

**PHILIPS**

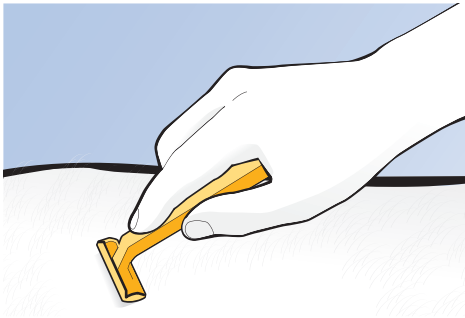
Clinical Services

Learning series

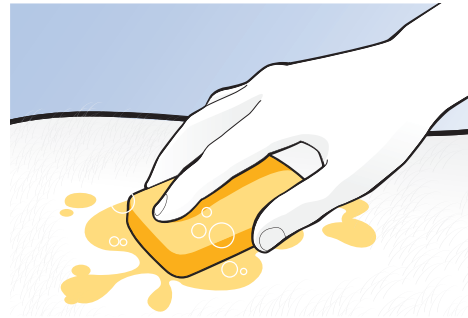
# Improving ECG quality\*

The quality of your ECG diagnosis depends on the accuracy of the ECG signal. This in turn relies on making a good electrical contact, and placing the electrodes correctly. This document gives you tips on how to prepare the patient, place the electrodes, and recognize and react to common issues.

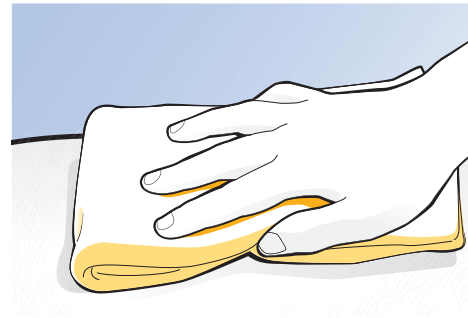
## Preparation



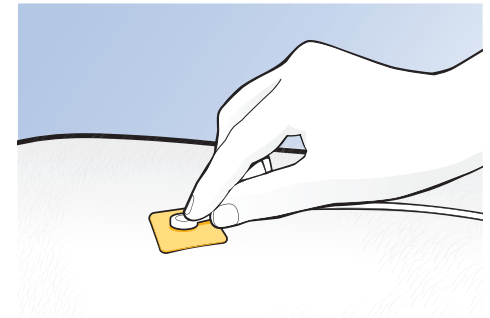
**1.** Shave areas with dense hair (if necessary and your hospital procedures allow). Cut hair close to the skin to minimize risk of skin injuries from the razor.



**2.** Wash the isolated area with soap and water.



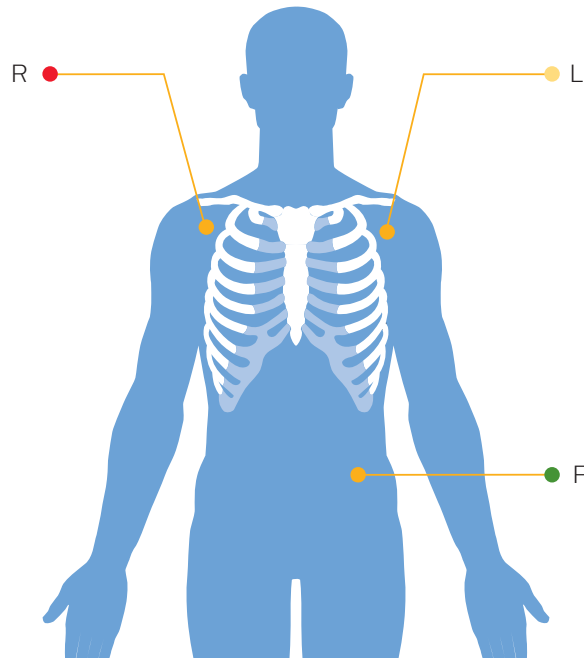
**3.** Wipe the electrode area with a rough washcloth or gauze, or use a fine grain sandpaper to roughen a small area of the skin. Do not use alcohol for skin preparation; it can dry out the skin.



**4.** Apply a full set of fresh disposable electrodes to prepared sites. Change daily or as often as needed.

# Placement

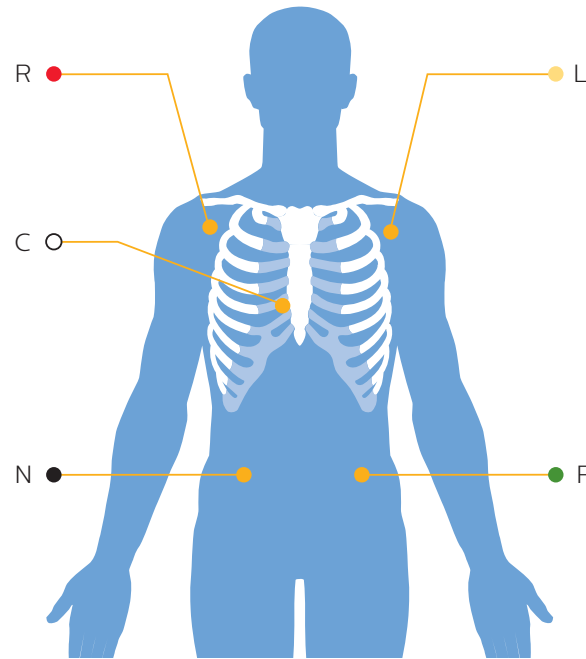
## 3 lead placement



### Limb electrode lead placement

- R Directly below the clavicle, near the right shoulder
- L Directly below the clavicle, near the left shoulder
- F Just below umbilicus, left midclavicular line

