

## Effectiveness of sensory protocols implemented to reduce self-injurious behaviours such as rumination

Mansi Rajadhyaksha

### Executive summary

Rumination is defined as the regurgitation, chewing and re-swallowing of partially digested food. It is estimated that it occurs in about 10% of individuals with developmental disabilities (McDowell C, et al., 2017).

This case study will discuss the effectiveness of implementing pupil specific sensory protocols designed to reduce the occurrence of self-injurious behaviours, particularly rumination. It has been observed that the pupil engages in rumination soon after meal times and this can have significant health implications for the pupil in the long term. The protocols put in place have helped the pupil in being able to manage his urge to ruminate and reduced this self-injurious behaviour drastically.

### Introduction

The study focuses on a 14-year-old with a diagnosis of Autism Spectrum Disorder (ASD). The pupil communicates using Makaton signs. He attends a school which uses an Applied Behavioural Analysis (ABA) approach and receives 1:1 support from an adult throughout his day. He additionally receives an Occupational Therapy intervention on a 1:1 basis for 15 minutes a week as well as 1:1 speech therapy.

Research has demonstrated that meal time and feeding disorders occur frequently in children with autism (Archer, Rosenbaum and Streiner, 1991), and can include food refusal, food selectivity, food packing and rumination (Lyons, Rue, Luiselli and DiGennaro, 2007; Munk and Repp, 1994). The long-term physical effects of rumination include malnutrition, esophagitis, and dehydration and reduced resistance to disease (Konarski and Favell, 1992). With no medical reasoning found, a functional analysis was conducted to examine the environmental factors responsible for rumination. This pupil was observed to ruminate at various times of the day; however, the frequency of rumination was highest soon after a meal, i.e., snack or lunch.

Some interventions tried in the past included presenting aversive or punitive consequences contingent on the behaviour. Such aversive consequences included verbal reprimands and reminders to spit out the food ruminated to decrease the future occurrence of the rumination (Dominguez, Wilder, Cheung, and Rey, 2014). Other non-aversive interventions trailed include differential reinforcement schedules, extinction, special feeding techniques, contingent exercise, chewing gum, and brushing teeth after meals. These interventions were each tried in isolation and they did not appear to be effective. It is also important to note that these interventions are successful and effective for some, and require special planning, preparation and additional resources (Borreson and Anderson, 1982; Starin and Fuqua, 1987). The current case study is aimed to extend on the previous interventions by implementing a rumination protocol that was specifically designed for the pupil and included a daily pre and post meal drink, food and exercise routine. This intervention was considered appropriate for the pupil as he had all the necessary pre-requisite skills in his repertoire.

### Method

An A-B design was implemented, and the study focused on two naturally occurring settings in school, morning snack and lunch time. The target behaviour was operationally defined as the return of pre-chewed food into the mouth indicated by; a gurgling sound, the swelling of cheeks, chewing action of the mouth outside of snack and lunch time and a swirling sound. Rumination ended after the deswelling of the cheeks, pupil showing his open mouth empty of food to his tutor and spitting the ruminated food out of his mouth. Frequency data was collected on the rumination occurred and was done so using a clicker. The intervention was put in place for the entire day but specifically 30 minutes before snack and lunch and 15 minutes after snack and 30 minutes after lunch. Total frequency data across the day was reported along with the antecedents.

The pupil has displayed the ruminative behaviour for approximately three years. Reports and discussions from parents have ruled out a medical cause for the ruminative behaviour including any problems with reflux or the esophageal area. A previous intervention for rumination has been unsuccessful.

Observation and recording of the occurrence of rumination occurred in 2 settings during the school day. The settings consisted of snack time (10:30-11:00 am), and lunch time (12:30-1:30 pm) in the classroom. In both settings, the pupil had access to the usual eating implements and utensils and was free to choose foods (for snack) from a range that were available to him in his snack box and the lunch sent from home

during lunch time. The pupil usually got the same foods for snack – a variety of fruits and either pasta with meat, rice with meat or quinoa with meat for lunch. The staff members with the pupil would always have a clicker with them to tally the frequency of the rumination.

A rumination protocol was designed by the supervisor using a multidisciplinary approach, where suggestions were given by other professionals that had experience with rumination behaviours. According to the protocol, an anecdotal food diary was kept on a daily basis to check for preferable food and if a certain kind of food led to increase in the rumination. The pupil's liquid intake was limited throughout the day with the pupil not being able to access fluids 30 minutes before and 30 minutes after snack and lunch. However, throughout the rest of the day, the pupil was given small sips for water/fluids in a cup when requested by the pupil.

The pupil was required to sit at a table alone if possible for lunch. This was to avoid him grabbing other pupil's food. The pupil usually had fruit for snack cut in small chunks which he could eat off a plate or a bowl. For lunch, he had a silver cylinder container of food which was already heated and didn't need any preparation. He was given a bowl and a teaspoon (fork if he has pasta) to have lunch. Staff was instructed to put a small amount in the bowl at a time and make sure he ate slowly with both snack and lunch.

Upon request by the supervisor, the pupil was sent to school with chewing gum. As per parent request and guidance, 4-5 of these little chewing gum pieces were given to him if the staff noticed him ruminating. If the pupil were to take the gum out of his mouth and played with it in his hand, he was not allowed to play with it any longer than 1 minute after which he was asked to put it in the bin. After this the pupil was given another 4-5 bits of the gum.

