

Autism Self-Injurious Behaviour (SIB) in the school environment: a research report from a specialized school in England

Efthalia Karakatsani M.Ed, University of Birmingham, School of Psychology.

Dr. Spiridon-Georgios Soulis, University of Ioannina, Department of Primary Education

Résumé

Contexte : Les comportements automutilation constituent un problème majeur pour les enfants ayant un trouble du développement, tel que les troubles du spectre autistique (TSA) et autres entités cliniques. Ce travail vise à clarifier l'association entre comportement d'automutilation et situations environnementales et biologiques chez les enfants avec ASD, ainsi que les stratégies pédagogiques qui s'appliquent pour gérer ces comportements. *Méthodes* : Pour cette étude nous avons utilisé des entrevues semi-structurées avec les professionnels qui travaillent

quotidiennement avec les enfants qui présentent des SIB , les observations des enfants qui présentent des comportements difficiles et d'automutilation, ainsi que des documents tels que les dossiers de la personne décrivant de leurs évolutions. *Résultats* : Les résultats de cette étude montrent qu'il y a des caractéristiques personnelles et environnementales spécifiques tels que les comportements autistiques, l'impulsivité et l'hyperactivité, les comportements stéréotypés et les intérêts restreints, des besoins accrus et le niveau de déshabilité intellectuelle qui pourraient être considérés comme marqueurs de risque important pour la manifestation de SIB.

Conclusion : L'enquête sur les caractéristiques cliniques et de l'environnementales des enfants qui présentent SIB nous offrent les causes présumées de SIB, et par le biais de l'analyse fonctionnelle de ces comportements, les professionnels pourraient appliquer ces observations à leur intervention pour la rendre plus appropriée et adaptée aux besoins des personnes concernées.

Mots clés : troubles du comportement, comportement d'automutilation, troubles du développement neurologique, troubles du spectre autistique (TSA).

Abstract

Background: Self-injurious behaviour consist major behavioural problem for children with neurodevelopmental disabilities such as Autism Spectrum Disorders (ASD) and other clinical populations. This report seeks to clarify the association between self-injurious behaviour and

environmental - biological contingencies in children with ASD and the strategies that Teachers apply to handle these behaviours.

Methods: For this study have used semi-structured interviews with professionals working on a daily basis with children who exhibit SIB, observations of children who exhibit challenging and self-injurious behaviour, as well as documents such as school individual's records of their progress.

Results: The outcomes of this study report that there are specific personal and environmental characteristics such as Autism, Impulsivity/overactivity, stereotyped/restricted behaviours, additional needs and the level of intellectual disability which might considered as important risk markers for the SIB manifestation.

Conclusion: The investigation of the clinical and environmental characteristics of children who are engaged in SIB provide us the putative causes of SIB and through the functional analysis of those behaviours professionals could apply the most suitable intervention adapted to individuals needs.

Keywords: challenging behaviour, self-injurious behaviour, neurodevelopmental disorders, Autism Spectrum Disorder (ASD).

Exploring SIB

Self-Injurious Behaviour (SIB) constitutes a form of challenging behaviour, which often accompanies developmental disorders such as autism (Janicki and Jacobson, 1983). In general, challenging behaviour is defined as *“any culturally abnormal behaviour of such intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy or behaviour which set boundaries for a person's access to community facilities”* (Emerson, 1995 p.24). Especially considering individuals with Intellectual Disabilities has reported that the 4% of this population exhibit a type of self-injurious behaviour (Emerson et al. 2001). Oliver et al. (2009) state that the 39, 2% of children aged 4 to 18 showed behavioural problems in a clinical significant level. Among individuals with autism it is estimated a range from 20% to 71% of people who are engaged in self-injurious behaviour (Dominick et al. 2007). Murphy et al. (2009) found that 64.3 % (101) individuals show challenging behaviour. As it has been noted there is a large number of individuals with neurodevelopmental disorders who exhibits

challenging or self-injurious behaviour.

Schneider et al. (1996) state that more than 65% of SIB forms begin in children prior to 5 years old. Murphy et al. (1999), state that SIB can develop in older children who are well past infancy. Berkson, Tupa and Scherman (2001), found that many SIB forms might occur in some children with disabilities from the first year of their life. Studies of SIB in older children and adolescents suggest that those with severe/profound intellectual and developmental disabilities are most likely to exhibit self-injurious behaviour. Lower daily living skills, impaired ambulation, visual sensory impairment, autism, and particular genetic causes have been associated with self-injurious behaviour (MacLean et al. 2010).

