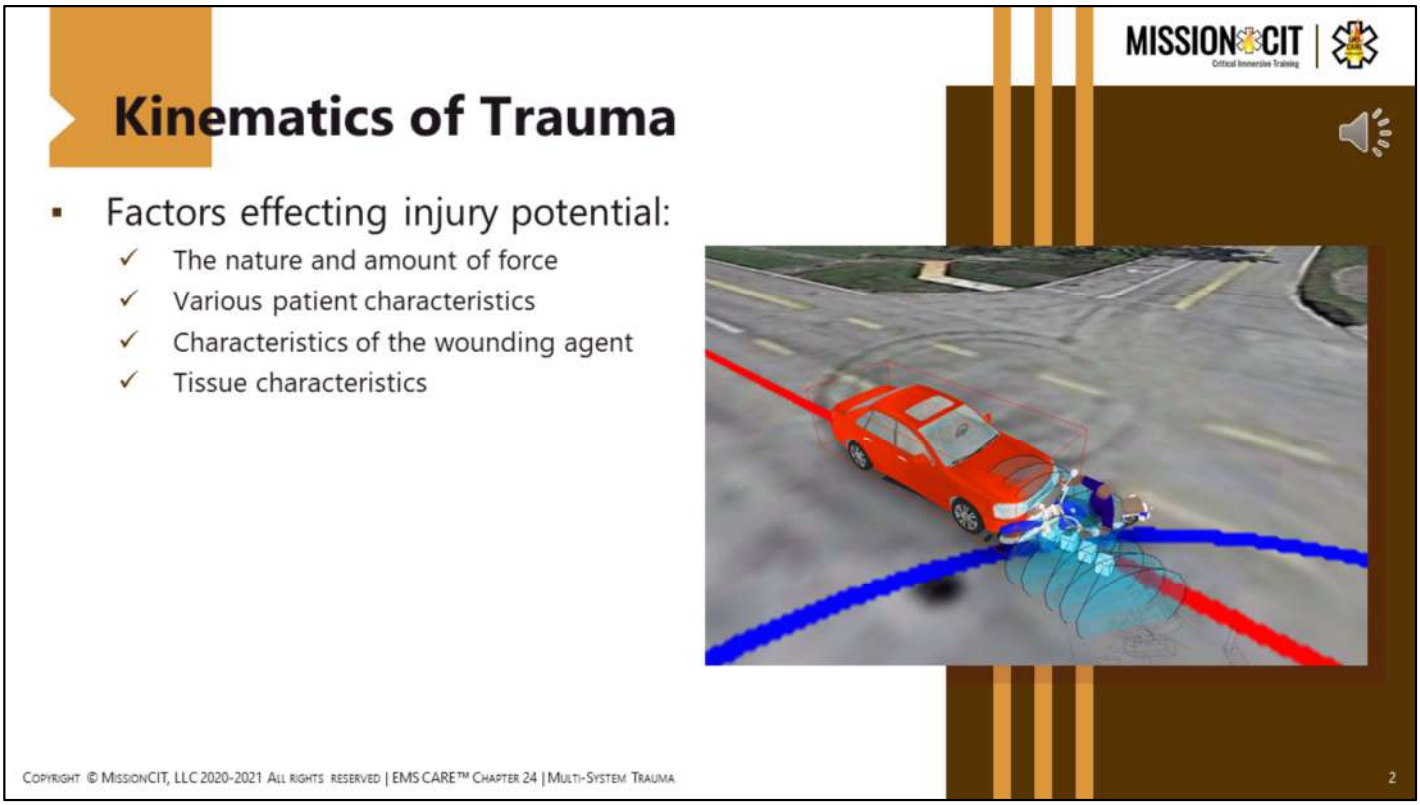


Welcome to the first lesson about determining patient severity. You must look at actual physiologic injuries, anatomic locations, and mechanism of injury to adequately judge patient severity and transport priority. Special considerations, such as age and underlying medical condition, may alter the initial severity decisions.

