Physical Restraint Reduction Using Systematic Duration Fading

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Abstract

The current study evaluated the efficacy of a fading procedure used to reduce physical restraint duration on an 18 year-old male student diagnosed with autism. The author calculated a fading threshold to determine when the duration of the restraint should be faded. Results showed that the fading procedure was successful in reducing the restraint duration by 50%. This study demonstrated that duration fading is an effective tool in reducing the intrusiveness of physical restraint.

Keywords: restraint fading, restraint reduction, fading threshold
Physical Restraint Reduction

Using Systematic Duration Fading

Using physical restraint is a common practice among many human service providers, especially those who serve people with challenging behaviors. Reasons for implementing physical restraints include managing crisis situations or intervening systematically to decrease challenging behaviors (The Handbook of High-Risk Challenging Behaviors in People with Intellectual and Developmental Disabilities, 2011). Regardless of the reason for restraint implementation, the social validity of restraint is at the forefront of the human services field. The restrictiveness of physical restraint is a human rights issue and as a result must be handled with care and implemented using empirical methods.

Whatever the reason for its use, there are risks associated with every situation that involves physical restraint. For example, Ferleger (2008) recently cited a case in which a 12-year old boy who was being restrained for head banging stopped breathing and could not be revived.

While death is the most extreme, yet uncommon, result of restraint, many other injuries occur more frequently. Tilli and Spreat (2009) collected data on injuries to clients that were associated with physical restraint. The study showed that approximately one third of emergency restraints implemented over a year’s time resulted in injury to a client. Even though the injuries were relatively minor in nature (e.g., redness of skin, small bruises, and scrapes), such injuries may become exacerbated by additional restraint.
While it may be impractical or unsafe for both clients and caregivers not to use physical restraint, alternative procedures are available. Luiselli (2008a) describes several ways in which maladaptive behavior can be reduced without employing restraint, including antecedent interventions. An antecedent intervention begins with the identification of behavioral functions, possible motivating operations, and other environmental factors that lead to dangerous behavior. Once the function of the behaviors is identified, as well as the specific conditions under which the behavior is more likely to occur, antecedent-based treatments can be applied to identify functional alternative behaviors and/or decrease relative states of deprivation or satiation. For example, Vollmer, Marcus, and Ringdahl (1995) found that self-injury maintained by negative reinforcement decreased when participants were given non-contingent breaks from work tasks.

If it is not possible to treat behavior with antecedents and non-restraint consequences alone, it may be necessary to include some form of restraint in the treatment plan. In the event that restraint is included in the treatment plan, there are alternative options available to reduce the relative duration and frequency of the restraint procedure. Luiselli, Treml, Kane, and Young (2004) evaluated the effects of fixed-time release (FTR) versus behavior-contingent release (BCR). In this study, the participant had a BCR physical restraint in her treatment plan at the time of the study, in which restraint was terminated when 60 seconds elapsed free of struggling and resistance against staff members. The treatment phase changed restraint from the BCR to a FTR. The results showed that the FTR implementation reduced both the frequency and duration of the restraints per week. However, the results were skewed
by the fact that staff were allowed to implement a BCR if they felt that it was unsafe to release the student from the restraint.

Luiselli, Pace, and Dunn (2006) extended the findings of the previous study. The three students in this study had BCR restraints as part of their treatment plan. In Phase 1 of the study, BCR was used to determine whether or not the restraint should be released. The criterion for release was set between 15 seconds and 120 seconds free of resistance, depending on the child’s behavior. During the FTR phase, each child was restrained for a fixed amount of time; this time was based on a percentage of the average time spent in the restraint during the BCR phase. Results showed that the participants spent less time in physical restraints during the FTR phase than they did in the BCR phase. This finding from Luiselli et al. is important in that it supports a less intrusive approach to physical restraint, even though restraint was not entirely eliminated.

Although research suggests that FTR for physical restraint may be less intrusive and more effective than BCR, additional studies addressed ways to further reduce the intrusive nature of FTR physical restraint. Luiselli (2008) evaluated the effects of a fading procedure on a FTR implementation of physical restraint. During baseline, a FTR 60 seconds physical restraint was implemented contingent on participant’s aggressive behavior. During the fading procedure, the duration of the restraint was systematically reduced to 30 seconds, 15 seconds, and 7 seconds, depending on the occurrence of a decreasing trend of restraint frequency and duration at each fading phase. During the final phase, no restraint was applied following aggressive behavior. Instead, the staff member working with the student stood behind...
him, placed their hands on his shoulders and gave him the direction to ‘sit down.’

