Invited Paper
Review

Behavioral Treatment of Self-Injurious Head Banging and Head Hitting in Young Children With Developmental Disabilities

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The present paper provides a selective review of studies on the treatment of self-injurious head banging and head hitting in young children with developmental disabilities. The literature has focused on the etiology of self-injury in young children, and few studies have focused on the treatment of self-injurious head banging and head hitting in young children with developmental disabilities. What few studies there are have demonstrated the efficacy of behavioral interventions. However, we conclude that further research is needed to validate behavioral treatments for self-injurious head banging and head hitting in young children with developmental disabilities.

Key Words: head banging, head hitting, developmental disability, behavioral treatment, young children with developmental disabilities

Self-injurious behavior (SIB) occurs in approximately 10% to 14% of individuals with developmental disabilities (Iwata & Rodgers, 1992). Of the various forms of self-injury, head banging and head hitting are the most common topographies (Gorman-Smith & Matson, 1985; Hyman, Fisher, Mercugliano, & Cataldo, 1990). Children who do not have developmental disabilities may have self-injurious behavior, including head banging, that is similar to that of children with severe and profound intellectual disabilities (De Lissovoy, 1962; Vinson & Gelines-Sorell, 1991). It has been estimated that from 3.3% to 15.2% of children who do not have developmental disabilities exhibit some form of head banging (Sallusto & Atwell, 1978; De Lissovoy, 1961), but in most such children, head banging decreases around the age of 2 years and has usually disappeared by 4 years of age (De Lissovoy, 1961). Children with severe and profound disabilities, however, appear not to replace head banging with more functional communication and motor skills, and instead, head banging may become socially maintained and open to wider communities of reinforcement as the child gets older.
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Retrospective reports from parents on the emergence of self-injurious behavior in their children suggest that some children begin engaging in rhythmic and proto-self-injurious behavior as infants or toddlers (De Lissovoy, 1962; Kurtz, Chin, Huete, Tarbox, O'Connor, Paclawskyj, & Rush, 2003). A recommendation generally made is that when children have a physical, communication, or cognitive delay, intervention should be started as early as possible. The same emphasis on early intervention would seem to be indicated for children who have begun displaying proto-injurious behavior (e.g., stereotyped head movements). However, currently there appears to be a dearth of early intervention services specifically aimed at the prevention of self-injury in at-risk children.

This lack of emphasis on prevention and early treatment could be related to the fact that parents and professionals may be waiting in hope that the child will "grow out of" the behavior, as is usually the case in children who do not have developmental disabilities. However, this neglect could also represent a gap in knowledge between academic professionals and parents and teachers. An additional factor that may cause some children to fail to receive early treatment for self-injurious behavior could be a lack of screening to identify children who are at risk.

In practice, the treatment of self-injurious behavior is often delayed until the behavior becomes serious and persistent, encroaches on a child's educational and social experiences, and/or causes tissue damage (Kurtz et al., 2003). Many parents worry about their young children's behavior that verges on self-injury, but are often told by well-meaning professionals that they are witnessing a "phase" that the child will outgrow (Vinson & Gelinas-Sorell, 1991; Wills & Garcia, 2002).

**Etiology**

Self-injurious behavior can be viewed as learned operant behavior maintained by positive, negative, or automatic reinforcement (Iwata, Dorsey, Slifer, & Richman, 1982). However, although operant mechanisms have been used to account for the maintenance of self-injury, fewer attempts have been made to use operant mechanisms to explain the emergence of early self-injurious behavior in young children with developmental disabilities.

To date, at least three theories have been presented to account for the emergence and maintenance of self-injurious behavior in individuals with developmental disabilities:

1) Self-injurious behavior is maintained by social consequences like attention, access to tangibles, and escape from demand, and the controlling consequences can be experimentally discovered by means of a functional analysis of the individual's behavior (Iwata et al., 1982).

2) Self-injurious behavior emerges in response to internal, biologically mediated events that cannot be observed using current behavioral measurement procedures and tools (Guess & Carr, 1991):

3) Self-injurious behavior is a form of communication (Kurtz et al., 2003).

Self-injurious head banging may develop through one or more of these three
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mechanisms.

**Possible Risk Factors**

Several factors may place a child at risk for developing self-injurious behavior in general, and head banging and head hitting specifically (Sigafos, Arthur, & O’Reilly, 2003). These include severity of disability, impoverished environment, deficits in speech and language development, adaptive skill deficits, and the presence of some predisposing genetic syndrome.

