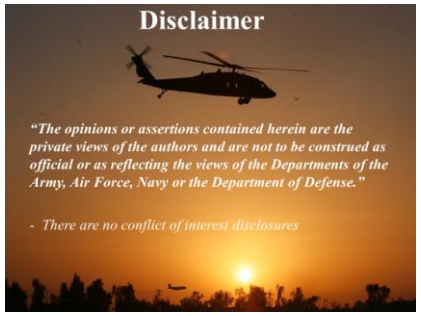
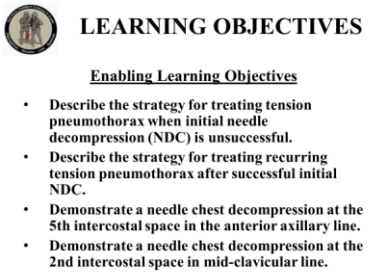
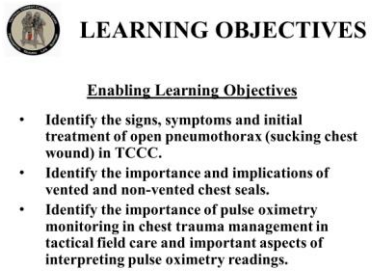
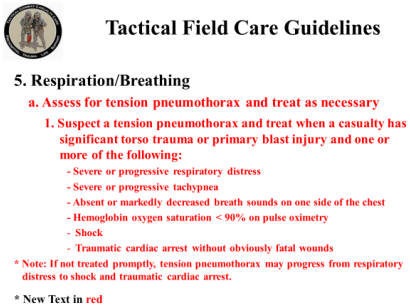
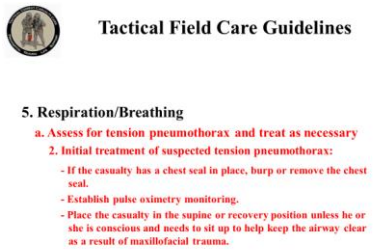
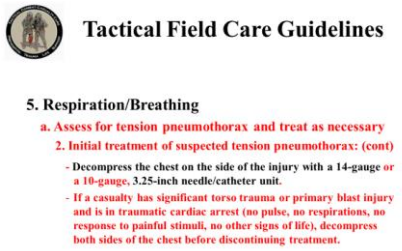
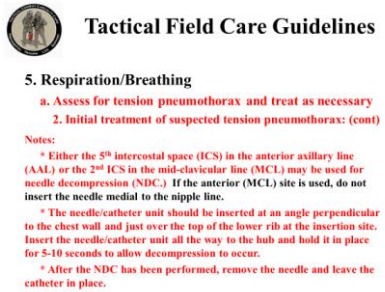
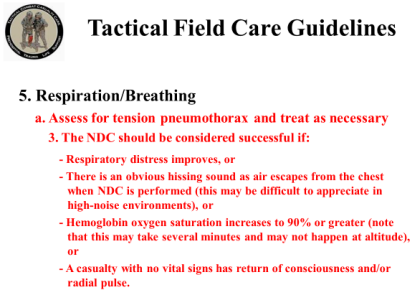
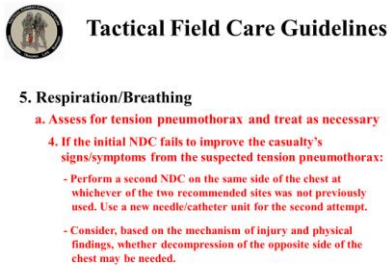
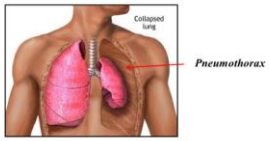
1.	Tactical Combat Casualty Care for Medical Personnel August 2018 (Based on TCCC-MP Guidelines 180801) Tactical Field Care 1d Respiration/Breathing	**Tactical Combat Casualty Care for Medical Personnel** **August 2018** **(Based on TCCC-MP Guidelines 180801)** **Tactical Field Care 1d** **Respiration/Breathing**	Our topic here is Respiration and Breathing – specifically Tension Pneumothorax and Open Pneumothorax.
2.		**Disclaimer** ***"The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Departments of the Army, Air Force, Navy or the Department of Defense."*** - ***There are no conflict of interest disclosures***	Read the disclaimer.
3.	**LEARNING OBJECTIVES** **Terminal Learning Objective** • **Perform management of respiration and chest trauma in Tactical Field Care.** **Enabling Learning Objectives** • **Describe the progressive strategies, indications, and limitations of chest trauma treatment techniques in tactical field care.** • **Identify the signs, symptoms and initial treatment of tension pneumothorax in TCCC.**	**LEARNING OBJECTIVES** Terminal Learning Objective • Perform management of respiration and chest trauma in Tactical Field Care. Enabling Learning Objectives • Describe the progressive strategies, indications, and limitations of chest trauma treatment techniques in tactical field care. • Identify the signs, symptoms and initial treatment of tension pneumothorax in TCCC.	Read the text.

