Effectiveness of Wet Sheet Packs in Children and Adolescents with Severe Auto/Hetero Aggressive Behaviors: An Exploratory Approach

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Abstract: *Objective*: To explore the effectiveness of wet sheet packs on auto/hetero aggressive behaviors in children and adolescents hospitalized in a psychiatric setting.

Method: We reviewed the charts of all patients (N=8) who received packing therapy in the context of resistance to behavioral interventions, milieu therapy and medications from 2005-2009. We scored the level of auto/hetero aggressive behaviors per patient for each day they were hospitalized. Inter rater reliability was good (Intraclass correlations=0.91). We used a mixed generalized linear model to assess whether the following explanatory variables (time, typical and atypical antipsychotics, mood stabilizer, sedative drug, stimulant and wet sheet pack) influenced the course of aggression over time, the dependant variable.

Results: Using univariate analysis, the only variables that were found to be associated with a significant decrease in auto/hetero aggressive score were time ($p=8\ 10^{-3}$), atypical antipsychotics (p=.027) and packing therapy ($p=10^{-9}$). Effect of packing therapy remained significant after adjustment for atypical antipsychotics ($p=1.8\ 10^{-9}$) and for time (p=.0017).

Conclusion: In addition to atypical antipsychotics and milieu therapy, the results of this exploratory study suggest that wet sheet packs may be effective in relieving auto/hetero aggressive behaviors.

Keywords: Aggressive behavior, Effectiveness, Packing, Child, Adolescent.

Treatment of severe auto/hetero aggressive behaviors in children and adolescents is a complex issue. It is useful to treat symptoms as well as underlying psychiatric conditions. Symptomatic treatments include behavioural, family interventions (Périsse, Gérardin, Cohen, Flament & Mazet, 2006), and psychotropic medications, mostly sedative drugs, mood stabilizers and antipsychotics (Gerardin, Cohen & Flament, 2002). To date, only few atypical antipsychotics have been approved in minors for irritability and behavioral impairment associated with intellectual disability and/or pervasive developmental disorder, and these have numerous adverse effects (Bonnot, Inaoui, Lloret-Linares, & Cohen, 2011). In some treatment-resistant cases with autism, clozapine (Lambrey, S., *et al*., 2010), intensive behavioural intervention (Frazier *et al.*, 2010) and electro-convulsive therapy (ECT) (Wachtel *et al.*, 2009) have been recommended, even in children and adolescents. The search for other therapeutic options is urgent.

Wet sheet packs, or packing therapy, are an adjunct treatment given in a hospital. In our setting, this treatment is administered by psychomotricians, a type of occupational therapist. Packing therapy involves enveloping a patient in cold damp sheets for one hour sessions while he or she is fully and spontaneously invited to express him or herself (Cohen *et al.*, 2009). Due to the absence of evidence-based studies supporting this treatment, its usefulness with children and adolescents with autism is controversial (Spinney, 2007; Rhode, 2008; Delion, 2010). Recent controversies have emerged based on: (i) the absence of an evidence baseto support the treatment; (ii) the possible absence of free consent in individuals with poor communication skills; and (iii) the erroneous association of the theoretical background of packing with psychoanalysis (althoughthe patient's experience of packing may contribute to the psychodynamic metapsychology of the self (Delion, 2010)). This final point is crucial, as there is strong disagreement between parents' associations and psychodynamic theory in the field of autism in France (Chamak & Cohen, 2003) and abroad (Rhode, 2008). As described by A. J. Ayres (2005) or A. Bullinger (Kloeckner *et al*., 2009), we believe that packing therapy should be understood as a sensory integration approach. Sensory integration is the hierarchical organization of the somatic sensations which serve as foundations for an individual's perceptions, behaviors and learning. The greatest potential for the development of sensory integration occurs within an adaptation response, which is defined as a purposeful, goal-directed response to a sensory experience. Auditory, vestibular, proprioceptive, tactile and visual senses are progressively integrated as a *body percept* and are rooted

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in different psychosomatic functions, such as the coordination of the two sides of the body, motor planning, activity level, attention span and emotional stability. Sensory integration dysfunction results in a wide variety of developmental disorders (Bundy, Shia, Qi & Miller, 2007) including pervasive developmental disorders and behavioral disturbances associated with severe psychosocial adversity.