## 5 lead placement



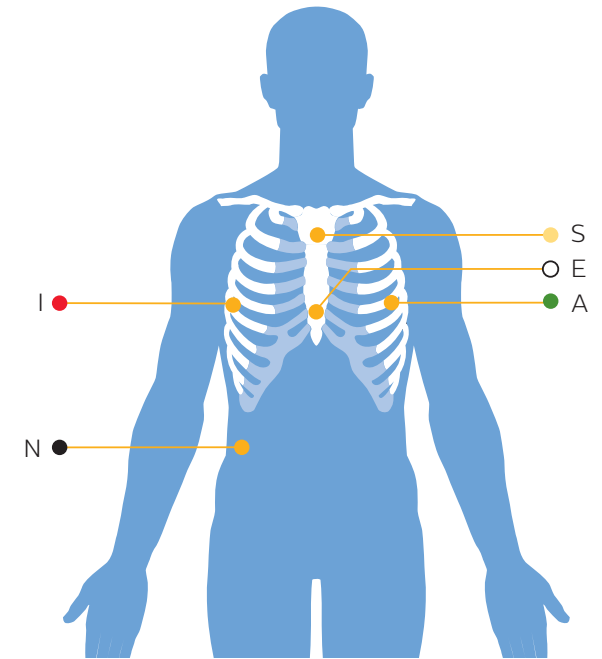
### Limb electrode lead placement

- R Directly below the clavicle, near the right shoulder
- L Directly below the clavicle, near the left shoulder
- N Just below umbilicus, right midclavicular line
- F Just below umbilicus, left midclavicular line

### Chest electrode placement

- C Fourth intercostal space at right border of sternum

## EASI lead placement



### Chest electrode placement

- E On the lower sternum at the level of the 5th intercostal space
- A On the left midaxillary line at the same level as the E electrode
- S On the upper sternum
- I On the right midaxillary line at the same level as the E electrode
- N Reference electrode – can be anywhere, usually below the 6th rib on the right hip

# Troubleshooting signal quality

## Power Line Interference (50/60 Hz Interference)



Regular sawtooth baseline with exactly 10 peaks every 5 mm at 25 mm/sec. (50 Hz) or 12 peaks every 5 mm at 25 mm/sec. (60 Hz).

### Possible cause

Poor electrode placement.

Possible non-grounded instrument near patient.

### Solution

Reapply electrodes.

Disconnect electrical appliances near patient (one at a time) by pulling wall plugs, to determine faulty grounding. Have engineer check grounding.

## Muscle artifact



Fuzzy, irregular baseline.

Tense, uncomfortable patient.

Poor electrode placement.  
Tremors.  
Diaphoresis.

Make sure patient is comfortable.

Check that electrodes are applied on flat, non-muscular areas of the torso; reapply electrodes if necessary.

## Irregular baseline



Rough, jagged baseline.

Poor electrical contact.

Respiratory interference.

Faulty electrodes.  
Dry electrodes.

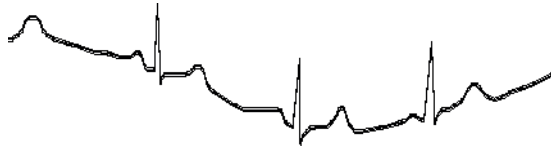
Reapply electrodes, using proper technique.

Move electrodes away from areas with greatest movement during respiration.

Apply new electrodes.

# Troubleshooting signal quality

## Baseline wander



Rhythmic up-and-down movement of the ECG baseline.

### Possible cause

Movement of the patient.

Improperly applied electrodes.

Respiratory interference.

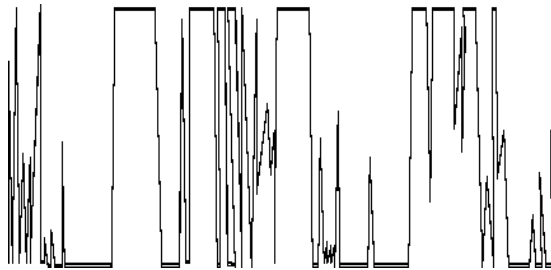
### Solution

Make sure the patient is comfortable.

Reapply electrodes. Check that patient cable is not pulling on electrodes.

Move electrodes away from areas with greatest movement during respiration.

## Poor electrode contact



Trace switching from high to low in steps.

Loose electrodes.

Defective cables.

Change all electrodes, using good skin prep.

Replace cables.



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