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Chapter 22

Multidisciplinary treatment plan for challenging behaviors in neurodevelopmental disorders

VINCENT GUINCHAT[1]*, CORA CRAVERO[2], JEAN LEFÈVRE-UTILE[2], AND DAVID COHEN[2,3]

[1]*Psychiatric Section of Mental Development, Psychiatric University Clinic, Lausanne University Hospital, Prilly-Lausanne, Switzerland*

[2]*Service de Psychiatrie de l'Enfant et de l'Adolescent, APHP.Sorbonne Université, Groupe Hospitalier Pitié-Salpêtrière, Paris, France*

[3]*Institut des Systèmes Intelligents et Robotiques, Sorbonne Université, Paris, France*

Abstract

Among symptoms that patients with neurodevelopmental disorders can exhibit, challenging behaviors (CBs) are some of the more complex to face, both for caregivers and the patients themselves. They are more frequent in individuals with severe autism spectrum disorders and intellectual disability, and during the transition period from late childhood to young adulthood. Here, we offer an overview of the therapeutic approaches proven worthy in managing CB. Topics include nonpharmacologic treatments (such as behavioral and family interventions), drug prescriptions, and specific intensive care for life-threatening situations, including inpatient stay in specialized neurobehavioral units. Then, we focus on rare, complex, and resistant clinical presentations, mainly based on the authors' clinical experience. We propose a multimodal intervention framework for these complex presentations, embracing developmental and dimensional approaches. A case presentation illustrates the proposed framework, with the aim of serving readers and health practitioners that are facing such cases.

INTRODUCTION[1]

Challenging behaviors (CBs) in children and adolescents with neurodevelopmental disorders (NDDs) include self-injurious behaviors (SIBs), hetero-aggression, major disruptive behaviors, and catatonia. Their treatment is a complex endeavor, especially in severe autism spectrum disorder (ASD) and intellectual disability (ID) (Tanwar et al., 2017). Due to their severity (intensity, frequency, duration, and/or localization), these behaviors often result in dramatic and sometimes even life-threatening conditions. Causes are extremely diverse, but include comorbid medical conditions, either organic or psychiatric (Guinchat et al., 2015). In addition, subjects may experience intense pain from idiosyncratic sources but struggle to localize it and communicate it in an appropriate way, even if the physiologic pain response is adequate (Tordjman et al., 2009).

Symptomatic treatments include behavioral and family interventions and psychotropic medications, mostly sedative drugs, mood stabilizers, and antipsychotics. To date, only a few atypical antipsychotics have been approved to treat irritability and behavioral impairments associated with ASD or ID (Cohen et al., 2013). Clinical trials have evaluated an array of therapeutic options, providing clinicians with numerous

[1]Abbreviations used in the chapter are listed at the end of the chapter before References section.

*Correspondence to: Vincent Guinchat, Psychiatric Section of Mental Development, Psychiatric University Clinic, Lausanne University Hospital (CHUV), Prilly-Lausanne, Switzerland, Tél: +41-21-314-3528, Fax +41-21-314-2673. E-mail: vincent.guinchat@chuv.ch

off-label options (LeClerc and Easley, 2015). In some resistant cases, clozapine (Lambrey et al., 2010), intensive behavioral interventions (Frazier et al., 2010), and even electroconvulsive therapy (ECT) (Wachtel and Hagopian, 2006; Consoli et al., 2013) are possible options. In addition, an inpatient stay in specialized neurobehavioral units using a systematic framework for exploration of comorbid conditions and a multidisciplinary care approach has also been recommended (Guinchat et al., 2015).

In this chapter, we briefly review available treatment approaches that have been assessed in clinical studies focusing on CB in individuals with NDDs. Mainly, we distinguish nonpharmacologic treatments, on the one hand, and drug prescriptions, on the other hand. Then, we move on to more complex and resistant situations. Based on our clinical experience of such patients, we show how the management of CBs necessitates understanding the meaning of CBs and the multiplicity of their causes, while maintaining a relationship with the person who expresses such extreme behaviors. To do so, we define an intervention framework for complex situations, focus on developmental and dimensional approaches, and delineate the most common causes. A brief clinical example illustrates this complexity.

