Episode Book

EPISODE #6118

What NRR Actually Means for Your Ears

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SYNOPSIS

Every hearing protection box promises big numbers, but what do those ratings actually mean for your ears? This episode breaks down the gap between lab-tested NRR ratings and real-world protection, why custom earplugs lose 70% of their stated attenuation, and the logarithmic scale that makes "25 dB reduction" sound like a sixth as loud. From shooting range muffs to Loop earplugs designed for neurodivergent users, we explore how to match the right protection to the right situation — and when reaching for maximum attenuation is actually the wrong call.

TRANSCRIPT



Corn

Every buying guide for hearing protection says the same thing. Find the biggest number on the box and buy that one. Thirty three, thirty four, the higher the better, because more protection is more protection.



Herman

Which is fine advice if your job is breaking concrete.



Corn

And it's bad advice for almost everybody else, which is where Daniel comes in. He was trying to set up a new work repository this afternoon, somebody started drilling, and his brain went off after the drill and wouldn't come back. So he grabbed his shooting range earmuffs, the big ones, rated thirty four, put them on, and his first reaction was, and I'm quoting, "whoa, that's too much." Eerily quiet. More than he needed.



Herman

I love that reaction, because it's correct.



Corn

He calls it his armory, and I like that, because that's what it is. Every weapon he's built up against noise over the years. The range muffs, custom silicone earplugs he had made for sleeping, a pair from Alpine that are actually designed with neurodivergent people in mind, and Loops. What he wants is to understand them well enough to know which one goes on when. Plugs versus muffs, what the numbers really mean, whether there's anything adjustable, and the worry underneath all of it, which is whether leaning on these every day makes him less able to tolerate normal noise.



Herman

And when Ezra's home, he doesn't want to wall himself off, but the screaming goes straight through him.



Corn

Straight through a thirty four, presumably.



Herman

Nearly, yes, and we'll get to why. The number first, because the number on the box is the least understood thing in this whole category. NRR, noise reduction rating, is the American label. It's measured in a lab, on trained people, with the protector fitted perfectly by someone who knows what they're doing. It's a best case.



Corn

So the thirty four is the protector on its wedding day.



Herman

Pretty much. And the regulators know it. The American workplace safety people have a formula where you take the rating, subtract seven, and halve it. Run Daniel's muffs through that and thirty four becomes about thirteen and a half decibels of real world protection.



Corn

Thirteen and a half. That's a long way down from thirty four.



Herman

That formula is deliberately pessimistic, to be fair. The other federal agency, the one that does the research, uses a gentler correction that depends on the type of device. Earmuffs lose a quarter of their rating. Foam plugs lose half. Every other kind of plug, including premoulded ones like Loop and custom moulded ones, loses seventy percent.



Corn

Wait. Seventy percent off the custom ones? The ones made from a mould of your actual ear?



Herman

That's the part that surprises people, and it's not that custom plugs are bad. It's that plugs are only as good as the seal on the day, and the seal varies enormously. Earmuffs win on consistency. A cup over the ear goes on the same way every time, so a thirty four muff realistically gives you something like twenty five. A plug might give you its full rating or a third of it depending on how you pushed it in.



Corn

Which explains why my brother has never once worn earmuffs properly.



Herman

My ears do not fit in the cup, Corn, that is a design flaw in the earmuff industry, not in me.



Corn

They fit in about a third of the cup.



Herman

The rest of me is very well protected. Okay, the other thing you need is what a decibel feels like. The scale is logarithmic. Ten decibels of reduction sounds roughly half as loud. Twenty sounds about a quarter as loud. So Daniel's muffs, at a realistic twenty five, make the world sound something like a sixth as loud as it is.



Corn

Which is the eerie part. Not silence. A sixth.



Herman

And there's a ceiling, which is why he'll never find a fifty. Passive earmuffs top out in the low to mid thirties on the label. Foam plugs top out around thirty three. Past that, sound simply goes around the protector, through your skull, straight to the inner ear. Bone conduction caps total protection somewhere between forty and sixty decibels depending on the pitch, no matter what you wear.



Corn

What if you wear both? Plugs and muffs. Thirty plus thirty.



Herman

Everybody hopes it adds up. It doesn't. You get somewhere between nothing and fifteen extra decibels over the better of the two, and almost nothing right in the middle of the range where speech sits. Put a twenty six plug under a thirty four muff and at a typical speech frequency you get maybe forty five.



