

## Assessing the Instructional Environment to Meet the Needs of Learners With Multiple Disabilities Including Students who are Deaf-Blind

Bonnie L. Utley  
TRACES Regional Director, Northern Region<sup>1</sup>

Many children and youth who are deaf-blind function in a range of settings where the factors related to lighting and visual contrast may be modified to maximize their use of residual vision. Team decisions regarding such modifications, however, must also include information on needs that may arise from the presence of physical disabilities as well as factors related to audition. For this reason, a check list designed to be completed by two or more team members in collaboration is described, and provides a preliminary framework for decisions regarding environmental adaptations.

Team members who complete this check list should strive to achieve an individualized set of environmental adaptations for each student since no two students are alike in their degree and combination of disabilities. Additionally, team members should recognize that the final outcome of this process is to achieve a *balance* between the adaptations made for a particular student.

Multiple aspects of therapeutic positioning, lighting and contrast, as well as considerations regarding audition, must be coordinated to achieve the best overall environment for instruction.

The appropriate application of information obtained through use of this check list requires thoughtful classroom scheduling to balance the multiple instructional, as well as therapeutic, needs of individual students. For example, it may be recommended that a particular student spend short periods of time in a left sidelying position for good body alignment and relief of discomfort caused by asymmetrical distribution of tone. However, that same student may have only one functional eye which may also be on the left lateral side of the body. Team members who serve this student should design a schedule so that minimal visual demands are put on this student when he or she is positioned in this way.

Finally, please note that the items listed on the check list are to be viewed as *preliminary only*. A more thorough assessment of a particular student's ability to benefit from low vision aids (e.g., magnification), amplification, and adapted positioning equipment should be made by team members according to the knowledge base of their respective disciplines.

<sup>1</sup> The author recognizes the need to consider residual hearing in individuals who are deaf-blind and the need to assess how hearing can be affected by positioning. This paper, however, does not address those assessment considerations. It specifically focuses on visual assessment.

## Organization of the Check List

Team members who complete this check list should do so from the perspective of the student (i.e., the orientation in space occupied by the student should be assumed by the team members as well). This practice will increase the accuracy of the decisions to be made with regard to the two sections of the check list: (a) therapeutic positioning and (b) lighting and contrast. Each section of the check list is described in more detail below.

**Section I** The items contained in this section of the check list are designed to assist team members to determine whether key aspects of therapeutic positioning may be used to enhance sensory functioning as well as physical ability and normalization of muscle tone. The first items address overall body positioning in sitting, sidelying, and supported supine. The items as written reflect general, desirable attributes of these positions. Team members should collaborate to determine whether or not all the features of a particular position are appropriate for an individual student.

An additional item in this section relates to the position of peers and adults during interaction. Please note that team members and peers should assume a position for interaction that is on the same plane as the student's face if possible (i.e., all parties should be seated or standing in a way that promotes face-to-face regard). This position facilitates communication between all parties, whether speech or nonspeech modes are used. This position may also reduce the likelihood that a student will adopt a head position that may result in abnormal posture or tone throughout the rest of the body (e.g., a hyperextended head and neck).

The final item in this section is the most difficult to complete as it relates to the plane (i.e., horizontal, vertical, or an angle in between these points) used for presentation of instructional materials. Selection of the most appropriate plane for presentation of instructional materials is particularly difficult for students without good head control. A neutral head position (i.e., neither turned, nor flexed, nor hyperextended) is the ideal position for many students. For other students, a position in which the head is turned, flexed, or hyperextended may be more visually functional for the student. For those students for whom a neutral head position is desirable, it is recommended that external support be provided to enable this position to be assumed. This is true for the student who is not yet able to maintain his or her head in a neutral position independently for the length of time needed to complete a particular task. Support may be provided by a collar, straps, or through physical assistance provided by an adult, if necessary. For most students, a fully upright posture for at least some periods of the school day is important. Upright posture in either sitting or standing is the most normalized position for participation within more inclusive school or work settings, as well as community-based training. To prevent complete reliance on external support, however, specific intervention strategies to promote more independent head control should be conducted at times other than those that require optimal use of the student's vision. It is simply too difficult for some students

## Environmental Check List

Name of Student \_\_\_\_\_

Date \_\_\_\_\_

### SECTION I - THERAPEUTIC POSITIONING

#### 1a. Overall Body Positioning (Sitting)

- \_\_\_\_ a. Student is upright, or reclined slightly, with hips, knees, and ankles at 90-degree angles, or other angle(s) recommended by a therapist.
- \_\_\_\_ b. Student's head is neutral and upright, with or without external support.
- \_\_\_\_ c. Student's arms are supported by the table top or wheelchair tray so the elbows are flexed between 90 and 120 degrees.

#### 1b. Overall Body Positioning (Sidelying)

- \_\_\_\_ a. Student is supported correctly (i.e., lower shoulder is forward; head is in alignment with the spine; hips, knees and ankles are flexed; pillows are placed between and below bony prominences).
- \_\_\_\_ b. Student is lying on the side that results in the better eye (if known) being on the upper lateral half of the body. (**Note:** Consultation with the team is recommended to determine whether sidelying on a particular lateral half of the body may be contraindicated).

#### 1c. Overall Body Positioning (Supported Supine)

- \_\_\_\_ a. Student is supported correctly (i.e., head in alignment; chin slightly flexed; shoulders rounded forward slightly; hips, knees, and ankles flexed).
- \_\_\_\_ b. Student's head is stable with or without external support.

