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Article

Hearing aid Battery Life

By Chris Perkins

How long will my hearing aid batteries last?

I bet you wish you had a dollar for every time you heard that question. So, what do you tell your patients when they want to know? Do you look at a chart, or take an educated guess? Just how can you tell how long a hearing aid battery will last anyway?

And even more importantly, what do you tell your patients that complain that their hearing aid batteries don't last long enough? How can you verify there is indeed a problem, or that maybe the patient has unrealistic expectations.

Thankfully, there is an easy way to tell how long hearing aid batteries will last in any hearing aid, but first you need to understand a little about how hearing aids work with different types of batteries.

The common factor in all hearing aids:

Whether you are working with an older linear hearing aid, a brand new digital instrument, or anything in-between, there is one common element. They all get their power to function from a hearing aid battery. Every electronic circuit needs some sort of power or energy source to operate – and for hearing aids, it is of course the battery. Now, when you turn the hearing aid ON, it uses the energy stored in the battery. Hearing aids need a certain amount of energy in order to operate, and the circuit will continue to operate until the stored energy in the battery is not sufficient to operate that hearing aid circuit any longer.

If you want an uncomplicated analogy, think of a hearing aid as your car, and the battery as a tank of gas. You start off with a full tank, but as you drive around town the gas in the tank is used for energy to run the car, and once the tank is empty the car stops. You've run out of gas, just like a hearing aid battery runs out of energy to operate a hearing aid.

There are factors which impact how far you can drive on a tank of gas. How economical the car is, the size of the gas tank, if you leave your car parked with the motor running. The same is true for hearing aids. Some low amplification circuits use less energy, while some high gain – high power circuits use a lot more. The size of the battery matters too, as this directly correlates to how much energy can be stored in the battery. And of course if you leave the hearing aid ON while it sits on the dresser overnight you will waist battery life. We'll talk more about the energy stored in the battery in a minute.

So how can you tell how long the hearing aid battery will last?

First, we need to measure what is commonly referred to as Battery Drain. It is actually the amount of electronic current the hearing aid needs to function, and it can easily be measured using a battery drain meter. The drain meter typically plugs into the hearing aid through the battery compartment using a special connector called a battery pill, or battery sub. If you've never seen one you can view here:

<http://www.lightningenterprises.com/bdm.html>

To get an accurate reading from the drain meter, you must first turn the hearing aid ON and adjust the volume control of the hearing aid (if it has one) to approximate user level. Then simply plug the hearing aid into the drain meter and read the result on the display. Make sure the hearing aid is not whistling or feeding back. This can cause some hearing aid circuits to use more power, and therefore skew your measurement. Plug the sound outlet port with if necessary to keep the hearing aid from feeding back during measurement.

What is this Battery Drain Reading Mean?

The number you see on the display is the amount of electronic current the hearing aid is using to function. It is displayed in milliamps, or 1000ths of an ampere if you want to get technical. And, this is the mystical number you will use to calculate how long your customer's hearing aid battery will last.

One more factor

Size matters when it comes to hearing aid batteries. Just like the gas tank in your car, the larger the tank, the further you can drive before filling up. A size 13 battery stores more energy than a size 312, which stores more energy than a size 10A. So, this is going to be a factor in calculating how long the battery will last in a hearing aid. This stored energy has a value called milliamp hours. And though this value may differ depending on battery manufacturer, there are some default values you can use for your calculation. You can also get the milliamp hours from the battery packaging.

Here are the default values depending on battery size:

Battery Size:	Milliamp Hours:
675	600 mah
13	260 mah
312	130 mha
10A	70 mah
5A	35 mah

The Calculation

Now we have all the information we need to determine how long your customer's hearing aid batteries will last. Divide the Battery Capacity in milliamp hours (determined by the battery size) by the Battery Drain of the hearing aid. This will give you the approximate total number of hours the hearing aid battery should last in that particular hearing aid.

Next, divide the total number of hours by the number of hours the user will wear the hearing aid during the day.

Example: You want to calculate how many days a battery will last in an ITE instrument using a 312 size battery. You have measured the Battery Drain at .75 ma and we will use the default Battery Capacity from the table above which is 130 mah. We will assume the user is wearing the hearing aid 16 hours per day.

Total Hours (TH) = Battery Capacity (BC) / Battery Drain of Hearing Aid (BD) =
 $130 / .75 = 173.33$ Total Hours.

Total Days (TD) = Total Hours (TH) / Hours worn per day (HW) =
 $173.33 / 16 = 10.83$ Days.

About the Author

Chris Perkins is the owner of Lightning Enterprises, and facilitates the Lightning Enterprises newsletter. He has worked in the hearing aid industry since 1991 in hearing aid manufacturing and product development, as well as equipment and process consulting.