Corn

For people living in Israel, does the American label even matter? It's not what's on most of the boxes here.



Herman

Good catch. Europe and Israel mostly use SNR, single number rating, under the European standard. It's usually a few decibels higher than the NRR for the same product, although with Loop the gap is huge. Their Quiet model is twenty four SNR and fourteen NRR. Same earplug, ten decibels apart depending on which continent printed the box.



Corn

That's not a rating, that's an exchange rate.



Herman

The European boxes also print three smaller numbers, H, M and L, for high, mid and low frequencies. L is the one Daniel should look at. A low L means the thing is weak against rumble, like a lorry idling outside or the deep thud of a breaker.



Corn

Here's my problem with all of this, though. I hear "twenty five decibels" and I still don't know if that's a lot for the situation I'm in. Can you give me the ladder? What does fifteen feel like, what does twenty five feel like?



Herman

Yes, and this is the most useful thing we'll say today. Around fifteen, you're taking the edge off. Conversation stays easy, music sounds like music. That's Loop Engage territory, about sixteen on the European scale, and the old musician's filters rated at fifteen. Around twenty to twenty five, speech starts to take effort and background chatter mostly stops being words. That's Loop Quiet at twenty four, the Loop Switch on its strongest setting at twenty six, and the Alpine focus range, which comes in twenty two to twenty four depending on the filter you fit. Thirty and up is construction. Foam plugs. Daniel's range muffs.



Corn

So he reached for the top rung for a job that probably wanted the middle one.



Herman

For a drill on the other side of a wall, honestly, the top rung isn't crazy. A hammer drill is somewhere between a hundred and five and a hundred and sixteen decibels at the tool. Through a wall, much less. But the drill is the one case in his week where I'd say the big muffs are the right call, partly because of what they do to the noise and partly because of what they do to his day. Muffs go on in two seconds and off in two seconds. The moment the drill stops, they come off.



Corn

Do you think that's actually what he does, though? Takes them off when it stops?



Herman

I'd guess not. I'd guess they stay on because the quiet feels good. And that's the question I want to get to properly, the dependence one.

L

Larry

Thirty four. Close your eyes. The world... falls away. A whisper of nothing. The silence of a man who has stopped returning calls. Velvet. Midnight. A single drill, somewhere very far from you, drilling for someone else. Attenuation, by Larry. The quilted cranial cosy. Hand stitched, gently padded, generously sized to cover your ears, your eyebrows, and with practice, your obligations. Machine washable. Not suitable for hearing. Attenuation. Because you were never really listening.



Corn

Does it come in a smaller size?



Herman

Corn, it's a tea cosy. You'd be wearing a tea cosy on your head in a café. Okay. The dependence worry. Daniel's instinct here is right, and there's a real mechanism behind it. Your auditory system has a volume knob in the brain, people call it central gain. If you take sound away for long stretches, the brain turns the knob up to compensate.



Corn

It goes looking for the sound it's missing.



Herman

That's a good way to say it. The cleanest demonstration is an American study from two thousand three. Healthy volunteers wore earplugs in both ears, around the clock, for about two weeks. Afterwards, sounds were judged louder than before. They were rating sounds as uncomfortably loud at levels five to nine decibels lower than they had at the start. The same group showed the reverse with low level noise generators worn for the same period. Add quiet sound and the knob comes down.



Corn

Two weeks, around the clock. That's not the same as Daniel wearing muffs for an hour while someone drills.



Herman

No, and that distinction matters a lot. Nobody is saying an hour of muffs during a jackhammer rewires you. What hearing clinicians warn about is the pattern where protection creeps from the loud situations into the quiet ones. You wear plugs in the café, then on the bus, then at home in the evening when nothing's happening, because the absence of sound has become the thing you're seeking rather than the absence of the drill. There's a well known case report describing a spiral from overprotection to hyperacusis to genuinely being afraid of sound, and in the extreme version, people end up housebound.



Corn

Is Daniel's thing even hyperacusis, though? I'd have guessed it's more the ADHD side. The drill isn't hurting him, it's stealing him.



Herman

I think you're mostly right, and it's worth separating three things that get lumped together. Hyperacusis is when ordinary sound feels too loud or painful. That's a gain problem, and overprotection makes it worse. Misophonia is when specific sounds, chewing, breathing, trigger anger or disgust at any volume, and attenuation does surprisingly little for it. And then there's distractibility, where a sound at a perfectly normal level pulls your attention away and won't let it go. That's what Daniel described this afternoon, and for that one, a thirty four is overkill. A fifteen to twenty plus something steady to listen to usually does the job.



