

Katherine Wills

OUTDOOR FIRST AID

2ND EDITION



A PRACTICAL MANUAL

ESSENTIAL KNOWLEDGE FOR OUTDOOR ENTHUSIASTS



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2ND EDITION



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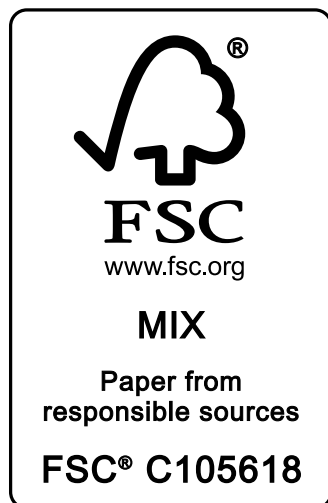
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PREFACE

When I started teaching first aid to people who work or play in the outdoors, I wanted to give the candidates a reading list which would help them to expand their knowledge of first aid skills in the remote setting. I soon realised there were very few books that covered basic remote first aid, and those that did were either produced in other countries – and had some strange approaches to certain treatments – or were too medically-orientated. They covered topics on high altitude, the administration of drugs (that the average person couldn't and in some cases shouldn't possess), and talked about weird and wonderful creatures which simply don't exist in the UK. Their use of the term 'Wilderness First Aid' often referred to casualties who were several days, if not weeks, from further medical assistance, and as such advocated treatments and 'rescue techniques' which seemed quite inappropriate and out of place in our UK mountain environment.

When I wrote the first edition of **Outdoor First Aid** I wanted to present basic first aid principles geared specifically towards use in the UK mountains. As an advanced first aider with the Llanberis Mountain Rescue Team I used my own experiences over many years to highlight the challenges of doing first aid in the outdoors.

In the second edition of the book not only have I brought the treatment protocols up to date but I have also broadened the concept of rescue to include not just Mountain Rescue, but also guidance on working with the Coastguard, when the emergency is at sea, and Fire and Rescue services during inland waterway emergencies. This edition also brings the trauma casualty assessment up to date with the <C> ABC approach and the new pre hospital assessment of the levels of response AcVPU. There is also an extended look at the drowning casualty, along with immersion hypothermia, and up to date guidance on dealing with catastrophic bleeds and spinal injuries.

To keep **Outdoor First Aid** as basic as possible I have used straightforward terminology and tried to avoid medical jargon. It includes first hand accounts

from real people who have experienced the need for first aid in the outdoors. It is as relevant to the novice as it is to the more 'seasoned' first aider; from the lone adventure to the group leader, whatever the land-based activity.

Unlike urban first aid books, this one includes an alternative **remote casualty assessment**, in which the first aider is introduced to the concept of evacuating a casualty themselves or, if necessary, summoning medical help to their location (e.g. calling for mountain rescue). With this in mind, I have included chapters on 'Moving and Carrying a Casualty' and 'Working with Rescue Services'. I wanted to show that it is possible for people to deal with certain injuries and illnesses in the outdoors, and get themselves safely back to civilisation; not every incident necessitates an emergency response.

On those rare occasions, when there is a genuine need to dial 999/112, the information and advice given guides the first aider towards providing the best possible care within the remote setting and crucially what information should be passed on to the rescue services.

When I started out I asked myself one question. "What kind of first aid book would I have wanted to read, all those years ago, before I started taking part in outdoor activities?" I think the answer to that question is "This one!"

WARNING

The authors and the publisher have made every effort to ensure that the information is as accurate and up-to-date as possible. Therefore, except for any liability which cannot be excluded by law, neither Pesda Press nor the authors accept liability for damage of any nature arising directly or indirectly from the information in this book.

Readers are advised that this book should be used in conjunction with the training provided on a suitable first aid training course. You should do nothing that exceeds your training or skill level.

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I wish to express my sincere gratitude to those who kindly contributed to the 'Real Life Stories' that appear throughout the book. I know for some it meant revisiting particularly difficult memories and feelings which took great effort and courage. Their first-hand accounts provide a unique insight from the casualty's perspective and greatly enhance the main text.

In the field of grammar thank you to Anna Cosslett, Alan Gale, and Mandi Shipton for their guidance and particular thanks to Anna who saw me through all five years of the first edition of the book's development and whose endless enthusiasm, especially during the harder stages of the process, drove me on. I would like to thank Tim Cain MBE from Swaledale Mountain Rescue Team, and Search and Rescue Dog Handler, and Val Cochrane Paramedic and Medical Officer for Glossop Mountain Rescue team for their input in the second edition which has proved invaluable.