Although children at risk can now be identified, there is a paucity of research on treatment of early emerging self-injurious head banging and head hitting behavior in young children with developmental disabilities. Previous studies have indicated the need for early intervention in order to prevent self-injurious behavior from becoming a chronic, lifelong problem for persons with intellectual disabilities (Murphy, Hall, Oliver, & Kissi-Debra, 1999, Murphy, Oliver, Corbett, Crayton, Hales, Head, & Hall, 1993). Fewer studies have explored participant characteristics that could be utilized in the creation of an accurate early-childhood screening tool.

**Rationale and Relevant Research Questions**

The remainder of the present paper provides a selective review of three studies focused on the behavioral treatment of head banging in young children. We limited our review to self-injurious head banging, because it appears to be the most common form of self-injury. In reviewing the studies, the following questions will be addressed:

1) Does self-injurious behavior emerge prior to six years of age?

2) Does the head banging and head hitting of children with intellectual disabilities differ in onset, quality, or maintenance from that of children without intellectual disabilities?

3) What social and biological consequences seem to maintain head banging and head hitting in young children?

4) What published behavioral interventions focus on treating head banging and head hitting in children younger than six years of age?

5) Does behavioral intervention alter the frequency, occurrence, or quality of head banging and head hitting in young children?

6) What future research could best contribute to academic and practical discussions concerning early behavioral intervention for self-injury in young children?

**Challenges in Addressing Research Questions**

The main challenges in addressing these questions lie in the lack of substantial research with young children on self-injurious head banging. Because few intervention studies have been done with young children, it is difficult to ascertain which individual treatment strategies are effective in reducing self-injurious behavior (Kurtz et al., 2003). Furthermore, it is impossible to know whether specific participant
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characteristics, or the course of the emergence of head banging in children with developmental delays, vary significantly from children without developmental delays, because there are no independent group experiments looking for such potential differences and similarities. Also, because follow-up studies are rare, it is difficult to evaluate the long-term effectiveness of behavioral treatments for self-injury in young children with developmental disabilities.

Selection of Studies

We conducted a search of the literature published in the past 20 years using the following search terms: head hitting and children, head banging and children, and self-injury and children. Searches were conducted using the Psychology and Behavioral Sciences Collection, Medline, and PsychoINFO. Additionally, each database was searched using the term "literature review" in order to identify any existing literature reviews on self-injurious behavior and children. Criteria for selecting studies to review for the present article were as follows: First, the study must have had a focus on the treatment of self-injury. Second, the study must have included at least one child who was younger than 6 years of age, and who engaged in either self-injurious head hitting or hand to head hitting. Third, the article must have been published between 1984 and 2004.

This process identified 72 articles. Each article was then reviewed to determine if it met the selection criteria. After reading the abstract and participant sections of the identified papers, only three out of the 72 articles qualified for inclusion in our literature review. The most common cause for exclusion was that the paper did not include children who were younger than 6 years of age. The lack of treatment studies including young children was surprising, given that investigators have stressed the need for early intervention (Berkson, 2002; Guess & Carr, 1991; Hall, Oliver, & Murphy, 2001, Hyman et al., 1990).

Review of Treatment Studies

The three studies that focused on treatment of self-injurious head banging and head hitting in young children with developmental disabilities were Davies, Howlin, Bernal, and Warren (1998), Kurtz et al. (2003), and Vollmer, Marcus, and LeBlanc (1994). Of these, the Kurtz et al. (2003) study appears to be the only large single-subject design study evaluating the effects of a behavioral intervention on the early emergence of head banging.

In the Kurtz et al. (2003) study, 70% of the participants engaged in head banging. The mean age of onset was 17 months. Approximately 70% of the parents of those children who engaged in more than one topography of self-injurious behavior reported observing head banging as the first self-injurious behavior to emerge; others reported hand to head self-injurious behavior (10%), self-biting (6.7%), body slamming (3.3%), and scratching (3.3%).

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Parents in the Kurtz et al. (2003) study reported a mean service delay of 16 months. Half of the parents reported significant physiological and/or environmental events prior to the emergence of their child’s challenging behavior, while the other half did not recall any such significant event. The self-injurious behavior of 37.9% of the children appeared to be maintained by positive reinforcement, especially attention and access to tangible items. The same percentage of participants had self-injurious behavior that appeared undifferentiated. An interesting relation was discovered between length of service delay and the necessity of punishment procedures to eliminate self-injurious behavior. Specifically, those children who encountered a longer service delay were much more likely, when they did get service, to need punishment in their treatment package in order to reduce their problem behavior.