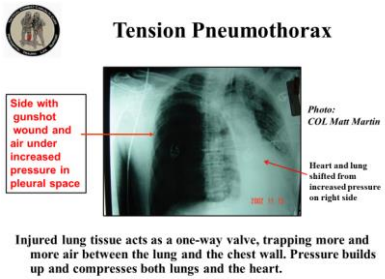
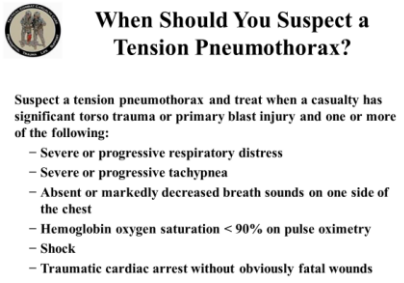
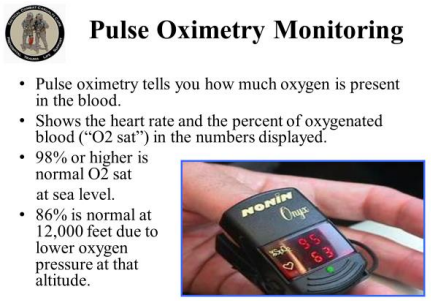
4.		**LEARNING OBJECTIVES** Enabling Learning Objectives • Describe the strategy for treating tension pneumothorax when initial needle decompression (NDC) is unsuccessful. • Describe the strategy for treating recurring tension pneumothorax after successful initial NDC. • Demonstrate a needle chest decompression at the 5th intercostal space in the anterior axillary line. • Demonstrate a needle chest decompression at the 2nd intercostal space in mid-clavicular line.	Read the text.
5.		**LEARNING OBJECTIVES** Enabling Learning Objectives • Identify the signs, symptoms and initial treatment of open pneumothorax (sucking chest wound) in TCCC. • Identify the importance and implications of vented and non-vented chest seals. • Identify the importance of pulse oximetry monitoring in chest trauma management in tactical field care and important aspects of interpreting pulse oximetry readings.	Read the text.

6.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 1. Suspect a tension pneumothorax and treat when a casualty has significant torso trauma or primary blast injury and one or more of the following: - Severe or progressive respiratory distress - Severe or progressive tachypnea - Absent or markedly decreased breath sounds on one side of the chest - Hemoglobin oxygen saturation < 90% on pulse oximetry - Shock - Traumatic cardiac arrest without obviously fatal wounds * Note: If not treated promptly, tension pneumothorax may progress from respiratory distress to shock and traumatic cardiac arrest. * New Text in red	Read the guideline.
7.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 2. Initial treatment of suspected tension pneumothorax: - If the casualty has a chest seal in place, burp or remove the chest seal. - Establish pulse oximetry monitoring. - Place the casualty in the supine or recovery position unless he or she is conscious and needs to sit up to help keep the airway clear as a result of maxillofacial trauma.	Read the guideline.

