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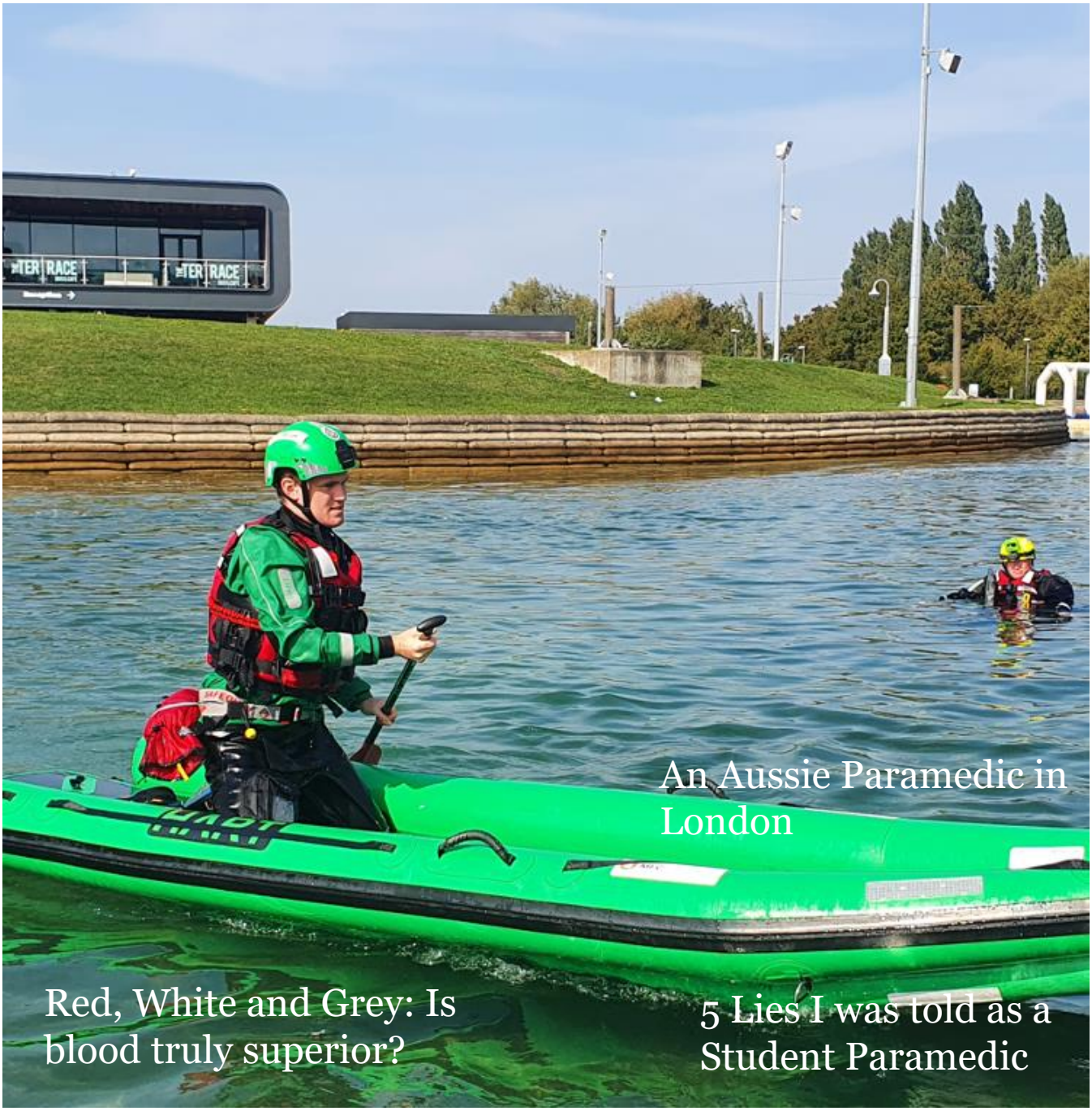

An Aussie Paramedic in London

Red, White and Grey: Is blood truly superior?

5 Lies I was told as a Student Paramedic

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‘Muddy Response’

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Editors Note

Welcome to the first Winter Volume of The Shift Extension. This is our fourth official volume, and it is an exciting time as the profession (and the platform) move from strength to strength. In this volume we will explore some clinical case studies while we also delve into paramedic research with a difference. We will hear from paramedics working internationally, privately, and domestically while they personally explore experiential reflections, health and wellbeing, and mentoring.

As we publish this volume it is also a time for us to reflect on our first year of operations.

Our online magazine has seen tremendous growth over the last 12 months which is now averaging 500 - 1000 visitors per week. Our most successful article form this year was downloaded over 1200 times in its first 14 days and our most successful podcast has been listened to just over 500 times. Our contributors span operational staff, researchers and students, and our readers are representatives from 24 countries. We facilitated our first clinical symposium on the Gold Coast with over 70 attendees and next year we are aiming to hit the road with several more symposiums on offer.. It has been a whirlwind journey and one that we aim to keep growing.

I hope everyone stays safe out there through 2022 wherever you are working your shift. Please enjoy the podcast and the magazine, and if you have any feedback, we would love to hear form you!

Stay systematic, and thanks again for your support.

Sunny

Editor-in-Chief

THE SHIFT EXTENSION

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The Shift Extension is a free-to-access, open-source publication that is committed to providing industry-relevant literature and information to enhance the development of the paramedicine profession through the sharing of information.

Cover image by Callum Shepherd

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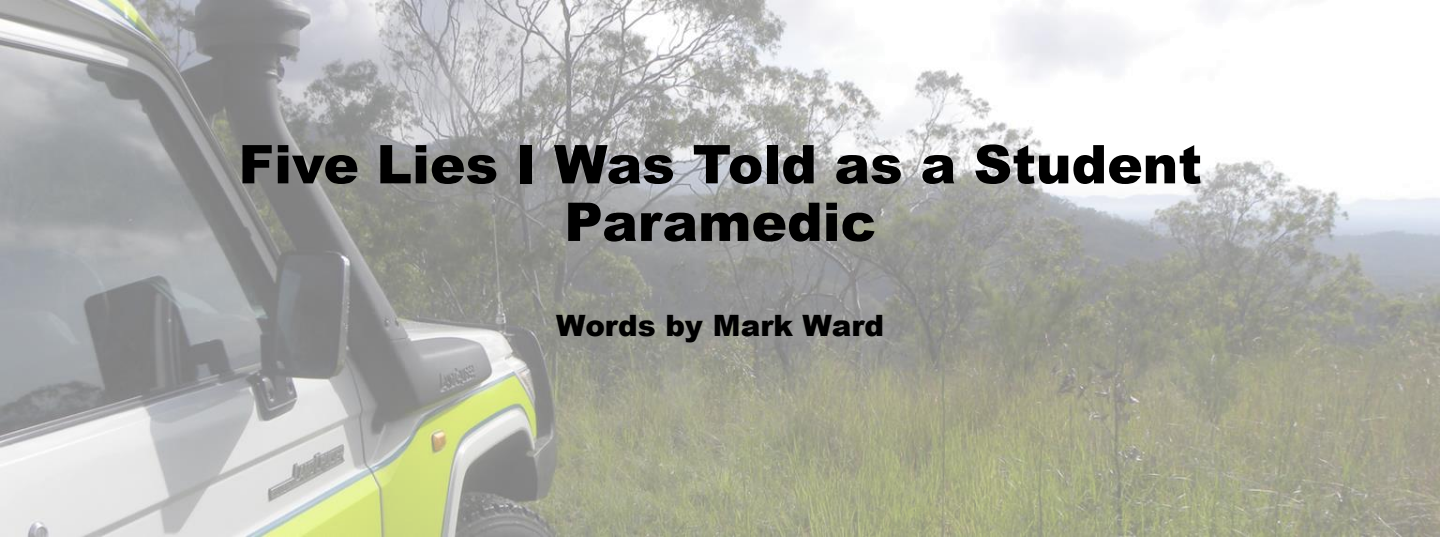

Five Lies I Was Told as a Student Paramedic

Words by Mark Ward

Thinking back on it now, the entire myth of Santa Clause is hard to believe even as a little kid. Seriously, this bloke wearing snow gear in December with a small herd of magical reindeer has managed to not only pack enough toys for every kid on the "nice list", but he has also managed to get around to every house on his list in one night. Not only that, but he has also never been shot sliding down some drunk farmer's chimney or attacked by a west Sydney drug dealer's rottweiler? And how quick does this guy have to work. This bloke hasn't got time for a glass of milk and a cookie. He definitely hasn't got time to be kissing mummy either. What type of lunatic writes a song about seeing mummy kissing Santa Clause? If that was me, I'd go straight in and tell dad that mum's downstairs getting it on with some fat bloke dressed up like Santa. Christmas would be ruined.

As ridiculous as it is, I was still going to bed every Christmas Eve till I was fourteen with my stockings hanging over the mantel piece. Actually, I didn't get into wearing stockings till I was much older, and we didn't have a fireplace, but you get the idea.

