



*"Advanced SOLUTIONS for
Physiology Teaching and Research"*



Tech Note

EEG Electrodes

One of the keys to recording good EEG signals is the type of electrodes used. Electrodes that make the best contact with a subject's scalp and contain materials that most readily conduct EEG signals provide the best EEG recordings.

Some of the types of electrodes available include:

1. Reusable disks. These electrodes can be placed close to the scalp, even in a region with hair because they are small. A small amount of conducting gel needs to be used under each disk. The electrodes are held in place by a washable elastic head band. Disks made of tin, silver, and gold are available. They can be cleaned with soap and water or Cidex. The cost of each disk and lead is dependent on the type of metal used as a conductor, the gauge of wire used as a lead, and the type of insulation on the wire lead. Since these electrodes and leads can be used for years, their expense is low. For example, a set of 5 silver/silver chloride disks with silicone-coated lead wires, Tac-Gel, and a headband is available from iWorx for \$90.00/set (Part No. A-E-264).

2. EEG Caps with disks. Different styles of caps are available with different numbers and types of electrodes. Some caps are available for use with replaceable disks and leads. Gel is injected under each disk through a hole in the back of the disk. Since the disks on a region of the scalp covered with hair cannot be placed as close to the scalp as individual disc electrodes, a greater amount of conducting gel needs to be injected under each. After its use, more time is required to clean the cap and its electrodes, as well as the hair of the subject. Depending on the style and longevity of the cap and the electrodes, their expense can be moderate to high.

3. Adhesive Gel Electrodes. These are the same disposable silver/silver chloride electrodes used to record ECGs and EMGs, and they can be used with the same snap leads used for recording those signals. These electrodes are an inexpensive solution for recording from regions of the scalp without hair. They cannot be placed close to the scalp in regions with hair, since the adhesive pad around the electrode would attach to hair and not the scalp. When purchased in bulk, their expense is very low.

4. Subdermal Needles. These are sterilized, single-use needles that are placed under the skin. Needles are available with permanently attached wire leads, where the whole assembly is discarded, or sockets that are attached to lead wires with matching plugs. Since they are a sterile single-use item, the expense of needle electrodes is moderate to high. Also, human subjects and, in some situations, regulatory committees need to approve the use of these electrodes before they are used.

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