

*EFFECTS OF WRIST WEIGHTS ON  
SELF-INJURIOUS AND ADAPTIVE BEHAVIORS*

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The effects of wrist weights on the self-injurious and adaptive behaviors of a young boy with profound mental retardation were evaluated. Application of wrist weights reduced SIB by 92% and was associated with either increases or stable levels of multiple novel and preexisting adaptive behaviors.

DESCRIPTORS: self-injurious behavior, automatic reinforcement, wrist weights, adaptive behavior, self-feeding

Application of wrist weights is one method that has been used to treat self-injurious behavior (SIB) directed at the head (Van Houten, 1993). In addition to demonstrating that the SIB of 1 boy was decreased when wrist weights were applied, Van Houten also measured a single adaptive behavior (defined as touching toys) that previously existed in the boy's repertoire and showed that toy touching was equivalent with and without wrist weights. It did not appear that toy touching necessitated the boy raising his arms; therefore, it is unclear whether the use of wrist weights adversely affected other adaptive behaviors, particularly those that involve movement of the hand toward the head (e.g., self-feeding). In addition, it may be important not only to evaluate the extent to which wrist weights affect behaviors previously existing in an individual's repertoire (Van Houten), but also to examine the effects of wrist weights on the occurrence of new responses. In the current investigation, we evaluated the effects of wrist weights on

the SIB of a young boy with profound mental retardation. We also examined the extent to which weights affected novel behaviors and previously existing behaviors that required the child to bring his hand to his head (self-feeding and pacifier-to-mouth behavior).

#### METHOD

Rico, a 6-year-old boy who had been diagnosed with profound mental retardation, cerebral palsy, and cortical blindness, was hospitalized in an inpatient facility for the assessment and treatment of SIB (hand-to-head hitting). Rico's SIB resulted in severe tissue damage to his face and interfered with a variety of adaptive skills (e.g., eating, object manipulation). A functional analysis of Rico's SIB was conducted using conditions similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). High and variable levels of SIB were observed across all conditions ( $M = 36.5$  responses per minute; range, 0.9 to 87.1), suggesting maintenance of SIB by automatic reinforcement. The effects of wrist weights on SIB and adaptive behaviors were evaluated using a multiple baseline design across non-injurious behaviors. Sessions were 5 min in length and were conducted in rooms (3 m

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by 3 m) or a classroom. Two trained observers independently recorded SIB and adaptive behaviors on laptop computers during 52% of sessions. Mean exact agreement was 88.6% (range, 80% to 99% across behaviors). In all baseline sessions, Rico wore an empty wrist weight apparatus on each forearm. During treatment sessions, four 0.23-kg weights were inserted into each apparatus, totaling 0.92 kg (2 lb) per arm. SIB resulted in no programmed consequences throughout the assessment.

Four conditions were conducted to observe novel (switch play and communication) and preexisting (pacifier-to-mouth and self-feeding) adaptive behaviors with and without weights. A vibrating musical switch that Rico could independently operate with his hands was available in the switch play condition. Percentage of the session with switch play was calculated by dividing the amount of time any part of Rico's hands touched the switch by the total session time multiplied by 100%. A voice-output switch that played the prerecorded message, "Play with me please," was available in the communication condition, in which Rico received 30 s of physical attention (the therapist would swing, tickle, and hug Rico while providing verbal praise) contingent upon pressing the switch. Communication was scored when any part of Rico's hand depressed the voice-output switch. Prior to each session involving switches, Rico was physically guided to press the switch and was provided with reinforcement (no prompting to engage in the adaptive behavior occurred during the session). These adaptive behaviors were considered novel because Rico did not have a history with the vibrating musical switch toy or the communication switch prior to his hospitalization. During the pacifier condition, Rico had access to a pacifier attached to his shirt that he could place in his mouth. Pacifier-to-mouth behavior was scored any time Rico placed the pacifier past

his lips. At the onset of each session, Rico's hand was placed on the pacifier, but no other prompts to touch the pacifier were used during the session. Self-feeding was measured during meals in which the therapist scooped food on a spoon and provided a verbal prompt for Rico to independently lift the spoon to his mouth. Independent bites were scored any time Rico raised the spoon to his mouth. Pacifier-to-mouth and self-feeding behaviors were considered to be preexisting behaviors because Rico engaged in these behaviors prior to his hospitalization.

## RESULTS AND DISCUSSION

The data for SIB and adaptive behavior without wrist weights (baseline) and with weights (treatment) are presented in Figure 1. The mean rate of SIB was 72.5 responses per minute (range, 0.8 to 128.6) across all baseline sessions and 4.7 (range, 0 to 51.4) across all treatment sessions (92% reduction in SIB from baseline to treatment). During the switch play condition, SIB was reduced to near-zero levels and switch play increased from baseline ( $M = 0$ ) to treatment ( $M = 26\%$ ). In the communication condition, Rico's SIB was reduced to near-zero levels during treatment and communication increased from baseline ( $M = 0$ ) to treatment ( $M = 0.2$  presses per minute). Rico's SIB was also reduced during treatment in the pacifier condition with pacifier-to-mouth behavior increasing from a mean of 0.5 (baseline) to 0.8 responses per minute (treatment). SIB was reduced to zero during treatment in the self-feeding condition. Independent bites dropped to zero during the last three baseline sessions ( $M = 2.3$  responses per minute); however, a stable rate of independent bites was observed across treatment sessions ( $M = 1.8$ ).