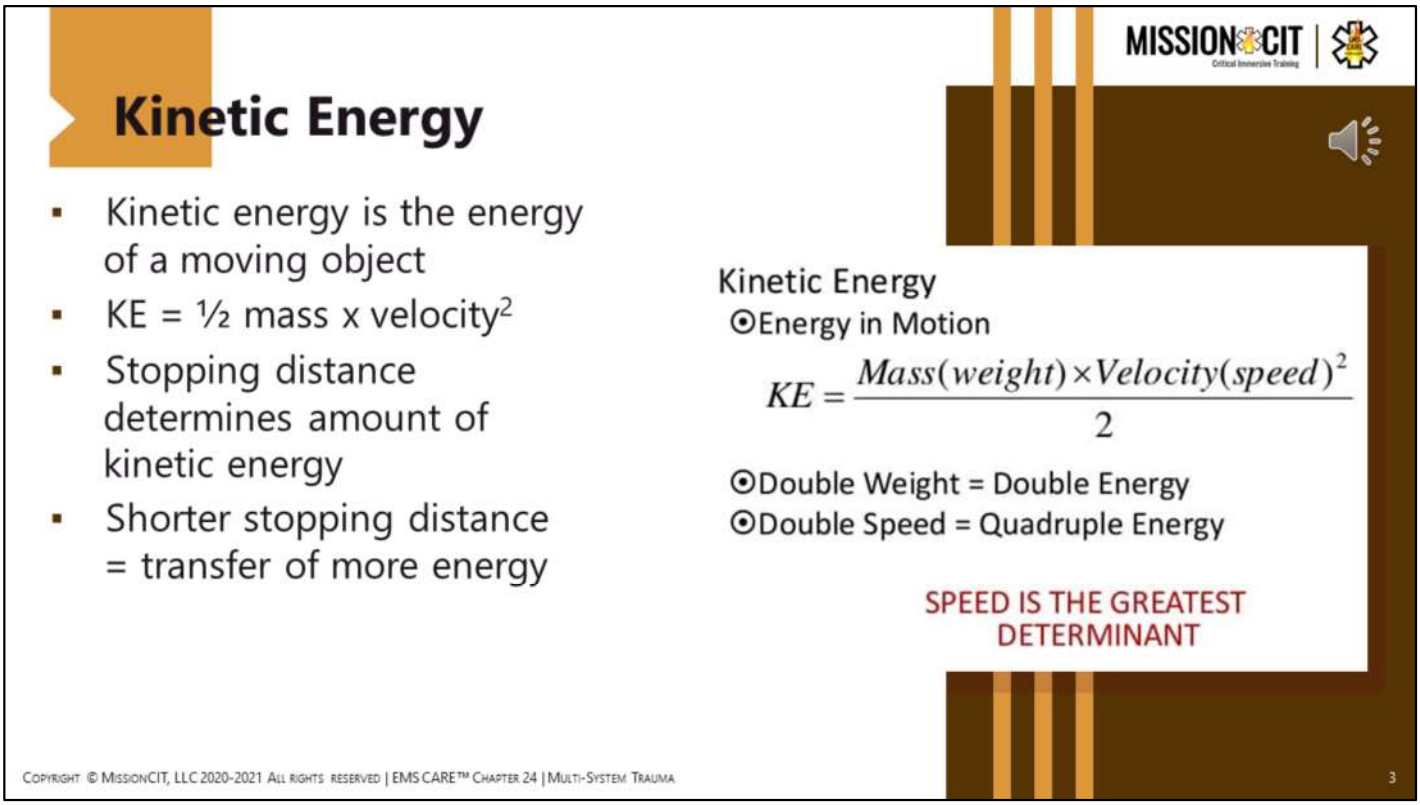


Kinematics of trauma deals with looking at a trauma scene and attempting to predict what injuries might have resulted based on an evaluation of the motion involved. As can be presumed from the derivation of the word kinematics, its essence revolves around motion. All injury is related to the interaction of the host and a moving object. That object may be commonplace and tangible, such as a moving vehicle or speeding bullet or more subtle as in the case of the moving particles and molecules involved in injury from heat, blasts, and ionizing radiation.

Injury is related to the energy of the injuring element and the interaction between that element and the victim. Knowing the details of a traumatic event may aid to further investigative efforts to uncover occult but predictable injuries.

Four factors effecting injury potential:

- The nature and amount of force – dose of energy involved
- Various patient characteristics
- Characteristics of the wounding agent – type of energy and how that energy was applied to the tissues
- Tissue characteristics – what injuries can I predict based on my understanding of the tissues involved?



Kinetic energy is the energy of a moving object. It reflects the relationship between the mass (weight) of the object and the velocity (speed) at which it is traveling. KE = ½ mass x velocity^2.

During a traumatic event, kinetic energy is transferred from an object to the human body, causing injury. Stopping distances help determine the amount of kinetic energy transferred in a traumatic event. The shorter the stopping distance, the more energy is transferred to the patient.