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And finally to my husband Brian whose entertaining words of encouragement and his patience deserve a bigger thank you than I am able to express here.



Sunrise on Yr Wyddfa (Snowdon)
Photo: Jason Rawles

ABOUT THE AUTHOR



Katherine is a qualified Specialist Physical Education teacher and currently runs Active First Aid Training, delivering Rescue Emergency Care certified courses throughout the UK. Having lived in Eryri (Snowdonia) since the mid 80's she is passionate about mountaineering. In 2000 Katherine became a member of the Llanberis Mountain Rescue Team and since then has attended over 350 rescue incidents. For over two decades she held the Mountain Rescue Council's Casualty Care first aid certificate as well as the Emergency Care in Mountain Rescue (Advanced) certificate. Katherine spent a number of years as the chair of the rescue team's Medical Subcommittee. She sits on the Mountain Rescue England and Wales Medical Subcommittee as well as the Llanberis Medical Subcommittee, and holds the Queen's Diamond and Platinum Jubilee Medals for her services to mountain rescue.

Details of Katherine's Active First Aid Training courses can be found at www.activefirstaid.co.uk



INTRODUCTION

The great outdoors provides us with a playground and, for some, a place of work. All outdoor activities carry inherent risks and dangers. In fact, seeking and controlling those risks can, for some, be a part of the whole enjoyment. Because of this, there has to be an acceptance that injury could be a consequence of taking part in such activities. We must, therefore, be prepared to have to deal with an accident (or some form of medical problem) possibly in an isolated, inaccessible or even hostile environment.

In an urban setting we rely on ambulance crews, paramedics, doctors and nurses to provide assistance and medical care when things go wrong. This usually means the average person can get away with knowing surprisingly little first aid, but remain fairly safe on a day to day basis. However, once you enter the remote setting, your minimal first aid knowledge and skills may suddenly feel inadequate.

The remote setting

Broadly speaking, the term 'remote' refers to a location that is some distance away from civilisation, where if medical assistance is required, it could be some time before that help arrives and the casualty is evacuated to hospital. Although it is true to say a farm house situated in the far corners of the Scottish Highlands could be viewed as remote, in the context of this book the remote setting refers specifically to an outdoor location away from immediate help and assistance.

First aid in the remote setting

Remote first aid is very different from its urban counterpart in three distinct areas. First, medical help can be some considerable distance away, and because of this, time spent with the casualty is extended and an element of 'nursing' becomes an important part of the treatment. (Throughout the book the term 'casualty' has been used to describe someone who is in need of first aid.)

Tied in with this is the concept of casualty evacuation – removing a casualty from the remote setting – by either self-evacuation or through the rescue services. Self-evacuation is when the first aider, or casualty, takes care of the whole process. A rescue evacuation, on the other hand, involves staying where you are and summoning medical help to your location. In the UK this will depend on your activity and location and may involve requesting help from the **coastguard, fire and rescue** or a **mountain rescue** team.

The second difference is the outdoor environment itself: we need to consider not only the location of the casualty, but also the prevailing weather conditions. Bad weather can make administering first aid quite challenging, as well as limiting which rescue resources can be used (i.e. a helicopter) and the speed with which rescue teams on foot can reach you.

Finally, there may be a limited first aid kit available; you will only have whatever you choose to carry. This means that on occasions you will need to improvise and, at times, apply a little imagination. Successful improvisation relies on a sound understanding of the principles behind the first aid given. To adapt equipment or kit effectively you will need to ask yourself, "What is it I am trying to achieve, and what have I got to help me do that?"

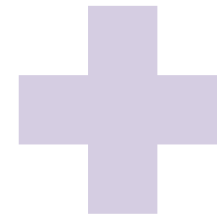
Due to these three unique aspects of remote first aid, some of the information presented here may differ from first aid books and courses geared towards the urban environment. The treatments suggested are based on the premise that medical help is some considerable time away; therefore a number of procedures presented should not be attempted if medical assistance is expected to arrive quickly or the incident occurs in an urban setting.

