

**ELECTRICAL THERAPY  
PROCEDURE**

**Purpose:** To provide a procedure for the performance of appropriate electrical therapy (defibrillation, synchronized cardioversion, external pacing, automatic external defibrillation) according to West Michigan Regional or "local" protocols.

**I. Manual Defibrillation**

**Note:** This procedure is to be used in conjunction with the appropriate protocol by Paramedics only.

A. Indications: ventricular fibrillation, pulseless ventricular tachycardia

B. Technique:

1. Confirm unresponsiveness and absence of pulse and respirations.
2. Turn defibrillator on.
3. Place conductive gel on paddles or conductive pads on patient's chest.
4. Place "quick-look" paddles (or "hands-off" electrodes) in appropriate position on patient's chest to determine patient's cardiac rhythm.
5. Confirm that synchronizer switch is "off".
6. Charge defibrillator to energy level specified in appropriate protocol with paddles in hands.
7. Place paddles (or "hands-off" electrodes) in position with one paddle to right of upper sternum below clavicle and other paddle just to left of heart apex.
8. Recheck rhythm.
9. "Clear" the area.
10. Apply firm pressure (approximately 25 #) to the paddles, being careful not to lean on paddles or allow paddles to slip off. (Does not apply to "hands-off" electrodes.)
11. Discharge the electrical charge by simultaneously pressing defibrillator buttons.
12. Watch for evidence of muscle contraction when shock delivered.
13. Leave paddles in place to recheck rhythm.
14. Confirm presence or absence of pulse.
15. If VF or pulseless VT persist, recharge paddles and re-shock as outlined in appropriate protocol.
16. Continue to treat the patient according to the appropriate protocol.

C. Precautions

1. Do not treat the monitor alone. Confirm presence or absence of pulse and respiration after each defibrillation shock (except during initial three shocks)
2. Dry the chest wall if wet or diaphoretic.
3. Nitroglycerin paste should be removed; paddles should not be placed over nitroglycerin patches.
4. Avoid placing the paddles over a pacemaker or AICD generator.
5. If visible muscle contraction of the patient did not occur, defibrillation did not occur; check equipment.
6. Ensure that no other individuals are in contact with the patient or the defibrillator prior to delivering the electrical shock.
7. Defibrillation may not be successful in hypothermic patients; refer to hypothermia protocol.

D. Complications

1. Accidental shock of adjacent individual.

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2. Skin burns resulting from inadequate contact between paddles and skin or due to inadequate conducting gel or dry conductive pads.

**II. Synchronized cardioversion**

**Note: This procedure is to be used in conjunction with the appropriate protocol by Paramedics only.**

- A. Indications: pulsed, unstable ventricular tachycardia; unstable supraventricular tachycardia
- B. Technique:
  1. Initiate IV prior to procedure.
  2. Sedate the patient, if appropriate, according to the appropriate protocol.
  3. Attach monitor electrodes and select a lead which gives upright QRS complex.
  4. Turn synchronizer switch "on". Ensure that synchronizer "light" coincides with QRS complex.
  5. Charge defibrillator to energy level as specified in appropriate protocol.
  6. Place conductive gel on paddles or conductive pads on patient's chest.
  7. Place paddles in position with one paddle to right of upper sternum below clavicle and other paddle just to left of heart apex.
  8. Recheck rhythm.
  9. "Clear" the area.
  10. Apply firm pressure (approximately 25 #) to the paddles, being careful not to lean on paddles or allow paddles to slip off. (Does not apply to "Hands-off" defibrillator).
  11. Discharge the electrical charge by simultaneously pressing and holding the defibrillator buttons until the charge is delivered; it may take several seconds for the charge to be delivered.
  12. Watch for evidence of muscle contraction when shock delivered.
  13. If no shock is delivered and the patient is in a wide complex tachycardia, turn off the "synch" switch and defibrillate the patient.
  14. If shock is delivered, but the rhythm does not convert, re-cardiovert according to the appropriate protocol.
  15. If the patient is cardioverted into or progresses into ventricular fibrillation, turn off the "synch" switch and defibrillate (unsynchronized) the patient at 200 joules.
- C. Precautions
  1. May be contraindicated in patients with digitalis toxicity.
  2. The same precautions as for defibrillation occur.
  3. If the defibrillator does not discharge on "synch" with the tachycardia, turn off the "synch" switch and defibrillate the patient.
  4. If a sinus rhythm is achieved by cardioversion, even briefly, and then reverts to previous rhythm, repeat the cardioversion at the same setting as was initially successful.
- D. Complications
  1. Same as for defibrillation.