Corn

Something steady meaning noise.



Herman

Meaning soft, continuous sound. Which is exactly what the clinicians recommend for the gain problem too. Protect when the sound is genuinely loud or the situation is genuinely overwhelming, use the least attenuation that works, don't protect in quiet rooms, and keep some low level sound around rather than chasing silence.



Corn

Where does that leave the sleep plugs? That's eight hours a night, every night. Around the clock, at least a third of the clock.



Herman

That's the fair question, and I'm not certain of the answer. The study had people plugged during the day too, while they were living their lives. Sleeping in a quiet bedroom with plugs is a smaller deprivation, because the bedroom is mostly quiet anyway. I'd keep them, and I'd notice if the daytime starts feeling louder.



Corn

The other daily cost is the one Daniel flagged himself. The ear canal.



Herman

Yes, and we've talked about earwax and plugs on the show before, the short version being that a plug blocks the ear's own conveyor belt. That still stands. The American family doctors' review lists earplug style protectors among the physical barriers that go with wax impaction, though nobody has properly studied people who wear them every day. So muffs do have a real point in their favour for daily use. They don't go in the canal at all. They trap heat, they press on your head, and if you wear glasses the arms break the seal and you lose a good chunk of the protection. But no wax, no irritation, no infection risk.



Corn

Clean plugs, dry ears, and Alpine, I notice, says don't wear their plugs more than eight hours at a stretch.



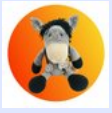
Herman

Which is the manufacturer quietly agreeing with Daniel.



Corn

Adjustable. He asked whether anything lets you dial it in to the situation. Is there?



Herman

More than there used to be. The simplest is the Loop Switch, which has a little dial on the earplug itself. Three settings, roughly twenty, twenty three and twenty six on the European scale. It's not a huge range, but it's the right range for a person whose day goes from café to home office to toddler. Alpine's custom focus plugs do it with swappable filters instead of a dial. And then there's the category I think Daniel should look at for Ezra, which is electronic level dependent earmuffs.



Corn

The shooting ones with microphones on the outside.



Herman

Those. They pipe quiet sound in through microphones, so you can hear someone talking normally, sometimes better than without them. When sound gets loud, they clamp down. The clamp usually kicks in around eighty two to eighty five decibels. Now think about a toddler. A screaming sixteen month old at close range is somewhere around a hundred to a hundred and twenty decibels.



Corn

I have heard Ezra at a hundred and twenty. I have heard him at a hundred and twenty from the other side of the flat.



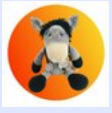
Herman

And I believe you, and as a former pediatrician I can confirm the human scream is engineered for exactly that. There's a lovely study from two thousand fifteen showing screams carry a fast rattling quality in the loudness, a roughness, that ordinary speech avoids and alarms share. It goes straight to the brain's alarm circuitry. That's why it gets through even when it's quieter. Through realistic muffs at twenty five, a hundred and ten decibel scream is still about eighty five. A busy street, in your ears.



Corn

So the level dependent ones let him hear Ezra say a word, and clamp the scream.



Herman

That's the idea. The downside is they look like what they are, shooting gear, and the cheaper ones hiss. Apple's newer earbuds do a version of this too, the protection rises as the room gets louder, but Apple themselves say it's not meant for impulse sounds like jackhammers. For a scream I'd want to test it before I trusted it.



Corn

And for the house in general, when Ezra's just being Ezra, not screaming?



Herman

Something low and flat. Loop Engage, or the Switch on its lowest setting. You want his voice to still sound like his voice, just with the edges filed. Foam is the wrong tool there, because foam blocks the high frequencies far more than the low ones, so everything sounds muffled and boomy, and a kid's voice ends up sounding like it's coming through a wall.



Corn

Daniel's instinct this afternoon was that the muffs were too much. I think the instinct was right but he picked the wrong reason. They weren't too much for the drill. They were too much for the hour after the drill.



Herman

That's fair. And the hour after is when the knob in the brain is quietly turning. Although... plugs and muffs together, I want to go back to that, because the forty five I gave you was...



Hilbert

Forty one. Twenty six plug, thirty four muff, one kilohertz. It's forty one. You said forty five, Herman. You say forty five about most things.



Herman

Forty one. Fine.