There is research evidence (McClintock, Hall & Oliver, 2003) which states that SIB is strongly correlated with the level of intellectual disability. Thus, estimates of SIB are highest in individuals with severe and profound levels of intellectual disabilities. Self-injurious behaviour is a common feature of many genetic and neurodevelopmental disorders such as Smith Magenis Syndrome (Taylor, 2008), Tourette's syndrome (Mathews et al. 2004), Autism Spectrum Disorders (Oliver and Richards, 2010) Lesch- Nyhan (Hall, Oliver and Murphy 2001), Cornelia De Lange (Oliver et al. 2009). Researchers have suggested an association between social skills deficits and self-injurious behaviour (McClintock, Hall & Oliver, 2003). Specifically, individuals with intellectual disabilities are more likely to display negative social skills and undesirable social behaviours because of poor adaptive behaviours. Bolte and Poustka, (2002) support that children with autism often are experiencing social deficits, difficulties in daily living skills and communication problems.

Potential Causes of SIB

Self-Injurious Behaviour has both biological and environmental causes. In terms of biological causes there are neurotransmitter disturbances, genetic disorders and pain which are involved in SIB manifestation. Most notably, regarding the neurotransmitter disturbances Murphy and Wilson (1987), state that differentiations in the dopaminergic and serotonergic system have been linked with self-injurious behaviours in autism. Respectively to genetic disorders, SIB is a prominent behavioural feature of Fragile X, Lesch-Nyhan, Prader-Willi, and Smith-Magenis syndromes. Arron et al. (2011), state that self-injury is more likely to be shown by individuals with Cornelia De Lange, Criu Di Chat, Fragile X, Lowe, Prader Willi and Smith Magenis Syndrome. Individuals with Angelman syndrome are more likely to show physical aggressive behaviour. Hall, Oliver and Murphy (2001) suggested that congenital errors in brain might explain the manifestation of SIB in children with Lesch-Nyhan and Cornelia de Lange.

In addition, pain has been linked with self-injury. Murphy and Wilson, (1985) support, that SIB has also been connected with the side effect of minor illness hypothesis where people with developmental delay might exhibit SIB in order to be relieved from another irritation or an internal pain.

The operant theory states that SIB is behaviour regulated by environmental events (Carr, 1977). Most notably, SIB may be maintained by contingent positive reinforcement (Durand and Crimmins, 1988 cited in Oliver et al. 1993) or negative reinforcement (Iwata et al. 1990), automatic reinforcement (Iwata et al. 1990) and sensory stimulation (Edelson, 1984).

Weis (2003) proposed that SIB could be regulated by three main environmental hypotheses: the positive social reinforcement hypothesis, the negative reinforcement hypothesis and the sensory self-stimulation hypothesis. The positive social reinforcement hypothesis refers to the strengthened of SIB with a desirable way for the individual (Favell and Greene, 1980). The negative reinforcement hypothesis support that the individual engage in SIB in order to avoid an unwanted procedure (negative reinforcement). Regarding the third hypothesis individuals with autism could display SIB because of abnormal levels of physical stimulation (Edelson, 1984). Respectively (Henault 2006), states that individuals with autism with hypersensitivity or hyposensitivity display SIB in order to increase or eliminate the intensity of the physical stimuli. Furthermore, according to Edelson (2007) individuals might display SIB in order to increase or reduce their arousal level.

Risk Markers for SIB

SIB is a behaviour which governed by both environmental and biological contingencies (Weis, 2003). Risk markers could be divided in two main categories: Personal and Environmental risk markers for Challenging behaviour. Personal risk markers include: level of intellectual disabilities, secondary disabilities such as communication, social or mobility problems and specific genetic disorders. Environmental risk markers could be considered social deprivation, sensory and material deprivation, high levels of unpredictable stress, inconsistent practice, high rate demands, differential reinforcement of challenging behaviour and high expressed emotion (Allen et al. 2009).

There are several personal and environmental characteristics which are involved in self-injury. McClintock, Hall and Oliver (2003) state, that the degree of intellectual disability, autism, social and communication deficits regarding the expressive and receptive communicative function are related with self-injurious behaviour. Gender might consider as risk marker for aggressive

behaviour. Similarly, Cooper et al. (2009) state, that repetitive behaviours and impulsivity are associated with the manifestation and the severity of self-injury. Altered pain perception could be related with the persistence of self-injury in individuals with intellectual disability and autism (Peebles and Price, 2012; Richards and Oliver, 2008).