This book provides an invaluable insight into the challenges of first aid in the outdoor environment. Although many health professionals have been consulted during its development (the vast majority of whom have experience of applying their clinical skills in the remote setting) it is important to emphasise that the contents cover basic first aid and not remote medicine. Health professionals who work in the urban environment may find the information presented rather different from what is normally advocated in a conventional clinical setting.

Although an essential resource, this book should not be used as a substitute for attending a structured first aid course geared towards the outdoor environment delivered by a knowledgeable and experienced instructor. First aid skills need to be practised in an environment which allows you to safely develop judgement and casualty-handling before doing it for real. In the remote setting you may be placed in a situation where you have to treat injuries and medical conditions which you would not normally be expected to deal with when an ambulance is only a few minutes away.

Chris and Sarah are descending the track from the summit. They've had a long day and the weather has not been kind, plus to cap it all it's getting dark. On the steep rocky section at the top of the track Chris trips and falls over the edge and out of sight. Sarah, horrified, comes running down and around a rocky outcrop to see Chris holding what is obviously a broken leg shouting "HELP ME!" Sarah stares in disbelief. There is no mobile signal and it's a good hour's walk to get help.

Apart from panicking, what might you do in Sarah's place?



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It's not rocket science ...

Keep them breathing.

Stop them bleeding.

Keep them warm.



4. LIFE-THREATENING BLEEDING AND SHOCK

In simple terms, shock is a problem with the circulatory system – heart, blood vessels and blood – which results in insufficient oxygen reaching the body's tissues and vital organs. The most common reason for a casualty going into shock following an accident is life-threatening bleeding. The body can tolerate a certain amount of blood loss. However, if bleeding is not stopped, the situation will eventually reach a critical point where the body can no longer cope and the whole system begins to fail. Shock is a true emergency and requires prompt first aid action and urgent evacuation.

Shock

The term 'shock' is generally misunderstood and often misused. Many people confuse it with the body's reaction to psychological stresses, such as surprise, distress, etc. Unfortunately, the symptoms are very similar and although psychological shock is unpleasant, it is not an emergency. Shock in its truest sense, however, is a life-threatening physical condition which, if not treated, will result in death.



The circulatory system consists of the heart, the blood vessels (arteries and veins) and the blood. Photo: www.istockphoto.com

Shock is caused by one of three circulatory problems: a faulty pump (heart), the blood vessels becoming baggy (dilated), or the system leaking (blood loss). Shock is usually labelled according to what causes it, although the end signs and symptoms are often similar. If the heart fails the blood is no longer being pumped effectively around the body in order to send oxygen to the body's tissues; this is referred to as **cardiogenic shock**.

Another type of shock occurs when the arteries and veins become too dilated resulting in an insufficient amount of blood in the system to work effectively. This can happen with some spinal and head injuries – **neurogenic shock** – and also in a severe allergic reaction – **anaphylactic shock**.

The third type of shock, and the most common, is from massive blood loss – **hypovolaemic shock**. This can be caused by external bleeding which may be obvious or internal bleeding which is hidden inside the body. This chapter deals specifically with blood loss shock.

Blood loss shock explained

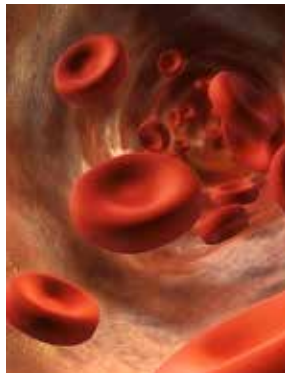


Photo:
www.istockphoto.com

The amount of blood we have depends on our size and a rough rule of thumb is that we have about 1 pint of blood per stone in body weight (70ml per kilo and 80ml for children). As the body loses significant amounts of blood the tissue and organs become starved of oxygen and a message is sent to the heart to speed up. If the system continues to leak, the heart will need to beat increasingly fast in order to deliver sufficient amounts of oxygen to the tissue and organs. The heart doesn't just work in isolation, the blood circulating needs to take in oxygen (and get rid of carbon dioxide) through breathing. As the heart rate increases so does the breathing rate.

At the same time a message is sent to the blood vessels feeding less important areas of the body, such as the gut, muscles and skin, telling them to constrict (become narrower), reducing blood flow. As this happens you may notice changes in skin colour and temperature; the casualty may start to look pale and feel cold. In the meantime the vital organs of the brain, heart muscle and kidneys continue to be fed with what little blood is still circulating; this combined with their own self-preservation mechanisms allows them to continue functioning for longer. The blood supply to the brain is protected right to the end. Eventually, the part of the brain which controls consciousness becomes starved of oxygen and the casualty becomes increasingly anxious, agitated, confused, drowsy and ultimately unconscious.

