Using Salivary Cortisol to Measure the Effects of a Wilbarger Protocol–Based Procedure on Sympathetic Arousal: A Pilot Study

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OBJECTIVE. This study investigated changes in salivary cortisol, the stress hormone, after administration of a procedure based on the Wilbarger protocol to children diagnosed with sensory defensiveness (SD), a type of sensory modulation dysfunction.

METHOD. Using a single-subject design across participants, we studied 4 boys with SD ages 3 to 5 years. Each participant completed four sessions consisting of the collection of a saliva sample, administration of a procedure based on the Wilbarger protocol, 15 min of quiet neutral activities to allow time for any changes in cortisol level to manifest in the saliva, and the second collection of saliva. Saliva samples were analyzed using enzyme-linked immunosorbent assay (ELISA).

RESULTS. Salivary cortisol levels in all participants changed after each of four applications of a procedure based on the Wilbarger protocol. The cortisol levels of 2 children whose levels were relatively higher on pretest decreased at each posttest. The levels of 1 child whose cortisol was higher on pretest three times decreased those three times and increased the one time the pretest cortisol was lower. The levels of 1 child who had the lowest cortisol levels of any of the children increased each time. Therefore, in all participants, cortisol moved in the direction of modulation.

CONCLUSION. In these 4 boys, a procedure based on the Wilbarger protocol modulated cortisol levels toward a middle range. This pilot study indicates that there is an association between sympathetic nervous system response and the Wilbarger protocol–based procedure, as indicated by salivary cortisol levels.


The Wilbarger protocol (WP), often inaccurately called brushing, is a therapist-guided treatment for sensory defensiveness (SD). Occupational therapist Patricia Wilbarger developed the protocol in 1965 (Wilbarger & Wilbarger, 2001); she based it on Ayres's theory of sensory integration (1964, 1965, and numerous personal communications as they worked together). Occupational therapists use the WP widely to treat SD in children and adults. More than 15,000 health care professionals have received specialized training in the WP, and 20,000 therapy brushes are ordered each year (Avanti Educational Programs, Panorama City, CA). When using the WP, caregivers provide very deep pressure input to the skin with a specially manufactured nonscratching brush (now called the “Therapressure Brush”) followed by compression to major joints.

Use of the WP is controversial. Some therapists who use Ayres's original therapeutic concepts (1964, 1972) consider the passive application of touch input to be inconsistent with her theory, because one of its major tenets is that for optimum results, the child must self-initiate the therapeutic activity. However, Ayres (1972) recognized the tendency for people with defensiveness to avoid anything new and
felt that they might be unable to choose activities that would result in change, so she recommended passive intervention: “Occasionally . . . it seems best for a therapist to impose tactile stimuli at first to help the child get over the initial defensive stage” (p. 116).

Although much anecdotal evidence has been used in describing the effect of the WP, our study, performed in 2000, was the first to investigate the effect of a WP-based procedure on the sympathetic nervous system by measuring salivary cortisol levels.

Literature Review

Sensory Modulation

Through her work in sensory integration, Ayres (1965, 1972, 1979) linked neurobehavioral theory and sensory-based activity to help children develop occupational competence. She created treatment methods that facilitated normal development of modulation and sensory integration in children (Bundy, Lane, & Murray, 2002; Kimball, 1999a, 1999b; Wilbarger, 1995). The first type of sensory modulation problem Ayres (1964) described was tactile defensiveness, and she treated it with many sensory-based activities, including rubbing the skin with various textures (e.g., paint brushes, fur, hair brushes, dry washcloths, silk or velvet cloths, her hand). Ayres hypothesized that tactile defensiveness was caused by an imbalance between the two major somatosensory tracts (Ayres, 1964, 1965, 1972, 1979). Occupational therapists soon found that all sensory systems could be involved and began using the term sensory defensiveness. Wilbarger and Wilbarger (1991) and Wilbarger (1995) further differentiated and expanded the theory of sensory defensiveness, believing that it is one type of sensory modulation dysfunction.