8.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 2. Initial treatment of suspected tension pneumothorax: (cont) - Decompress the chest on the side of the injury with a 14-gauge or a 10-gauge, 3.25-inch needle/catheter unit. - If a casualty has significant torso trauma or primary blast injury and is in traumatic cardiac arrest (no pulse, no respirations, no response to painful stimuli, no other signs of life), decompress both sides of the chest before discontinuing treatment.	Read the guideline.
9.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 2. Initial treatment of suspected tension pneumothorax: (cont) Notes: * Either the 5th intercostal space (ICS) in the anterior axillary line (AAL) or the 2nd ICS in the mid-clavicular line (MCL) may be used for needle decompression (NDC.) If the anterior (MCL) site is used, do not insert the needle medial to the nipple line. * The needle/catheter unit should be inserted at an angle perpendicular to the chest wall and just over the top of the lower rib at the insertion site. Insert the needle/catheter unit all the way to the hub and hold it in place for 5-10 seconds to allow decompression to occur. * After the NDC has been performed, remove the needle and leave the catheter in place.	Read the guideline.

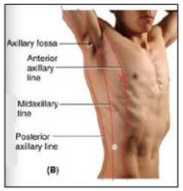
10.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 3. The NDC should be considered successful if: - Respiratory distress improves, or - There is an obvious hissing sound as air escapes from the chest when NDC is performed (this may be difficult to appreciate in high-noise environments), or - Hemoglobin oxygen saturation increases to 90% or greater (note that this may take several minutes and may not happen at altitude), or - A casualty with no vital signs has return of consciousness and/or radial pulse.	Read the guideline.
11.		**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 4. If the initial NDC fails to improve the casualty's signs/symptoms from the suspected tension pneumothorax: - Perform a second NDC on the same side of the chest at whichever of the two recommended sites was not previously used. Use a new needle/catheter unit for the second attempt. - Consider, based on the mechanism of injury and physical findings, whether decompression of the opposite side of the chest may be needed.	Read the guideline.

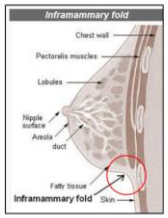
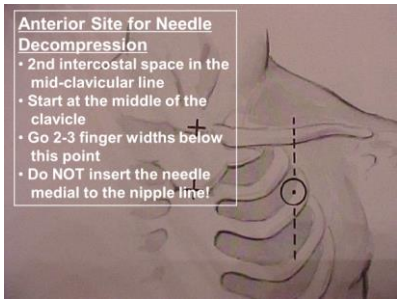
12.	**Tactical Field Care Guidelines** **5. Respiration/Breathing** **a. Assess for tension pneumothorax and treat as necessary** **5. If the initial NDC was successful, but symptoms later recur:** **- Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC.** **- Continue to re-assess!** **6. If the second NDC is also not successful:** **- Continue on to the Circulation section of the TCCC Guidelines.**	**Tactical Field Care Guidelines** **5. Respiration/Breathing** a. Assess for tension pneumothorax and treat as necessary 5. If the initial NDC was successful, but symptoms later recur: - Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC. - Continue to re-assess! 6. If the second NDC is also not successful: - Continue on to the Circulation section of the TCCC Guidelines.	Read the guidelines.
13.	**Tension Pneumothorax** • **Tension pneumothorax is another common cause of preventable death encountered on the battlefield.** • **It's easy to treat.** • **Tension pneumothorax may occur with entry wounds in the chest, abdomen, back, shoulder, or neck.** • Blunt (motor vehicle crash) or penetrating trauma (GSW) or primary blast injury may cause tension pneumothorax.	**Tension Pneumothorax** • Tension pneumothorax is another common cause of preventable death encountered on the battlefield. • It's easy to treat. • Tension pneumothorax may occur with entry wounds in the chest, abdomen, back, shoulder, or neck. • Blunt (motor vehicle crash) or penetrating trauma (GSW) or primary blast injury may cause tension pneumothorax.	Two things about a tension pneumothorax: - It is a very common cause of preventable death on the battlefield. - It can be effectively treated by combat medics, corpsmen, and PJs.
14.	**Pneumothorax**  A pneumothorax is a collection of air between the lung and chest wall due to an injury to the chest wall and/or lung. The lung then collapses as shown above.	**Pneumothorax** A pneumothorax is a collection of air between the lungs and chest wall due to an injury to the chest and/or lung. The lung then collapses as shown above.	Normally the lung fills up the entire chest cavity. With injury, air may get between the chest wall and the lung and cause the lung to collapse. Air is supposed to be INSIDE the lung. Here the air is inside the chest but OUTSIDE the lung – this does not help get oxygen to the body and may compress the heart and other lung.