The increase in heart rate and the amount of blood pumped, along with the faster breathing rate and the redirection of the precious blood to the vital organs of the heart, brain and kidneys, are the body's way of coping or 'compensating' for blood loss. However, if bleeding is not stopped, there is only a certain amount of time before the system begins to fail, the pump stops working and the casualty dies.

POTENTIAL LIFE-THREATENING BLEEDING INJURIES

Thigh bones – Break your thigh bone and if it remains **closed** (i.e. there is no tear in the skin over the break) you are likely to lose between 500ml and 1000ml of blood (0.88 and 1.75 pints). If **open** (i.e. there is a tear in the skin over the break) this can increase to between 1000ml and 2000ml (1.75 and 3.5 pints).

Pelvis – This can vary from a minor injury causing about 500ml of blood loss (0.88 pint), to major, causing you to lose **all** your blood.

Spleen, liver or chest injury – These can be trivial causing you to lose a few teaspoons of blood, through to catastrophic, causing you to lose **all** your blood.

Identifying blood loss shock

It is difficult to work out if someone is going into blood loss shock for two reasons; firstly it's virtually impossible to work out how much blood has been lost – either external and/or internal; secondly, certain casualties compensate incredibly well, even when they have significant blood loss and may initially appear fine.

You will need to rely on other factors to help you. Take a history, find out exactly what happened and consider the 'mechanisms of injury'. Look for significant and obvious external bleeding, as well as other injuries that may cause internal bleeds, such as a broken pelvis, broken thigh bones, chest injury or abdominal injury – or any combination thereof!

Establishing the mechanisms of injury – and the forces involved – will help you to assess the likelihood of certain types of injuries, and the potential for the casualty to go into blood loss shock.

Photo:
www.istockphoto.com



The severity of shock depends largely on how much and how quickly the casualty loses blood: usually the faster the blood loss, the more severe the signs and symptoms. Other factors may also interfere with how quickly the signs and symptoms of shock appear, including the casualty's age, fitness level, any pre-existing diseases or conditions and medications they may be taking.

Very young and old casualties will have differing abilities to deal with significant blood loss. The elderly, and those with chronic medical conditions, are less likely to cope due to their reduced physical reserve. They may also be taking certain medications, such as beta blockers, which will mask changes in the heart and breathing rates, or blood thinning drugs such as warfarin which will hamper blood-clotting.



PREGNANCY AND LIFE-THREATENING BLEEDING

Pregnant women nearing their term have an increased blood volume of up to 50% which means that even with severe blood loss, you may notice few signs or symptoms.

Photo:
www.istockphoto.com

On the other hand children and those who are very fit and healthy will compensate and, despite considerable blood loss, at first appear fine. Eventually they reach a breaking point, when they can no longer cope, and catastrophically deteriorate.

Treating blood loss shock

Life-threatening bleeding and shock should be treated at the same time, not in isolation. Your aim should be to do some simple procedures, do them quickly, keep the casualty warm (hypothermic blood does not clot as well as blood at a normal body temperature) and arrange for the casualty to be evacuated to hospital. This is an emergency!

LOOK OUT FOR

In an adult:

Skin – pale, cold, sweaty.

Fast heart rate (over 100 beats per minute).

Fast breathing (over 20 breaths per minute).

Thirst.

Altered mental state – anxious, restless, confused, drowsy into unconsciousness.

WHAT TO DO

Dial 999/112 – request the appropriate rescue service.

Treat external bleeding and identify possible internal bleeding such as into the chest, abdomen, or breaks to the pelvis or thigh bones.

Lie the casualty down.

Reassure and comfort the casualty.

Keep the head either level or slightly lower than the rest of the body.

If possible raise the legs, sending blood to the vital organs.

Keep the casualty warm, insulate from the ground.

Provide shelter and monitor the vital signs; level of response (AcVPU), breathing and pulse.

To effectively treat blood loss shock, significant external bleeding needs to be stopped without delay. Your initial assessment of <C> should assess if there is an obvious, 'rapidly expanding pool of blood' and if identified it must be treated immediately. This forms the basis of the of the <C>ABC approach. Catastrophic bleeding (<C>) should be rapidly controlled as a priority before identifying, and if necessary treating, any Airway, Breathing or other types of Circulatory problems.

