are not trapped by muscle and return to their normal position in the protective groove.
- The cinch rope on the upper binding, a knot or clothing being pressed into the lower end of the brachial plexus or radial. I believe that this nerve bundle could be pinched between rope, ribs and arm bone. This being a possibility, I would question the wisdom of the upper cinch when using this tie for sideways suspension with individuals who might be susceptible.
- Overly tight wrist tie. The function is merely to support and not restrain. Leave a lot of slack.
- Assuming the person being tied is a standard text book case and that 'one size fits all'. We are all different; nerves can be in odd places or unusually vulnerable in some people.

I believe that knots joining ropes or twists/crossings are especially dangerous in the under arm area, especially with thicker rope. Apart from the above, I do not see any problems with the arm/body portion of this tie, when correctly applied. All the other problem areas are well away from the components.