I saved my kids the pain and anguish of going through the same traumatic experience as I did over Santa. I just couldn't do it. As soon as my daughter handed me a letter addressed to Santa with an iPad, Xbox and an 85-inch flatscreen TV on it, I just had to break the news to her. The conversation went something like, "Sweetheart, daddy is actually Santa. That weird fat guy with elves and reindeer doesn't exist. Now go back to your room and rewrite that wish list and try to keep it under two hundred bucks".

How gullible we can be? But looking back over two decades in the ambulance service and some of the lies I was told when I was a student almost makes Santa seem plausible. Here are the five biggest lies that I was told as a student paramedic. Some have been proven wrong by good medical research and others were just ridiculous lies from the start.

Lie 1. Everyone gets oxygen

Oxygen is one of those lies that was proven harmful in high doses by clinical research. The evidence was just too obvious to ignore. Back in the early 2000s, we would walk into a job, introduce ourselves, slap a mask on the patent, dial the flow metre to a level anywhere between 6 and 15 litres depending on how sick the patient looked, and then ask why we were called today. That's just how we rolled back in the day. We treated every patient with oxygen and diesel whether they needed it or not. Those were the days when some cities around the world had oxygen bars. Forget walking in and buying a beer. All you do is sip on your skinny lactose free latte while wearing nasal prongs pumping out six litres a minute.

Funny thing is, a study printed in the British Medical Journal back in 1976 showed no benefit in routine oxygen for uncomplicated myocardial infraction. This was the gold standard double-blind control trial on a small cohort of only 43 patients however, the conclusion showed no evidence of oxygen being beneficial(1). That triggered a flood of research that continues to this very day. All of the research points to the same conclusion. Not only is there no benefit, in most cases it is actually harmful. So, if this was first discovered in 1976, then why were we still putting oxygen on everyone, especially cardiac patients, 30 years and hundreds of research papers later?

I have completed a lot of research into the way paramedics as well as people in general think over the years and this is not a surprise to me. One of the hardest things to change is our beliefs. They are linked to our behaviours and understanding of the world and can be challenging and even confronting to change. Imagine living in the days when Columbus was trying to make everyone believe that the world was round. For centuries we just assumed it was flat. How hard would it have been for that bloke to put a crew together for the first voyage? I wonder how confident he was himself. I'm sure he would have been telling his crew his reasons for believing the world is round but still sending a deck-hand up the crows nest with a telescope. "If you see the end of this thing, sing out and we will spin this ship around".

Trees do a great job of supplying oxygen. Unfortunately, trees don't supply a Wi-Fi signal, broadcast Netflix or anything else we consider important these days, so we continue to cut them down at a massive rate of knots. But until we run out of them, they will do the job just fine. It has taken many years and hundreds of studies before we changed our practice and these days, if I have to change an oxygen cylinder in the ambulance, I have to Google how it is done.

Lie 2. The Hospital is Just Around the Corner

How many students have had this scenario?

Student – "I might just pop a line in and give pain relief."

Mentor – "What for?"

Student – "He's in a lot of pain. I think he might have a penile fracture.

Mentor – "Nah, were almost at hospital anyway."

I still see horribly painful injuries bought in by ambulance without pain relief. Isn't it one of the fundamentals of pre-hospital care? Plus, the theory of being close to hospital is not a good one. Let's assume that you are not "almost at hospital". Let's imagine that you are treating a patient at the front door of the hospital. How long do you think it takes for that patient to get pain relief from the hospital staff? Let's compare paramedics giving pain relief and the ED giving pain relief.

Paramedic – Sets up and IV. Puts in an IV. Fills up an IV. Pain managed.

ED – Line up at the triage desk. Get triaged. Get ramped. Ask the nurse if your patient can have some pain relief. Nurse waiting for the doctor. We finally get to a bed and the entire process starts again. We hand over and the nurse starts from scratch. The poor patient has to go through all of those crazy questions again. "What brings you here today?" By the time the nurse confirms that the poor bugger has a ruptured tunica albuginea, our initial dose of pain relief would be starting to wear off. This might surprise some paramedics but there isn't a nurse waiting at the ambulance ramp with a syringe full of morphine. Surely, we have time to give some narcotics if required. I have been the patient a few times and I needed morphine on board just to answer all those questions.

There is nothing worse than being in excruciating pain and having to answer the same questions over and over again. “How would you rate your pain?” Or the worst question I get asked is “who can we contact in case of an emergency?” What sort of question is that? Call another doctor. Call a few doctors if you can. Get a full retrieval team here if you have to.

Please don’t put your patients through that ordeal without any pain relief on board. There is no rush and giving pain relief is what we do. And as an added bonus, pain relief settles down the patients and can even make them a nicer person. I have read a lot of patient complaints about paramedics over the years and not one of the patients complaining was juiced up on fentanyl. Which is the perfect segue into my next lie.

Lie 3. Don’t ever use Narcan

We all learnt that waking up a heroin addict with Narcan makes them cranky because you have ruined their high. Not true.

Fentanyl is now a common drug on the streets and has taken up where heroin left off. Add a little black market Oxycontin and there is still a reasonable chance that paramedics are going to come across a narcotic overdose or two.

We used to go to a few good heroin overdoses back in the day and I have to say, all heroin addicts that I met on the job didn’t seem too scary. Skinny, weedy and sooky bunch that don’t seem to be too athletic, so I don’t know why we are scared about making them cranky. I’m six foot tall, 115kgs and can bench 6 heroin addicts so why are we worried about making them cranky. They should be worried about making me cranky. I can understand why they would be disappointed and perhaps even annoyed. Drugs are really, really expensive. That’s why whenever anyone offers me drugs, I always take them. There’s no way I could afford to buy my own.

While missing out on almost dying does make the average heroin addict upset, it is actually the hypoxic head that makes them cranky. The respiratory depression leads to acute hypoxia and a hypoxic head is a cranky head. A heroin addict that hasn’t taken a breath for 44 seconds is bound to be cranky. If it is safe and suitable to do so, wake them up after they have been ventilated for a few minutes. Reverse the hypoxia and they might be a lot more pleasant. Don’t expect a tip or a Christmas card but they won’t punch you in the nose either.

Interestingly, some of the more recent studies on naloxone reversal of narcotic overdose has found that the way the patient is spoken to before, during and after the administration of naloxone makes a massive difference to how aggressive they are(2). Being reassuring and positive in your communication as opposed to judgmental and negative can make a big difference. Slip in a little bag valve mask work as well and you may even make a new friend.

Lie 4. Pneumothorax will have Tracheal Deviation

When I first heard about tracheal deviation, it made sense. One lung has collapsed and the air filling that pleural space is now pushing the trachea over to one side. I could see that happening.

However, the plural space is a vacuum. It is at a slightly lower pressure than atmospheric pressure which is what creates the vacuum and causes the lungs to stick to the thoracic wall. A pneumothorax is when air is able to move into the plural space and a tension pneumothorax is when the air that has moved into this space has now caused the plural vacuum to fail. The plural space is now equal to or greater than atmospheric pressure. At this point, that lung is doing nothing and can only be inflated with positive pressure. This person is now officially sick.

The Journal of Clinical Diagnostic Reasoning printed an incredibly interesting case study of a pneumothorax with tracheal deviation. It was a 13yo female post RTC who was assessed and discharged after a chest Xray however, the patient had a pneumothorax that was missed. The patient re-presented a few hours later, and now had a tension pneumothorax with tracheal deviation. This girl was so sick by this stage that the lung was unable to be reinflated and an emergency thoracostomy was done which revealed a right main bronchus tear. The patient was sent to surgery to have the tear sutured closed and after a lengthy stay in hospital, she recovered.(3) This is obviously not something we can do on road and is a great example of how sick a patient with tracheal deviation is.

By the time we see this, the patient is way beyond a tension pneumothorax. In fact, it would be safe to assume that without a chest drain, the hypoxic patient now has so much thoracic pressure that venous return is now compromised as well. However, a chest Xray will see tracheal deviation but it will not be visible just by looking at the patient. Not until it is too late anyway. Delayed recognition of a pneumothorax has been linked to increasing mortality by between 31% and 91%.(4)

In my experience, hypoxic patients with reduced cardiac output tend to fall off the perch rapidly. Perhaps if we ever see tracheal deviation, we may need to give the needle decompression a miss and go straight to a finger thoracostomy. Following local clinical guidelines off course. Diagnosing a pneumothorax with tracheal deviation is like diagnosing pregnancy with a fully dilated cervix. Yes, that is a sign that you are definitely pregnant, but it would be nice to pick it up prior to this.

Lie 5. No one reads the paperwork

The fifth lie I was told as a student is one that drives me crazy. No one reads the paperwork. This is just wrong. The paperwork is read and read on more than one occasion. My partner is an emergency nurse and has read thousands of ambulance report forms. From the triage nurse, to the treatment nurse, to the emergency physician all the way to the ward nurse, the paperwork is read. Not every word but it is used as part of the patient records.

I know some paramedics that are great at paperwork and others, like myself, who are average at paperwork. I also see paperwork that is treated very differently to the patient. My partner tells me that when she would be on triage, she would get a hand over by the paramedics, then the paperwork would read completely different to what she was just told during the handover.

The strangest paperwork I ever read was by a crew that upset the patient's wife with their poor attitude so the wife told the paramedics that she wasn't happy and would make a complaint. Therefore, the paramedics wrote a report on the wife and very little was written about the patient.