Circulation checks

Your **C**irculation checks should include the following.

- Control any external bleeding.
- Recognise the **potential** for a casualty to go into blood loss shock, and urgently summon help.
- Identify other possible areas of internal bleeding.
- Make an assessment of skin colour, mental status and, if possible, find and take a pulse.

Controlling catastrophic life-threatening external bleeding

The initial catastrophic bleed check (the <C> of <C> ABC) refers to quickly assessing for a visible 'rapidly expanding pool of blood'. It's fair to say that the speed at which that puddle is growing is probably a more accurate gauge of blood loss than its size. In the outdoors it is extremely difficult to estimate blood loss based solely on what you can see. Often, blood disappears into the ground, can be soaked up into clothing or be hidden inside waterproof clothing.

A severe life-threatening bleed is one in which the casualty appears to be losing a significant amount of blood quickly and if not stopped the casualty will go on to die.

Photo: Katherine Wills.



VARICOSE VEINS

Varicose veins are swollen and enlarged veins and are very common. Those near the surface of the skin can sometimes bleed if they are caught and can be difficult to stop, particularly if the casualty is taking blood thinning medication such as warfarin.

WHAT TO DO

Your treatment will depend on where the wound is located and whether it is compressible.

Check the wound and identify the exact point of the severe bleed and apply pressure (this may be inside the wound itself).

Tightly pack the entire wound with a dressing (or equivalent) and manually press on the wound for 10 minutes.

If appropriate, consider using a haemostatic agent.

When bleeding is controlled leave the packing inside the wound and cover with a trauma dressing (if a haemostatic agent has been used, tuck the empty dressing package under the final wrap of the bandage so the receiving hospital can see what has been used).

If necessary when dealing with a limb injury, as a last resort, consider a tourniquet.

Wound packing

If a wound is bleeding significantly and bleeding can not be controlled by direct pressure you may need to pack the wound with a dressing. If a dress-



ing is not available **any** packing is better than none and you may need to improvise. Never pack a bleeding chest wound.

STOP THE BLEEDING NOW

Place your fingers/fist/knee into the wound and apply direct pressure over the bleed to try and stop it. You may have to place your fingers inside the wound to do this. Ask someone to get your first aid kit out.

PACK THE WOUND TIGHTLY

The goal is to completely and very tightly pack the wound cavity to stop bleeding. Push your 'packing' dressing, gauze or improvised packing **into** the injury while maintaining pressure over the wound. This packing needs to make direct contact with the bleeding vessel.

Once the wound has been very tightly packed apply direct manual pressure over the wound for 10 minutes (1-3 for haemostatic dressings).

APPLY A TRAUMA DRESSING

Finish by applying a pressure trauma dressing over the packed wound. Place the dressing pad over the wound. Take the bandage around the dressing above and below the pressure bar.

Twist the bandage and slip it through the slot in the banana shaped pressure bar and pull it tight.

Take the bandage in the opposite direction pulling the pressure bar down onto the pad. Continue wrapping the bandage until the finishing bar is exposed with the two 'grab it' hooks. ...



To secure, lift either edge of a wrap and hook the bar in place at the top and bottom.

Consider splinting or immobilising the area if possible because movement during evacuation can move the packing and allow bleeding to restart.

Haemostatic products

Haemostatic products are designed to stem blood flow by generating an artificial clot. They are used in conjunction with pressure and must be applied directly to the source of the bleed. Once applied they need to be covered with a trauma bandage and the receiving hospital should be notified of their use.



HAEMOSTATIC AGENT

Celox™ blood clotting granules are actually very high surface area flakes. When they come in contact with blood, Celox™ swells, gels, and sticks together to make a gel like plug. Celox™ blood clotting agent only clots the blood it comes directly into contact with. It can clot hypothermic (cold) blood and also clots blood containing blood thinning drugs such as Heparin and Warfarin.

Compression trauma dressings (military)

Modern military compression trauma dressings have developed considerably over the years, many as a result of experiences within the battlefield. Don't confuse these with simple wound dressings; they are very different. Compression dressings have additional elements: a thicker dressing pad and a strong elastic bandage capable of applying direct and significant pressure over the bleed.

