





Transcutaneous Pacing		6091D
Effective 7/1/2023		Expires 6/30/2026
Low Frequency/High Risk: Transcutaneous Pacing	Approval: Medical Director John Beuerle, MD	Signed 
Applies To: Paramedics	Approval: EMS Director Teresa Rios	Signed 

Performance Objective

Electrical capture and control of the mechanical contraction of the heart resulting in adequate cardiac output and tissue perfusion.

Before performing transcutaneous cardiac pacing (TCP), paramedics must:

1. Methodically assess patient’s ABC’s within 30 seconds.
2. Determine the patient is hemodynamically unstable due to bradycardia and is a candidate for immediate TCP by confirming all the following are present:
 - a. The patient is exhibiting signs and symptoms of systemic poor perfusion *and*
 - b. bradycardia is present on the ECG *and*
 - c. Underlying causes of the dysrhythmia have been considered and reversible causes have been treated *and*
 - d. Confirm no contraindications to TCP are present *and*
 - e. The cardiac monitoring equipment is placed correctly on patient and a baseline rhythm strip is printed.
 - 1) Consider performing a 12 Lead ECG prior to initiating TCP if such delay does not cause harm to the patient.
3. Identify contraindications for TCP:
 - a. Children less than or equal to 12 years old (brady dysrhythmias in children are usually respiratory- related)
 - b. Asystolic arrest, unless approved by base hospital.
4. Prepare for TCP
 - a. Administer Atropine, if indicated by heart rhythm, while preparing pacer. Do not delay TCP if there is difficulty establishing an IV.
 - b. Use TCP without delay for high-degree block (type II second-degree block or third-degree block)
5. Explain to patient/family what they can expect to feel and to see but do not delay immediately needed treatment.
6. Once capture is obtained with TCP, strongly consider Versed for sedation and amnesic effect of conscious patient.
 - a. Use IN/IM route for sedation if IV access is poor and would delay TCP.

While performing transcutaneous cardiac pacing (TCP), paramedics must:

1. Apply the ECG defibrillation/pacer multifunction pads (MFP) firmly to the patient’s clean, bare skin in the correct anatomical locations for maximum electrical current flow through the heart.
 - a. Proper pad placement on cleaned, dry skin is essential to minimize pain (heat generated from passage of current through the skin) and maximize current conduction. The better the contact, the more effective pacing will be.
2. Identify a patient with a pacemaker or automatic internal cardiac defibrillator (AICD) and place the MFP(s) in alternate position(s) to minimize damage to the device(s) and disruption of current flow through the heart.
3. Place the ECG monitor into pacing mode.
4. Turn Pacer on and set initial Rate and Current values for procedure (60 bpm and 10 mA). Gradually

- increase current until electrical capture is gained. (i.e. Pacer spike generates a QRS complex on the ECG).
5. Determine and utilize minimum electrical current needed to maintain capture (i.e. decrease current by 5 mA increments until pulses capture lost, increase current by 5 mA increments until capture/pulses regained).
 6. Confirm mechanical capture by palpating pulses that match pacemaker.
 7. Evaluate the effectiveness of TCP by assessing the patient's level of consciousness and vital signs for improvement.
 8. Identify continuing signs and symptoms of poor perfusion (including but not limited to hypotension, altered level of consciousness, chest pain, dyspnea/tachypnea, diaphoresis, pale, cool skin) despite effective mechanical capture and increase TCP rate in increments of 10 bpm to a max of 80 bpm to increase cardiac output.
 9. Provide Versed for sedation and amnesic effect as clinically required per protocol.
 10. Continuously re-assesses the patient's vital signs and level of consciousness throughout the prehospital period of treatment.
 11. Contact the base hospital if signs and symptoms of poor perfusion persist.
 12. Properly document procedure, printing paced rhythm strip and attach it to the PCR.

Critical Success Targets for TCP

1. Electrical and mechanical capture
2. Resolution of patient's bradycardia related signs and symptoms (hypotension, skin signs, level of consciousness, dyspnea/tachypnea, chest pain).

System Benchmark

Percentage of patients that experience mechanical capture with signs of improved cardiac output (i.e. improved level of consciousness/mentation, peripheral pulses, BP, skin signs).

Core Competency Requirements to be covered during education/ training on TCP

1. Assessment of patient to determine if appropriate indications are present (hemodynamically unstable bradycardia or AV blocks with wide complexes), and contraindications (patients under age 12 or asystole)
2. Proper placement of ECG electrodes on patient
3. Proper identification of cardiac dysrhythmia(s) requiring TCP
4. Proper placement of multi-function pads on patient
5. Assessment for and recognition of hemodynamic instability
6. Verbalize possible treatments for hemodynamically unstable bradycardias other than TCP
7. Explain procedure to patient (where applicable)/ pre-medicate patient (where applicable)
8. Demonstrate proper technique for setting rate and current
9. Demonstrate proper technique for gaining electrical capture with minimum required current
10. Describe how to obtain mechanical capture if not gained with initial electrical capture
11. Cardiac monitoring/ rhythm recognition and treatment

Equipment Requirements

1. PPE
2. COR mannequin(s)
3. Stethoscope
4. Cardiac monitor/ECG/Defibrillator
5. ECG Rhythm Generator
6. ECG electrodes
7. Defibrillation/ Multifunction pads
8. Versed
9. Pre-medication equipment (IV access, IN equipment, IM equipment)