Packing therapy has a long history, and was first used in the nineteenth century. In the United States, it was used mostly in adult psychiatric inpatients as an alternative to physical constraints. By the 1980s, when Ross and colleagues (1988) surveyed U.S. psychiatric hospitals, it was being used rarely.. By reviewing its use in 46 hospitalized psychiatric patients at Sheppard-Pratt Hospital, these investigators concluded that the treatment was safe and had interesting and useful effects that go beyond the concept of simple restraint. There have been some case reports on children and adolescents. Singh, also working at Sheppard-Pratt, reported on the case of a severely self-destructive adolescent who responded well to treatment with cold wet sheet packs (1986).

Goeb and colleagues (2009), reported on a sample of ten outpatients aged 5 to 16 years with pervasive developmental disorder who demonstrated severe behavioral impairments; these patients showed significant improvement on the Aberrant Behavior Checklist (ABC, (Aman, Singh, Stewart, & Field, 1985) after packing therapy was implemented. ABC total, irritability and hyperactivity scores showed a 38%, 50% and 42% decrease, respectively. Cohen *et al*. (2009) reported on a sample of six patients with catatonia aged 13 to 17 years who received packing therapy. As measured by the Bush-Francis Catatonia Rating Scale (Bush, Fink, Petrides, Dowling, & Francis, 1996), four of the six patients improved after receiving packing therapy. However, because of the study designs, neither of these studies was able to control for other therapeutic approaches.

Given the paucity of data, we aimed to use an exploratory approach to study the potential effectiveness of packing therapy in severe aggressive behaviors. We retrospectively reviewed therapeutic data on all inpatients who received packing sessions from 2005 to 2009 due to severe auto/hetero aggressive behaviors that proved to be partially resistant to psychotropic drugs and milieu therapy. We used a General Linear Mixed (GLM) model with adjustments for time and psychotropic drugs to control for other therapeutic approaches (Lambrey *et al*., 2010). We found that packing therapy significantly reduced auto/hetero aggressive behaviors.

METHOD

Participants

We reviewed data from all cases of children and adolescents with severe auto/hetero aggressive behaviors who had wet sheet packs during their inpatient stay during the years 2005-2009. Inclusion criteria were intentionally broad to enhance the generalizability of findings, consistent with recommendations for effectiveness studies (Gartlehner, Hansen, Nissman, Lohr & Carey, 2006). The exclusion criteria were the following: (1) dry sheet pack (n=0); (2) wet sheet pack for a different symptom (n=1: catatonia); and (3) inpatient stay less than eight weeks, as that would not allow for control of time within the GLM model (n=0) (see below). The final sample included eight patients hospitalized in the Department of Child and Adolescent Psychiatry at a university teaching hospital (GH Pitié-Salpétrière, Paris). At this hospital, packing therapy was proposed as an adjunct or alternative treatment for patients who did not improve sufficiently to be discharged despite adequate behavioral interventions, milieu therapy and medications. All patients and parents consented to the use of packing therapy.

Table **1** summarizes the socio-demographic and clinical characteristics of the patients. The sample included 62.5% boys (n=5) and 37.5% girls (n=3). The mean age was 11 years (range 7-15). The eight patients presented severe auto/hetero aggressive behaviors comorbid with other disorders, including: externalizing disorders (n=6); mood disorders (n=4); pervasive developmental disorder (n=4); and/or attachment disorders (n=3). Five patients had experienced severe psychosocial trauma including maltreatment (n=4) and/or abandonment/foster care (n=4).