Paramedics are notoriously poor at documentation. I have worked in an ED where I have written up the assessment of my patients and it is vastly different and more detailed than my paramedic paperwork. As it should be. Paramedics are not discharging a patient with a management plan or admitting a patient to a ward. Having said that, what we do document is just the basics. And that is fine, but we need to document the basics very well.

Let's look at a potential spinal injury as an example. We do that very well. We are trained to look after potential spinal injuries from day one of paramedic school. We know the NEXUS criteria. Some of us still know the Canadian C Spine Rules. That's the one where all patients over 65 years old get a collar. We all know how to do a thorough neurological examination. In most cases, paramedics are more than capable of ruling out C Spine injury on the vast majority of patients we collar. Problem is, we don't document it. I was able to find on old study on exactly this issue. The study reported that "Paramedics already assess most, if not all, of the criteria standard to C-spine clearance algorithms, but are inconsistent in their documentation of the presence or absence of all of the relevant findings." (5)

What I take home from that is we just have to write down the entire examination if it is relevant. And if your patient is in a collar, then a detailed neuro would be nice to have on the ambulance report. However, if your patient is presenting with a STEMI, a detailed neuro exam isn't import but a typical back pain would need a full neurological exam. I would like to add that it doesn't have to be full of fancy medical terms. Just make it easy to read and relatable. Doctors do this all the time so why shouldn't paramedics? Doctors don't say, "Mr Ward, we have just found a 13mm pheochromocytoma on your right adrenal gland". No, they say "Mr Ward, we found a grape sized growth near your kidney that we have to remove". Same thing. Both make sense to me but my dad would have no idea what the first one is and I would still have to clarify the second explanation to him as well. Doctors measure everything in fruit and veg. Grape, pea, apple and the big one, grapefruit. That's terminal. You want to hear them say grape but never grape-fruit.

Keep it simple, make sure the relevant information is detailed and don't ever think that no one will ever read the paperwork. The nurse, doctor, judge, defence lawyer or coroner may be reading it one day so make sure you only write down the facts.

So that's it folks, my five top lies I was told as a student. They were factually wrong, professional stupid and downright rubbish. In conclusion, lies suck. Follow the evidence and if you are unsure, don't repeat it, clarify it before you continue the endless cycle of clinical lies.

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Red, White and Grey: Is blood truly superior?

Words by Ali Rengers

Ask any clinician their thoughts on tissue reperfusion with crystalloids and you've opened a can of worms. Answers range from the black and white – "I would rather keep an actively bleeding patient's systolic BP (SBP) at 60mmHg with no fluids than give a litre of crystalloid" to the grey 'well… it depends'.

The recent trial by Crombie et al., compared the use of packed red blood cells (PRBC) and lyophilised (dried by freezing) plasma (LyoPlas) to 0.9% sodium chloride in improving tissue reperfusion and reducing mortality in the prehospital setting. The aim of their trial entitled "Resuscitation with blood products in patients with trauma-related haemorrhagic shock receiving prehospital care (RePHILL): a multicentre, open-label, randomised, controlled, phase 3 trial" was to determine if the blood products were in fact superior to the crystalloid in treating prehospital haemorrhagic shock. The study aimed to determine this by measuring mortality (death between injury and discharge from the primary receiving facility) and blood capillary lactate clearance (failure of this clearance was defined as less than 20% in the first two hours after the randomisation process began). Lactate in this instance is not lactic acid, but blood lactate; the waste product released from oxygen deprived tissues that requires recycling or oxidisation through the liver or other body tissues (2).

The current preferred choice for prehospital reperfusion of patients experiencing traumatic haemorrhage is with PRBC (3). According to Griggs et al., the administration of PRBC to civilian patients stemmed from its successful battlefield use in Afghanistan and Iraq (3). The goal of battlefield administered PRBC to traumatic haemorrhage patients was to restore haemoglobin concentration and moderate the possibility of acute traumatic coagulopathy (4). This type of coagulopathy is characterised by the patient's initial inability to clot, followed by excessive clotting causing an increased risk of thrombosis, and is one element of the 'lethal triad' of haemorrhagic shock (4, 5).

According to Crombie et al., although the use of PRBC and plasma in the prehospital environment seems intuitive, it has its drawbacks. Sustaining universal blood products, managing blood product wastage and compliance, safe and timely administration and identification of suitable patients in the prehospital setting all need consideration.

Based across four prehospital critical care services in the UK the study was a multicentre, phase three, allocation concealed, open-label, parallel group, randomised controlled trial. Now while this all seems very complex, broken into small chunks it is quite understandable. Phase

three denotes that the trial was undertaken to study the efficacy of the intervention compared to other standard or experimental interventions with a large group of individuals (6).

Allocation concealed involves separating the individual involved in recruiting patients from the randomisation process (7). Open label, also referred to as unblinded trial, allows the participants and researchers involved to know the treatments being used, while parallel group involves groups of patients observed for the same time after receiving different treatments. Finally, a randomised controlled trial involves participants being randomly distributed into groups with the non-control participants receiving the intervention and the control group receiving another treatment or placebo. So, the study was of a reasonable sample size with unbiased randomisation. The participants and researchers knew what the treatments being used were, however did not know who received which treatment over the same observation time. Essentially, a gold standard study.

Participants were included in the study if they were older than 16 years with a traumatic injury and hypotension (SBP less than 90mmHg or the absence of a radial pulse). Participants were excluded if they received prehospital blood products before being assessed for trial eligibility, were known to refuse prehospital blood products, were pregnant, had an isolated head injury without major haemorrhage, were prison inmates, or patients in traumatic cardiac arrest prior to arrival of the prehospital emergency team. A total of 432 participants were involved in the study with 209 randomly assigned to the blood product intervention group and 223 to the 0.9% sodium chloride group. Written informed consent was sought from the patient or their personal or professional representative after the emergency had passed.

The randomisation of PRBC/LyoPlas and 0.9% sodium chloride involved placing either product into sealed, externally identical, temperature monitored boxes. These boxes were then carried on emergency vehicles for up to 48 hours before replacement if unused. Blood products were then returned to the blood bank stock.

Intervention group participants were supplied with up to two units of PRBC and two units of LyoPlas during the trial. Boluses between 220mL – 340mL (mean = 282mL) of group O, rhesus factor D negative (the protein found on the outside of red blood cells (RBC)), Kell negative (the antigen attached to the membrane of RBC) leucodepleted (removal of granulocytes and lymphocytes) PRBC in an additive solution were administered to participants. LyoPlas (derived from blood group A or AB) was reconstituted in 200mL of water for injection (total bolus of 213mL) immediately prior to administration. One unit of PRBC was alternated with one unit of LyoPlas when administering the intervention to patients. The control group received a maximum of four, 250mL 0.9% sodium chloride boluses.

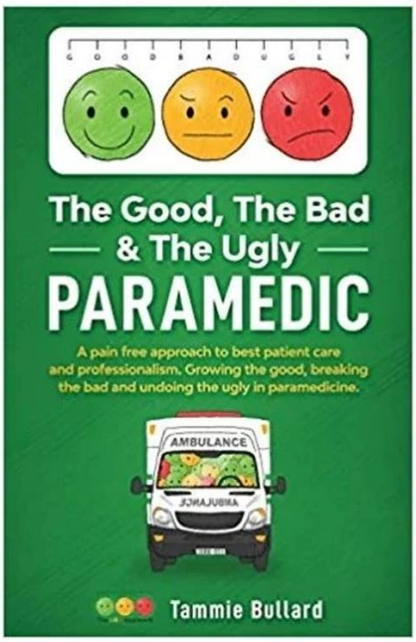
that work on road in the Ambulance Service in South Australia when they need it most. Time off work, injury rehab, psychological help (I know, we are not supposed to talk about that, hence we need it).

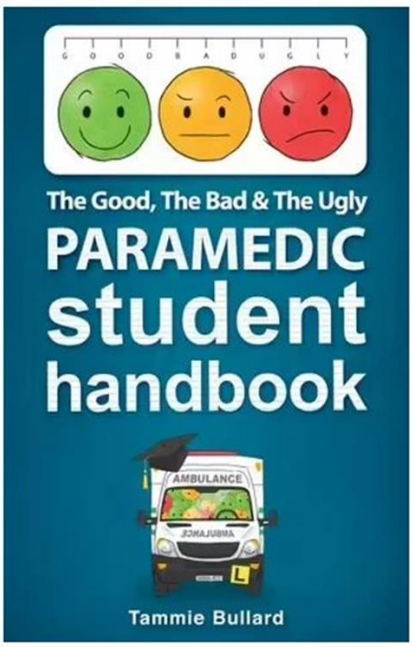
In both instances fluid delivery was administered with a fluid warmer, and interventions were dispensed until arrival at hospital or return of palpable radial pulse or a SBP of 90mmHg or greater. If treatment was ceased for any of these reasons and the participant's SBP decreased on the way to hospital, fluid administration was reinstated. If intervention participants received all four units of blood products and required further fluid replacement, non-trial 0.9% sodium chloride was administered.