Instructor Resource Materials

1. AHA ACLS Provider Manual
2. AHA PALS Provider Manual
3. Current AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care
4. NHTSA EMS Educational Instructor Guidelines for EMT and Paramedic

Transcutaneous Cardiac Pacing

Successful (y/n)	Performance Steps	Additional Information
	Take or verbalize body substance isolation.	Selection: gloves, goggles, mask, booties, gown, N95 PRN
	Methodically assess patient's ABC's within 30 seconds.*	
	Determine the patient is hemodynamically unstable due to bradycardia and is a candidate for immediate Transcutaneous Pacing (TCP)*	<p>Confirm that <i>all</i> of the following are present:</p> <ul style="list-style-type: none"> • The patient is exhibiting signs and symptoms of systemic poor perfusion; <i>and</i> • Symptomatic bradycardia is present on the ECG; <i>and</i> • Underlying causes of the dysrhythmia have been considered and reversible causes have been treated; <i>and</i> • No contraindications of TCP are present.
	Place cardiac monitoring equipment on the patient correctly and print a baseline rhythm strip.	Consider performing a 12 Lead ECG prior to initiating TCP, if such delay does not cause harm to the patient.
	Identify contraindications for TCP.	<ul style="list-style-type: none"> • Children less than or equal to 12 years old (brady dysrhythmias in children are usually respiratory related)
	Prepare for TCP.	<ul style="list-style-type: none"> • Administer Atropine if indicated while preparing pacer. <ul style="list-style-type: none"> ◦ Do not delay TCP if there is difficulty establishing an IV. • Use TCP without delay for high-degree block (type II second-degree block or third-degree block)
	Explain to patient/family what they can expect to feel and to see.*	Do not delay immediately needed treatment.
	Strongly consider Versed for sedation/amnesic effect while preparing TCP equipment.	Use IN/IM route for Versed for sedation/amnesic effect if IV access is poor and would delay TCP.

	Apply the ECG monitor/pacer multifunction pads (MFP) firmly to the patient's clean, bare skin in the correct anatomical locations for maximum electrical current flow through the heart. *	<ul style="list-style-type: none"> • Anterior-posterior placement is recommended, if possible. • Proper pad placement on the patient's cleaned, dry skin is essential to minimize pain (heat generated from passage of current through the skin) and maximize current conduction. The better the contact, the more effective pacing will be.
	Identify a patient with a pacemaker or automatic internal cardiac defibrillator (AICD) and place the MFP(s) in alternate position(s) to minimize damage to the device(s) and disruption of current flow through the heart *	
	Correctly place the ECG monitor into pacing mode. *	
	Turn the pacer on and accurately set initial rate and current values for procedure. *	80 beats per minute (bpm) and 10 mA
	Gradually increase current until electrical capture is gained *	i.e., a Pacer spike generates a QRS complex on the ECG
	Confirm mechanical capture by palpating pulses that match pacemaker. *	
	Evaluate the effectiveness of TCP*	Assess the patient's mentation and vital signs for improvement.
	Identify continuing signs and symptoms of poor perfusion despite effective mechanical capture and increase TCP rate in increments of 10 bpm to a maximum of 100 bpm to increase cardiac output.	Signs and symptoms of poor perfusion include but are not limited to: <ul style="list-style-type: none"> • Hypotension • Altered level of consciousness • Chest pain • Dyspnea/tachypnea • Diaphoresis • Pale/cool skin
	Provide Versed for sedation/amnesic effect and Morphine for pain as clinically indicated per protocol.	
	Accurately document all assessment findings, therapeutic treatments, and the patient's response to therapy.	Print paced rhythm strip and attach it to the PCR.

	Identify a patient with a pacemaker or automatic internal cardiac defibrillator (AICD) and place the MFP(s) in alternate position(s) to minimize damage to the device(s) and disruption of current flow through the heart *	
	Correctly place the ECG monitor into pacing mode. *	
	Turn the pacer on and accurately set initial rate and current values for procedure. *	80 beats per minute (bpm) and 10 mA
	Gradually increase current until electrical capture is gained *	i.e., a Pacer spike generates a QRS complex on the ECG
	Confirm mechanical capture by palpating pulses that match pacemaker. *	
	Evaluate the effectiveness of TCP *	Assess the patient's mentation and vital signs for improvement.
	Identify continuing signs and symptoms of poor perfusion despite effective mechanical capture and increase TCP rate in increments of 10 bpm to a maximum of 100 bpm to increase cardiac output.	Signs and symptoms of poor perfusion include but are not limited to: <ul style="list-style-type: none"> • Hypotension • Altered level of consciousness • Chest pain • Dyspnea/tachypnea • Diaphoresis • Pale/cool skin
	Provide Versed for sedation/amnesic effect and Morphine for pain as clinically indicated per protocol.	
	Accurately document all assessment findings, therapeutic treatments, and the patient's response to therapy.	Print paced rhythm strip and attach it to the PCR.

Critical Failure Criteria

- Failure to take or verbalize BSI appropriate to the skill prior to performing the skill**
- Failure to identify indications/contraindications for procedure**
- Failure to ensure the functionality of cardiac monitor and availability of equipment**
- Failure to adjust current and rate appropriately**
- Failure to confirm efficacy of intervention – using electrical and mechanical capture**
- Any procedure that would have harmed the patient**