Intervention: Packing Therapy

Packing therapy is aimed at restoring sensory integration and body representations, and reducing anxiety. The overall treatment encompasses a series of twice-a-week sessions over a minimum length of one month. Sessions take place in the same quiet room and they usually last one hour each; though, they can be expanded up to two hours depending on the patient's response. During sessions the patient wears a bathing suit. Sessions are conducted under the supervision of a *psychomotricien*[1] and involve at least two members of the patient's care team. At the beginning of the session, the patient's consent to proceed is orally obtained as no session is compulsory. Then, the patient is first wrapped in cold damp sheets (cold phase) and covered up with a rescue and a dry blanket. Afterward the body spontaneously warms up (warm phase). The patient is then invited to freely express his feelings, bodily/cutaneous sensations and somatic fantasies. Cardiac rate, respiratory rate and blood pressure are monitored during the session to detect any adverse cardio-vascular effects or adverse autonomous reactions. A brief moment of drawing or modeling with clay is proposed at the end of each session in order to provide non-verbal avenues through which the patient can express feelings and explore body representations. Throughout the session, the patient's comments as well as relevant observations from the clinicians (e.g., clinical signs, body image, coenesthesic sensations, and adverse events) are carefully recorded by one of the observers (Cohen *et al*., 2009 ; Delion, P., 2007).

Procedure and Variables

We retrospectively reviewed charts from the hospitalization period for all patients in the sample, including clinician and nursing notes. All information pertaining to the identity of the subjects was removed. Two co-authors (AL and CJ) independently extracted the relevant

[1]a *psychomotricien* is a therapist holding a French diploma in *psychomotricité* which is a specialized training in psychomotor disturbances within the Occupational Therapy course.

Table 1. Socio-Demographic and Clinical Characteristics of the Children and Adolescents (N=8) with Auto/Hetero Aggressive Behaviors who Received Wet Sheet Packs During Hospitalization

Case	Sex, *Age*	Duration, in days*	Behavioral impairment	ICD10 diagnosis	Psychosocial context	Baseline aggression
1	F, *15*	93	Auto/hetero AB	Conduct disorder Mixed episode PDD-NOS		13
2	M, *9*	180	Auto/hetero AB	Disinhibited attachment disorder PDD-NOS ODD	Sexual abuse Abandonment Foster care	13
3	F, *13*	>300	Auto AB	MDE with PF		29
4	M, *11*	262	Auto/hetero AB	Disinhibited attachment disorder Dysthymia Reading & mathematical disorder	Child neglect FH of alcoholism FH of antisocial PD Foster care	13
5	M, *13*	257	Auto/hetero AB	Conduct disorder Dysthymia	Divorce Parent conflict FH of antisocial PD Foster care	11
6	M, *9*	176	Auto/hetero AB	Autism	FH of poor therapeutic alliance	21
7	M, *7*	146	Hetero AB	Disinhibited attachment disorder ADHD ODD Conduct disorder	Physical abuse Foster care FH of instability	18
8	F, *11*	67	Auto AB	PDD-NOS		13

F=female; M=male; AB=aggressive behavior; PDD-NOS=pervasive developmental disorder-not otherwise specified; D=disorder; ODD=oppositional defiant disorder; ADHD=attention deficit hyperactivity disorder; FH=family history; P=personality; MDE with PF=Major Depressive Episode with Psychotic Features.
*Duration of hospitalization included also days spent outside the hospital (e.g. week ends).
**Baseline aggression score = Σ day 1 to day 7 (Maximum score = 7 x 6 = 42).

data from the originally selected reports and reviews. Contradictions between the data selected by the two co-authors were checked for improper extraction; final data decisions were made by consensus.