Sensory modulation is the central nervous system’s (CNS’s) ability to regulate and organize the body’s reactions to sensory input “in a graded and adaptive manner which involves changes in the responsivity of neurons and allows the nervous system to adapt its output in the face of a continually changing environment” (Miller et al., 1999, p. 6). One aspect of modulation involves habituation and sensitization. Habituation is the CNS’s ability to recognize a stimulus as familiar and to decrease responsiveness to it. Sensitization involves the CNS’s ability to “recognize a stimulus as important or potentially harmful” and therefore respond in a heightened fashion (Dunn, 1997, p. 25). Habituation and sensitization cannot occur in isolation; the CNS needs to use both and to be able to differentiate between the two.

Everyone has a different range of thresholds. Modulation between habituation and sensitization is necessary for a person to remain in his or her individual range of optimal performance. Increases in anxiety and stress can cause people to react as through they had increased sensitization, therefore increasing arousal and affecting the ability to accomplish daily occupations. Earlier theory hypothesized that when the sympathetic nervous system becomes “over-awakened,” the protective pathway dominates, causing behaviors that interfere with the child’s learning (Fisher & Dunn, 1983), typically fight, flight, or freeze behaviors. Their intensity is determined by the level of perceived threat overlaid on the current level of arousal of the individual’s nervous system, and their purpose is the safety and survival of the organism (Kimball, 1993, 1999a). If the nervous system is already at a high level of sympathetic arousal when the individual perceives the new but otherwise nonthreatening stimulus, a strong survival response may be evoked that is out of line with the intensity of the new stimulus alone, but the response does not seem out of line when the arousal state of the whole nervous system is considered (Kimball, 1993, 1999a).

The concept of the “protective” component of sensory processing has been refined and is now more accurately called the low-route pathway or the evaluative system (LeDoux, 2002). Its primary functions are actually more than a general alerting function for the nervous system, and include “preparing for action, processing of low-level affective or highly learned information . . . and [assigning] value and relevance to stimuli” (Wilbarger & Wilbarger, 2001, p. 12).

Researchers have begun to examine the theoretical explanations for sensory modulation dysfunction. Miller and her team (McIntosh, Miller, Shyu, & Hagerman, 1999; Miller, 2003; Miller et al., 1999) showed that the sympathetic nervous system does play a role in sensory modulation dysfunction. They showed that electrodermal reactivity, a marker of sympathetic nervous system activity, is significantly different from typical children in children diagnosed with severe sensory processing deficits (Miller, 2003). Schaaf, Miller, Seawell, & O’Keefe (2003) have begun to confirm the role of the parasympathetic nervous system (also predicted by earlier theory) and found that vagal tone, a measure of parasympathetic nervous system functioning, was significantly lower in children with sensory processing impairments than in typical children. As Miller (2003) noted, this finding is consistent with other studies “that found decreased parasympathetic functioning associated with stress vulnerability, developmental and cognitive delays, and emotional and behavioral over-reactivity” (p. 8).

Several problems have been identified as related to difficulty with sensory modulation, but the most clearly identified is sensory defensiveness, which is “a tendency to react
negatively or with alarm to sensory input that is generally considered harmless or nonirritating” (Wilbarger & Wilbarger, 1991, p. 3). Children with SD can have decreased cognitive, social, and sensorimotor functioning (Dunn, 1997). They find their environments fearful, dangerous, and anxiety ridden. They have difficulty engaging in play and other occupations of childhood as typical children would. In their continuing education courses on SD, Wilbarger and Wilbarger (2001) discuss sensory processing as resulting in a continuum of reactions from defensiveness and avoidant behaviors to the ability to joyfully and jubilantly explore sensation.