Participants were mostly caucasian (62%) with a median age of 38 years. Road traffic collision accounted for 62% of major trauma. All patients were administered 430mL of crystalloid fluid and 90% tranexamic acid (TXA) prior to randomisation. Of the patients receiving PRBC/LyoPlas, 64% failed to clear lactate or died or both, while 65% of participants administered 0.9% sodium chloride also reached this primary outcome. Although the mean haemoglobin concentration was higher in patients receiving PRBC/LyoPlas on emergency department (ED) arrival, lactate concentrations, vital signs and 3 hour and 30-day mortality rates were similar across the PRBC/LyoPlas and 0.9% sodium chloride groups.

Patients receiving PRBC/LyoPlas experienced higher rates of respiratory, neurological, cardiovascular and liver failure when compared to their 0.9% sodium chloride receiving counterparts (58% vs. 52%; 63% vs. 57%; 67% vs. 62%; 9% vs. 5%). They also experienced higher rates of acute respiratory distress syndrome (ARDS) compared to the 0.9% sodium chloride group (6% vs. 2%). Failure to coagulate was higher in patient's receiving 0.9% sodium chloride than those receiving blood products (15% vs. 8%).

Infection rates were similar across both groups, however patients receiving 0.9% sodium chloride experienced higher levels of urinary tract infections (UTI) (8% vs. 4%), while PRBC/LyoPlas patients faced a higher incidence of soft tissue infection (25% vs. 15%). Transfusion related complications in the first 24 hours were similar across both groups (7%).





The use of blood products was overall higher in patients receiving PRBC/LyoPlas therapy. Based on the trial findings highlighted above, the monetary and logistical costs of prehospital blood product use may not be justified. Current European guidelines recommend that commencement of transfusion should occur when haemoglobin levels fall between 70-90g/L. Patients that received PRBC/LyoPlas were delivered to the ED with higher concentrations of haemoglobin (133g/L vs. 118g/L), however only 6% of individuals receiving 0.9% sodium chloride arrived at the ED with haemoglobin levels less than 80g/L.

Crombie et al. believe that the lack of demonstrated benefit of blood products may be due to several factors, including short patient transportation times to definitive care, use of lypophilised rather than fresh frozen plasma and enrolment of predominantly older participants in the study with higher injury severity.

Overall, the RePHILL trial did not demonstrate the superiority of PRBC/LyoPlas therapy over 0.9% sodium chloride in improving patient mortality or lactate clearance in prehospital haemorrhagic shock.

The RePHILL trial could have implications for major services nationally and internationally. According to the Queensland Ambulance Service (QAS) guidelines "early blood use is preferrable in haemorrhagic shock"8. Available blood products are to be administered using a warmer at a 1:1 ratio of PRBC to plasma (8), which sounds like an involved process in the prehospital setting. The New South Wales (NSW) Institute of Trauma and Injury Management state that the consensus believe the "early use of blood, if available, remains the optimal resuscitation fluid for the hypovolaemic patient" (9).

According to the RePHILL trial administration of blood products to patients experiencing traumatic haemorrhage in the prehospital setting does not improve patient mortality. Although further studies will need to be conducted to corroborate the findings of the RePHILL trial, the results are exciting and could influence evidence-based practice guidelines for prehospital treatment of haemorrhagic shock in the not-too-distant future.

The original article can be read here.

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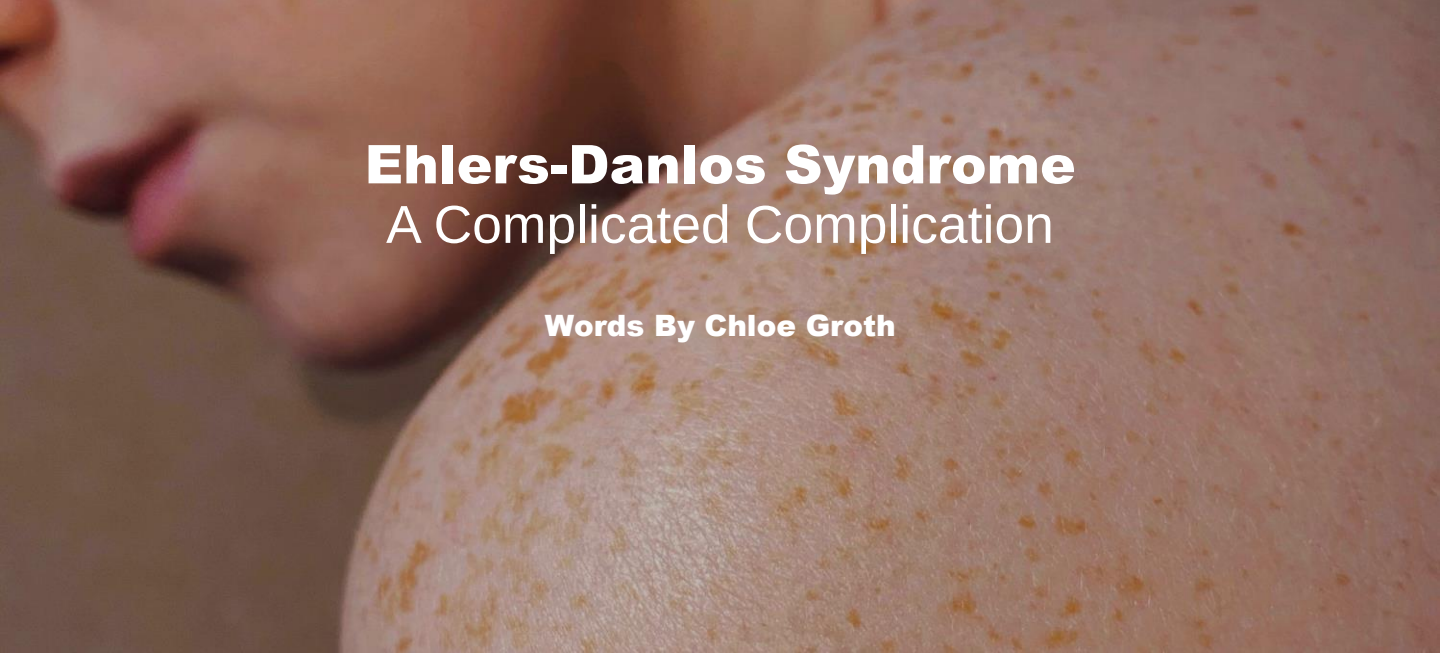

Ehlers-Danlos Syndrome
A Complicated Complication

Words By Chloe Groth

Ehlers-Danlos Syndrome (EDS) may cause cardiac complications far more than what is often perceived. What is it and why is it a condition that isn't well understood or researched in cases of traumatic injuries? With significant effects to mobility and organ functionality, his condition needs to be further highlighted in the pre-hospital setting.

EDS is a genitive connective tissue disorder which affects collagen formation and function within the body. This can then affect multiple organ systems. Several complications may arise with this syndrome such as joint dislocations, chronic pain, fatigue, arterial ruptures, and organ ruptures (1). In addition to this, research has also shown links between acute cardiogenic pulmonary oedema and pneumothorax or hemothorax are other potential and pre-existing complications associated with EDS (2,3). However, this could be seen as a limitation due to the lack of evidence, presentation, and epidemiology of such a complication. This is understandable as there are 13 subtypes of EDS. Some of these subtypes include Classical EDS (cEDS), Classical-like EDS (clEDS), Cardiac-valvular (cvEDS), and vascular EDS (vEDS).

Case Study

An 18-year-old male patient that presented as pale diaphoretic, and SOB following blunt force trauma to the thoracic area. There is myriad of other differential diagnosis for this patient, such as pneumothorax, tension pneumothorax, fractured ribs, and pulmonary contusions. The list can go on without further diagnostics. For me, this patient was suffering from an acute cardiogenic pulmonary oedema. The patients' vitals consisted of HR 145-150bpm, BP - 74/40weak bilateral radial pulses, SPO2 84%, wheezes/ crackles in the left lower lobes, abnormal heart sound 3, pale, cool temp of 35, diaphoretic, chest pain described as heaviness and tight, SOB, diaphragmatic breathing, ECG - tachycardic and T-wave inversions. The t-wave inversions were noted as previous hx changes in the patient's ECG's. In alignment with the presenting trauma, abrasions to the patient's chest, arm and back were noted. There were no obvious deformities to the thoracic, abdomen, shoulders, neck or arms. After a conversation with the patients mother who was on scene she stated that there was a note of previous wandering atrial pacemaker events that were not

captured adequately to be diagnosed as yet with specific ECG changes of T-wave depression.

The initial management of this patient consisted of oxygen therapy at 10L/min (SPO2 increasing to 94%), IV access for morphine and fluids administration which was consulted due to the patients deteriorating BP and primary diagnosis of pulmonary oedema. The potential to exacerbate the patients BP and possible pulmonary oedema was taken into consideration. Therefore, treatment was done slowly and with continuous reassessments, especially chest auscultations.

The patient was then transferred over to an Ambulance Service for transportation to the closet trauma hospital for further assessment and management.

