Performing Transcutaneous Pacing

Prepare the patient
Make sure the patient understands the procedure. Sedation may be necessary to improve tolerance of transcutaneous pacing.

Clean and dry skin
If hair prevents good pad contact with the skin, shave the area before applying pads. Be sure to avoid breaking the skin. Follow the manufacturer's directions on the pad pouch.

Apply pads
Apply pads to the patient, preferably using anterior-posterior placement. Do not reverse the pads. Connect the pads to the defibrillator/monitor.

Capture the heart rate
Start the pacer. Increase the output (mA) until pacer spikes are visible in front of each QRS complex and capture has occurred. Then, decrease the output to the lowest level that still maintains capture.

Evaluate the patient
Did the patient improve with capture? Evaluate BP, SpO₂, and pulse rate. If hemodynamic monitoring is available, evaluate stroke volume and SvO₂.

NOTE: Capture alone does not guarantee the cardiac output has improved.

Anterior-Posterior Placement for Pacing (Standard)

Anterior-Apex Placement for Pacing (Optional)

Demand (synchronous) mode is the preferred means of pacing as it paces only when the patient's heart rate falls below a level set by the clinician. This mode avoids problems such as a pacer impulse landing on a T-wave and possibly causing a ventricular dysrhythmia.

Fixed (asynchronous) mode paces at the rate set by the clinician regardless of the patient's heart rate. This mode is not the preferred means of pacing and is usually reserved for when (1) the pacer cannot sense the heart rate or (2) when motion artifact prevents the pacer from sensing the heart rate.
**About Transcutaneous Pacing**

Transcutaneous pacing is the technique of electrically stimulating the heart externally by using a set of electrode pads. This technique is not as efficient as transvenous pacing because the electrical stimulus (the pads) is not in direct contact with the heart muscle. Transcutaneous pacing is a good temporary solution in an emergency situation to improve a slow heart rate resulting in inadequate cardiac output.

**Key Points**

### Obtaining capture

Increase the output (mA) until the pacer spike is seen in front of the QRS complex.

The amount of mA used varies per patient. Increasing the mA slightly above where capture is obtained may help prevent the loss of capture.

**Troubleshooting**

If the pacemaker spike is not in front of each QRS complex, then one of two problems may exist.

1. **Failure to capture**
   - Failure to obtain capture occurs in demand and fixed mode. Increasing the output (mA) may obtain capture. Be sure the pads have good skin contact. Check for correct pad placement.

2. **Failure to sense**
   - This problem occurs in demand mode only and is seen when the pacemaker discharges immediately after the patient's own QRS complex (the discharge occurs in the refractory period of the heart). In this case, the pads are not sensing the patient's heartbeat. Select a different monitoring lead or reposition the pads. Fixed pacing may be indicated.

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**Emergency Indications**

1. Slow heart rates (bradycardias) that produce unstable hemodynamics (e.g., low blood pressure, stroke volume, SvO₂)
2. Slow heart rates (particularly escape rhythms) that do not respond to drug therapy
3. Any condition as a temporary measure in preparation for a transvenous pacemaker
4. Non-emergent indications
   a. Overdrive pacing (when drugs and electrical cardioversion have failed)
   b. Heart blocks in the presence of myocardial infarction

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**Patient Preparation**

- **Psychological**
  - Educate patient about possible discomfort with pacing.
  - Instruct patient and family that muscles will twitch with each pacemaker beat.

- **Sedation**
  - If sedation is needed (a normal occurrence), be prepared to initiate when pacemaker is activated.
  - Discomfort may not be noticed until higher mAs are used.
  - Sedation should be for a targeted level (e.g., Ramsey of 2-4).

- **Skin**
  - Prepare skin for pad placement (cleaning and shaving, if necessary). Be sure to avoid breaking the skin while shaving.
  - Check skin routinely to avoid severe skin irritation.
  - If patient's condition allows, move pad placement as necessary to protect skin.

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**Patient Care**

- **Patient Oriented**
  - Evaluate pads for comfort.
  - Instruct patient and family that muscles will twitch with each pacemaker beat.

- **Pacemaker Oriented**
  - Routinely ensure that the pacemaker is capturing the heart rate with each discharge (check for a pulse with each pacer spike).
  - Identify the length of time the pacemaker is to be used.
  - Keep in mind that transcutaneous pacing is only temporary, usually less than a few hours.