Wilbarger and Wilbarger (1991) were the first to develop a comprehensive treatment strategy for sensory defensiveness aimed at helping individuals be able to live comfortably in their environments (Kimball, 1993, 1999a, 1999b; Roley & Wilbarger, 1994). This treatment includes three components: awareness of the problem (specific detection and analysis of sensory-based symptoms); a planned, controlled sensory diet; and the use of the Wilbarger protocol, also known as the deep tactile and proprioceptive technique (Wilbarger, 1995; Wilbarger & Wilbarger, 1991).

Awareness involves identifying the key issues and making a paradigm shift from seeing behavior as individual occurrences and as learned patterns, or as just emotional problems, to seeing symptoms as a whole and reflective of specific actions of the CNS response that misidentifies nonnoxious environmental stimuli as irritating or even dangerous. A sensory diet helps the client use modulating activities to stay calm yet alert and organized. The sensory diet activities, which occur in the client’s normal environment, are intentionally and specifically designed and timed to provide an increase in intensity, duration, frequency, rhythm, and type of sensory input over the level the individual is currently experiencing (Kimball, 1993, 1999a; Wilbarger, 1995).

The most carefully prescribed element of the intervention program for SD is the Wilbarger protocol. The WP uses very deep pressure input with a specially manufactured nonscratching brush. The brush must be used with correct pressure and technique to deliver pressure only, without noxious input (e.g., tickle or scratch). This deep pressure is followed by compression to the major joints. The whole process, designed to produce modulation, needs to be applied very accurately following a specific training program, takes a short time, and must be performed repeatedly throughout the day on a prescribed schedule. Its prescription depends on specific diagnostic criteria as evaluated by a trained occupational therapist or physical therapist, who may teach the specific procedures to caregivers (Kimball, 1993, 1999a; Wilbarger & Wilbarger, 1991).

Wilbarger and Wilbarger (1991, 2001) recommended diagnosing SD primarily using a careful sensory history interview and by observation, and Dunn (1999) advocated using the Sensory Profile, a caregiver-completed survey of the child’s reactions to sensory input. Miller developed the Short Sensory Profile (SSP), a shorter version of the Sensory Profile, to be used in research (Dunn, 1999). Both the Sensory Profile and the SSP provide a standard diagnostic method of viewing the child’s responses to certain sensory events. Although there are some differences between Wilbarger and Wilbarger’s (1991, 2001) and Dunn’s (1999) theoretical explanations for and evaluation of sensory defensiveness and sensory modulation dysfunction, it appears that both conceptualizations describe the same real and important phenomena. The issue of what terminology optimally describes the intricacies of sensory modulation dysfunction has been the subject of discussion (see Hanft, Miller, & Lane, 2000; Lane, Miller, & Hanft, 2000; Miller & Lane, 2000).

The purpose of the present study was to investigate the effects of a WP-based procedure on the sympathetic nervous system of children diagnosed with SD. Occupational therapists have used the WP for many years to treat SD. Anecdotal parent and therapist reports have indicated its effectiveness in helping people modulate their CNS responses and, therefore, behavioral responses, to environmental stimuli. Because the people receiving the WP and the conditions under which it is used vary widely, controlled studies have been difficult to orchestrate. SD as theoretically described appears to be consistent with the components of a physiological stress response. Now that cortisol, the hormone associated with increased sympathetic arousal and stress, can be tested in saliva, the effect of the WP on the sympathetic nervous system can be tested directly.

Cortisol

Stress is an external stimulus that can affect a person’s internal environment. Stress can be caused by physiological events, such as illness or injury; positive emotional events, such as falling in love; or psychological events, such as social conflict, anxiety, loss of control, or threat (Bear, Connors, & Paradiso, 1996; de Haan, Gunnar, Tout, Hart, & Stanbury, 1998). The system responsible for the stress response, the hypothalamic–pituitary–adrenocortical system (de Haan et al., 1998), produces cortisol, a glucocorticoid that not only inhibits the immune system response and “increases glucose production for energy and other metabolic needs” (Schmidt, 1997, p. 189) but also has the direct effect of helping the CNS respond to physical and emotional stimuli (de Haan et al., 1998; Lumley, Schramm,
Research suggests that cortisol levels are directly related to sympathetic arousal of the CNS (de Haan et al., 1998; Schmidt, 1997).