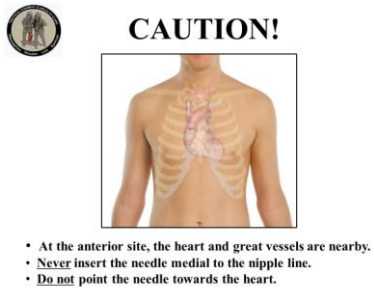
15.		**Tension Pneumothorax** Injured lung tissue acts as a one-way valve, trapping more and more air between the lung and the chest wall. Pressure builds up and compresses both lungs and the heart.	<u>Every breath adds more air</u> to the air space outside the lung. The air can't be exhaled because it's outside the lung – there's no way for it to escape, so pressure builds up.
16.		**When Should You Suspect a Tension Pneumothorax?** Suspect a tension pneumothorax and treat when a casualty has significant torso trauma or primary blast injury and one or more of the following: – Severe or progressive respiratory distress – Severe or progressive tachypnea – Absent or markedly decreased breath sounds on one side of the chest – Hemoglobin oxygen saturation < 90% on pulse oximetry – Shock – Traumatic cardiac arrest without obviously fatal wounds	Read the text.
17.		**Pulse Oximetry Monitoring** • Pulse oximetry tells you how much oxygen is present in the blood. • Shows the heart rate and the percent of oxygenated blood ("O2 sat") in the numbers displayed. • 98% or higher is normal O2 sat at sea level. 86% is normal at 12,000 feet due to lower oxygen pressure at that altitude.	This is what a pulse oximeter looks like and what it tells you. What it actually tells you is the percentage of <u>hemoglobin</u> in the blood that is oxygenated.

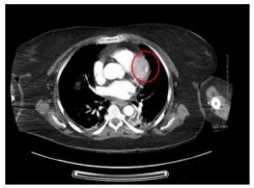
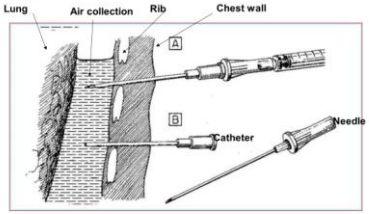
18.	**Pulse Oximetry Monitoring** Consider using a pulse ox for these types of casualties: • A casualty with severe penetrating, blunt , or blast chest trauma at risk for developing a tension pneumothorax. • TBI – good O2 sat is very important for a good outcome • Unconscious casualty Reassess often! 	**Pulse Oximetry Monitoring** Consider using a pulse ox for these types of casualties: • A casualty with severe penetrating, blunt , or blast chest trauma at risk for developing a tension pneumothorax. • TBI – good O2 sat is very important for a good outcome • Unconscious casualty Reassess often!	Hypoxia is associated with worse clinical outcomes in casualties with moderate/severe TBI. Monitoring the O2 saturation in these casualties with a pulse oximeter will help identify hypoxia so that it can be prevented or treated. Unconscious casualties may experience an airway obstruction. Chest trauma and blast trauma casualties may not exchange oxygen well in their lungs.
19.	**Pulse Oximetry Monitoring** Oxygen saturation values may be inaccurate in the presence of: • Hypothermia • Shock • Carbon monoxide poisoning • Very high ambient light levels 	**Pulse Oximetry Monitoring** Oxygen saturation values shown on pulse ox may be inaccurate in the presence of: • Hypothermia • Carbon monoxide poisoning • Very high ambient light levels	A normal reading on a pulse oximeter is NOT a good indicator for the **absence** of shock. Even after significant blood loss, the blood remaining in the intravascular compartment may be normally oxygenated. Readings on a cold limb may be artificially low. The pulse ox can mistake carbon monoxide for oxygen in burn patients and give a falsely high reading. To repeat – a decrease in O2 sat is normal at altitude. This drop in O2 sat is REAL.
20.	**Tension Pneumothorax** • Both lung function and heart function may be impaired with a tension pneumothorax, causing respiratory distress and possible shock. • Traumatic cardiac arrest may ensue if the tension pneumothorax is not treated promptly. • The treatment is to let the trapped air under pressure in the pleural space escape.	**Tension Pneumothorax** • Both lung function and heart function may be impaired with a tension pneumothorax, causing respiratory distress and possible shock. • Traumatic cardiac arrest may ensue if the tension pneumothorax is not treated promptly. • The treatment is to let the trapped air under pressure in the pleural space escape.	One collapsed lung should not kill you, but the elevated air pressure OUTSIDE the collapsed lung in a tension pneumothorax can impair the function of the good lung and the heart by preventing them from functioning normally. This CAN kill you.