The results showed that the frequency and duration of restraint steadily decreased from the FTR 60 seconds phase to the FTR 15 seconds phase. Frequency of the behavior increased somewhat during the FTR 7 seconds phase, yet the duration remained very low. The no restraint phase showed near zero rates of the ‘sit down’ procedure, apart from an initial spike. This study is important in that it demonstrates that it is possible to reduce the intrusiveness of physical restraint by fading the duration.

There is still limited research regarding restraint reduction. Also, there is no literature on the use of a fading threshold to determine the subsequent fading steps. The purpose of the current study is to extend the utility of fading restraint duration in order to reduce the intrusiveness of physical restraint.

**Method**

**Participant and Setting**

The single participant in this study, Paul, was an 18 year-old male with a diagnosis of autism. He communicated primarily through short sentences and single words, but sometimes used gestures. Paul could complete many academic and self-care skills independently, but required some help with fine motor tasks. In his leisure time, Paul watched cartoons on the computer, read books, and completed puzzles.

The setting was a school that served children and young adults with developmental disabilities. At the time of the study, Paul lived at home and attended school Monday through Friday for approximately six and a half hours each day. Paul’s primary classroom consisted of five other students with similar diagnosis and
three teachers. The classroom was 5 meters by 11.6 meters and contained tables, chairs, shelves with various activities and a computer.

Paul displayed a variety of challenging behaviors, including non-compliance, dropping to the ground, and aggression. In the past, Paul’s aggression was observed to cause injury to staff, as well as to persist over long episodes. For safety reasons, it was deemed necessary to implement physical restraint when Paul displayed aggressive behavior with pursuit of another person.

**Response Measurement and Reliability**

The criterion for protective holds in this study was aggression with pursuit. Aggression with pursuit was defined as any actual or attempted instance of pushing, hitting, pinching, scratching, biting, or kicking another person paired with movement towards another, holding on to another person and pulling a body part towards an open mouth, or while standing within 3 feet of another person while in the classroom. Physical restraint was applied upon any attempt or successful occurrence of these behaviors.

Frequency and duration of physical restraints were recorded. Physical restraints were applied in a supine position, with Paul laying on his back and a staff member holding each arm with one hand just above Paul’s wrist and one hand just below his shoulder joint. If kicking occurred during the hold, a third staff member was permitted to cradle Paul’s legs between the staff’s arm and rib cage just above Paul’s knees.

All classroom staff were trained on Paul’s behavior support plan. Each one possessed at least a Bachelor’s degree and the lead teacher was a graduate student in a
special education program. The author provided the teachers with instruction regarding how to take Inter-observer agreement (IOA) data and staff went through standard applied behavior analysis and data collection training that is required for all school staff upon orientation. Classroom staff took exact interval IOA. IOA was taken for 55% of school days and was calculated by dividing the number of days with 100% agreement by the number of total days and multiplying by 100. IOA for this study was 85.5% (range, 0% to 100%).

Treatment integrity was taken for a) student meeting criteria for restraint, b) correct duration of restraint, and c) restraint being implemented within 3 seconds of aggression with pursuit. Treatment integrity was taken for 10% of occurrences of physical restraint and was calculated to be 97% (range, 66.7% to 100%).

**Procedure**

This study included two phases: baseline and fixed-time release fading. During the study, Paul participated in his typical academic and leisure activities throughout each day. Paul was able to complete most work independently, but sometimes required minimal prompting to complete tasks; at these times, a least intrusive to most intrusive prompting strategy was employed. A differential reinforcement of other behavior (DRO) plan was in place as an antecedent strategy in Paul’s behavior support plan. Paul earned 5 minutes on the computer, his most preferred form of reinforcement, every 30 minutes. However, if Paul displayed aggression with pursuit, the 30-minute interval was reset.

Baseline data were collected for 3 consecutive weeks. The student’s behavior support plan previously included a 60-second supine restraint upon the occurrence of
aggression with pursuit. A fixed time-release 60-second physical restraint contingent upon aggression with pursuit remained in effect during the baseline phase.

A fading threshold was calculated using the average frequency of restraints per day from a random 5 day sample from the month prior to baseline. During this sample, Paul’s number of restraints was much higher than frequency at the time of the study. Results of this calculation indicated that an average of six restraints per day were implemented, thus the fading threshold was set at six. If Paul stayed at or below the threshold for the week, ten seconds was subtracted from the restraint duration used during the following week. If Paul exceeded the threshold, the restraint duration was increased by ten seconds for the following week. If restraint time were reduced to 10 seconds, the next fading phase would be 5 seconds. The clinical team determined that, due to the imminent risk posed by Paul’s aggression and his history of long aggressive episodes, complete removal of the restraint would not be appropriate.