Vollmer et al. (1994) proposed treatment strategies that relied on a conceptualization of self-injurious behavior, not as operant behavior, but as an internally motivated event that fluctuates dependent on external stimuli. In the Vollmer et al. (1994) study, the authors alternated between an enriched environment and an impoverished environment while concurrently moving the children through analogue conditions. The treatment procedure effectively reduced self-injurious behavior of two boys who had engaged in head banging as well as other topographies of self-injurious behavior, but yielded only a modest decrease in the rate of self-injurious behavior for the girl in this experiment. For her, an additional component of time-out (i.e., hands down for 5 s.) reduced the self-injurious behavior effectively enough for long-term removal of an arm splint that she had been wearing to decrease hand mouthing. Environmental enrichment strategies were used to increase the child’s experience of external stimuli.

In the Vollmer et al. (1994) study, a prior functional analysis was completed with each participant to ensure experimentally that the self-injurious behavior was not being maintained by social consequences. When materials used in the environmental enrichment treatment were first determined using a pair-wise preference assessment, environmental enrichment reduced self-injurious behavior in the participants. However, it is important to note that enrichment was used together with differential reinforcement of other behavior (DRO) for two of the children and that time out from positive reinforcement was also used with one child. Vollmer et al. (1994) proposed that the potency of the reinforcers used in behavioral interventions is of the utmost importance in developing successful intervention packages. The reinforcer must be strong enough to compete with the reinforcement that the individual receives from engaging in the self-injurious behavior.

The third study (Davies et al., 1998) involved treatment of head banging in a 4-year-old boy who had been wearing restraints to prevent serious tissue damage. The intervention involved using the least effective amount of restraint contingent on attempted self-injury and differential reinforcement of other behavior. The results were mixed, in that the child’s level of self-injury increased dramatically during one session. This abrupt increase, however, might have been due to the medication he was taking for muscle spasms.
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Summary

It is clear that children with developmental disabilities often engage in self-injurious behavior, including head banging and head hitting. Head banging in young children may be maintained by social consequences, such as attention, access to tangibles, and demand situations; these social consequences can be determined using functional analysis (Kurtz et al., 2003). However, Vollmer et al. (1994) showed that self-injury in some young children may be maintained by automatic reinforcement. The behavioral treatments used with young children have included environmental enrichment (Vollmer et al., 1994), restraint plus differential reinforcement of other behavior (Davies et al., 1998), and functional communication training packages including extinction, differential reinforcement of other behavior, and non-contingent reinforcement (NCR) components, dependent on individual need (Kurtz et al., 2003). Functional communication training packages appear to be associated with good outcomes in terms of decreasing problem behavior (Kurtz et al., 2003).

In the three studies identified in this review, behavioral interventions were shown to be effective in reducing head banging. A commonality among the children in all three studies is their lack of functional communication skills. The fact that functional communication training worked so well to decrease head banging in the Kurtz et al. (2003) study could point to a possible relationship between level of communication skills and the ensuing emergence and maintenance of self-injurious behavior which might serve a communicative function. Of course, because there was no comparison with children who had similar communication skills and similar levels of disability but who did not engage in self-injurious behavior, it is difficult to say that this relation between communication skills and self-injury in young children will be useful in designing screening tools for children who might be at risk for developing self-injury. Possible risk factors for self-injury that have been identified include a diagnosis of severe or profound intellectual disability or autism spectrum disorder, the presence of sensory impairment, the presence of a physical disability, and limited communication or functional living skills. Oliver, Murphy, and Corbett (1987) determined that people who engage in self-injurious behavior are more likely to have a severe or profound disability than their peers. The few studies we found did not allow for a wider examination of whether other possible biological determinants, such as Cornelia de Lange, Prader-Willi, or Lesch-Nyhan Syndrome places an individual more at risk for developing self-injurious behavior.

Conclusion

Unfortunately, the extremely limited amount of published work focusing on the treatment of self-injurious behavior in children younger than six does not allow for an empirically rigorous analysis of the findings. However, the intervention study by Kurtz et al. (2003) has provided future researchers an adapted methodology for
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functional analysis and demonstrated the successful results possible in treating the self-injurious behavior of very young children. Future research should continue the important work of documenting successful interventions for young children who engage in self-injurious behavior.

In addition, it is necessary to undertake research to develop an adequate screening tool that will identify those children with developmental disabilities who are most at risk for developing self-injurious behavior. In terms of treatment, it will be necessary to develop family-friendly, proactive intervention packages that treat potentially serious proto-injurious behavior. To encourage and facilitate such interventions, we recommend that future studies be undertaken that include long-term follow-up of the children and their families.

References


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