Tourniquets

A tourniquet is a band that is tightened around a limb to cut off the blood flow; by applying tight pressure around the arm or leg, it is possible to squash the blood vessels and stop blood travelling to the end of the limb. It can be used to stem catastrophic external life-threatening bleeding when all other treatments have failed. A tourniquet is a great life-saving piece of kit if it is used at the right time, with the right type of bleed, in the right way.

Attempts should be made to stop the bleed by all other means before a tourniquet is considered. The only time this rule may be broken is if you need to control a catastrophic life-threatening bleed on a casualty who is trapped and the point of injury is out of reach, or with multiple casualties



with extremity injuries such as in an explosion, or when dealing with a traumatic amputation (a limb has been torn off).

MANUFACTURED TOURNIQUET

The Combat Action Tourniquet (CAT) with windlass bar used to tighten the tourniquet and a docking station for the bar to sit in. Tighten the strap as much as possible before tightening the windlass. Always write the time of application on the tourniquet.

IMPROVISED TOURNIQUET

The improvised tourniquet should consist of a broad band that is flexible and easily twisted (such as triangular bandage, or shirt sleeves) tied tightly. A leather belt is NOT suitable as it can not be twisted. Place a strong rigid object (in this example a stick) underneath the broad band to act as windlass bar and twist. Secure the rigid object in place with either the ends of the triangular, another piece of fabric or strong tape.

It is vital that a tourniquet is used correctly or not at all. They are specialist pieces of kit and ideally you should be trained to use it properly. If available use a manufactured tourniquet like the Combat Application Tourniquet (CAT), however it's okay to improvise. It is important to stress that once applied a tourniquet must **not** be removed, leave this to the medical rescue services.

WHAT TO DO

Dial 999/112 – request the appropriate rescue service.

Apply the tourniquet quickly and if possible onto bare skin to prevent slippage.

Place the tourniquet approximately 5cm (about 3 fingers) above the wound (between the injury and the heart) but not over elbow or knee joints.

Tighten the tourniquet until the catastrophic bleed stops (slight oozing may be present). This will be extremely painful for the casualty, but explain that this is needed to save their life.

If bleeding is not controlled re assess: attempt to tighten the tourniquet, reposition it, or consider the application of a second tourniquet next to the first.

Note the exact time the tourniquet is applied.

TOP TIPS

Consider writing the letter T on the forehead (or cheek) of a casualty wearing a tourniquet.

Always record the time a tourniquet is applied.

Never cover the tourniquet with clothing. It is important that the receiving medical rescue team can clearly see it and are informed that the casualty has a tourniquet applied.

Tourniquets are **only** used with catastrophic life-threatening bleeding; less severe bleeds can be managed using simpler methods (see **Care of Wounds**).

Identifying and treating other possible areas of bleeding

This check is to establish if there are other potential sites of less obvious life-threatening bleeding hidden inside the body. Despite being very serious these types of bleeds can be difficult to detect in the early stages. An internal bleed can be a result of either an injury or medical problem. Sometimes a spontaneous bleed can happen from a stomach ulcer bursting or a weak artery rupturing. Suspect internal bleeding if the casualty is going into shock but there is no obvious external bleeding.

In trauma there are four areas that need to be considered: bleeding into the chest, the abdomen, or from breaks to the pelvis or thigh bones. Bleeding into the chest may be picked up during your **Breathing** check (see the chapter on **Breathing Problems**). The abdomen should be visibly checked for any obvious wounds, swelling or bruising and gently palpated (felt with the hands and fingers) for any tenderness and/or swelling. The pelvis should **not** be physically examined or compressed. If conscious, the casualty may complain about pain in or around the pelvis; if unconscious, assume a pelvic fracture if the mechanism of injury involves significant forces. Fractured thigh bones must also be identified and treated.

Circulation assessment

This is a general assessment of how well the circulation is working. Firstly look at the casualty's skin colour; as shock develops the casualty will start off slightly pale, and then turn very pale, cold and sweaty. Another useful check is to assess their mental state. The casualty may initially be clear-headed and responsive, but then become anxious, restless, confused and eventually drowsy into unconsciousness. Finally, taking and monitoring breathing and pulse rate can be a particularly valuable tool; both increase rapidly as shock develops. If you are unable to take a pulse then perform a capillary refill test (CRT) on the top of the breast bone. Keep the casualty calm, still and summon help quickly. Where possible insulate from the ground, provide shelter and monitor their vital signs while you await rescue.