If a stimulus is stressful, several physiological processes occur. Parvocellular neurosecretory neurons located in the periventricular hypothalamus release the peptide corticotropin-releasing factor (CRF). CRF travels through the blood and reaches the anterior pituitary. Depending on the body's interpretation of the event, the anterior pituitary will release corticotropin or pituitary adrenocorticotropic hormone (ACTH). In the face of stressful stimuli, ACTH is released into general circulation, and it eventually reaches the adrenal cortex, where it activates cortisol release. Cortisol is released into general circulation, where it binds to plasma-borne proteins and is carried throughout the body (Bear et al., 1996; Lumley et al., 1995). If the levels of cortisol released exceed the plasma-borne protein binding capacity, the unbound cortisol is excreted into urine and saliva (Schulz, Halperin, Newcorn, Sharma, & Gabriel, 1997).

Evaluation of cortisol levels is the established method used to study stress, because they have been found to increase "reliably and linearly in response to a wide range of physical and physiological stressors" (Lumley et al., 1995, p. 470). Recently, it has become possible to assay cortisol in salivary secretions, a method that has proved superior to blood and urine assays when studying stress (Grauer, 1991).

Taking blood samples causes anxiety and a temporary increase in cortisol levels (Lumley et al., 1995). Collecting cortisol in urine samples requires repeated samples over 24 hr; cortisol follows a circadian rhythm, and depending on stress conditions, glucocorticoid levels are usually highest early in the morning, decrease to half of morning levels by late afternoon, and further decrease to insignificant levels by midnight (Schmidt, 1997). Urine collected over 24 hr cannot take this variation into account, and collecting urine on a timetable is cumbersome for adults and almost impossible for young children. Another disadvantage of urine sampling is that because of the delay between a stimulus and the production of urine, there is little ability to link the cortisol production to a specific stimulus (Lumley et al., 1995).

Therefore, salivary assessment of cortisol is preferred because it avoids many of the disadvantages of blood and urine sampling. Saliva concentrations of cortisol are directly proportional to blood concentrations and do not depend on salivary flow rate or salivary enzymes (Lumley et al., 1995; Schmidt, 1997). In addition, blood studies have shown that changes in cortisol levels in the blood may be reflected in saliva within as few as 5 min of a stimulus (Schmidt, 1997).

Two main types of tests are used to determine salivary cortisol levels: radioimmunoassay (RIA; Gunnar, Tout, de Haan, Pierce, & Stansbury, 1997; Scheer & Buïjs, 1999) and enzyme-linked immunosorbent assay (ELISA). RIA is not routinely performed in U.S. labs, although the test is highly sensitive to cortisol and the results are obtainable in a short amount of time (Schmidt, 1997). Because radioisotopes (iodine 125) are required for this test, it was not possible to perform this test at our university because of site licensing regulations. The ELISA, however, requires small amounts of saliva and can be done without radioisotopes. ELISA has demonstrated a strong positive relationship with the RIA in test results, meaning that even without radioisotopes, an accurate reading of cortisol levels can be achieved (Schmidt, 1997).

Research on stress suggests that cortisol levels are directly related to sympathetic arousal of the CNS (de Haan et al., 1998; Schmidt, 1997) and that salivary cortisol assay is the method of choice to measure fast, reliable expression of those cortisol levels (Grauer, 1991). The WP is thought to influence many CNS responses, including modulating sympathetic arousal; therefore, studying salivary cortisol levels would be the method of choice to investigate whether and how the WP affects the sympathetic nervous system.

