

## Resonance Boards

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The idea of using hollow resonating boxes or platforms to help deaf people perceive sounds as vibrations has been known for centuries (Lane, 1984). You may have seen teachers in programs for deaf students stamp their feet on wooden classroom floors to get the students' attention. One of the leading classical musicians in the UK, Evelyn Glennie, is a percussionist who is profoundly deaf and partly "feels" the music through the wooden platforms on which she stands to perform (*The Evelyn Glennie Home Page*). This idea was introduced into the world of visual impairment and blindness when Lilli Nielsen began to promote the use of resonance boards by children who had visual impairments and additional difficulties (Nielsen, 1992). Then, in the later 1980s, people involved with children who are deaf-blind took up the idea, and it is now possible to find these simple but useful pieces of equipment in all kinds of programs and in homes (Johnson, Griffin-Shirley, & Koenig, 2000). Every baby and infant should have access to a resonance board as part of their collection of toys and equipment since these boards offer great and exciting opportunities.

### How Do You Make a Resonance Board?

There is scope for creativity and variety in making a board, but the basic design is simple and requires only

rudimentary skills in carpentry. To make a board you will need the following materials:

- ◆ **A square piece of plywood at least 1/8 of an inch thick.** The thickness may vary depending upon who is going to be getting on the board. Remember that if the board is too thin it will split when an adult kneels on it, and if it is too thick it will not resonate very well. I suggest that you stand in a timber shop and hold sheets of plywood of various thickness vertically on the floor, then place your ear and the side of your head against them as you tap and scratch at each one to see what you think. A good size is 4 feet square, but this can be enlarged or reduced, again depending upon who is going to be using it. Too small a square and the resonant qualities will reduce dramatically; too large a square and the center of the board will sag and touch the floor when a person's weight is on it, seriously dampening the resonance. If the board is much bigger than 5 feet square then only tall, strong people will be able to lift and move it. I generally use 3-foot-square boards for babies and infants, and 4-foot-square boards for older children. As children with limited movement grow and get taller, I place them more diagonally on the board.
- ◆ **Four strips of 1-inch-x-1-inch wood** to be attached to the underside rim of the sheet of plywood (for example, on a 4-foot-square board each of these strips would need to be 3 feet 11 inches long). These can be glued around the underside rim, but if the board is likely to get a lot of use and a lot of lifting and moving around (in a school classroom rather than in a home), use glue plus nails or screws, tak-

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ing care to countersink the nails or screws into the surface of the plywood for safety. Some people are concerned that using nails or screws deadens the resonant quality of the board, but I have found this to be so slight that it seems negligible.

- ◆ *One can of furniture wax and a polishing cloth.*

### How Do You Finish and Maintain the Board?

Once the board is constructed, the upper surface and edges need to be made very smooth and safe by rubbing with sandpaper and then glasspaper. The final step is to apply two coats of furniture wax with a polishing cloth (hard work!) so that the finished surface is smooth, rather waterproof, and easy to wipe clean. You might like the idea of using scented wax polish (such as lavender) to add a consistent smell as an extra marker to identify the board. When I made my first board in 1985, I painted it black for good visual contrast and for saliva proofing. It was a beautiful job with undercoat and two coats of black gloss paint, but I found that these layers of paint deadened the resonant qualities of the board very significantly. Painting the board with clear varnish does the same, so it is best to stick to wax polish.

Maintenance needs depend upon the amount and intensity of use that the board gets. The board I used for years got a lot of use and so needed to be rubbed down with glasspaper and rewaxed two or three times every year. If you see parts of the plywood surface losing their sheen or bits of frayed wood or splinters, you urgently need to make repairs, at least to rewax with the polishing cloth until you have time to glasspaper it smooth again. To save storage space, it is best to keep the board upright against a wall (maybe behind a cupboard or a sofa), with the smooth surface towards the wall for protection.

### What Can You Use on the Board?

Toys and equipment to be used on the board depend entirely upon availability, safety considerations, and personal preferences (yours and the child's!). I recommend access to a variety of things that includes plastic and enamel plates and bowls, metal chains of various lengths and weights (such as dog choker collars), bunches of metal spoons or keys, rocking toys with bells inside (such as Chime Bird and Happy Apple), plastic or metal Slinkies, spinning tops, metal cans of all sorts, music boxes, drumsticks, large round pebbles, and vibrating and wind-up objects. Since my arrival in California from England in 2000, colleagues at the Blind Babies Foundation have introduced me to the idea of using more natural materials like pieces of smooth driftwood and piles of walnuts and pecans (still in the shell, of course!). My favorite object to use on the board is myself. I like to knock and scratch on

the board or talk and sing at it as a way of making contact with the child who is on it.