The understanding of the presenting case suggests that blunt force trauma had resulted in thoracic injuries such as pulmonary contusion, diaphragmatic injuries, myocardial injury and thoracic aortic disruption. With many risks factors that may affect the morbidity and mortality in blunt chest trauma such as age and pre-existing conditions such as connective tissue disorders (4). It is unclear whether the trauma resulted in heart failure causing contusion of the myocardial muscles, rupture of a cardiac chamber of disruption of heart valves or vessels (5) which could be seen to have increased the progressiveness of the patients symptoms due to the frailty of the patient's EDS affected myocardium. A follow up and further research would be necessary to clarify this. It should also be noted that poor vascular tone, inability to maintain pressure, and limited vascular tone resulted in further deterioration of the patient. Without adequate knowledge of the complications that can occur with EDS, it would be unclear if the patient would have deteriorated more quickly, nor the potential changes to the patient's outcome. Finally, there may be links to possible acute and chronic aortic regurgitation with connective tissue disorders. This may cause symptoms of pulmonary oedema, arrhythmias, and heart failure, all of which could be part of the patient's diagnosis for the presenting complaint (6).

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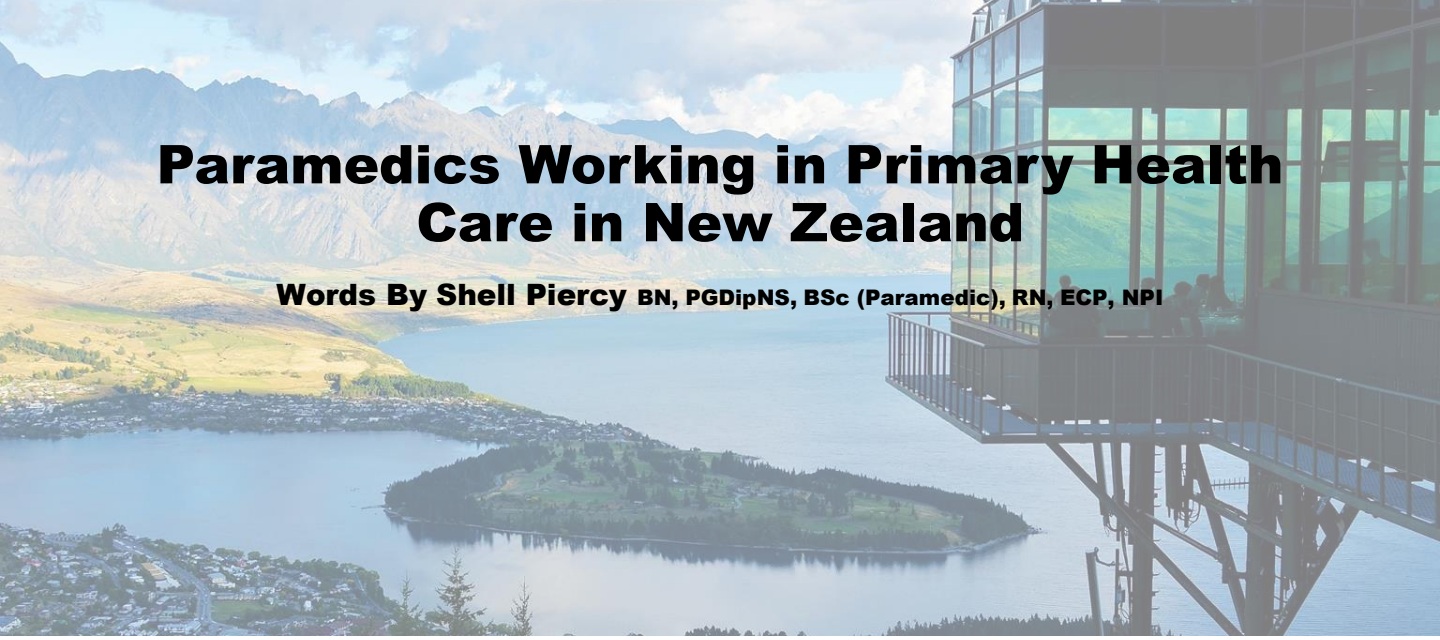


Paramedics Working in Primary Health Care in New Zealand

Words By Shell Piercy BN, PGDipNS, BSc (Paramedic), RN, ECP, NPI

In 2020, a group of pioneering paramedics in New Zealand began establishing opportunities to support better patient outcomes in areas outside of ambulance services. Specifically they set to work in district health board emergency departments, urgent care clinics, general practice, and rural and remote clinics. However, the transition for paramedics from ambulance services to any of these areas is not without its challenges. Fighting for recognition and equal funding is one of the many barrier's paramedics face. Currently in New Zealand, the Accident Compensation Corporation (ACC) funds ambulance services via bulk funding. Within urgent care, general practice and rural general practice, funding is given per patient based on time and services rendered. In the ACC legislation, paramedics are not specified as providers, hence cannot access this funding. From the aforementioned areas of health, providers in the ACC schedules are listed as medical practitioners, nurse practitioners, registered nurses and enrolled nurses. The same applies for general medical services funding from the Ministry of Health. Typically, an enrolled patient will be funded for non-accident illness through bulk funding called capitation. Non enrolled patients will be funded for the visit. Paramedics cannot currently claim for this funding either. The GMS funding is for medical practitioners and Nurse practitioners only. In saying this, nurse practitioners had to overcome their own obstacles to access this funding as well.

Ironically, paramedics are perfectly suited to acute, chronic and urgent care. For example, urgent care patients and acute patients presenting to general practice and rural general practice are often not enrolled patients. The small group of advanced and extended care paramedics that currently work in these areas are working together with the support of two, physician-based colleges in these areas. This bridges the gaps and allows access to funding.

As many are not willing to admit, we have a health work force crisis. On the ground, nursing staff are light, there are not enough doctors, and patients are waiting for extended periods of time to access appropriate healthcare. It is important to remember that we are here for the patients. Our focus must be on patient care and the best outcomes for them.

Other challenges facing paramedics that are stepping away from ambulance services, are understanding the standards and legislation for the specific area they are working in.

Some of these standards and legislations include: 'The standard for Urgent care 2015 and the quality programmes of 'Foundation' and 'Cornerstone' for General Practice. Within this legislation and industry standards there are also education and training requirements that are different to current requirements for Paramedics within ambulance services such asACLS qualifications, ATS triage qualifications and standing order qualifications etc.

Understanding the standards for each of the healthcare sectors is vital to ensure paramedics and registered nurses are working safely within them. 'The standard 2015',for example, stipulates the type of triage assessment needed within urgent care and what qualification the person conducting triage needs. Education platforms like Ace Hub are working hard to ensure this type of education is accessible and affordable for all.

Utilising Paramedics outside of the comfort and security of ambulance services in New Zealand requires a robust set of standing orders. The MoH provides guidance on the specific details of how Registered Nurses and Registered Paramedics can utilize these orders. These orders explain in detail, the skills, medication for administration and supply. Competence is proven as per the MoH guideline. This constitutes the paramedics Authority To Practice (ATP). Unlike the robust ATP and CPG systems within ambulance services in NZ, it is hard to imagine that every clinic's medical director will want to establish their own standing orders and manage the extent of assessment of competence required. Therefore, collaboration is going to be key. The risk is health care professionals not understanding each other's scope of practice, not having an understanding of audit processes, and unclear competence assessments. We must work together to raise the profession of paramedicine outside of ambulance services and ensure our new frontier does not become the wild west.

The goal here is to reduce patients needing ambulance services, reduce emergency department admissions, offload overly stretched medical colleagues, while supporting better outcomes for patients.

I have worked for several years in both ambulance services and emergency departments. No matter how hard I worked, I could never improve anything other than the experience of my individual patients. So I stepped aside , took a broader view of the situation and dove head first into health work force change management. My current role is to support healthcare providers improve patient outcomes by changing the way the health work force is utilized. This includes supporting healthcare practices with education, CPG's, policies, procedures, standing orders, procedures for assessment of competence, and utilizing extended scopes in both nursing and paramedicine. I also aid the transition from ambulance services into the world of primary health care acute service. This is done with educational support for extended scope paramedics and nurses.

So how do we change the current paradigm?

Now, I am not an authority on this subject, I am just a one-woman crusade to ensure health work force management is given a broader view within New Zealand. So, let's take off the blinkers, lets understand the scopes and limitations of our multi-disciplinary team, let's work together to be the best evidenced based clinicians we can be, and let's aim to work at the top of our scopes with currency and competence and without ego. Reflect and develop with excellent professional practice to ensure equity in health care and better patient outcomes are available for all patients.

Do Paramedics Need Empathy?

Words By Steve Sunny Whitfield

Last year I was in our backyard mud-kitchen with my son when my wife called for me. She said that one of our neighbours was at our front door asking for me. I tiptoed through the house to the front door trying delicately (and not successfully) to limit the mud on the floor when I saw June (name changed). She was an elderly resident from three houses down and she looked rather shaken.

As I opened the door and greeted her she looked down sorrowfully. “Jim’s fallen over and he is not speaking to me” she said flatly. I didn’t know Jim that well, or June for that matter, but we had exchanged friendly waves while living on the same street. She had seen the ambulance parked outside our home whenever I was on-call so she had come seeking some help.

‘Have you called an ambulance?” I asked her but she just looked down and shook her head.

“Its ok, call an ambulance and Ill get my shoes on and come with you.”

