

## Clinical Information

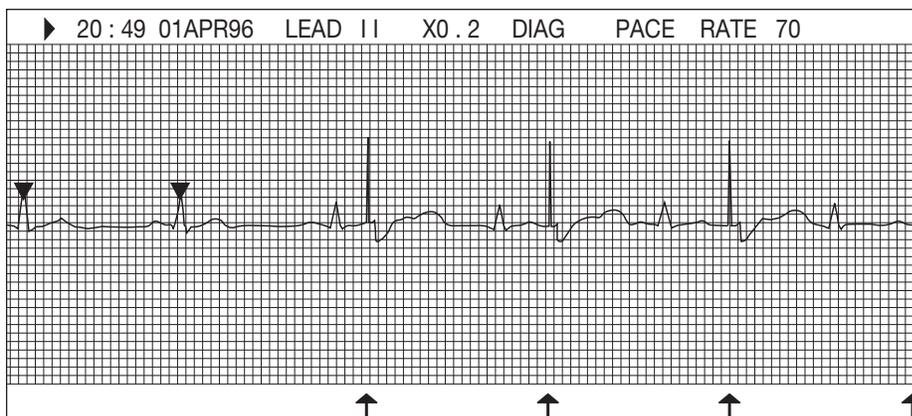
### Demand Pacemakers “See” the Heart’s Electrical Activity

Fixed-rate (non-demand) pacemakers gave way to demand pacemakers because the latter had one tremendous advantage: demand pacemakers do not compete with the heart’s intrinsic electrical activity; they deliver pacing pulses only when the heart fails to produce its own beat. The demand pacemaker’s ability to “sense” the heart’s intrinsic activity causes it to withhold delivering a pace pulse (i.e., be “inhibited”). Not sensing intrinsic activity permits delivery of the pulse.

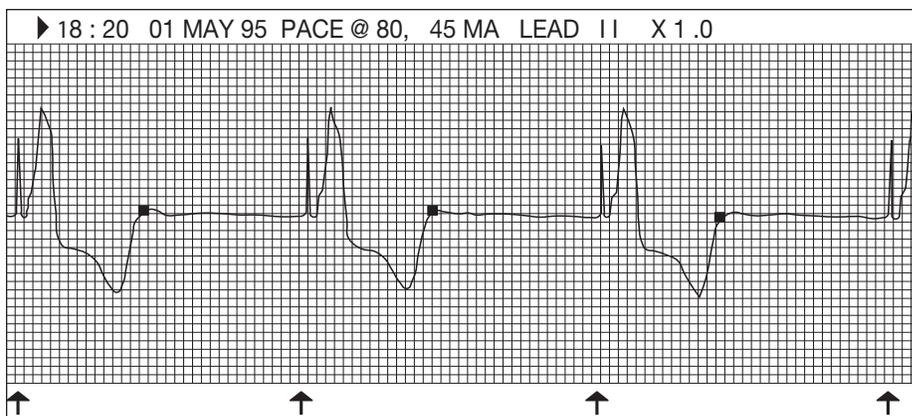
Problems with sensitivity are caused by either undersensing or oversensing. Undersensing occurs when the pacemaker does not sense intrinsic cardiac activity that is present and delivers a pace pulse when it shouldn’t. To correct undersensing, you can select another ECG lead that shows larger QRS complexes. If that doesn’t work, try repeating skin prep and reapplying the ECG electrodes in the same spot or repositioning the ECG electrodes on another area of the patient’s chest. These measures change the appearance of the ECG signal on the monitor.

Oversensing is inappropriate inhibition of a demand pacemaker due to detection of signals other than R-waves, such as muscle artifact or T-waves. When oversensing occurs the pacemaker will not maintain the set pace rate and may not deliver any pace pulses. To correct oversensing, select another ECG lead or reposition ECG electrodes so the QRS complexes are smaller. It may be necessary to select the non-demand pacing mode if all other troubleshooting measures fail.

It is not difficult to master the basics of external pacing, but it does take a little practice. Actual experience is not common to all care providers since many do not have a need to frequently operate an external pacemaker. Retraining is simple with a patient simulator and training electrodes from the manufacturer.



**UNDERSENSING:** First two complexes are sensed (note the sense markers in the QRS complexes). Remaining QRS complexes are not of sufficient amplitude to be detected. Pacemaker fires even though patient’s intrinsic rate is above the set rate. (The arrows at the bottom of the ECG strip indicate delivered pace pulses.)



**OVERSENSING:** The set rate is 80, but the actual pace rate is 45. Note sense marker on the T-wave, which inappropriately inhibits the pacemaker and resets the timing cycle.



**Physio-Control, Inc.**  
11811 Willows Road NE  
P.O. Box 97006  
Redmond, WA 98073-9706 USA  
Tel 425 867 4000  
Toll-Free (USA Only) 800 442 1142  
Fax 425 867 4146  
[www.physio-control.com](http://www.physio-control.com)