### How Do You Start Using the Board?

A child can be placed alone on the board or can use it with another child or with an adult in any safe, desired, or useful position. Standing and walking on the board barefoot can be fun, as well as sitting and lying down. Some children might enjoy being in their seat or standing frame on the board. For first-timers in the horizontal position the board can be a scary place in the beginning, so I often recommend spreading a towel over the board, so that it acts as a muffler to sounds and vibrations. The towel can be repositioned gradually as the child gets used to the sound and vibro-tactile qualities of the board, so that first bare feet touch the board, then the legs, then the butt, the torso and shoulders, and finally, if the child is happy and interested, you can remove the towel completely and expose the head to the bare wood. Some children may need days or weeks for this process, but others cope with it over the space of half an hour or so. Another idea is to begin with the child lying on the carpet with only his or her feet on the board. If sensitive feet are a problem you might want to reverse this position or just leave the child's shoes or socks on. You can place the board on carpet to minimize the resonance or move it to a hard floor surface like linoleum, tiles, or concrete to produce much more dramatic feedback. Sometimes a child on a chair, or in a wheelchair, or standing might like to interact with the board held vertically next to them (as you did in the timber shop when you first selected the wood).

### What Do You Do with the Board?

This is where all that hard work pays off and things get exciting! Use your imagination and the sky is the limit! You can work on an amazing range and variety of skills and activities using a board, including math, communication, large motor skills and mobility, fine motor manipulation, use of vision and hearing, tactile and visual search, turn-taking, anticipation, encouraging vocalizations and speech, problem-solving, sequencing, cause and effect, rhythm, and on and on. The special quality of the board is that any movement on its surface will produce amplified sound and matching vibration, and it will vibrate to music or voices aimed at it even if the sound-maker is not in direct contact with the wood. For children with deaf-blindness the amplified sound coming through the board might be important, but the vibration that accompanies the sounds will have an immense impact if the child is in direct contact with the board's surface, and this might be very motivating for them. Sometimes using a board can produce very interesting and surprising outcomes:

- A distractible and very active child who moves around the room a lot may choose to remain on the board because it is the place where all the interesting feedback happens, yet a very passive immobile child may become more active on the board because of the feedback it provides, and also because it has a smooth surface that reduces friction and makes sliding, bottom-shuffling, and back-scooting easier.
- A child with poorly coordinated movements might move less but move with more care and planning in order to produce specific feedback from the board, yet a passive and inactive child might be encouraged to move more because each arm or leg movement or turn of the head produces interesting feedback when he or she knocks the rocking toy, drags the metal chains draped across wrists or ankles, or just taps and kicks on the board directly.
- A very vocal child might be silent on the board in order to listen and attend, but a normally very silent child may vocalize in response to sounds and vibrations coming through the board.
- A child who does not normally use vision may look to see what is tapping or rocking on the board or may use vision to guide arm or leg movements to produce interesting feedback again.
- A child who dislikes using his or her hands to touch things might reach out to make sounds and vibrations happen again.
- Children who do not normally interact with other people in positive ways may attend, wait, look, touch, and take turns during tapping games on the board. Interactions with peers might be encouraged if children spend time together on the board. I have also observed in regular classrooms a board raised up onto a large table with the whole class sitting around it and playing games involving turn-taking, creating or accompanying music, or banging and chanting as part of a storytelling or drama session. Used in this way the board is an effective agent for including all the children in the class activity (Park, 2000).
- By traveling around the board in some way a child might discover the board's edges and use touch or vision to explore them, thus expanding their understanding of space and boundaries.
- A child with a poor sense of space and direction may be helped by tapping games on the board, since the vibrations through the wood will provide extra information about where the taps are coming from and where the other person is located.
- Sometimes a child might decide, or be encouraged to decide, to get himself on or off the board, and this can provide interesting challenges to problem-solving abilities.

As you can see from this list, many of the things that the board can encourage are often thought of as being in the areas of expertise of the physical therapist, the vision specialist, the orientation and mobility specialist, and the teacher of the deaf. If you have a board, any of these professionals can be brought in to explore it, to experiment with it, and to collaborate in developing ideas to help individual children. There are also other pieces of equipment designed or promoted by Lilli Nielsen (Nielsen, 1992; Johnson, Griffin-Shirley, & Koenig, 2000) that can be used with a resonance board. Above all, let the children you know show you how to use the board, and let your imaginations and creative impulses run free together. Discovering these boards almost twenty years ago changed my life in the most positive ways, and I hope the discovery changes your life too.

## References

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### Seeking Parents to Review Assessment Tool

The Bringing it All Back Home Project is seeking parents of children who are deafblind to assist with the field testing of a recently revised assessment tool called *HomeTalk*. The project would like to learn about parents' experiences using this tool as part of an IEP review, triennial evaluation, or other educational planning meeting. If interested, contact Dr. Charity Rowland of the Oregon Institute on Disability and Development (rowlandc@ohsu.edu, 503-238-4030) or Dr. Harvey Mar of St. Luke's-Roosevelt Hospital Center (hbm1@columbia.edu, 212-523-6235).