#### 2. Position of Peers, Adults, and Materials

- \_\_\_\_ a. Depending on the student's head control, materials are placed horizontally, vertically, or somewhere in between those points.
- \_\_\_\_ b. Peers or adults position themselves at or near the student's eye level during interaction.

### SECTION II - LIGHTING

#### 1. Amount and Type of Light (indoors)

- \_\_\_\_ a. A combination of light sources (i.e., natural light plus incandescent light, etc.) are available.
- \_\_\_\_ b. The entire work surface is illuminated evenly (dependent upon specific task requirements).
- \_\_\_\_ c. Supplemental lighting is available (if necessary).

#### 2. Position of Light

- \_\_\_\_ a. Student is positioned so that all sources of natural light (e.g., windows) are behind him rather than behind the instructional/social/communicative partners.
- \_\_\_\_ b. Supplemental light source originates from over the student's head so the shade directs the light on only the task materials (if necessary).

OR

- \_\_\_\_ c. Supplemental light source originates from behind and over the shoulder of the student (e.g., over the left shoulder for those who use the right hand and vice versa).

OR

- \_\_\_\_ d. Supplemental light source originates from behind and over the shoulder of the student on the lateral half of the head where the most functional eye.

#### 3. Glare

- \_\_\_\_ a. Work surface is made of (or covered with) nonreflective material.
- \_\_\_\_ b. Materials are made of nonreflective material (if possible).
- \_\_\_\_ c. The amount of light emitted in the direction of the eye is limited or eliminated.

#### 4. Contrast

- \_\_\_\_ a. For tasks that rely on materials that are black or dark in color, the background surface is lighter to enhance contrast. Light colored materials use a dark background surface.
- \_\_\_\_ b. Select or purchase materials that contrast with the work surface (if possible).

**Note:** The items listed on the check list are to be viewed as *preliminary only*. A more thorough assessment should be made by team members according to the knowledge base of their respective disciplines.

to maintain head erect behavior *and* work on a visual task *and* communicate simultaneously.

Selection of the most therapeutic upright position should be followed by selection of the best plane of presentation for instructional materials and the student's communication materials (e.g., a communication board, the area for presentation of manual signs). The use of more atypical positions such as sidelying, supported supine, or prone should be reserved for instructional sessions that have a different, less structured, therapeutic or instructional function (e.g., a period of time spent prone over a wedge to promote postural drainage before lunch; "long" sitting during story time in the library).

**Section II** This part of the check list is designed to assist team members to evaluate four aspects of lighting.

- Amount and type of light
- Position of light
- Glare
- Contrast

Again, it is important to achieve a balance between these various aspects of lighting to achieve sufficient illumination without glare.

To enhance visual performance in a school, community, or work setting it is generally desirable to have a combination of light sources available including natural light from windows and doors in addition to fluorescent and incandescent sources. The surface of the table, wheelchair tray, desk or other surface should be illuminated evenly unless the student fails to respond visually to objects on that surface, even after enhancement of the contrast. In the latter situation, supplemental lighting on the task materials alone may be necessary to provide additional contrast between the materials and the background surface.

There are two factors to consider during selection of an incandescent light source such as a table lamp or "study" lamp. The lamp should have a weighted base, or be attached to the work surface with a "C" clamp to prevent tipping, and the shade should be double-layered. A double-layered shade permits the outer shade to stay cool, an important factor when the light source is positioned close to a student for prolonged periods of time. The lamp should be fitted with a standard indoor bulb (not a "soft-white" bulb) of 60-75 watts. Soft white bulbs diffuse the light too much and produce a substantially lower overall output of light than do standard bulbs. Sources for study lamps may be found in catalogs of equipment for students with visual disabilities, but many study lamps found in hardware stores may meet the needs of most students without incurring high cost.

A second aspect of lighting is the position or direction of the light source(s). Generally, a student should be positioned with his or her back to natural light sources. This recommendation is particularly important for students who rely on sign language input as their view of a signing partner may be limited to a silhouette under these conditions. The other primary light source for most set-

tings is found in the ceiling. The location of supplemental light sources should be from directly over the task (if necessary to promote higher contrast of the materials against the work surface), or from over the student's shoulder on the lateral side of the body opposite the dominant hand (i.e., from over the left shoulder for a student who is right-handed and vice versa). In the latter situation, the supplemental light source should originate from over the shoulder on the same lateral side as the more functional eye. The overall goal is to achieve a well-lit work surface without shadows.

Another aspect of lighting to be evaluated is glare. Glare can be reduced or eliminated through the use of nonreflective material for work surfaces and materials. The amount of light emitted in the direction of the eyes should also be reduced or eliminated.

The final aspect of the environmental check list consists of an evaluation of contrast factors in the selection and placement of instructional materials. Supplemental lighting may be needed when dark materials are being used. In general, dark materials should be positioned on light work surfaces and vice versa.

Contrast factors should be considered in the selection and purchase of instructional materials. For example, a red or dark blue toothbrush should be purchased for placement on a white sink for use during instruction on toothbrushing rather than a white toothbrush. For those situations when color of materials is not optional, the background color of the work surface may be modified instead.

## Summary

The environmental check list described here should be used by two or more team members as a *preliminary* tool to guide them in meeting the therapeutic and sensory needs of students who are multiply disabled. Key features of this check list are twofold. First, team members need to recognize a balance between the relative priority of various environmental modifications. Second, team members should recognize that all learning relies on the reception of a sensory, but not necessarily visual, stimulus. Instructional planning made on an individual basis, with consideration of each student's particular combination of sensory and physical disabilities, constitutes the primary factors in this process.

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