MAIN TREATMENT OF CB IN CHILDREN AND ADOLESCENTS WITH NDD

Nonpharmacologic interventions

Behavioral interventions

Nonpharmacologic interventions for CB in children and adolescents with NDDs are summarized in Table 22.1. In many countries and recommendations, behavioral approaches to CB are regarded as gold standards. These approaches usually try to identify environmental contingencies that contribute to the maintenance of CB (functional analysis) and manipulate these to bring about a desired behavior change using positive reinforcement and/or behavior extinction. There is robust evidence for the efficacy of interventions based on these behavioral principles, which work better when individualized or personalized (Health, 2015). The importance of personalization is likely to be related to the function of the CB, as it may serve a purpose for the person with NDD and often indicates unmet needs. The two programs that are the most commonly studied are *applied behavior analysis* (ABA) and *positive behavioral support* (PBS) (Woodcock and Blackwell, 2020). Despite robust evidence, behavioral approaches have several limitations: generalization is often limited, meaning that they lack efficacy outside the context of intervention; they are expensive, as they often require one-to-one intervention; and they provide limited interests for cognitive and emotional processes, even though such components may be important to consider in CB (see the following). This last point has been shown in temper outbursts associated with Prader–Willi syndrome, a genetic disorder due to a 15 q11-q13 maternal deletion associated with ID, hyperphagia, and behavioral impairments (Rice et al., 2018).

Other interventions

As stated by Woodcock and Blackwell (2020) in their excellent exhaustive review, "behavioral approaches, whilst an effective and necessary part of the solution to CB, cannot provide the whole solution for everyone" (Woodcock and Blackwell, 2020). Other approaches summarized in Table 22.1 mainly include parent training, usually combining behavioral approaches, parent–child interaction therapy, and children interpersonal problem solving (e.g., (Zlomke and Jeter, 2020)); meditation and body-mediated approaches based on relaxation and body sensory integration (e.g., (Delion et al., 2018)); and skill training implemented to improve skills in individuals with NDD (e.g., nonverbal communication, emotion recognition, and regulation) (Aspiranti et al., 2019). Notably, as individuals with NDD are prone to ostracism and may have limited access to health care in many countries, multiple intervention programs implemented through public funding have usually shown their value for improving CB (Brookman-Frazee et al., 2019). As a general statement, it appears that offering facilities to individuals with NDD helps. This needs to be acknowledged.

PHARMACOLOGIC INTERVENTIONS

General context

Available evidence shows that antipsychotic prescriptions have notably increased in recent decades (Halfdanarson et al., 2017). For example, between 1993 and 2009, the rate increased eight times in the United States. This trend has worried the US control authorities, since psychiatrists' prescriptions seem even higher in children and adolescents than in adults (Olfson et al., 2012). In addition, it appears that the prevalence of antipsychotic prescriptions is high and often does not comply with regulatory agency recommendations. Several estimates were calculated from health insurance databases and always yielded high figures: 4.2% of prescriptions among children aged 6–17 (Crystal et al., 2009) and 2.7% of prescriptions among children in the care of child welfare (Dosreis et al., 2011). The reasons for this prescribing "boom" can be summarized as follows: a trend toward greater acceptance of psychotropic drug prescriptions in children; better knowledge of these drugs combined with an awareness of the disorders and the frequency of

Table 22.1

Nonpharmacologic treatment strategies for challenging behaviors

Type	N	Targets	n	Main strategies	Comments
Applied Behavior Analysis	28	ASD, ADHD, ID, FraX and other genetic syndromes	67	Combination of reinforcer or demand manipulation, functional communication training, functional-based intervention, multiple schedule fading, pivotal response parent training, sleep manipulation	Mainly single cases and case series; improvement is generally obtained but depends on personalization; difficulties in large-scale application and transfer at home or school.
Positive Behavior Support	8	ASD, ID	560	Integrated positive behavior support in residential services ± augmented communication strategies	Much larger studies on behavioral approaches. Mostly positive impact but also costly. Again without in-depth generalization training, gains are often limited to the specific settings subject to the intervention.
Parent training	9	ASD, ADHD, ID	220	Combination of behavioral approach, parent–child interaction therapy based on attachment theory and social learning theory, children interpersonal problem solving	Constant benefit to children's challenging behaviors. Combination of both behavioral approach and parent–child interaction therapy is promising.
Meditation/body mediated approaches	8	ASD, ID, ADHD	261	Mindfulness, yoga, deep breathing relaxation, therapeutic body wrap	Mindfulness and relaxation show a clear benefit for parents, unclear for children. Might be better for children with greater intellectual functioning. Sensory reintegration with therapeutic body wrap decreases aberrant behaviors.
Skill training	6	ASD, ID, ADHD	274	Implemented to improve skills in individuals with NDD (e.g., nonverbal communication, emotion recognition, and regulation)	Heterogeneity of studies make comparison difficult. Most also combine behavioral approaches with focus put on the skill to improve.
Technology assisted	5	ASD, ID	11	Technology for delivering of behavioral programs or scaffolding of cognitive and social skills	Improvement is usually reported, but studies are still too limited to offer conclusion. Despite the growing interest in new technology in NDD, their use for challenging behavior remains limited.
Multiple supportive program	3	ASD	809	Individualized mental health intervention publicly funded in the US context, flexible assertive community treatment and intensive assertive outreach	Challenging behaviors improved over time with these interventions showing the crucial value of free access to care for NDD population that is often the target of ostracism.
Other	3	ID, ASD, Tourette syndrome	80	Painting therapy, sleep education, cognitive therapy of Tourette (single case)	Improvement of challenging behaviors with intervention. Preliminary studies.