Murphy et al. (1993) state, that self-injurious behaviour can be prevented by the design of early intervention programmes. Most notably, it is essential to examine child's clinical and behavioural profile in order to identify the putative risk markers which are involved in SIB. The identification of risk markers regarding challenging or self-injurious behaviour development in children with neurodevelopmental disorders could explain the occurrence of SIB.

Methods

This short research report aims to identify the clinical and environmental characteristics of children with ASD which are involved in SIB manifestation and to describe how teachers manage those behavioural problems. The present study contacted in two specialised classrooms for challenging behaviour known as 'challenging class' and 'primary class' which were based on a specialized school for autism in England. The allocation of the students in both primary and challenging class depends on the age of each child. Students up to 12 years old are allocated in primary class and the students over 12's are allocated in challenging class.

In terms of methods, I carried out interviews with 7 professionals working with children who exhibit SIB, observation of 6 children's behaviour during class and break times, as well as relevant documents of each child clinical/medical background and school's records (see below Table 1). A total number of 6 children's challenging behaviour was observed and recorded based on the Functional Behaviour Analysis principles where has been used the Antecedents Behaviour Consequences Checklist (ABC) method. Every child's behaviour was analyzed based on the Functional Behaviour Assessment (FBA, Gresham, Watson and Skinner, 2001) which includes information about the frequency, intensity, duration and the sense of SIB. Later was recorded a list of possible environmental factors that might enhance SIB.

Results of the study

Table 1. Details of the pupils who participated in the study

Student	Primary ASD Diagnosis	Additional needs	Other forms of Communication	Form of SIB	Gender	Age	Behavioural Intervention
A	Severe autism	Epilepsy	No	Head Banging/Aggression	Female	13	Team-Teach
B	Severe autism	Epilepsy	No	Head banging/ self-biting/ Aggression	Female	13	Physical-Exercise/ Extinction
C	Severe autism	No	No	Hand mouthing	Male	15	DRA
D	Severe autism	No	No	Head slapping/ Aggression	Female	12	Functional Communication Training
E	Autism	Sensory Issues	No	Trichotillomania	Female	9	Extinction/DRA
F	Autism	No	No	Head Banging/ Aggression	Male	8	Team-Teach/Extinction

1. Personal Risk Markers for SIB

During the observation of the pupils in both classes and play-time activities were identified a variety of specific biomedical and environmental factors which might involved in each child's SIB aetiopathogenesis and manifestation which often is closely related with each child's severity of condition. As it has been indicated in the literature Autism and/or other genetic syndromes are considered as biological risk marker for SIB. All participants in this study who manifest SIB have ASD as primary diagnosis. Additional needs has confirmed in this study as an important personal risk marker for SIB. Based on the analysis of the individual school record for pupil A the epileptic seizures which the child was suffered considered as a medical factor that enhance the manifestation of SIB in order to relief from seizures pain. According to both literature body and the teacher's interpretation irregular sleep patterns affect seizures activities which result on pupil's

A health and mood. Correspondingly, student B who has been also diagnosed with Epilepsy and sleeping problems during the observation she slept on a chair, when the school staff tried to engage her in school activities she exhibited aggressive and self-injurious behaviour.

2. Environmental Risk Markers

However, as results from this study the broader environmental factors are also involved in SIB manifestation. There is research evidence which indicates that there is significant relation between social communication problems and challenging behaviour. In those cases, according to the literature body, the function of SIB serves an alternative way of communication/interaction with the social environment. As it has been observed, the pupils who have developed alternative forms of communication such as sign language and Picture Exchange Communication Skills (PECS) exhibited less frequently self-injurious. Is notable the quote of a Senior Teacher relating to this issue:

“Sometimes the communication problems or frustration which a child might experience could be the main reason of SIB occurrence.”

As was observed during the break time, student A in challenging class exhibited SIB when teacher expressed her request towards the student. Student felt frustrated and started self-injured as a way to express her refusal towards teacher’s request. Similar, student B in challenging class although that she could use some body language skills, those skills are enough limited in order to communicate effectively with teachers or even to be engaged in a social interaction context. Thus, frustration feelings consist one of the most possible reasons of this student’s SIB manifestation. Children who have not developed communication skills face problems with social interaction.