**III. External Transcutaneous Pacing**

**Note: This procedure is to be used in conjunction with the appropriate protocol by**

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**Paramedics only.**

- A. Indications: asystolic cardiac arrest; heartblocks & bradycardias, symptomatic and refractory to drug therapy
- B. Technique:
  - 1. Ensure continuous EKG monitoring during procedure.
  - 2. Consider sedation, if time permits.
  - 3. Prep patient skin:
    - a. Clip/shave hair (if pads won't adhere).
    - b. Dry skin if diaphoretic.
  - 4. Apply Pacing Electrodes (anterior - posterior preferred).
    - a. Negative:  
L anterior chest, halfway between xiphoid process and L nipple, with upper edge of electrode below nipple line.
    - b. Positive:  
L posterior beneath scapula and lateral to spine
  - 5. If QRS complexes are present, make sure QRS or EKG are in most positive, upright position (so machine can sense their presence).
  - 6. Set external pacemaker rate to 70 B.P.M. to begin.
  - 7. Set Milliamp (MA) at zero.
  - 8. Slowly dial up MA until evidence of capture has occurred.
  - 9. Dial up at increments of 20 MA for unconscious/arrest patients and 5 MA for conscious patients.
    - a. Use only minimal MA needed for mechanical capture.
  - 10. Run EKG strip and save.
  - 11. Ensure adequate capture including electrical and mechanical capture.
    - a. **Electrical:**  
Visible pacer spike immediately followed by wide QRS and Broad T waves.
    - b. **Mechanical:**  
Palpable Pulses; LOC; BP
  - 12. If mechanical capture is not obtained, return immediately to CPR and contact medical control.
- C. Precautions
  - 1. Use of external transcutaneous pacemakers can cause painful muscle contractions. Consider the use of sedation in awake patients.
- D. Contraindications
  - 1. Wet environment
  - 2. Burns to the chest (relative)

**IV. Semi/Automatic External Defibrillation**

**Note: This procedure is to be used in conjunction with the appropriate protocol by Medical First Responders, EMTs and EMT-S's.**

**M B S**

- A. Indications: unresponsive patient without pulse or respiration.
- B. Technique:
  - 1. Confirm absence of pulse and respiration.

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- a. If pulse is absent initiate or continue CPR and ensure ALS response.
  - b. If patient is >8 years old and >70 lbs., attach Semi/Automatic External Defibrillation Unit (AED) electrodes to patient.
  - c. If patient is one year to eight years old initiate CPR for one full minute. Then attach Semi/Automatic External Defibrillation Unit AED by using the pediatric AED electrodes with joule reducer.
- 2. STOP CPR** and turn on AED to analyze patient's rhythm, and Allow defibrillation as indicated.
- a. Ensure that no one is touching the patient.
  - b. If semi-automatic unit, activate for shock as directed by unit.
  - c. If patient is not converted to electrical rhythm after the first defibrillation, a second and third shock maybe delivered by the AED.
  - d. If patient is not converted with the third shock, the AED will enter monitoring mode.
- 1) Perform CPR for one minute. After one minute assure that the unit will analyze again.
    - e. If indicated the AED may deliver 3 additional shocks.
    - f. Continue to alternate between 1 minute of CPR and 1 cycle of analysis (and three shocks if appropriate) until ALS arrives or the patient converts to a perfusing (pulsed) rhythm.
  - 2) For BLS transport, begin transporting following second cycle of Shocks. AED should not be operated in a moving vehicle. Reassess with AED every 5 minutes if possible.
3. Should a patient who is successfully defibrillated in the field re-fibrillate, as diagnosed by the AED, an audio 'beep' or other alarm will sound, followed by the phrase "Check Breathing and Pulse". Check patient. If breathing and pulse are absent, Immediately re-initiate the ASSESSING mode.
4. If, at any time, a shock must be aborted, immediately press the ON button or specific disarm button.
    - a. to reinitiate the assessing mode, push the ON button again.
  5. Upon the arrival of the ALS unit, give a patient report including patient condition and therapy delivered.
    - a. If the AED is in the process of delivering shocks, the AED Should not be disconnected. (The AED will deliver a shock Faster than a manual defibrillator and should always be allowed to complete its cycle).
      - 1) Prepare monitor/ defibrillator for use.
      - 2) Apply EKG electrodes to the patient when the AED is in the monitoring mode. Announce when a tracing appears on the EKG monitor, then turn the AED off.
    - b. If the AED is in the monitoring mode upon arrival:

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- 1) Prepare monitor/defibrillator for use.
  - 2) Apply EKG electrodes to the patient when the AED is in the monitoring mode. Announce when a tracing appears on the EKG monitor, and then have the AED operator turn off the AED.
  - c. Continue CPR, if warranted, while the interface is being accomplished.
- C. Precautions:
1. Do not intervene with patient care until the AED operator indicates that the time is appropriate. The AED operator is trained to know all of the safety aspects of the AED.
  2. In all cases, the manual monitor/defibrillator should be attached before the AED is disconnected.