Adapted from Woodcock, K.A., Blackwell, S., 2020. Psychological treatment strategies for challenging behaviours in neurodevelopmental disorders: what lies beyond a purely behavioural approach? Curr Opin Psychiatry 33, 92–109. doi:10.1097/yco.0000000000000571.
ADHD: attention deficit hyperactivity disorder; *ASD*: autism spectrum disorder; *FraX*: Fragile X syndrome; *ID*: intellectual disability; *N*: number of studies and case reports; *n*: number of individuals with NDD included in the studies all combined; *NDD*: neurodevelopmental disorder.

psychologic suffering in children; limited access to nonpharmacologic treatments; an ever-increasing pressing demand for rapid and inexpensive treatment; and a very wide disparity in the time available and reimbursement rates for the nonpharmacologic treatment of behavioral problems. This is particularly true in vulnerable populations, such as children with severe NDD in which treatment options are extremely limited in terms of supply and access to care (Harrison et al., 2012). In a survey of parents of patients with autism (n = 393, mean age = 12 years), Cravero and colleagues reported that 52% of the patients had received a psychotropic drug, 35% of whom continued it (Cravero et al., 2017a,b). Atypical antipsychotics (23%) and typical antipsychotics (13%) were the most prescribed. The adverse effects reported by parents increased when atypical antipsychotics were prescribed, in the case of polymedication, or when the prescription appeared to be off-label. Obviously, there is a need for cautious prescription of drugs in NDD, and when it is indicated, there is a need for careful monitoring of possible adverse events and for regular attempts to stop medication.

Drugs for CB in NDD that have been assessed in randomized controlled trials

Table 22.2 summarizes the different drugs that have been assessed through randomized controlled trials (RCT) for improving CB in children and adolescents with ASD and/or ID. Most of the studies examined aripiprazole and risperidone, two second-generation antipsychotics approved in several countries for this indication. Four studies involving 493 patients investigated aripiprazole on behavioral impairments associated with autism and/or intellectual disability (Marcus et al., 2009; Owen et al., 2009; Findling et al., 2014; Ichikawa et al., 2017). Aripiprazole in most of the studies was significantly superior to placebo. Similarly, eight studies involving 538 patients investigated risperidone on behavioral impairments associated with autism and/or ID (Buitelaar et al., 2001; Aman et al., 2002; McCracken et al., 2002; Snyder et al., 2002; Shea et al., 2004; Luby et al., 2006; Nagaraj et al., 2006; Findling et al., 2014). Risperidone was significantly superior to placebo in most studies. Other medications received anecdotal interest outside robust evidence from double-blind RCT.

Despite the encouraging short-term results with risperidone and aripiprazole, the benefit/risk ratio remains questionable for long-lasting prescriptions, given the adverse effects of such medications (Cohen et al., 2012). These include weight gain and increased appetite, somnolence/sedation, metabolic adverse events including diabetes, hypercholesterolemia and hypertriglyceridemia, dyskinesia, extrapyramidal symptoms, hyperprolactinemia with and without galactorrhea, and cardiac secondary effects (Cohen et al., 2012). Monitoring is therefore warranted (Pringsheim et al., 2011; Raffin et al., 2014).

MOVING TO COMPLEX AND RESISTANT SITUATIONS

CBs of individuals with NDDs most often occur in complex developmental situations, in particular when they exhibit ASD and/or ID. The occurrence of CBs usually increases during the so-called transition period from adolescence to early adulthood (Murphy et al., 2005). Even though they are more frequent in this population (Emerson, 2003), many of them do not rely specifically on the behavioral features of the NDD condition itself. Their impact depends on the environment in which they express sharply curbing psychosocial functioning. When self-harm injuries or aggressive behaviors last in time, one of the great challenges also relies on their dramatic consequences, which can be multiple: aesthetic, functional sequelae, sometimes involving vital risk. In addition, the physical integrity of caregivers may be threatened (Fig. 22.1). In sum, these CBs are associated with a high risk of threatening situations both for patients and caregivers that represent a shared vulnerability between patients and professionals (Lefèvre-Utile et al., 2018a,b). It is crucial to be careful that this vulnerability does not break the primary therapeutic or educational process through resultant implementation of excessive restraint measures or psychoactive medications (Robertson et al., 2000).