Another important part of the rumination protocol was the pupil's daily exercise. The pupil in the study is a fairly active. As a part of the protocol, he was required to go for a walk for 15 minutes after he ate his snack and 30 minutes after he ate his lunch. Additionally, the pupil was required to walk for 15 minutes before he left to go home at the end of the day. This protocol was implemented daily and all staff working with the pupil were trained on the implementation of it.

## Results

Baseline data was monitored for two weeks and 2 days, 27.01.2020 – 11.02.2020. Data monitored was taken throughout the day and frequency data was collected. Baseline data from the food diary also suggested that rumination was likely to occur after lunch time since the pupil would always eat some form of meat for lunch. Figure 1 shows the frequency of rumination for each day, the range being from 54 times to 11 times each day.

The rumination protocol was implemented on the 12.02.2020. Figure 2 shows a graph which indicates the immediate reduction in the frequency of rumination, with the range being 14-0. This is also consistent across all days during the implementation of the intervention.

## Discussion

Baseline data, including a food diary, indicated that rumination was more likely to occur when preferred protein-based foods were ingested. This suggested that the potential reinforcer was the flavour of regurgitated food. The combination of the pre and post meal steps taken as per the protocol, were hypothesized to have brought about the reduction in the rumination behaviour.

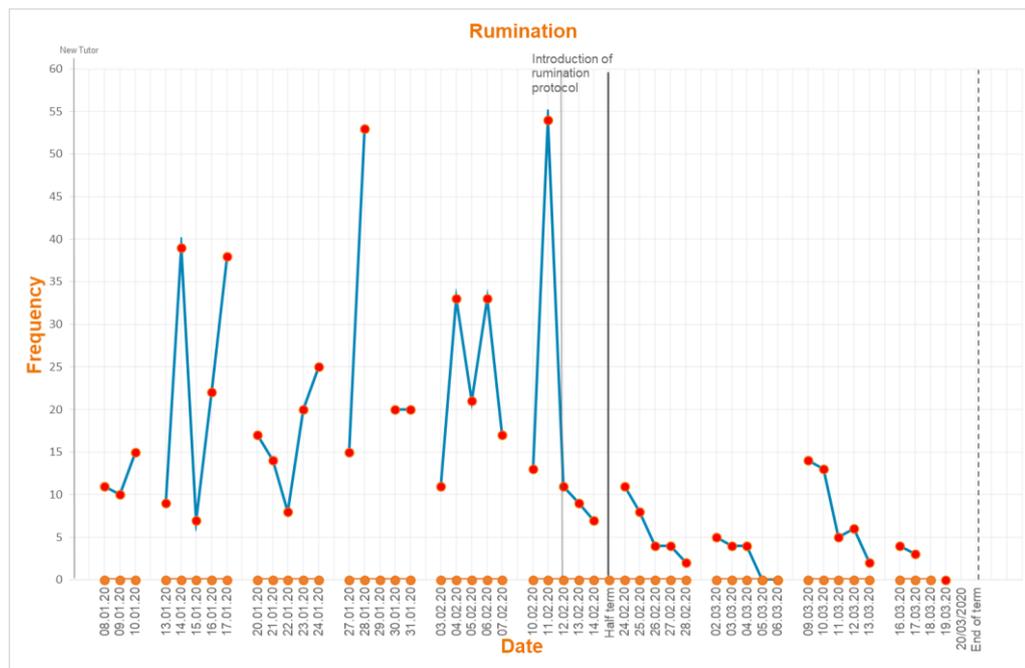
The results of the current case study indicate that the consistent implementation of the rumination protocol effectively reduced ruminative behaviour and reduced the frequency of the behaviour from a range of 54-11 to 14-0 times each day in the setting where it was implemented. The food diary showed that there were no observable changes in relation to the types of foods available during snack and lunchtime before or after intervention. There were also no observable changes in the types of foods chosen by the child before or after intervention.

Although only based on results from one participant, these findings indicate that a combination of various interventions, a consistent implementation of the intervention, quality of intervention training provided and ensuring that the intervention is implemented accurately, and finally a multidisciplinary approach to designing the intervention can be effective in the reduction of the frequency of self-injurious behaviours such as rumination. Additionally, it is worth noting that this was an ethical intervention that was effective without the use of punitive methods.

Figure 1

Date	Total Frequency Level 1		
08.01.20	11	11.02.20	54
09.01.20	10	12.02.20	11
10.01.20	15	13.02.20	9
		14.02.20	7
13.01.20	9	Half term	
14.01.20	39	24.02.20	11
15.01.20	7	25.02.20	8
16.01.20	22	26.02.20	4
17.01.20	38	27.02.20	4
		28.02.20	2
20.01.20	17		
21.01.20	14	02.03.20	5
22.01.20	8	03.03.20	4
23.01.20	20	04.03.20	4
24.01.20	25	05.03.20	0
		06.03.20	0
27.01.20	15		
28.01.20	53	09.03.20	14
29.01.20		10.03.20	13
30.01.20	20	11.03.20	5
31.01.20	20	12.03.20	6
		13.03.20	2
03.02.20	11		
04.02.20	33	16.03.20	4
05.02.20	21	17.03.20	3
06.02.20	33	18.03.20	
07.02.20	17	19.03.20	0
		20/03/2020	
10.02.20	13	End of term	

Figure 2



## References

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