Selected data included socio-demographic data, medical histories, psychiatric diagnosis, and treatment information. Socio-demographic data were systematically assessed at admission and included age, gender, and psychosocial history. A detailed medical history based on personal and family past psychiatric history was recorded at intake using a semi-structured interview (Taieb *et al*., 2002). The inpatient team routinely uses standardized instruments to improve diagnosis (e.g. Autism Diagnostic Interview-Revised when pervasive developmental disorder is suspected; Diagnostic Interview for Genetic Study when schizophrenia or a mood disorder is suspected). Diagnoses were based on ICD-10 criteria. However, for the patients in this study diagnoses were made through the team consensus best-estimate diagnostic method due to the difficulties involved in testing individuals who exhibit such problematic behaviors and/or psychosocial backgrounds (Klein, Ouimette, Kelly, Ferro, & Riso, 1994). The diagnostic team included the two co-authors who extracted the data and two senior psychiatrists with a large amount of experience in inpatient care (DC and AC). Finally, data regarding treatment included duration of the hospitalization, the type, date and number of prescribed medications, the number and date of wet sheet pack sessions, and all adverse events regarding packing sessions.

To assess the effect of each treatment on auto/hetero aggression, medical and nursing files were systematically reviewed (Frazier *et al*., 2010). Following the method of Lambrey *et al*. (2010), each day was coded for aggression as follows: a score was given for each nurse team period (i.e., morning, afternoon and night) on each day; 0 indicated no aggressive behavior, 1 indicated at least one unquestionable physically aggressive act (e.g., destroying property, assaulting others, self-harm) with no emergency treatment, and 2 represented at least one aggressive act followed by an emergency sedative treatment. By summing the three periods per day, we computed scores ranging from 0 to 6 per day for each patient for each day of inpatient stay. Interrater reliability was calculated on 71 randomly selected patient

days. The intraclass correlation (ICC) between two blind raters was excellent (ICC=0.91).

Statistical Analysis

To assess the effect of therapeutic variables on auto/hetero aggressive behaviors during hospitalization, we used a generalized linear mixed model. Statistical analyses were performed using R Software, Version 2.11.0 with the package lme4, precisely the "glmer" function (The R Foundation for Statistical Computing). This function assumes the residuals correlation matrix to be symmetric and positive semidefinite, which in SAS-speak is called an "unstructured" variance-covariance matrix. For each treatment, a Poisson regression model for repeated measurements was applied, taking the aggression score as dependant variable and the treatment as explanatory variable. Indeed, the aggression score is a function of the number of aggressive events and it follows a Poisson distribution. Since the mean and the variance were approximately the same (respectively 0.95 and 1), we didn't have to take any over dispersion into account. In sum, we performed a linear regression that was generalized to the variable distribution (here a Poisson distribution) and mixed to take into account patients' auto correlations (Cnaan, Laird & Slasor, 1997). The dependant variable entered in the model was aggression score. The explanatory variables included in the model were: atypical antipsychotics, typical antipsychotics, stimulants, antidepressants, sedative drugs, mood stabilizers, and packing therapy. For psychotropic drugs, therapeutic classes were defined on the basis of the EphMRA classification (European pharmaceutical Market Research Association). Since the effect of packing (or any other treatment) may theoretically reflect a spontaneous improvement over time or an improvement due to other therapeutic factors, rather than a specific effect, time was also entered as an explicative variable.

RESULTS

The patients had in average 17 packing sessions (range: 6 – 32), for a duration of packing therapy ranging from 3 to 19 weeks. Clinicians reported no significant adverse events except 3 (2%) sessions that were postponed due to patient's refusal and 7 (5.1%) sessions of dry sheet packs because the patient complained of the initial cold effect. Mean baseline aggression (Σ day $_1$ to day $_7$) and discharge aggression scores (Σ day $_{-7 \text{ from discharge}}$ to day $_{\text{discharge}}$) were 16.4 (range: 11–29) and 8.1 (range 3–20) (Paired t-test, t=3.72, df=7, p=0.0075). The total number of days of hospitalization with computed aggression scores for the eight patients in our sample was

Table 2. Effect of Packing and Psychotropic Medications on Auto/Hetero Aggressive Behavior During Hospitalization (N=8): Summary of the GLM Model