21.	**Management of Suspected Tension Pneumothorax**  • If a chest seal has previously been applied to the casualty – *burp or remove the chest seal.* • This allows air to escape from the chest.	**Management of Suspected Tension Pneumothorax** • If a chest seal has previously been applied to the casualty – *burp or remove the chest seal.* • This allows air to escape from the chest.	Read the text.
22.	**Tension Pneumothorax** • If a tension pneumothorax is suspected and a chest seal is not present, the treatment is to let the trapped air under pressure escape by performing needle decompression or "NDC." • This is done by inserting a needle into the chest. • The recommended needle size is either a 14- or a 10 - gauge, 3.25-inch needle/catheter unit.	**Tension Pneumothorax** • If a tension pneumothorax is suspected and a chest seal is not present, the treatment is to let the trapped air under pressure escape by performing needle decompression or "NDC." • This is done by inserting a needle into the chest. • The recommended needle size is either a 14- or a 10 - gauge, 3.25-inch needle/catheter unit.	In a study by Dr. Harcke published in Military Medicine in 2008, several casualties died from needles being too short to get through the chest wall. The old 2-inch needles were too short. 3.25-inch needles will get through the chest wall in 99% of individuals.
23.	**Needle Decompression Works**  *Video courtesy of Dr. Oleksandr Linchevskyy Medical Director, Patriot Defence Ukraine*	**Needle Decompression Works** Video courtesy Dr. Oleksandr Linchevskyy Medical Director, Patriot Defence Ukraine	This video presents a pleuroscopic (inside the chest) view of a needle decompression performed on a trauma victim with tension pneumothorax and a collapsed lung. The re-expansion of the collapsed lung is dramatic. The catheter may inflict minor trauma on the lung, but this is acceptable given the benefit accrued from the removal of air from the pleural space and the returned function of the re-inflated lung and the decompressed heart. Click on the photo to play the video.

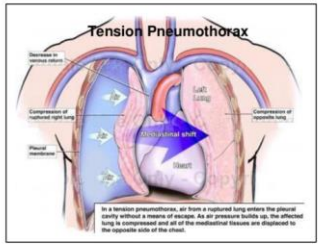
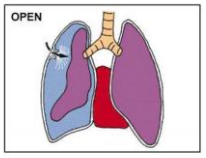
24.	**Tension Pneumothorax** • Question: "What if the casualty does not have a tension pneumothorax when you do your needle decompression?" • Answer: – If he or she has penetrating trauma to that side of the chest, there is already a collapsed lung and blood in the chest cavity. – The needle won't make it worse if there is no tension pneumothorax. – If he DOES have a tension pneumothorax, you will save his life.	**Tension Pneumothorax** • Question: "What if the casualty does not have a tension pneumothorax when you do your needle decompression?" • Answer: ▪ If he has penetrating trauma to that side of the chest, there is already a collapsed lung and blood in the chest cavity. ▪ The needle won't make it worse if there is no tension pneumothorax. ▪ If he DOES have a tension pneumothorax, you will save his life.	Note: If the trauma is BLUNT and there is no pre-existing pneumothorax when NDC is performed, a simple pneumothorax may be created by the procedure, but this not life-threatening. ***There have been NO reported life-threatening complications caused by NDC in Iraq or Afghanistan.***
25.	**Needle Decompression** **Two acceptable sites:** •Lateral site –The 5th intercostal space (ICS) in the anterior axillary line (AAL) or •Anterior site –The 2nd ICS in the mid-clavicular line (MCL)	**Needle Decompression** Two acceptable sites: • Lateral site – The 5th intercostal space (ICS) in the anterior axillary line (AAL) or • Anterior site – The 2nd ICS in the mid-clavicular line (MCL)	These are the two recommended sites for NDC.
26.	**Lateral Site for Needle Decompression - Males** • The first site that can be used for NDC is the 5th intercostal space at the anterior axillary line. • The 5th intercostal space is located at the level of the nipple in young, fit males. • The AAL is located at approximately the lateral aspect of the pectoralis major muscle. • Easily located in males. 	**Lateral Site for Needle Decompression - Males** • The first site that can be used for NDC is 5th intercostal space at the anterior axillary line. • The 5th intercostal space is located at the level of the nipple in young, fit males. • The AAL is located at approximately the lateral aspect of the pectoralis major muscle. • Easily located in males.	The 5th intercostal space at the anterior axillary line is more remote from the heart and great vessels and using this site may reduce the risk of complications from needle decompression. In a tactical situation, the lateral approach may be faster and safer given body armor configuration and ability to reassess.