There is research evidence that sensory issues and emotional arousal have been also involved in SIB manifestation. As it has been observed, student E in primary class exhibited SIB and aggression when teacher praised her. Moreover, as the Senior Teacher in challenging class underlined student A, faced also sensory issues. During the observation, this particular child during the greatest part of the school day remained in a special modified room, where she was able to work independently when staff assisted her with one to one support. It was notable senior teacher’s quote regarding to student’s A, aggressive behaviour:

“ Sometimes, I think that Student A hates me because I am blonde”.

Based in the Teacher's interpretation, because she has different hair colour might was afraid this difference and she behaved with aggressive behaviour towards the teacher. However, regarding to the observation data student's A, aggressive behaviour might be explained from sensory issues that this pupil faced. She felt sensory overloaded because teacher tried to engage her in social interaction process. Thus, was too much information coming in at once and this was overwhelming.

Finally, behaviours such as hand mouthing and trichotillomania constitute automatically reinforced behaviours. As Senior Teacher underlines, pupil C in challenging class might exhibits those behaviours when he is not closely supervised or when he has to be adapted in new environments. Moreover, as TAs indicated, when new members of staff are coming to the school is a situation which experienced as a tremendous environmental change which is possible provoke SIB and aggressive behaviour. As it has been observed this child has obsession with the routine as a result when this routine changes student C exhibited hand mouthing and aggression which are also connected with individuals' arousal level.

Teaching Interventions

As it has been presented there are a lot of factors which might involved in manifestation of SIB depending on the cognitive profile and individual needs of each pupil. Relatively to the assessment of individual's needs, the school's Head-Teacher underline that Pupils with self-injurious behaviours are supported by a variety of other agencies including clinical psychologists. One to one support has been provided to the majority of students because of the complexity of their needs and their behavioural problems. However, as teaching staff supported they were requesting from the clinical psychologists to visit them more frequently in order to assist them to manage effectively those behaviours. Also school aims to engage parents in the whole process and provision in order to identify clearer child's needs and strengths and provide them the most effective support. It is crucial to mention that teachers took into account child's level of intellectual disability, if he/she has additional needs and the form of self-injurious behaviour that he/she exhibited in order to apply the most appropriate behavioural strategy for this individual.

From the observational and interview data has been showed that teachers in this school have been trained to manage effectively challenging and self-injurious behaviour. As it has been observed in

students who have complex needs and intellectual disabilities Team-Teach which is based on Positive Handling Policy is the most preferable and effective strategy. For instance, in case of student A in challenging class teacher in order to manage student's A behaviour used restrictive physical interventions such as 'Body-Contact Technique' where teacher aiming to control student's aggressive behaviour setting boundaries when student A wants to have access in the room. Also because student A is strong enough to harm the teacher, there were and other teacher assistants who tried to eliminate student's movement. ABA strategies such as extinction or escape extinction are also useful when students display SIB. Teachers indicated that they try avoiding any changes in the environment such as providing positive or negative reinforcement (attention) during the manifestation of these behaviours in order to eliminate the frequency and the intensity of those behaviours.

In addition, teachers use body language, sign language and verbal speech in order to engage students in social interaction reducing frustration feelings. Another behavioural intervention that teachers apply in order to manage SIB is Differential Reinforcement of Alternative behaviour (DRA). Teachers tried to engage students in a different activity that they preferred in order to stop the manifestation of the previous behaviour. Beyond those interventions, teachers indicated that they use alternative behavioural strategies such as massage techniques, music therapy and sensory stimulation in order to manage SIB. Regarding the range of interventions which are available in this school the head-teacher underlines:

" Members of staff have acquired a wide range of professional training related to SIB's. Our pupils display also a range of behaviours, therefore is crucial to have such a variety of intervention and pick up the most effective depending in the case."

Relatively, to pharmacological strategies as head teacher indicated:

"Many pupils with SIB's are on medication to support them. It is not straightforward to say the medication is the solution to helping the child as there are so many other factors involved, but it can be very noticeable when medication is reduced or changed or stopped."

Conclusions and Recommendations

SIB constitutes major behavioural problem for children with developmental disabilities. The purpose of this research report was to identify both environmental and medical contingencies of SIB manifestation and to describe teachers' beliefs and strategies in order to manage effectively

those behaviours. The participants who have additional medical needs exhibited with higher intensity and frequency SIB than participants who have not additional medical issues. However, all the participants with and without additional needs who displayed some forms of challenging and self-injurious behaviour faced also social-communication problems. From this study it arises also the importance of educational provision for those behaviours. Teachers should be trained in a variety of methods and behavioural interventions in order to secure both children's and their own security.