### Methodology

The convenience sample consisted of 4 children who received occupational therapy services at the University of New England’s Community Occupational Therapy Clinic. Inclusion criteria were age of 3 to 5 years and SD symptoms as indicated by the child’s primary occupational therapist. Children who could not follow directions sufficiently to pretend to brush their teeth and spit were excluded. After signing consent forms, parents or guardians completed the SSP, the Conners’ Rating Scales—Revised (CRS–R; Conners, 1997) for parents, and a demographic questionnaire. The CRS–R is a well-researched checklist that guides professionals in evaluating problem behaviors by obtaining reports from teachers and parents regarding conduct, cognitive, anxiety, and social problems. Each participating child’s primary occupational therapist also completed the CRS–R for teachers and the SSP.

Collecting the saliva of 3-year-olds initially caused a dilemma. Saliva-absorbing chew-on squares were available from the testing company, but we felt that there was too great a risk that a small child would swallow the material. (Since the time of our study, the testing company has developed saliva-absorbing material attached to a string that allows the researcher to hold onto the absorbent material while the child chews on it, and a saliva-absorbing strip has...
also been developed.) Instead, we asked the children to spit into a cup, but they were not able to initially because it did not relate to their immediate occupational experience. So we moved the participants to the bathroom sink to pretend to brush their teeth with a dry toothbrush (no water or toothpaste and little actual contact with the teeth). After pretending to brush their teeth, participants spit into a plastic cup over the sink. The saliva was pipetted into microcentrifuge tubes and placed on ice until the tubes could be put into a freezer. This initial saliva collection was used to assess a baseline cortisol level.

We then administered one application of the WP-based procedure. The whole WP is structured to be used every 1¼ to 2 hr, but for the purposes of this research, we administered it during the study times, which occurred once per week, because the child's therapy time was the only time during which we could control for additional variables. Once we had administered the WP-based procedure, the children performed a "neutral" activity, which consisted of a quiet tabletop activity (e.g., puzzles, coloring), for 15 min to allow time for the cortisol to express itself in the saliva. We then collected a second saliva sample in the same manner as before. Samples were labeled and frozen and then were taken to the University of New England for analysis.

We administered the WP-based procedure and collected saliva samples once a week for 4 weeks at the beginning of normally scheduled occupational therapy sessions. The sessions were all scheduled in the morning to make measurement easier by coinciding with the body's highest level of cortisol production, and each child was tested at the same time each week to ensure consistency in cortisol levels.

College of Medicine faculty performed the analysis using ELISA, purchased from Salimetrics (State College, PA; see Salimetrics, 1999). ELISA relies on a spectrophotometer to determine an optical density value based on the amount of cortisol in the sample. There are no norms for cortisol levels in saliva.

Results

The participants in this study were 4 boys, and all had received a primary diagnosis of SD from their occupational therapist. Participant 1 was age 5 years, 8 months and had severe speech and language, developmental, and motor planning impairments. He displayed sensory-based symptoms that included tactile sensitivity, taste/smell sensitivity, auditory filtering, decreased energy, and auditory/visual sensitivity, according to the SSP results. The CRS–R results showed that Participant 1 had slightly atypical behaviors indicating inattention, anxiety, attention deficit hyperactivity disorder (ADHD), and emotional lability.

Participant 2 was 3 years, 1 month old and diagnosed with Soto's syndrome accompanied by speech and language delays. With SD, he had atypical behaviors, including underresponsiveness, auditory filtering, low energy, and visual–auditory sensitivity, according to the SSP results. The CRS–R results showed that Participant 2 displayed atypical behaviors including inattention, social problems, ADHD, restlessness, and inattentiveness.

Participant 3 was age 5 years, 10 months and diagnosed with pervasive developmental disorder. He displayed SD and sensory-based symptoms including tactile sensitivity, underresponsiveness, auditory filtering, and visual–auditory sensitivity according to the SSP results. The CRS–R results showed that Participant 3 displayed atypical behaviors involving perfectionism and anxiety.