Defining the challenges to be faced

Managing a CB involves asking three questions in parallel. What is the meaning of the CB? Within the multiplicity of possible causes, which are contributing to this particular case? Which rationale for the caregivers allows them to maintain a relationship with the person?

This raises three levels of challenges:

1. For the person with the CB: a rigorous description of the behavior, its context of appearance, consequences, frequency, intensity, duration, and history, is needed to establish a functional analysis (in particular an analog functional analysis), focusing on the identification of variables that influence the occurrence of disruptive behaviors, under real or recreated conditions. This, along with knowledge of the person's developmental level (in terms of socioemotional, cognitive, communicative skills), health status, and external factors, will help in raising multiple hypotheses and designing a specific treatment plan. For instance, a nonverbal child may manifest

Table 22.2

Short-term parallel randomized controlled trials with medication for behavioral impairments in children and adolescents with ASD and ID

Author year	Arm	N	Dose (mg)	Mean age	Improvement	Duration (weeks)	Main adverse events reported	Industry funded
Second generation antipsychotics								
Owen et al. (2009)	Aripiprazole	47	2/15	9.7	Aripiprazole > PBO	8	Weight gain	Yes
	Placebo	51		8.8				
Marcus et al. (2009)	Aripiprazole	53	5	9	Aripiprazole > PBO	8	Sedation/fatigue	Yes
	Aripiprazole	59	10	10			Sedation/fatigue	
	Aripiprazole	54	15	9.5			Sedation/fatigue	
	Placebo	52		10.2				
Ichikawa et al. (2017)	Aripiprazole	47	8.2 ± 4.9	10.3	Aripiprazole > PBO	8	Somnolence	Yes
	Placebo	45		9.9				
McCracken et al. (2002)	Risperidone	49	1.8	8.8	Risperidone > PBO	8	Weight gain, increased appetite, sedation/ fatigue, gastrointestinal upset	No
	Placebo	52		8.8				
Shea et al. (2004)	Risperidone	40	1.17	7.6	Risperidone > PBO	8	Weight gain, somnolence, gastrointestinal upset	Yes
	Placebo	39		7.3				
Aman et al. (2002)	Placebo	63		8.1	Risperidone > PBO	6	Weight gain, somnolence, headache	Yes
	Risperidone	55	1.16	8.7				
Snyder et al. (2002)	Placebo	57		8.8	Risperidone > PBO	6	Weight gain, increased appetite, headaches	Yes
	Risperidone	53	0.98	8.6				
Luby et al. (2006)	Placebo	11		4	Risperidone = PBO	24		Yes
	Risperidone	12	1.14	4			Weight gain, hypersalivation, hyperprolactinemia	
Nagaraj et al. (2006)	Placebo	19		5	Risperidone > PBO	24		Yes
	Risperidone	20	1	5			Increased appetite, sedation, dyskinesia	
Buitelaar et al. (2001)	Risperidone	19	2.9	14	Risperidone > PBO	6	Sedation/fatigue	Yes
	Placebo	19		13.7				
Other drugs								
Hollander et al. (2010)	Divalproate	16	>500	9.7	Valproate > PBO	12	Agitation, skin rash, polyuria, weight gain	Yes
	Placebo	11		8.97				
Hellings et al. (2005)	Divalproate	16	75.5 mcg/ml	12.1	Valproate = PBO	8	Skin rash, increased appetite	Yes
	Placebo	14		12.1				
Wasserman et al. (2006)	Levetiracetam	10	862.5 ± 279	5–17	Levetiracetam = PBO	10	Nonreported	Yes
	Placebo	10						
Belsito et al. (2001)	Lamotrigine	19	5 mg/kg	7	Lamotrigine = PBO	18	Nonreported	Yes
	Placebo	20		7				
King et al. (2001)	Amantadine	14	5 mg/kg	5.8	Amantadine = PBO	4	Insomnia/somnolence	Yes
	Placebo	14		5.8				
Hardan et al. (2012)	*N*-acetylcysteine	14	2700	7	*N*-acetylcysteine > PBO	12	Gastrointestinal adverse event	Yes
	Placebo	15		7.2				

ASD, autism spectrum disorder; *ID*, Intellectual disability; *N*, number of subjects; *PBO*, placebo; *RUPPAN*, Research units on pediatric psychopharmacology autism network.