If it was appropriate to provide some suggestions for further improvement it will be important to investigate further the educational provision for challenging behaviour. Most notably, Teaching staff and other professionals who work with pupils who exhibit SIB is vital to receive continuing professional development in core areas of support of SIB. Especially in the area of West Midlands in England where the present study contacted, there are university departments which carrying out prominent research in an international level with individuals with SIB, where new interventions are applied and tested for their efficacy. The participation of professionals which working with these pupils in daily basis in relevant workshops co organized from academics and other services would be vital in improving the provision and giving new insight in the specific manifestation in this complex area.

Moreover, multidisciplinary collaboration is necessary not only for SIB assessment but also for the effective management of those behaviours. Interprofessional collaboration might also be important relatively to SIB management in a research level. In terms of educational provision for challenging behaviour it will be important to investigate the parental involvement during individual's SIB assessment and relatively to the behavioural strategies that might be applied for behavioural management. More specifically, parental reports might provide information related to the possible factors that affect child's behaviour at home. Furthermore, parents could inform teachers about child's mood, sleeping problems and additional medical issues that children with autism may have.

Finally, take into account that a high percentage of the participants in this study leaved in care houses it will be interested to investigate further families and child's characteristics who display challenging behaviour. It is essential to identify the impact of SIB on parental stress and what kind of support parents have sought, what they received or what they would like to receive.

References

Allen, D., Dosen, A., Emerson, E., Kennedy, C., Langthorne, P., McGill, P., 2009. *Challenging Behaviour-National Strategy Group*.

Arron, K., et al. "The prevalence and phenomenology of self-injurious and aggressive behaviour in genetic syndromes." *Journal of Intellectual Disability Research* 55.2 (2011): 109-20.

Bailey A, Luthert P, Dean A, Harding B, Janota I, Montgomery M, et al. (1998). A clinicopathological study of autism. *Brain* 1998; 121: 889–905.

Berkson, Gershon, Megan Tupa, and Lauren Sherman. "Early Development of Stereotyped and Self-Injurious Behaviors: I. Incidence." *American Journal on Mental Retardation* 106.6 (2001): 539-47.

Bolte, S. and Poustka, F. "The Relation Between General Cognitive Level and Adaptive Behavior Domains in Individuals with Autism with and Without Co-Morbid Mental Retardation." *Child Psychiatry & Human Development* 33.2 (2002): 165-72.

Carr, E G. (1977). The motivation of self-injurious behaviour: A review of some hypotheses. *Psychological bulletin*, 84(4), 800.

Cooper, S. A., et al. "Adults with intellectual disabilities: prevalence, incidence and remission of aggressive behaviour and related factors." *Journal of Intellectual Disability Research* 53.3 (2009): 217-32.

Dominick, K. C., Davis, N. O., Lainhart, J., Tager-Flusberg, H., & Folstein, S. (2007). Atypical behaviours in children with autism and children with a history of language impairment. *Research in Developmental Disabilities*, 28, 145-162. doi: 10.1016/j.ridd.2006.02.003

Durand, V., Crimmins, B. Identifying the variables maintaining self-injurious behaviour. *Journal of Autism and Developmental Disorders*, Vol 18(1), Mar 1988, 99-117 cited in Oliver, C., et al. "Self-injurious behavior in Rett syndrome: Interactions between features of Rett syndrome and operant conditioning." *Journal of Autism and Developmental Disorders* 23.1 (1993): 91-109.

Edelson, S.M. (1984). Implications of sensory stimulation in self-destructive behaviour. *American Journal of Mental Deficiency*, 89, 140-145

Edelson, S.M. (2007). *Understanding and Treating Self-Injurious Behaviour*. Autism Research Institute.

Emerson, E. (2001). *Challenging Behaviour: Analysis and Intervention in People with Intellectual Disabilities* (2nd Edition). Cambridge: Cambridge University Press.

Favell, J.E., & Greene, J.W. (1980). How to treat self-injurious behavior. Pro-Ed: Austin, TX. Cited in Fucilla-Ristic, R. (2005). Self-injurious behavior in people with developmental disabilities. *The Journal of Safe Management of Disruptive and Assaultive Behaviour*. Crisis Prevention Institute

Goldstein, M. (1989). Dopaminergic mechanisms in self-inflicted biting behavior. *Psychopharmacology Bulletin*, 25, 349-352.