Participant 4 was age 5 years, 5 months and diagnosed with autism and pervasive developmental disorder. He displayed SD and sensory-based symptoms including tactile sensitivity, movement sensitivity, some underresponsiveness, auditory filtering, low energy, and visual–auditory sensitivity according to the SSP results. The CRS–R results showed that Participant 4 displayed atypical behavior involving inattention.

All four boys' occupational therapists had diagnosed them as having SD, and we used the SSP to confirm that diagnosis and the CRS–R to look for correlates of behavioral issues. We administered the SSP and the CRS–R to parents and therapists at the beginning and the end of the study, but we did not expect to see changes in such a short period, especially because we were not using the WP as it was usually administered—and, indeed, there were no changes in scores on either measure. However, this finding indicates that the changes in cortisol levels we saw with the WP-based procedure were attributable to the procedure itself and not to changes in the child's abilities caused by uncontrolled variables.

The cortisol levels of Participants 2 and 4 decreased from pretest to posttest in each of the 4 weeks tested, meaning that the cortisol levels decreased after the WP-based procedure was administered. Participant 1's cortisol levels decreased after three of the sessions and increased after the last session. On the last day, Participant 1 began the session with lower cortisol levels than he had ever shown, even lower than those he had attained after administration of the WP-based procedure. Interestingly, his last pretest level showed the lowest level of cortisol of any child in the study. The WP-based procedure that day elevated his cortisol to the same level he had obtained after it had decreased the previous three times. Thus, it appears that the WP-based procedure modulated his cortisol level up to a more normal level for him, which is what the WP is theoretically...
predicted to do. In other words, the child came in that day underaroused, and the WP-based procedure brought him up to a more normal level.

Participant 3’s cortisol levels increased after the protocol on each of four sessions. Participant 3’s reactions to the neutral activity were consistent: He refused to do it. It may be that he did not consider the neutral activity structured enough for his anxiety level; therefore, it might follow that his cortisol would increase. However, this participant’s pretest cortisol values were very low. It appears that the WP-based procedure brought them up to a more normal level, again modulating his cortisol level, as the WP is predicted to do. According to the College of Medicine faculty who did the analysis, Participants 1 and 4 had a lower volume of saliva than Participants 2 and 3, but all samples were testable. The cortisol levels are listed in Table 1 and graphed in Figure 1.

**Discussion**

Past research has demonstrated that salivary cortisol is an effective measure of the stress response. Sympathetic arousal is directly related to this response (Bear et al., 1996; de Hann et al., 1998; Lumley et al., 1995). The intent of the Wilbarger protocol is to help maintain optimal arousal (Wilbarger, 1995). After administration of a WP-based procedure, the salivary cortisol levels in our study participants changed in the direction of modulation. Thus, there is an apparent association between applications of the WP-based procedure and modulation of cortisol levels. Although this finding is preliminary, it is encouraging that saliva can be collected in a nonintrusive way from small children and that the WP-based procedure had an apparent effect on cortisol levels and, therefore, stress (arousal) levels in some children. This association is promising enough to warrant further research.

One variable we did not control for is cortisol level during normal activity in the natural environment. Because it is difficult to define what constitutes a “neutral” activity for each person, neutral activities, when possible, should be occupations in which the person normally engages (sedentary, not active).

Research is needed to investigate the effects of the WP as it was designed to be administered. The primary author has carried out a controlled study in which the WP was administered as designed with a different research design and client diagnoses, but the data have not yet been analyzed. This new study’s design was based on what was learned from this pilot study. We changed the research protocol by collecting saliva three times so that each child served as his or her own control and by collecting saliva samples in a natural but controlled environment (overnight camp) following a normal routine.