Treatment N [N']*	Coefficient	z value	p value	Meaning
Typical antipsychotic N=6 [N'=550]	0.8165	5.012	$<10^{-6}$	Significant effect : higher aggressive score when typical antipsychotic
Atypical antipsychotic N=5 [N'=448]	-0.2809	-2.205	0.0274	Significant effect: lower aggressive score when atypical antipsychotic
Mood stabilizer N=3 [N'=226]	-0.1550	-1.148	0.251	No significant effect
Antidepressant N=2 [N'=102]	0.09838	0.626	0.531	No significant effect
Sedative drug N=7 [N'=376]	0.1180	1.127	0.260	No significant effect
Stimulant N=1 [N'=68]	0.1157	0.730	0.466	No significant effect
Packing N=8 [N'=596]	-0.48122	-6.329	$<10^{-9}$	Significant effect: lower aggressive score when packing
Time N=8 [N'=942]	-0.010764	-3.356	0.000792	Significant effect: lower aggressive score over time
Packing adjusted for atypical antipsychotic	-0.46854	-6.016	$1.79\ 10^{-9}$	Significant effect: lower aggressive score when packing after adjustment for atypical antipsychotic
Packing adjusted for time	-0.417646	-3.138	0.0017	Significant effect: lower aggressive score when packing after adjustment for time

GLM model= Generalized Linear Mixed model.
*N=Number of subjects exposed to treatment in the model.
N'=Number of days with one treatment all patients combined in the model.

equal to 942. Table **2** indicates all therapeutic approaches that were entered in the model by class in terms of number of patients (N) and the number of days (N') patients were exposed to one treatment. Table **2** also summarizes the findings from the GLM model of the effect of each explicative variable on auto/hetero aggressive behaviors.

There was no significant effect on auto/hetero aggression score for mood stabilizers, antidepressants, sedative drugs or stimulants. Typical antipsychotics had a significant effect ($p=10^{-6}$); the prescription of typical antipsychotics was associated with higher aggression scores. Atypical antipsychotics also had a significant effect (p=0.027); the prescription of atypical antipsychotics was associated with lower aggression scores. Packing therapy had a significant effect ($p=10^{-9}$); lower aggression scores were seen when packing therapy was given. Finally, time had a significant effect (p=0.0008), with aggression scores decreasing over time. The effect of packing therapy remained significant after adjusting for atypical antipsychotics ($p=1.8\ 10^{-9}$) and for time (p=0.0017).

DISCUSSION

To our knowledge, this is the first report exploring the use of wet sheet packs as an adjunct to psychotropic medications for treating severe aggressive behaviors in children and adolescents hospitalized for such behaviors. Even after adjustments for time and atypical antipsychotic exposure, packing therapy appeared to significantly decrease aggressive behaviors. Our results support the effectiveness of atypical antipsychotics, for aggressive behaviors and/or irritability in children and adolescents with pervasive developmental disorder and/or intellectual disabilities, as has been demonstrated in evidence-based studies. In randomized placebo-controlled trials to date, risperidone (Aman, De Smedt, Derivan, Lyons & Finding, 2002; Buitelaar, Van der Gaag, Cohen-Kettenis & Melman, 2001; McCracken *et al.*, 2002; Shea *et al.*, 2004; Snyder, *et al.*, 2002), aripiprazole (Marcus, *et al.*, 2009; Owen, *et al.*, 2009) and divalproex (Hollander *et al.*, 2010) have been shown to be superior to placebo in reducing irritability and/or aggression. The paradoxical result regarding the significant increase of aggression with typical antipsychotic should be interpreted with caution since cyamenazine (a typical antipsychotic available in France) was the most frequent emergency prescription used due to its sedative properties. Given that the scoring method was based on whether or not an emergency treatment was given, it is not surprising to find such an association. The absence of significant effect with other medications is probably due to the lack of power and the small number of patients exposed (Table **2**).