These results replicate those of Van Houten (1993), suggesting that wrist weights reduce SIB while maintaining desirable levels

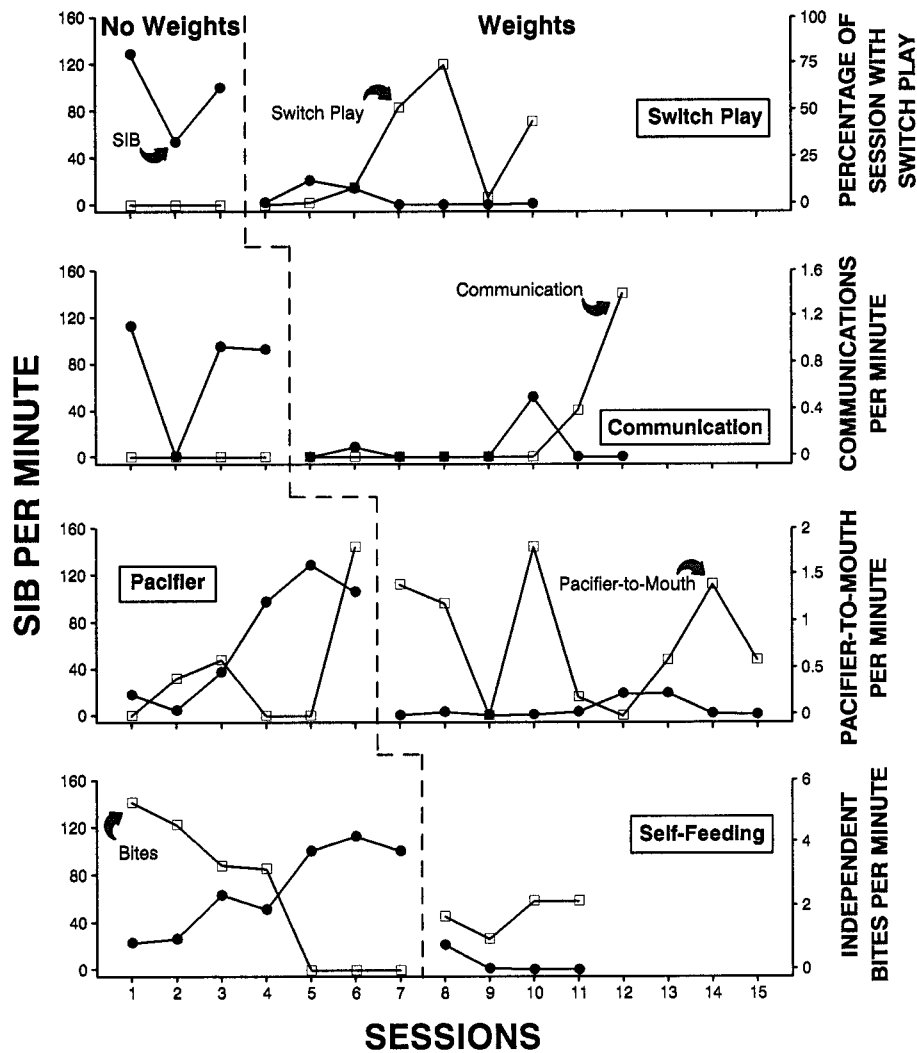


Figure 1. Number of self-injurious behaviors per minute across five settings in the no-weights and weights conditions. Percentage of the session with switch play during the switch play condition (first panel), number of communications per minute during the communication condition (second panel), number of pacifier-to-mouth responses per minute during the pacifier condition (third panel), and number of independent bites per minute during the self-feeding condition (fourth panel).

of adaptive behavior. Wrist weights represent a practical treatment for SIB that is maintained by automatic reinforcement because adult supervision is not necessary to implement consequences for SIB. In addition, if the individual engages in novel responses and maintains previously learned adaptive responses, he or she can obtain stimulation independently. The results also extend the literature on wrist weights in at least two

important ways. First, we showed that novel responses (switch play and communication) occurred with the application of wrist weights. Second, we showed that previously existing responses (pacifier-to-mouth play and self-feeding) were not disrupted with wrist weights. This finding is particularly significant because the participant continued to engage in the preexisting hand-to-head responses (self-feeding and pacifier-to-mouth

play) while wearing wrist weights, even though hand-to-head SIB was decreased to zero.

One potential reason why wrist weights exerted a differential effect on adaptive and self-injurious behavior may have been a function of the effort associated with the two responses. The adaptive behaviors involved arm lifting a shorter distance (approximately 15 cm to bring the pacifier or food to his mouth) relative to that required for SIB (approximately 20 to 30 cm). These findings may be similar to those obtained by Shore, Iwata, DeLeon, Kahng, and Smith (1997), who showed that when SIB and toy play were simultaneously available and required equal response effort, toy play was the more prevalent response. However, high rates of toy play were disrupted and responding shifted to SIB when the response effort for toy play was increased even by small amounts. Similarly, it is possible that SIB can be disrupted by increasing the response effort for SIB relative to that for other appropriate behaviors. However, the extent to which wrist weights affect responding via increased response effort is unknown. A second possible explanation for the differential effects of wrist weights on SIB may have been that the wrist weights attenuated the automatic reinforcement produced by SIB

(e.g., sensory extinction). That is, it appeared that the force with which Rico hit his head when wearing wrist weights was decreased relative to the force achieved without the wrist weights. A third possible explanation is that each attempt to engage in SIB was followed by aversive stimulation (i.e., lifting a heavy arm), and this aversive stimulation functioned as punishment for SIB attempts. However, these explanations are speculative. Future research should be directed toward examining the mechanisms that are responsible for the effectiveness of wrist weights.

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