**Implications for Practice**

Sensory defensiveness is seen in conjunction with many diagnostic categories and negatively affects many children and adults. Many occupational therapists use the WP to modulate the nervous systems of clients with SD and, therefore, their behaviors to improve their ability to participate more fully in their occupations. Occupational therapists who use the WP need empirical evidence of its effect on clients and its effectiveness in treating SD. Although much anecdotal evidence of its usefulness exists, to this point there has been no way to evaluate the WP by objective means. The results of the present study indicate that the WP-based procedure was associated with modifying salivary cortisol levels and, therefore, theoretically, arousal (stress), which could result in better responsiveness of clients’ CNS to the environment. The effect of the full WP still needs to be investigated. However, this small study provides information that supports occupational therapists’ long-standing clinical observations and clinical reasoning that use of the WP may be associated with modulation of the sympathetic nervous system. The finding that the WP-based procedure modulated cortisol levels in four participants supports occupational therapists’ observations that the WP brings clients to a more modulated state. Occupational therapists who use the WP should carefully document any behavioral changes they see in clients to determine whether the changes are consistent with sympathetic modulation.

Occupational therapists use many variations of the WP in practice. Although Wilbarger and Wilbarger (1991) designed the WP to be done in a prescribed manner every 1½ to 2 hr for several weeks to produce changes in nervous system functioning, many occupational therapists and caretakers use it in single applications to help clients through

**Table 1. Participants’ Salivary Cortisol Levels (μg/dL) Before and After Administration of a Wilbarger Protocol–Based Procedure**

<table>
<thead>
<tr>
<th>Participant</th>
<th>First Administration</th>
<th>Second Administration</th>
<th>Third Administration</th>
<th>Fourth Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Participant 1</td>
<td>0.054</td>
<td>0.050</td>
<td>0.302</td>
<td>0.024</td>
</tr>
<tr>
<td>Participant 2</td>
<td>0.131</td>
<td>0.084</td>
<td>0.240</td>
<td>0.145</td>
</tr>
<tr>
<td>Participant 3</td>
<td>0.026</td>
<td>0.075</td>
<td>0.037</td>
<td>0.041</td>
</tr>
<tr>
<td>Participant 4</td>
<td>0.114</td>
<td>0.101</td>
<td>0.082</td>
<td>0.012</td>
</tr>
</tbody>
</table>
difficult daily events, especially transitions. This use evolved as “practical” occupational therapists changed the protocol to fit their needs, much to the chagrin of the technique’s developers, who teach in their workshops that this can be a dangerous practice when done with clients with SD (Wilbarger & Wilbarger, 2001). Wilbarger and Wilbarger have taught in their courses that single applications should not be used with clients diagnosed with SD and that performing the WP incorrectly or with the wrong brush can have a negative effect on a client’s nervous system. Although we agree with their warning that the protocol should be performed as designed to maximize benefit and limit any possible harm, this small study may help explain why single applications of a WP-based procedure, once developed, have persisted. Our research showing that single applications resulted in modification of the sympathetic nervous system may reflect therapists’ clinical observations when they use the protocol in this manner. Further research is necessary to compare the effects on the sympathetic nervous system of WP-based procedures versus the effect of the whole WP as it was designed to be carried out.

If occupational therapists use a WP-based procedure on an as-needed basis to decrease or increase certain behaviors in their clients, do they risk precluding the permanent changes in SD behaviors that Wilbarger and Wilbarger (1991, 2001) reported when the protocol is used correctly? Or does the single-application use have a short-lasting effect that does not influence the effectiveness of the use of the whole protocol? Are there other variations of the protocol that may be effective in different ways? What gradations in duration, intensity, or frequency have the most positive effect? How do the nervous systems of clients with diagnoses other than SD respond to the protocol? Can occupational therapists make a client’s symptoms or problems worse by using single applications, and do they affect the nervous system negatively by performing the WP incorrectly? These interesting and important clinical questions can be answered only by more research. Until that time, occupational therapists should take care in using the WP and WP-based procedures and should systematically observe and document the behavioral changes they see in their clients.

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References