Gresham, F. M., Watson, T. S., & Skinner, C.H. (2001). Functional behavioral assessment: Principles, procedures and future directions. *School Psychology Review*, 30 (2), 156-172.

Hall, S., Oliver, C. and Murphy, G. (2001). Early development of self-injurious behaviour: An empirical study. *American Journal on Mental Retardation*, 106(2), 189-199.

Hanley G.P, Iwata B.A, McCord B.E. Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis*. 2003;**36**:147–185

Harkness, J.E. Wagner, (1975). Self-mutilation in mice associated with otitis media, *Lab. Anim. Sci.* 25, pp. 315–318.

Hastings, R.P. (2002). Parental stress and behaviour problems of children with developmental disability. *Journal of Intellectual and Developmental Disability*. 27, (3) 149-160.

Hénault, I. (2006), *Asperger's Syndrome and Sexuality: From Adolescence through Adulthood* London: Jessica Kingsley Publishers. www.jkp.com Bristol: Bristol Crisis Service for Women.

Iwata BA, Pace GM, Kalsher MJ, Cowdery GE, Cataldo MF. (1990) Experimental analysis and extinction of self-injurious escape behavior. *J Applied Behaviour Anal. Spring; 23(1):11–27.*

Janicki, M. P., & Jacobson, J. W., (1983). Selected clinical features and service characteristics of autistic adults. *Psychological Bulletin*, 4, 210-215 cited in Weiss, J. (2003). Self-injurious behaviours in autism: A literature review. *Journal on Developmental Disabilities*, 9(2), 129-143.

Leyfer, O. T., Folstein, S. E., Bacalman, S., Davis, N. O., Dinh, E., Morgan, J., Tager-Flusberg H, Lainhart JE. (2006). Comorbid psychiatric disorders in children with autism: Interview development and rates of disorders. *Journal of Autism and Developmental Disorders*, 36, 849, 861.

MacLean Jr, W E. (2010). Self-injury among a community cohort of young children at risk for intellectual and developmental disabilities. *The journal of pediatrics*, 157(6), 979. (2002): 239-49.

Mathews, C A. (2004). Self-injurious behaviour in tourette syndrome: Correlates with impulsivity and impulse control. *Journal of neurology, neurosurgery and psychiatry*, 75(8), 1149.

Murphy, G. & Wilson, B. (1985). *Self-injurious Behaviour*. Kidderminster: British Institute of Mental Handicap Publications.

McClintock, K. (2003). Risk markers associated with challenging behaviours in people with intellectual disabilities: A meta-analytic study. *JIDR. Journal of intellectual disability research*, 47(6), 405.

Murphy, O., Healy, O., and Leader, G., "Risk factors for challenging behaviors among 157 children with autism spectrum disorder in Ireland." *Research in Autism Spectrum Disorders* 3.2 (2009): 474-82.

Peebles K. A. & Price T. J. (2012). Self-injurious behaviour in intellectual disability and syndromes: evidence for aberrant pain signalling as a contributory factor. *Journal of Intellectual Disability Research* 56, 441–52.

Oliver, C. and Richards C. (2008). Self-injurious behaviour in children and adult with Autism Spectrum Disorder. National Autistic Society International Conference. London, September.

Oliver, C., et al. "Self-injurious behaviour in Cornelia de Lange syndrome: 1. Prevalence and phenomenology." Journal of Intellectual Disability Research 53.7 (2009): 575-89.

Oliver, Chris and Caroline Richards. "Self-injurious behaviour in people with intellectual disability." *Current Opinion in Psychiatry* 23.5 (2010).

Schneider, M J. (1996). The origin of self-injurious behaviour of children with mental retardation. *The British journal of developmental disabilities*, 42, 136.

Taylor, L. (2008). The behavioural phenotype of smith–Magenis syndrome: Evidence for a gene–environment interaction. *JIDR, Journal of intellectual disability research* 52(10), 830.

Weiss, J. (2003). Self-injurious behaviours in autism: A literature review. *Journal of Developmental Disabilities*, 9(2), 129-143

White, T, Schulz, S. K. (2000). Naltrexone in a 3½-year-old boy with self injurious behavior: *American Journal of Psychiatry*, 157: 1574-1582.

Whitely, P., Rodgers, J., Savery, D., Shattock, P., (1999). A gluten-free diet as an intervention for autism and associated spectrum disorders: preliminary findings. *Autism* 3(1), pp. 45-65.