27.	**Lateral Site for Needle Decompression - Females** • Nipple level is variable in females – but you can lift the breast and use the level of the infra-mammary fold. • Measure four fingers down from the axilla (measure the width of your hand placed under the patient's axilla with their arm down) at the lateral aspect of the breast/pectoral muscle. • Another option - two finger breadths below the bottom of the axillary hairline. Can see even if just shaved. 	**Lateral Site for Needle Decompression – Females** • Nipple level is variable in females – but you can lift the breast and use the level of the infra-mammary fold. • Measure four fingers down from the axilla (measure the width of your hand placed under the patient's axilla with their arm down) at the lateral aspect of the breast/pectoral muscle. • Another option - two finger breadths below the bottom of the axillary hairline. Can see even if just shaved.	Here are 3 options for locating the 5th ICS on a woman.
28.	**Lateral Site for Needle Decompression**  *Photo Courtesy Maj Andrew Hall* This photo shows NDC being performed at the lateral site in a cadaver model.	**Lateral Site for Needle Decompression** This photo shows NDC being performed at the lateral site in a cadaver model.	Read the text.
29.	**Lateral Site for Needle Decompression**  *Photo Courtesy Maj Andrew Hall* This photo shows the catheter left in place at the lateral site after the needle was removed.	**Lateral Site for Needle Decompression** This photo shows the catheter left in place at the lateral site after the needle was removed.	Read the text.
30.		**Anterior Site for Needle Decompression** • 2nd intercostal space in the mid-clavicular line • Start at the middle of the clavicle • Go 2-3 finger widths below this point • Do NOT insert the needle medial to the nipple line!	The anterior site is equally acceptable for NDC.

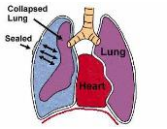
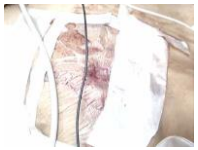
31.		**Anterior Site for Needle Decompression** This photo shows NDC being performed at the anterior site.	Read the text.
32.		**Anterior Site for Needle Decompression** This photo shows the catheter left in place at the anterior site after the needle was removed.	Read the text.
33.		**CAUTION!** • At the anterior site, the heart and great vessels are nearby. • Never insert the needle medial to the nipple line. • Do not point the needle towards the heart.	This is an outline of the location of the heart drawn on the surface of the chest.
34.		**CAUTION!** The two needles circled are TOO MEDIAL!	This clinical photo from a civilian trauma center shows multiple needle decompressions in both the anterior and the lateral locations. Note that two of the needles in the anterior site have been inserted at locations medial to the nipple line.