At her house I found Jim, pale, cyanosed and pulseless. I explained to June that Jim’s heart had stopped and that I would provide cardiac compressions until the ambulance arrived. I knelt down next to him and began squeezing blood around his body with every compression.

June just sat silently watching me while she observed her husband of over fifty years lying motionless and lifeless. I had no gloves on and no equipment so I was providing the most basics of basic life support until I heard the wonderful scream of a siren. I knew that the crew would have gear and equipment and I would soon be relieved. When the crew walked in, I knew them. Damo and Clare were colleagues of mine. They also had a student observer with them whom I didn’t know who they put straight to work relieving me. While the student worked away on the chest, Clare leaned over and handed me the defibrillator pads which allowed her to assist Damo with the airway.

Jim was provided the very best care possible however following several rotations and several cycles of resuscitative efforts, the decision was made to call the case. Both Damien and I explained to June that despite all of our best efforts, she would need to prepare herself to say goodbye to Jim. The police arrived soon after and I bid farewell

to the crew before walking back home. As I approached my house my wife was standing outside looking alarmed. There were two ambulances, two police cars, and her husband walking away from the scene in muddy clothes. “What happened” she asked me as I took my shoes off. “Jimbo died” I replied without a trace of emotion.

There was a momentary silence so I looked up and saw that my wife looked horrified. Whoops.

Upon later reflection back at the mud kitchen, I realised how callous my answer would have sounded but that was the only way I could describe it. Jimbo had died. It’s what people do when you work in a reasonably chaotic environment such as paramedic practice. It’s not that people died all the time, but as a paramedic you are exposed to life altering moments far more than a normal person. But normal was where I had started in my student days like so many others. Now, years later something inside me had obviously changed.

Was I to callous? I didn’t think I was uncaring… Did I have any empathy? I thought I did but part of surviving this kind of work is the learning how and when to switch your emotions off. Although we get it wrong sometimes I thought I had a good handle on this trick because I had long learned that emotions were often unhelpful in situations like that afternoon. I just wanted to get back to the backyard with my son, resume my day off and be normal again. I sat there perplexed.

The ambulances soon departed June’s house, the police departed our street and poor old Jimbo departed this world. But I was still fairly unfazed.

Do You Remember Empathy and Compassion?

Compassion and empathy will make you a patient advocate and a good paramedic, but too much could also be the reason you suffer a break-down or end up leaving the profession. Where sympathy is a shared feelings of another; empathy is when you understand the feelings of another but do not necessarily share them. In other words, sympathy is a statement of emotional concern whereas empathy reflects emotional understanding. Did I have either anymore? During my student paramedic days some of my clinical instructors had stressed the importance of maintaining empathy yet others had stressed that an emotional separation was key to survival.

I had joined the paramedic profession because I wanted to care for people, yet here I was having just attempted to resuscitate a neighbour without an emotion in the world. I had changed somewhere, and I wondered which side of the equation was where I was meant to be.

Researchers investigating this paradox have explored the purpose of empathy in healthcare and discovered conflicting results. The notion that a health care professional requires genuine empathy to provide best care to each patient is in direct comparison with the opposite notion that a health care professional is able to best care for their patients by remaining clinically detached. That is, by not becoming emotionally involved with patients, the debate claims that emotional separation will enable the clinician to make objective decisions concerning their patient care, and they will experience longevity in their career.

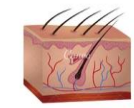
I believe that paramedics are always striving to provide the best care possible to their patients, but they are also trying to survive. Most paramedics get into this career due to an above average level of empathy and compassion, yet everyone will approach their clinical practice differently. This will no doubt be informed by their previous experiences. Sitting there in the mud with my son I realised that although I may be perceived to lack some empathy these days, the emotional separation clears my mind of clutter and permits me to navigate some high stress situations, thus do my job at work and at home. The emotional separation has also allowed me to survive mentally. That said, we still care for humans and its someone's family member in our charge so a little bit of empathy will keep us human.

#can you feel it

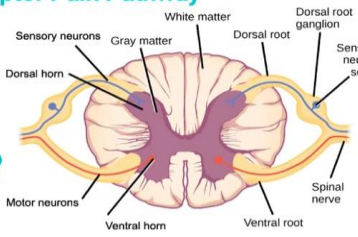
Pain in the A**

Designed and Written by : Oliver Henry Lubberink

Pathophysiology : The Nociceptor Pain Pathway

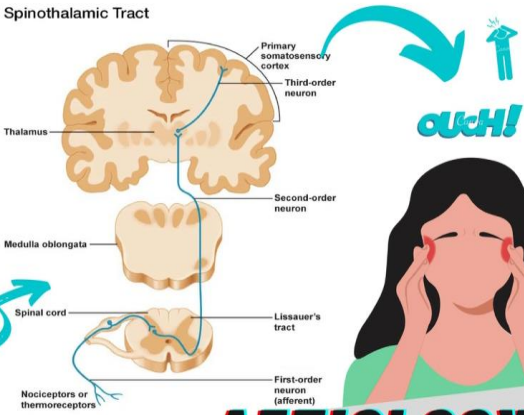


Peripheral Nociceptors



Cross Section of Spinal Cord

1st Order Neuron (Afferent)



AETIOLOGY?

Pain is a great diagnostic tool and understanding the causality of pain is important in establishing a competent survey and improving the efficacy of treatment in the prehospital setting.

Nociceptors, peripheral sensory neurons are part of the most common pain pathway, these nerve endings are located in the skin, muscles, joints, bone and viscera. Through detecting temperature, pressure and injury-related chemicals, nociceptors utilise transient receptor potential channels (TRP) to identify inflammation and tissue injury stimulating the corresponding homunculus component of the somatosensory cortex, via the spinothalamic tract (Cervero, 2012; Dubin & Patapoutian, 2010).

NEUROPATHIC?

Neuropathic pain? Caused typically from a lesion or disease of the somatosensory system. E.g. a nerve lesion induced by virus infection or diabetes. Neuropathic pain can lead to multiple positive and negative somatosensory signs; thermal and mechanical hyperalgesia, allodynia, hypoesthesia and hypoalgesia (Bond et al., 2006; Hansson, 2002; Maier et al., 2010; Shaygan et al., 2013).

PSYCHOGENIC?

Psychogenic Pain ? Neuroscience, still in its infancy, leaves us with no structural causes that can identify psychogenic pain. The mechanism proposed is psychological trauma and the suppression of painful emotions. Neuro-physiologically, unconscious stimuli that light up the locus coeruleus, increase adrenaline arousing the amygdala. The nociceptors in the central nucleus of the amygdala, are involved in the production of pain (Atarodi, 2010; Toda, 2007).

NOCICEPTOR?

MANAGEMENT PLAN?

Unfortunately, it has been shown that we can undertreat pain (Haley et al., 2016; Lord, 2004). So it's important we develop even more effective protocols and strategies to continue to remedy this systemic problem.

HAVE YOU DONE YOUR:

- ONSET
- PROVOCATION
- QUALITY
- RADIATION
- SEVERITY
- TIMING
- TREATMENT

What were you doing when the pain started? Did it come on suddenly, gradually or part of an ongoing chronic problem? Where is the Pain? Describe the Pain? Does it move anywhere? When did it start ? Does it come and go? Have tried to treat the pain or taken anything ?

SO WHATS THE ANTIDOTE?

Evidence based clinical practice guidelines (Lord, 2004). A great example of a QAS clinical practice guideline is the OPQRST.

CLINICAL FEATURES

Pain causes an inflammatory cascade, releasing bradykinin, histamine, serotonin, neutrophins and prostaglandins. Exciting nociceptors (Garland, 2012).

In addition the sympathetic nervous system is stimulated, leading to the release of nor-adrenaline. Increasing: HR, BP, peripheral vasoconstriction, RR, nausea, anxiety and the galvanic skin response.

SO WHAT IS PAIN?

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Cohen et al., 2018).