Physiologic Criteria

- Identification of critically injured patients:
  - ✓ Assessing level of consciousness – GCS
  - ✓ Measuring vital signs – SBP and respiratory rate

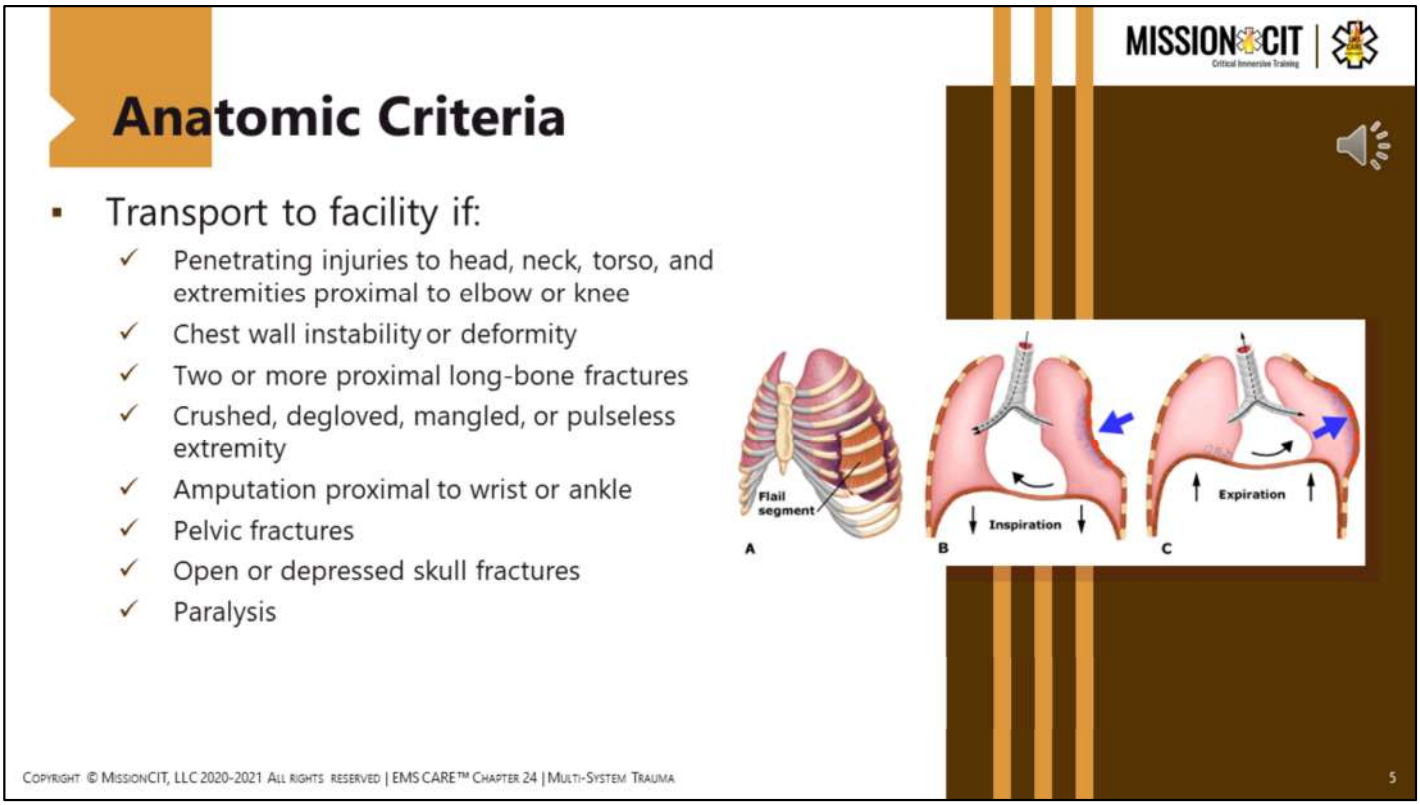
Blood Pressure Category	Systolic mm Hg (upper #)
Normal	less than 120
Elevated	120-129
High Blood Pressure (Hypertension) Stage 1	130-139
High Blood Pressure (Hypertension) Stage 2	140 or higher
Hypertensive Crisis (Seek Emergency Care)	higher than 180

TABLE 38-2
Glasgow Coma Scale

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	*Best response*	15
	Comatose client	8 or less
	Totally unresponsive	3

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Physiologic criteria is rapid identification of critically injured patients by assessing the level of consciousness (Glasgow Coma Scale [GCS]) and measuring vital signs (systolic blood pressure [SBP] and respiratory rate).