Several limitations of this study should be mentioned: (1) the retrospective collection of the data; (2) the small sample size; (3) the fact that the evaluation of the severity was not conducted by researchers blind to the diagnosis; (4) the absence of an *a priori* definition of responders, given the retrospective design; (5) the lack of a control group; (6) since the effect of wet sheet packs occurred both in children and adolescents in our small group, we cannot assume whether packing is better or equal according to age. However, strengths should be noted as well: (1) the excellent intraclass correlation of aggression score; (2) that each patient served as his own control, and that no patient was excluded; and (3) that confounding concurrent pharmacotherapy and time effect were accounted for through using GLM model. Given the difficulty of including such severe patients in double-blind placebo-controlled trials, the current method as well as other methods developed recently to answer these issues (Lambrey *et al.*, 2010; Frazier *et al.*, 2010), can be generalized to explore the effectiveness of other therapeutic approaches including behavioral interventions with prospective design and blind assessment.

Although it was not investigated in this study, some speculation on how packing therapy works may be proposed. First, in terms of therapeutic effect, we hypothesize that packing therapy provided the patient a new bodily/tactile experience, including both a holding effect and a sensory-integrative effect (Cohen, *et al.*, 2009). To support this view, we recently reported the case of an adolescent with autism and catatonia in whom improvement of catatonia during packing paralleled better body representation of the body in drawings the patient made at the end of the sessions (Consoli *et al.*, 2010). Second, packing therapy also had a powerful relaxing effect; normal individuals usually sleep during the warm time of the packing therapy session. This relaxing effect comes from the warming up of the body and from the body pressure caused by the wrapping. The relaxing effect of body pressure has been explained by Temple Grandin, an adult with autism who uses a self-made machine to produce this effect on her own body (Grandin, 1986; Chamak, Bonniau, Jaunay & Cohen, 2008). Third, since five of the eight cases in this study had a history of severe psychosocial adversity, we wonder whether or not the cumulative effects of holding, sensory-integration and relaxation during packing may have improved their feeling of being whole, of being internally secure. All together, these effects may improve body image and integration.

We conclude that packing therapy operates as a sensory-integration and relaxing approach useful in treating severe auto/hetero aggressive behaviors in children and adolescents. Packing therapy seems to be a feasible and promising adjunct treatment, along with psychotropic medications and other behavioral interventions. Further clinical studies are needed to clarify the possible efficacy and underlying mechanisms of packing therapy.

REFERENCES

Aman, M. G., De Smedt, G., Derivan, A., Lyons, B., & Findling, R. L. (2002). Double-blind, placebo-controlled study of risperidone for the treatment of disruptive behaviors in children with subaverage intelligence. *American Journal of Psychiatry, 159,* 1337-1346.

Aman, M. G., Singh, N. N., Stewart, A. W., & Field, C. J. (1985). The aberrant behavior checklist: a behavior rating scale for the assessment of treatment effects. *American Journal of Mental Deficiency, 89,* 485-491.

Ayres, A. J. (2005). Sensory integration and the child. Los Angeles: Western Psychological Services.

Bonnot, O., Inaoui, R., Lloret-Linares, C., & Cohen, D. (2010). Principe de surveillance des effets métaboliques, de l'hyperprolactinémie et du rythme cardiaque pour les antipsychotiques atypiques chez l'enfant et l'adolescent [Surveillance of metabolic syndrome, hyperprolactinemia and cardiac side effects in children and adolescent treated with antipsychotic]. *Neuropsychiatrie de l'Enfance et de l'Adolescence, 58,* 431-438.

Buitelaar, J, K., Van der Gaag, R., Cohen-Kettenis, P., & Melman, C. T. M. (2001). A randomized controlled trial of risperidone in the treatment of aggresssion in hospitalized adolescents with subaverage cognitive abilities. *Journal of Clinical Psychiatry, 62*, 239-248.

Bundy, A. C., Shia, S., Qi, L., & Miller, L. J. (2007). How does sensory processing dysfunction affect play? *American Journal of Occupational Therapy, 61*, 201-208.