35.	**CAUTION!**  *Photo Dr. Jay Johannigman* The circle shows an NDC catheter in the heart. Again – the NDC was performed too medially.	**CAUTION!** The circle shows an NDC catheter in the heart. Again – the NDC was performed too medially.	This CT image from a civilian trauma center shows a catheter that was used to perform needle decompression located in the myocardium.
36.	**NDC Technique** • Insert the needle/catheter unit perpendicular (90-degree angle) to the chest wall and insert it just over the top of the lower rib at the insertion site. • Insert the needle/catheter unit all the way to the hub. • Hold both the needle and the catheter in place for 5-10 seconds to allow full decompression to occur. • After the NDC has been performed, remove the needle and leave the catheter in place.	**NDC Technique** • Insert the needle/catheter unit perpendicular (90-degree angle) to the chest wall and insert it just over the top of the lower rib at the insertion site. • Insert the needle/catheter unit all the way to the hub. • Hold both the needle and the catheter in place for 5-10 seconds to allow full decompression to occur. • After the NDC has been performed, remove the needle and leave the catheter in place.	If you use a 14- or 10-gauge needle/catheter unit intended for IVs, you will have to remove the plug from the needle flash chamber before inserting the needle/catheter into the chest.
37.	**Enter Just Over the Top of the Rib Below**  *This avoids the artery and vein at the bottom of the rib above.*	**Enter Just Over the Top of the Rib Below** This avoids the artery and vein at the bottom of the rib above.	The needle should make a 90-degree angle to the chest wall, and it should slide in just over the top of the rib. An intercostal artery and vein run along the bottom edge of each rib. Note that the catheter is not inserted all the way to the hub in the lower needle/catheter unit. It should have been.
38.	**Successful Needle Decompression** The NDC should be considered successful if: – Respiratory distress improves, or – There is an obvious hissing sound as air escapes from the chest when NDC is performed (this may be difficult to appreciate in high-noise environments), or – Hemoglobin oxygen saturation increases to 90% or greater (note that this may take several minutes and may not happen at altitude), or – A casualty with no vital signs has return of consciousness and/or radial pulse.	**Successful Needle Decompression** The NDC should be considered successful if: – Respiratory distress improves, or – There is an obvious hissing sound as air escapes from the chest when NDC is performed (this may be difficult to appreciate in high-noise environments), or – Hemoglobin oxygen saturation increases to 90% or greater (note that this may take several minutes and may not happen at altitude), or – A casualty with no vital signs has return of consciousness and/or radial pulse.	Read the text.

39.	**Unsuccessful Needle Decompression – Next Step** If the initial NDC fails to improve the casualty's signs/symptoms from the suspected tension pneumothorax: – Perform a second NDC - on the same side of the chest - at whichever of the two recommended sites was not previously used. Use a new needle/catheter unit for the second attempt. – Consider, based on the mechanism of injury and physical findings, whether decompression of the opposite side of the chest may be needed.	**Unsuccessful Needle Decompression – Next Step** If the initial NDC fails to improve the casualty's signs/symptoms from the suspected tension pneumothorax: – Perform a second NDC - on the same side of the chest - at whichever of the two recommended sites was not previously used. Use a new needle/catheter unit for the second attempt. – Consider, based on the mechanism of injury and physical findings, whether decompression of the opposite side of the chest may be needed.	Read the text.
40.	**Recurrent Tension Pneumothorax** If the initial NDC was successful, but symptoms later recur: – Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC. – Continue to re-assess!	**Recurrent Tension Pneumothorax** If the initial NDC was successful, but symptoms later recur: – Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC. – Continue to re-assess!	Even if the catheter is still in place, it may have become plugged. You MUST use a new needle/catheter unit.
41.	**If Two NDCs Fail to Produce Improvement** If the second NDC is also not successful: – Continue to the Circulation section of the TCCC Guidelines.	**If Two NDCs Fail to Produce Improvement** If the second NDC is also not successful: – Continue to the Circulation section of the TCCC Guidelines.	After two needle decompressions, do not continue to persevere with NDC – move on to evaluating and treating for shock.
42.	**Remember!!!** • Tension pneumothorax is a common but easily treatable cause of preventable death on the battlefield. • Diagnose and treat aggressively! 	**Remember!!!** • Tension pneumothorax is a common but easily treatable cause of preventable death on the battlefield. • Diagnose and treat aggressively!	DO NOT MISS THIS INJURY!