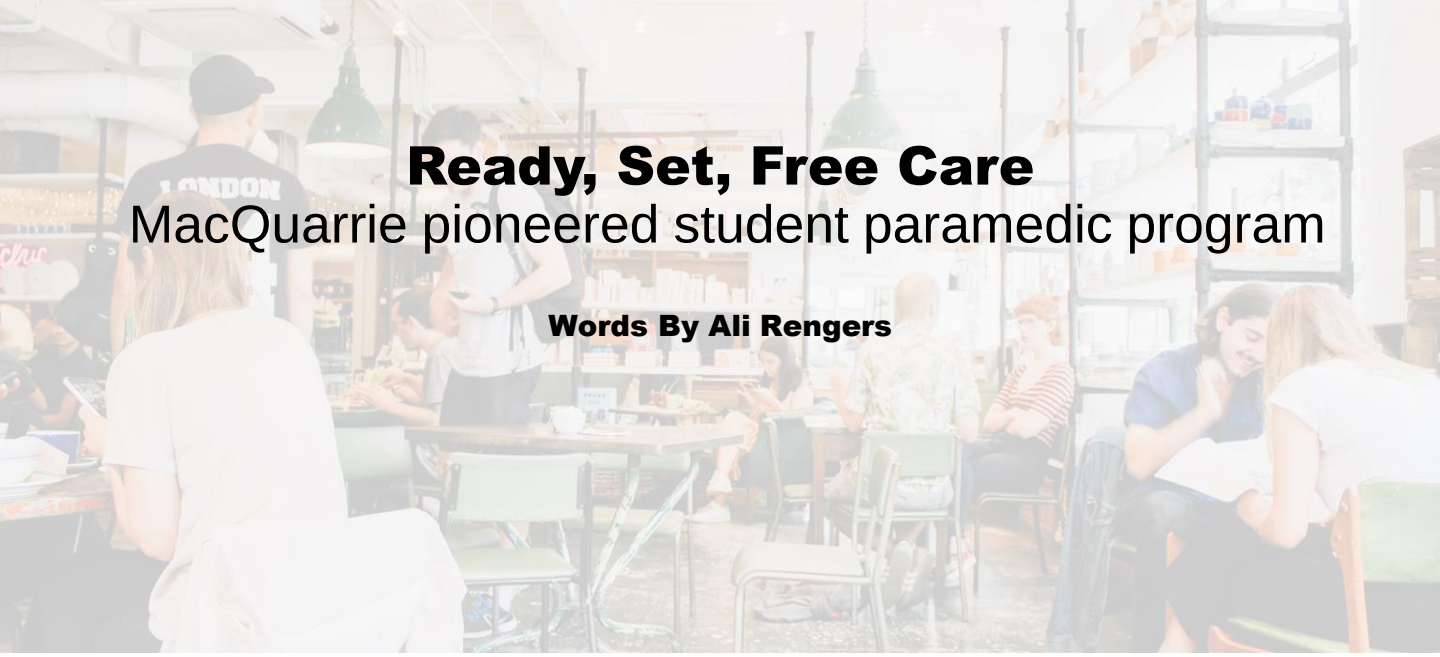
C Nerve fibres : Burning pain that continues after the cessation of the stimulus

Pain located in the viscera and muscles can stimulate cardiac vagal premotor neurons, causing hypotension, brady cardia and hypo-reactivity to the environment (Benarroch, 2006; Garland, 2012).

Stress and negative emotions like anger and fear may limit noradrenaline release, although once the fight or flight response dominates, it can increase blood flow to the muscle or effected vasculature, aggravating the original injury, or increasing blood loss (Garland, 2012).

Aδ Nerve fibres : An experience of a sharp, prickling pain.

CHRONIC OR ACUTE?



Ready, Set, Free Care

MacQuarrie pioneered student paramedic program

Words By Ali Rengers

Imagine a student paramedic placement program that not only offers students the opportunity to experience frontline health care, but it also provides a primary link for vulnerable people to access basic health assessments. We present a MacQuarrie pioneered student paramedic program administering health checks at a local community hub, benefitting student paramedics and clients alike.

Founded by Edith and Mal Kennedy the Set Free Care Community Hub, located on the Gold Coast, Australia, is a drop-in centre designed to provide a supportive and safe environment for vulnerable members of the Gold Coast community. Set Free Care is a charity that aims to make a difference in the lives they support through the provision of basic human necessities including meals, showers, community connections, referrals and togetherness1.

Student paramedic involvement with Set Free Care was pioneered by Griffith University Senior Lecturer Dr Sandy MacQuarrie, in January of 2021. His friendship with Edith and Mal and recognition of their passion, hope and goals for Set Free Care sent his mind into action. Dr MacQuarrie believed that student paramedic involvement with the clients at Set Free Care would not only benefit the health of those individuals, but also the experience of the student paramedics, and he was prompted to set up a meeting with the founders. On the morning of his meeting, as he stepped through the door, a Set Free Care volunteer was bitten by a dog and his skills as a paramedic were required. The patient was well taken care of and Dr MacQuarrie's case for the care that student paramedics could offer the individuals at Set Free Care was made for him. After further discussion with the founders and paramedicine program staff, and a thorough restocking of the extremely understocked Set Free Care first aid kit, Set Free Care Placement for student paramedics was born.

Set Free Care Placement is a unique Australian paramedic educational program. Each week on Tuesday and Friday between four to six Griffith University student paramedics meet a paramedic sessional or lecturer from Griffith University at Set Free Care. Over a period of three hours, under the supervision of the registered paramedic, the students offer free health checks to clients using the same basic diagnostic equipment they have encountered in their studies and on ambulance placements. Clients may wish to have a student

paramedic capture an ECG of their heart, check their blood sugar levels or may prefer to have a discussion about the difficulties they are facing in their life. It is up to the clients.

Dr MacQuarrie believes the rich interactions between clients and student paramedics and the ability for these students to talk with someone who is 'travelling rough' is extremely valuable. As one of those student paramedics who was fortunate to be involved since 2021 I can attest to the richness of the interactions between myself and the clients.

While classroom learning is necessary to acquire the skills required to be a paramedic it can never truly prepare you to talk with someone from a completely different background or walk of life. Assessing a non-speaking, non-moving plastic mannequin during a university scenario is planets away from discussing and treating a laceration on a client's foot at Set Free Care Placement. Working in the operational environment that is Set Free Care Placement fosters responsibility and independence, both qualities that are required in paramedic professional roles2. Studies have shown that student clinical skills improved significantly during clinical placements in a supportive atmosphere with positive student-instructor relationships2. The program is conducted to make you feel that the client you are talking to or assessing is in your care while the supervising registered paramedic sessional or lecturer is there to assist when required or asked. Interactions with real patients who have health issues and problems enables students to transition their classroom learning to the real world, preparing them for ambulance placement and their future careers.

Clients of Set Free Care benefit from the student paramedic-client interaction as they have their medical needs more easily assessed and met in the security of the familiar space that is the Set Free Care Community Hub. A table with some basic monitoring and diagnostic equipment is set up in a corner of the community hub with chairs placed around it to encourage clients to sit in if they wish to be assessed. Student paramedics are heartily encouraged to introduce themselves and not turn the monitor on or open a medical kit until they have explored what has brought the client to visit them. This ensures that the clients are listened to by the student paramedics to help build rapport and foster trust between the two parties before any clinical work takes place.

The Set Free Care Placements I have attended as a student paramedic during my degree have had personal benefit. In one instance I talked with a tense client about her current living situation, and she shared with me her concerns regarding her mental health. Her willingness to open up to me meant I was able to refer her to a phone counselling service that was both convenient and accessible. To me, providing a phone number for a referral is no huge feat, however to her it was the world and she asked and gave me a huge hug when leaving the community hub that day. During the debrief of the placement session I realised her delight over the phone number was really relief at having unburdened herself of her concerns and her gratefulness that someone was willing to listen to and try to help her. It is well known that big actions such getting an IV in or putting a pelvic binder on a patient can make a life-or-death difference. However, in this fast moving, unpredictable and sometimes callous prehospital setting, it is imperative to remember that small actions, such as actively listening and acknowledging a patient, can make a world of difference to their receptiveness to receive healthcare and trust healthcare providers.

The future of paramedicine is and will always be forever changing. Pioneering programs such as the Set Free Care Placement designed and implemented by Dr Sandy MacQuarrie benefit students and clients alike. More work to replicate similar support programs, and more research to improve such programs can only improve health outcomes for people, and better prepare our future paramedics.

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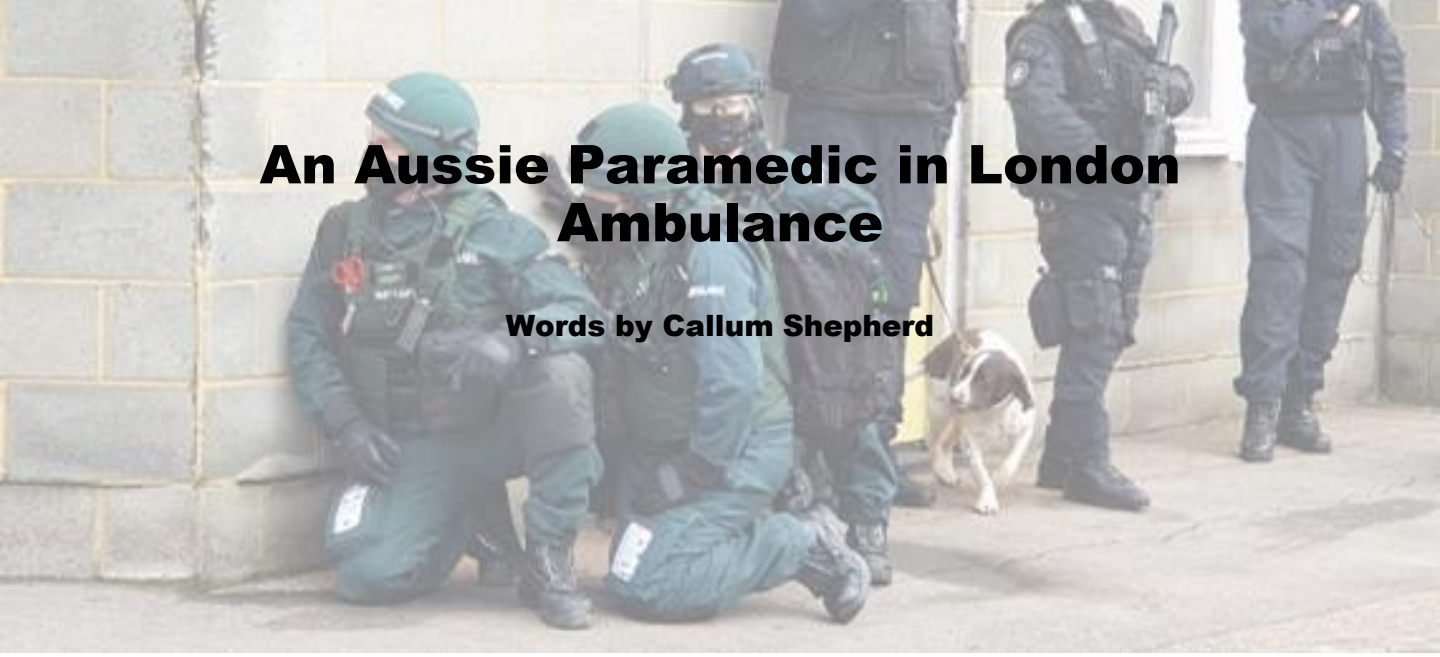

An Aussie Paramedic in London Ambulance

Words by Callum Shepherd

In early 2015, I had just started my final year of studies in Monash University's Bachelor of Emergency Health and Paramedic Practice. Like many 3rd year students, this was a daunting time. I remember sitting in a lecture theatre where everyone was discussing their future career plans and like most people, I only had really considered jobs in Australia.