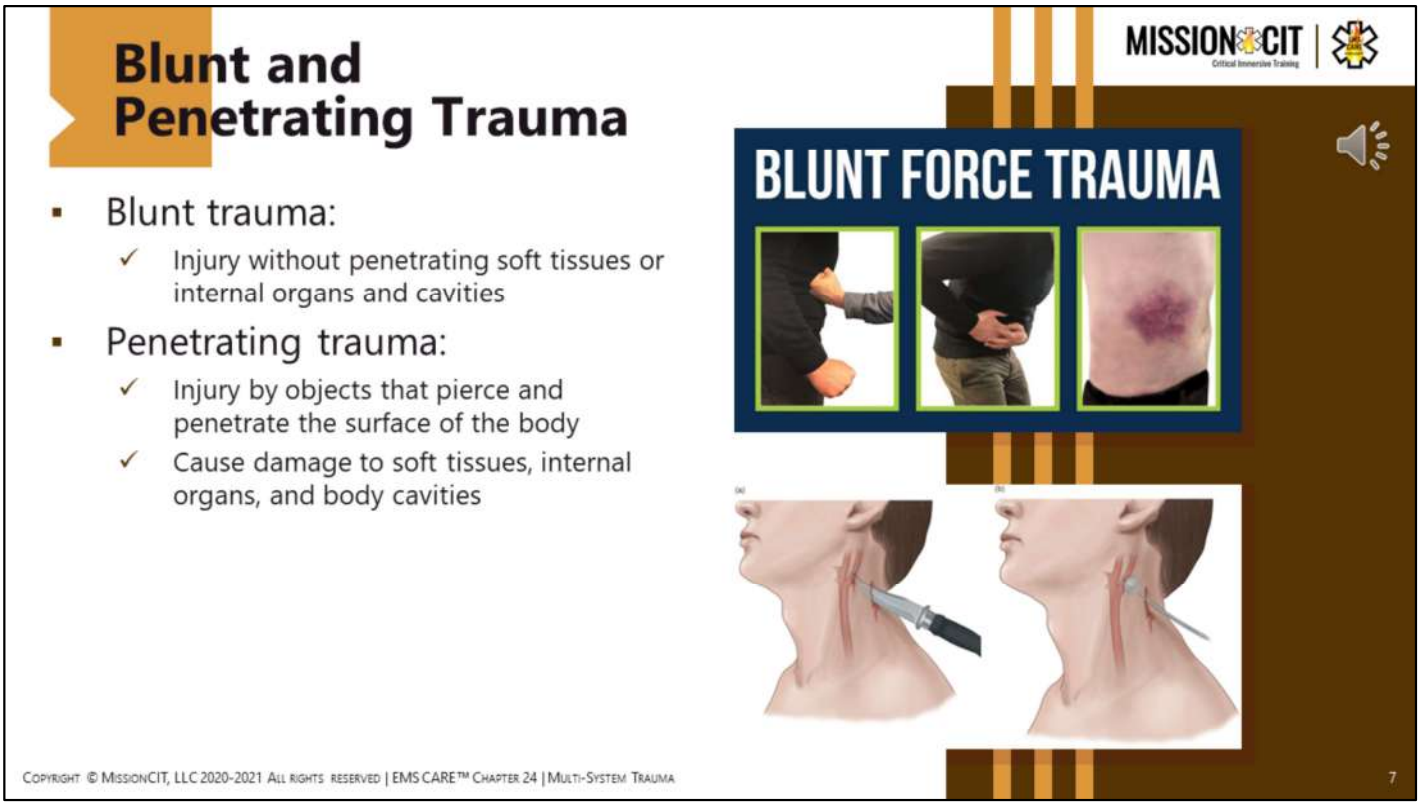
What special considerations might alter the decision-making process when dealing with a trauma patient? If a patient has normal physiology but has an anatomic injury that might require the highest level of care within the defined trauma system. Transport to a facility if any of the following are identified:

- Penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- Two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fractures or
- Paralysis



An injured patient who does not meet physiologic or anatomic criteria should be evaluated in terms of mechanism of injury (MOI) to determine if the injury might be severe but occult. Evaluation of MOI will help to determine if the patient should be transported to a trauma center. Some incidents where MOI should be considered are:

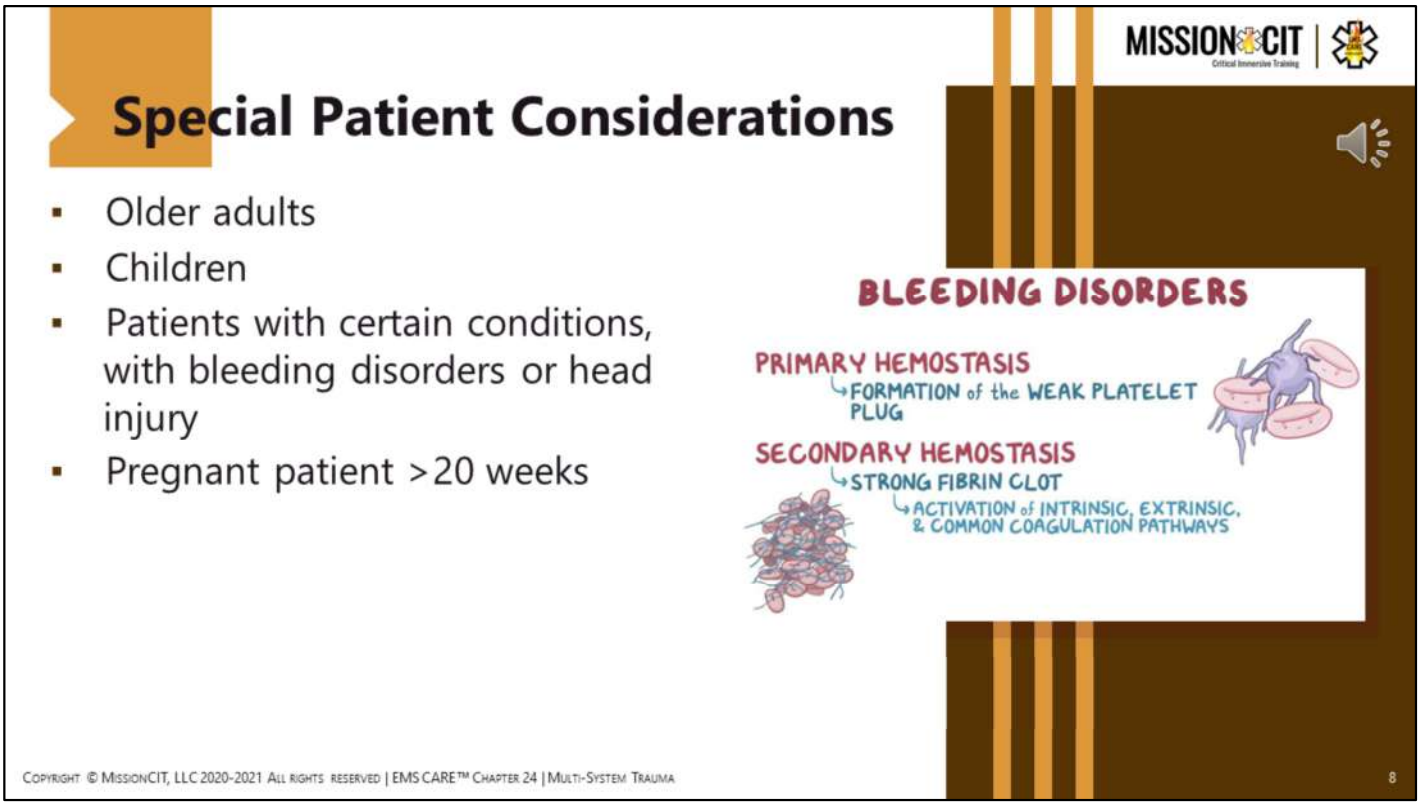
- Falls
- Intrusion
- Ejection from an automobile
- Death in the same passenger compartment
- Vehicle telemetry data consistent with a high risk of injury



Blunt trauma is the result of force to the body that causes injury without penetrating the soft tissues or internal organs and cavities.

Penetrating trauma causes injury by objects that primarily pierce and penetrate the surface of the body and cause damage to soft tissues, internal organs, and body cavities.

With either type, it is important to consider unseen as well as visible, obvious injuries.



Lastly, emergency personnel must determine whether persons who have not met physiologic, anatomic, or mechanism steps have underlying conditions or comorbid factors that place them at higher risk of injury or that aid in identifying the seriously injured patient. These patients might require trauma center care.

- Older adults do not efficiently compensate for shock since the risk for injury/death increases after 55 years. Even low impact mechanisms might result in severe injury for geriatric patients.
- Children may benefit by transport to a pediatric specialty facility.
- Patients with certain conditions such as those taking anticoagulants or with bleeding disorders. Patients with head injuries are at high risk for rapid deterioration.
- Pregnant patient >20 weeks.

Justin will next talk about how you can manage multi-system trauma patients.