Hilbert

I had this conversation once on a sleeper train from Belgrade to Bar. Two thousand eight. I was going down to look at a hotel kitchen, I did catering contracts then. The man in the next berth was called Dragan Vukovic. He sold industrial door seals. Rubber gaskets, for cold stores, abattoirs, recording studios. He had a theory that you should always buy the



Hilbert (continued)

strongest seal available. He'd sealed his own bedroom door so well that when he shut it, his ears popped. His wife moved into the kitchen. He said it was the best sleep of his life.



Corn

Did she get the kitchen sealed as well?



Hilbert

She didn't want it sealed. That was the whole dispute. Anyway, he travelled with a door. An actual interior door. Panelled, pine, wrapped in a quilt, in the corridor of the sleeper carriage. He'd booked it a ticket. It had its own berth, the top one, he slept underneath it. Every hotel he stayed in, he unscrewed their bathroom door and put his on, because their doors let in the corridor. The conductor knew him. The conductor called the door Milan.



Herman

The gasket on a door like that would equalise slower than the carriage. He'd feel every tunnel.



Hilbert

He felt every tunnel. He said it was the price of quality. What happened was, he sealed Milan onto our compartment that night, because the corridor was full of men playing cards, and he slept through Bar. Slept straight through. The train went to the end of the line, turned round, went back up to Podgorica, and came down again. He missed Bar twice. Couldn't hear the announcements. Couldn't hear the conductor banging on Milan. They had to get the attendant to take the hinges off from the outside, and the attendant's screwdriver didn't fit, because Dragan used his own screws.



Corn

Which you'd have to, if you're going to bring your own door.



Hilbert

He said the same. He wasn't embarrassed. He just took a hand drill out of his bag, the old kind with a crank, and drilled a hole in Milan, low down, by the handle. A hole on purpose. He measured it first. I've still got the offcut of his gasket. It's round my fridge door. The fridge is on the socket behind the bread bin, on a timer I fitted, and I had to cut the gasket down twice because it's made for doors twice the size and my claws are no good with a craft knife. Doesn't let a sound in. Hums, though. The fridge hums.



Herman

That's the compressor, the gasket wouldn't stop that.



Hilbert

That's what Dragan said. He said you don't seal against the thing you live with. He sent me a postcard about the hole. It was eleven millimetres. He said ten was too quiet and twelve let the card players in.



Corn

Eleven millimetres. He measured it first.



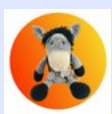
Herman

Hm.



Corn

Let me try to build the actual list, because Daniel asked for something he can use. The drill next door. Range muffs, because they go on and off in seconds and the fit is the same every time. And they come off when it stops.



Herman

Yes. Even if the quiet feels nice. Especially if the quiet feels nice.



Corn

Home, Ezra around, normal volume. The lowest, flattest thing he owns. Loop Engage, or the Switch on its bottom setting.



Herman

And if the screaming phase is bad, try electronic level dependent muffs. Hear the words, clamp the scream.



Corn

Working and needing to think, at a desk, with background noise but nothing structural. The middle rung. Twenty to twenty five. The Alpine focus plugs or the Switch on the top setting, with something soft playing.



Herman

Sleeping, the custom silicone ones, kept clean, and if daytime starts sounding louder than it used to, that's worth paying attention to rather than reaching for a bigger number.



Corn

And plugs plus muffs together only for the genuinely extreme stuff, knowing it buys him less than he thinks.



Herman

About forty one.



Corn

About forty one. Do you think he should get rid of the thirty fours?



Herman

No. I'd keep them for the drill. What would you do?



Corn

I'd keep them by the door, not by the desk. Where they live decides when they get worn.



Herman

That's actually good. Cutting room floor, one thing I didn't get to. Loop started in Antwerp in two thousand sixteen, two childhood friends, originally for concerts. The Victoria and Albert Museum has a pair in its collection, because the founders wanted earplugs to read like sunglasses, part of an outfit. And there's a Swarovski edition. Twelve crystals. On an earplug.



Corn

Hearing protection you can lose in a nightclub and feel genuinely bad about.



Herman

The bit I'd leave Daniel with is that the armory is well stocked. He's not short of weapons. He's short of the habit of choosing the smallest thing that works and taking it off when the job's done.



Corn

Eleven millimetres, more or less. Thanks as ever to our producer, Hilbert Flumingtop, for keeping all of this running.



Herman

This has been My Weird Prompts. You'll find every episode, and the back catalogue on all of this sensory stuff, at my weird prompts dot com.



Corn

See you tomorrow.