Bush, G., Fink, M., Petrides, G., Dowling, F., & Francis, A. (1996). Catatonia. I. Rating scale and standardized examination. *Acta Psychiatrica Scandinavia, 93*, 129-136.

Chamak, B., Bonniau, B., Jaunay, E., & Cohen, D. (2008) What can we learn about autism from autistic persons? *Psychotherapy Psychosomatics, 77*, 271-279.

Chamak, B., Cohen, D. (2003). L'autisme: vers une nécessaire révolution culturelle [Autism: towards a necessary cultural revolution]. *Médecine Science 19*, 1152-1159.

Cnaan, A., Laird, N.M., & Slasor, P. (1997). Using the general linear mixed model to analyse unbalanced repeated measures and longitudinal data. *Statistics in Medicine, 16*, 2349-2380.

Cohen, D., Flament, M., Dubos, P.F., & Basquin, M. (1999). The catatonic syndrome in young people. *Journal of American Academy Child & and Adolescent Psychiatry, 38*, 1040-1046.

Cohen, D., Nicoulaud, L., Maturana, A., Danziger, N., Périsse, D., Duverger, L., & Guilé, J. M. (2009). Investigating the use of packing therapy in adolescents with catatonia: A retrospective study. *Clinical Neuropsychiatry, 6*, 29-34.

Consoli A., Bonnot O., Gheorghiev C., Jutard C., Bodeau N., Kloeckner A., Pitron V., Cohen D. (2010). Lorazepam, fluoxetine and packing therapy in an adolescent with disintegrative disorder and catatonia. *Journal of Physiology (Paris)* 104, 309-314.

Delion, P. (2007). La pratique du packing [The practice of packing]. Paris: Erès.

Delion, P. (2010). Introduction aux journées de la SFPEADA: psychopathologie de l'enfant et neurosciences [Introduction to SFPEADA congress: child psychopathology and neurosciences]. *Neuropsychiatrie de l'Enfance et de* l'Adolescence, 58:272-276.

EphMRA classification (European pharmaceutical Market Research Association) http://www.ephmra.org/classification/anatomical-classification.aspx

Frazier, T.W., Youngstrom, E.A., Haycook, T., Sinoff, A., Dimitriou, F., Knapp, J., & Sinclair, L. (2010). Effectivennes of medication combined with intensive behavioural intervention for reducing aggression in youths with autism spectrum disorder. *Journal of Child & Adolescent Psychophamacology, 20*, 167-173.

Gartlehner, G., Hansen, R.A., Nissman, D., Lohr, K.N., & Carey, T.S. (2006). A simple and valid tool distinguished efficacy from effectiveness studies. *Journal of Clinical Epidemiology, 59*, 1040-1048.

Gerardin, P., Cohen, D., & Flament, M. (2002) Pharmacological treatment of conduct disorder in children and adolescents. *European NeuroPsychopharmacology, 12*, 361-370.

Goeb, J. L., Ravarya, M., Lallié, C., Kechi, G., Jardri, R., Bonelli, F., & Delion, P. (2009). Les enveloppements humides initialement froids (packings) sont efficaces dans les troubles graves du comportement chez les enfants et adolescents autistes [Packing therapy is efficacious in serious behavioral problems in children and adolescents with autism]. *Neuropsychiatrie de l'Enfance et de l'Adolescence, 57*:529–534.

Grandin, T. (1986). Emergence: labelled autistic, Warner Book: New York.

Hollander, E., Chaplin, W., Soorya, L., Wasserman, S., Novotny, S., Rusoff, J., & Anagnostou, E. (2010). Divalproex sodium vs placebo for the treatment of irritability in children and adolescents with autism spectrum disorders. *Neuropsychopharmacology, 35*, 990-8.

Klein, D. N., Ouimette, P. C., Kelly, H. S., Ferro, T., & Riso, L. P. (1994). Test-retest reliability of team consensus best-estimate diagnoses of axis I and II disorders in a family study. *American Journal of Psychiatry, 151*, 1043-1047.