I had never considered leaving Melbourne for work, nor moving overseas, until one of our lecturers sent out an email saying that London Ambulance Service (LAS) NHS Trust was coming to Melbourne on a recruitment drive. This was the start of my journey into an unknown. I applied to LAS for a Paramedic position at 20 years old whilst in my final year of university. Now bearing in mind, I was living at home with my parents, I had never cooked my own meals (thanks Mum!), I had also never done my own washing (…thanks Mum!) and I had never worked as a paramedic before. So, I would like to thank my 20-year-old naivety (and my incredibly supportive parents) for letting me move to the other side of the earth to live in a foreign country and do a job I'd never done before. The good news is – I was successful at the assessment centre, and I am still here 6.5 years later!

The interview and assessment process for LAS was fairly straight forward and I was offered a job within the same week. I then started applying for my Health and Care Practitioners Council (HCPC) Paramedic registration, as this is the governing body for paramedicine within the United Kingdom. If anyone is looking to move to the UK, my advice with HCPC registration is to start the process early! You'll need lots of information around your university courses and/or experience, including subject outlines, learning objectives, assignment summaries and more – so I'd recommend trying to collate these throughout your studies.

After an emotional goodbye to my friends and family, I hopped on a plane to London in February 2016 with a few of my mates from university. I was lucky enough that two of my best mates came to London with me and we all ended up working at the same station, so this made the move a lot easier. The first few days in London were a complete whirlwind – opening bank accounts, trying to read the London Underground Tube map, looking for rental properties in areas that I didn't know, signing phone contracts, getting a GP, visiting Buckingham Palace – the list goes on and on!

I started my induction course with 19 other Australian graduates that had also decided to make the move to London. We spent 4 weeks in the classroom, learning the UK ambulance guidelines and undertaking different types of theoretical and practical assessments. I really enjoyed my induction period, as I started to build a support network, learn about the UK and forge some incredible friendships. After 4 weeks of induction, we were released into London, where we undertook 8 weeks of mentoring. Yes, you read that right – 8 weeks. The good news – this has been changed, and now all Newly Qualified Paramedics undertake 6 months of 1 to 1 mentoring with an experienced paramedic.

What is it like in LAS?

London Ambulance Service NHS Trust is one of the busiest ambulance services in the world. To put it into numbers, LAS answered 2.1 million emergency 999 calls and a further 2.1 million urgent/non-emergency 111 calls in 2021. One of my favourite aspects of LAS are the opportunities that exist – you don't have to be a paramedic working on an ambulance. In my 6 years, I've worked across solo responding cars, the bicycle response unit, as a mentor on ambulances, within the ambulance control room as a clinical advisor and now as a Hazardous Area Response Team (HART) Paramedic Training Officer. There are other roles that exist in London for paramedics, including management roles, Advanced Paramedics in Critical Care and Urgent Care, the Mental Health Response Car, Tactical Response Unit (Police Jobs), Motorcycle Paramedics and the Helicopter Emergency Medical Service (HEMS).

Outside of LAS, Paramedics work in many different capacities here in the National Health Service and the United Kingdom. I have friends that work in hospitals and GP surgeries as Paramedic Practitioners (similar to Nurse Practitioners) and as Advanced Clinical Practitioners (ACPs) which are paramedics that have independent prescribing rights that work to a similar scope of practice as a specialty trainee doctor. Additionally, there are also lots of roles within tertiary education, telephone assessment services and community response teams.

What is it like working overseas?

I've been abroad for over 6 years now and I am still loving it. Due to the flexible nature of shift work, I have been able to travel around 50 countries prior to the COVID-19 pandemic. Living away from home is challenging at times, but the life experience of trying something new is definitely worth it.

If you're considering moving abroad – I can strongly recommend the UK. The UK is a great place to live and there is a high level of exposure to true paramedicine. Depending on the lifestyle that you want, there are many big cities (i.e. London, Manchester, Leeds, Birmingham, Brighton) and many small coastal towns and villages. The various NHS ambulance services (along with the private sectors) are virtually always recruiting for paramedics, and if you look at the right time, you could even get relocation expenses to assist you in moving from Australia to the UK.

The UK is also right on the doorstep of Europe and North Africa, so the travel options are endless. If you search at the right time, you can get flights for as little as $15-20 AUD to lots of different countries in Europe. As paramedics are mainly shift workers, I normally work 4 days on and then try to travel in my 4 days off. The beaches of Spain, the Swiss alps, the Italian wineries, Croatia's Mediterranean coast and the cheap Polish beers are all within a 3-hour flight of London. Additionally, many of my colleagues and friends enjoy travelling as well, so there is always a trip that I can tag along to if needed. For anyone considering moving overseas – I'd strongly recommend it! Australia will always be there and it's only a short 24-hour flight away!

Students as Stakeholders

Words by Ali Rengers

Earlier this year the Australian Tactical Medicine Association (ATMA) Conference was held in Brisbane from the 14th to 16th of September. Ten third year Paramedicine students from Griffith University on the Gold Coast worked as volunteers for the event. This volunteer role saw the students initially assist with setting up for the conference and then assisting on the day. On the Wednesday the 14th the student volunteers packed over 350 satchels and organised the lanyards for the conference attendees. Later that afternoon the student volunteers checked the conference attendees in, ready for the next two days. From the Thursday 15th to Friday 16th the student volunteers continue to help check in the conference attendees and ran the merchandise table. There was plenty of time for the student volunteers to walk around the different booths and attend any sessions they wanted to listen to. They rostered themselves using the daily program to ensure someone was running the merchandise table at all times. The evening of the 15th the student volunteers were invited by members of the ATMA board to attend the networking event, which was an enjoyable few hours. Overall, the student volunteers felt incredibly valued by everyone at the event (not made to feel like students or volunteers at all) and enjoyed the three days immensely.

Photo Credit: The Australia Tactical Medicine Association.

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Dare to Know Student Paramedic Research Conference 2022

We would like to invite you all to join us for the annual Dare to Know (D2K) conference

Date: Monday 26th September 2022
09:00 – 16:00

There are 2 ways to attend:

In person at Charles Sturt University, Bathurst, NSW
or
Online Webinar

Please register via: Eventbrite

About Us:

D2K is a unique annual Paramedicine Research conference created by Charles Sturt University students. The conference supports students and encourages student-led research topics as well as including academic and industry guest speakers. The conference is free to attend and open to all students and paramedics.

PARAMEDICINE in FOCUS
‘Flooded’

Photo by: Steve Sunny Whitfield

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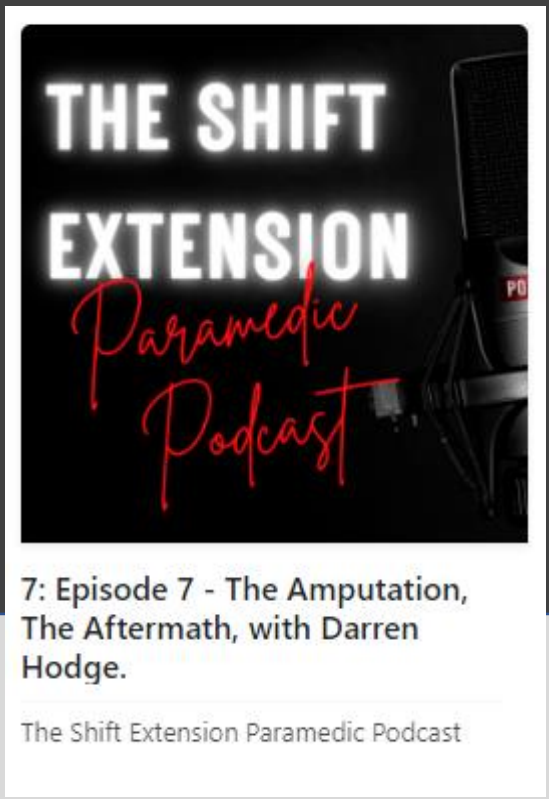

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