43.	 **Needle Decompression Practical**	**Needle Decompression Practical**	Needle Decompression Skill Sheet
44.	**Tactical Field Care Guidelines** **5. Respiration/Breathing** **b. All open and/or sucking chest wounds should be treated by immediately applying a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.**	**Tactical Field Care Guidelines** **5. Respiration/Breathing** b. All open and/or sucking chest wounds should be treated by immediately applying a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.	Read the guideline.
45.	**Sucking Chest Wound (Open Pneumothorax)**  **It takes a hole in the chest the size of a nickel or bigger for this to occur.**	**Sucking Chest Wound (Open Pneumothorax)** It takes a hole in the chest the size of a nickel or bigger for this to occur.	In a sucking chest wound, air enters the pleural space through a wound in the chest wall. The elastic lung deflates and pulls away from the chest wall. On inspiration, the air now enters the chest THROUGH THE HOLE instead of INTO THE LUNGS via the mouth and airways. The affected lung cannot be fully re-inflated by inhalation.

46.	**Open Pneumothorax** 	**Open Pneumothorax**	In this wound you can see into the chest cavity.
47.	**Management of Open Pneumothorax** • Input from the USCENTCOM/JTS assessment of prehospital trauma care in Afghanistan questioned the use of unvented chest seals in the treatment of open pneumothorax. • New animal research from both USAISR and Naval Medical Center Portsmouth has shown that vented chest seals work reliably to prevent a tension pneumothorax in the presence of an open pneumothorax and an ongoing air leak from the lung, but non-vented chest seals do not.	**Management of Open Pneumothorax** • Input from the USCENTCOM/JTS assessment of prehospital trauma care in Afghanistan questioned the use of unvented chest seals in the treatment of open pneumothorax. • New animal research from both USAISR and Naval Medical Center Portsmouth has shown that vented chest seals work reliably to prevent a tension pneumothorax in the presence of an open pneumothorax and an ongoing air leak from the lung, but non-vented chest seals do not.	Read the text.
48.	**Sucking Chest Wound** • May result from large defects in the chest wall and may interfere with ventilation • **Treat by applying a vented occlusive dressing completely over the defect at the end of one of the casualty's exhalations.** • Monitor for possible development of subsequent tension pneumothorax. • Allow the casualty to adopt the sitting position if breathing is more comfortable.	**Sucking Chest Wound** • May result from large defects in the chest wall and may interfere with ventilation • Treat it by applying a vented occlusive dressing completely over the defect at the end of one of the casualty's exhalations. • Monitor for possible development of subsequent tension pneumothorax. • Allow the casualty to adopt the sitting position if breathing is more comfortable.	Apply a vented chest seal at the end of an exhalation. At this point in the breathing cycle, there is relatively less air in the pleural space.

49.	**Sucking Chest Wound (Treated)**  Key Point: If signs of a tension pneumothorax develop – lift one edge of the seal and allow the tension pneumothorax to decompress ("burping" the seal). Alternatively, remove the seal for a few seconds to accomplish the decompression, then re-apply.	**Sucking Chest Wound (Treated)** **Key Point: If signs of a tension pneumothorax develop – lift one edge of the seal and allow the tension pneumothorax to decompress ("burping" the seal). Alternatively, remove the seal for a few seconds to accomplish the decompression, then re-apply.**	Once the wound has been occluded with a dressing, air can no longer enter (or exit) the pleural space through the wound in the chest wall. The injured lung will remain partially collapsed, but the mechanics of respiration will be better. You have to be alert for the possible development of tension pneumothorax because air can still leak into the pleural space from the injured lung. Monitor these patients with observation and a pulse oximeter.
50.	**Video: Sucking Chest Wound** 	**Video: Sucking Chest Wound**	This is a video of a sucking chest wound. Note the large open hole in the chest wall. Click on the photo to play the video.
51.	**Video: Sucking Chest Wound (Treated)** 	**Video: Sucking Chest Wound (Treated)**	This video shows a sucking chest wound after the defect in the chest wall has been sealed. Negative pressure during inhalation retracts the dressing over the wound. The lung now has a better chance of re-inflating. Click on the photo to play the video.
52.	**Sucking Chest Wound Treatment Video**  ** Note: The vented chest seal IS the occlusive dressing.*	**Sucking Chest Wound Treatment Video** ** Note: The vented chest seal IS the occlusive dressing.*	Click on the photo to play the video.

53.		**Questions?**	