Kloeckner, A., Jutard, C., Nicoulaud, L., Tordjman, S., Bullinger, A., & Cohen, D. (2009). Intérêt de l'abord sensori-moteur dans les pathologies autistiques sévères I: Introduction aux travaux d'André Bullinger [Sensory motor integration approach of severe pervasive developmental disorders: introduction to A. Bullinger's research]. *Neuropsychiatrie de l'Enfance et de l'Adolescence, 57*, 154-159.

Lambrey, S., Falissard, B., Martin-Barrero, M., Bonnefoy, C., Quicili, G., Rosier, A., & Guillin O. (2010). Effectiveness of clozapine for the treatment of aggression in an adolescent with autistic disorder. *Journal of Child and Adolescent Psychophamacology, 20*, 79-80.

Marcus, R. N., Owen, R., Kamen, L., Manos, G., McQuade, R. D., Carson, W. H., & Aman, M. G. (2009). A placebo-controlled, fixed-dose study of Aripiprazole in children and adolescents with irritability associated with autistic disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 48*, 1110-1119.

McCracken, J. T., McGough, J., Shah, B., Cronin, P., Hong, D., Aman, M. G. *et al*. (2002). Risperidone in Children with Autism and Serious Behavioral Problems. *New England Journal of Medicine, 347*, 314-321.

Owen, R., Sikich, L., Marcus, R. N., Corey-Lisle, P., Manos, G., McQuade, W. H., Carson, W. H., & Findling, R. L. (2009). Aripiprazole in the treatment of irritability in children and adolescents with autistic disorder. *Pediatrics, 124*, 1533-1540.

Périsse, D., Gérardin, P., Cohen, D., Flament, M., & Mazet, P. (2006). Le trouble des conduites chez l'enfant et l'adolescent: une revue des abords thérapeutiques [Conduct disorder in children and adolescent: treatment review]. *Neuropsychiatrie de l'Enfance et de l'Adolescence, 54*, 401-410,

Rhode, M. (2008). "Packing" therapy for autism. *Lancet 371*,115.

Ross, D. R., Lewin, R., Gold, K., Ghuman, H.S., Rosenblum, B., Salzberg, S., & Brooks, A. M. (1988). The psychiatric uses of cold wet sheet packs. *American Journal Psychiatry, 145*, 242-245.

Shea, S., Turgay, A., Carroll, A., Schulz, M., Orlik, H., Smith, I., & Dunbar, F. (2004). Risperidone in the treatment of disruptive behavioral symptoms in children with autistic an other pervasive developmental disorders. *Pediatrics, 114*, 634-641.

Singh, H. (1986). Treating a severely disturbed self-destructive adolescent with cold wet sheet packs. *Hospital and Community Psychiatry, 37*, 287-288.

Snyder, R., Turgay, A., Aman, M., Binder, C., Fisman, S., & Carroll, A. (2002). Risperidone Conduct Study Group. Effects of Risperidone on conduct and disruptive bahavior disorders in children with subaverage IQs. *Journal of American Academy of Child & Adolescent Psychiatry, 41*, 1026-1036.

Spinney, L. (2007). Therapy for autistic children causes outcry in France. *Lancet, 370*,646-645.

Taieb, O., Flament, M., Chevret, S., Jeammet, P., Allilaire, J.F., Mazet, P., & Cohen, D. (2002). Clinical relevance of ECT in adolescents with severe mood disorder: evidence from a follow-up study. *European Psychiatry , 17*, 1-7.

The R Foundation for Statistical Computing: software available at: http://www.r-project.org/foundation/

Wachtel, L.E., Contrucci-Kuhn, S.A., Griffin, M., Thompson, A., Dhossche, D.M., & Reti, I.M.. (2009). ECT for self-injury in an autistic boy. *European Child & Adolescent Psychiatry, 18*, 458-63.