The fading goal for the current study was to reduce restraint duration as close to 0 seconds as possible. The fading procedure was terminated when Paul stayed below the fading threshold for 3 consecutive weeks at the minimum effective restraint duration.

**Results**

Figure 1 shows the frequency and duration of physical restraint each day. Frequency of restraint is denoted on the primary Y-axis and duration is denoted on the secondary Y-axis. During baseline, frequency of restraint was at a low and stable rate ($M = .73$; range, 0 to 3). Paul met criteria to reduce restraint duration for 6 consecutive weeks (weeks 4 to 9), at which point the restraint duration was faded to 5
seconds. Week 11 marked an increase in restraint frequency and Paul met criteria to increase restraint duration over the next 3 weeks. Restraint frequency stabilized at 30 seconds at week 16; however, Paul was out of school for week 17. One day during week 18, the number of restraints exceeded the fading threshold, but remained stable for the rest of the week and for the following week.

**Discussion**

The results of the current study showed that restraint fading based on a fading threshold was successful in reducing duration of physical restraint. Restraint duration was successfully faded from 60 seconds to 5 seconds before restraint implementation increased. It stabilized when restraint duration was faded back to 30 seconds. At the end of the current study, Paul’s restraint duration was reduced by 50% from baseline levels.

This study adds to the literature on the effectiveness of restraint fading. There has been limited research conducted in this area and the current study demonstrated a systematic design for reducing physical restraint duration with a safe and data-based strategy.

The present study had several limitations. First, the amount of treatment integrity data collected was below the desired level. Due to staffing constraints, it was difficult for the classroom teachers to take treatment integrity. As a result, classroom staff were instructed to stop taking treatment integrity data and were informed that it would be evaluated through the school’s video recording system at the end of the study. However, due to unforeseen technical difficulties, very little video was available for evaluation. Instead of treatment integrity being taken for a
targeted 33% of observations, only 10% of observations were available for evaluation (both the available paper and video integrity combined). Despite the low percentage of observations, treatment integrity was still calculated to be 97%.

The second limitation of this current study was the fact that the procedure took a long time to complete. It is unknown whether or not restraint duration could have been faded more aggressively (e.g., following 3 days versus 5 days) and therefore reducing the overall time it took to meet completion criteria. However, there were risks associated with fading too quickly. The potential for Paul’s rate of restraint to steeply increase, as was observed in weeks 9 through 13, early on would have required a re-evaluation of how quickly to fade restraint duration, which could have potentially elongated the procedure even more.

The study was slightly elongated due to fading not commencing during week 14. Paul met criteria to fade restraint duration to 30 seconds the week prior, but a staff miscommunication resulted in restraint duration remaining at 20 seconds for the week.

In addition, during the study some unplanned interruptions occurred in Paul’s schedule, thus leading to a third potential limitation. For example, during week 9, an analog functional analysis was conducted independent of the current study. After termination of one of the conditions, Paul continued to exhibit aggressive behavior back in the classroom, thus contacting the contingencies for restraint. Due to abnormal conditions, restraint fading was withheld. Similarly, during week 18, Paul was ill and he surpassed the fading threshold. Anecdotally, it was observed in the past that days when Paul was sick were highly correlated to increased rates of
maladaptive behavior. Paul’s frequency of restraint was stable the following week and the study was concluded.

Finally, if a reversal had been conducted, there would be more evidence to suggest that the duration of the physical restraint was controlling the rates of Paul’s behavior. By doing a reversal from 30 second restraints to 60 second restraints, it could have been demonstrated that the 30 second restraint was equally as effective as the 60 second restraint.

In conclusion, this study successfully demonstrated a new method for fading FTR restraint duration using a fading threshold. Despite the aforementioned flaws, this design may be useful for reducing the intrusiveness of restraint. The implications of this study are socially valid for the human services field. While physical restraint may be necessary in many cases, it demonstrates an effort to promote a least restrictive model of treatment. Future research should look to extend the utility of a fading threshold in reducing physical restraint or other intrusive procedures with the goal of eliminating restraint when applicable.
References


Figure 1. Frequency and duration of physical restraint per day.
Figure 1.