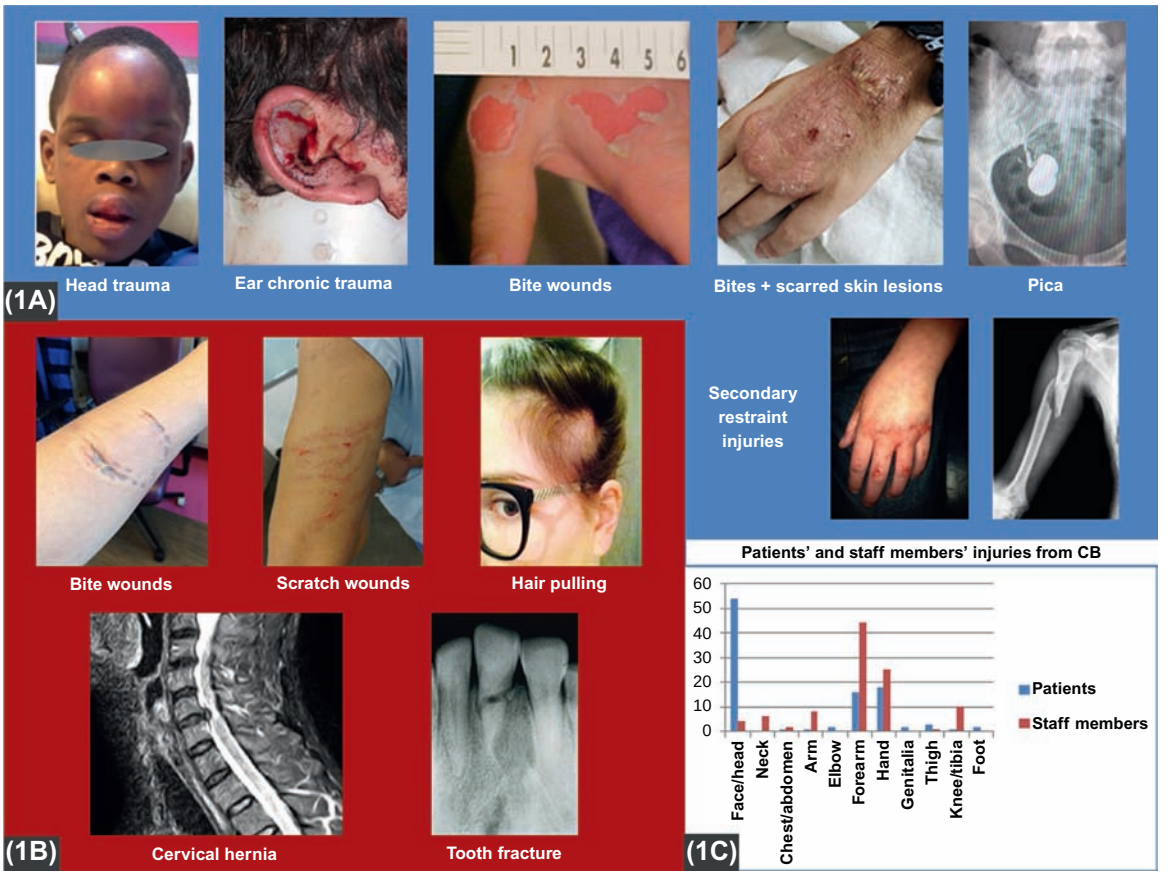

Fig. 22.1. Patients' and staff members' injuries in the context of challenging behaviors. (A) Patients' injuries are evidenced from photographs and X-rays; (B) Staff members' injuries are evidenced from photographs and X-rays; (C) Distribution (in percent) of the body part being impacted by CB in both patients and staff members. Data obtained from an ethnographic study involving 37 staff members from three neurobehavioral units in Canada, France, and the United States (see details in Lefèvre-Utile et al., 2018a,b). *CB*: challenging behavior. Adapted from Lefèvre-Utile, J., Guinchat, V., Wachtel, L., et al., 2018. Équipements de protection individuelle et outils de sécurisation alternatifs à la contention dans la prise en charge des troubles graves du comportement des personnes avec autisme et déficience intellectuelle (partie 1: perspective des patients) Personal protective equipment and restraints alternatives in the management of challenging behaviors in inpatients with autism and intellectual disability (Part 1: Patients' perspectives). Neuropsychiatr Enfance Adolesc 66, 443–459. doi:10.1016/j.neurenf.2018.08.001; Lefèvre-Utile, J., Guinchat, V., Wachtel, L., et al., 2018b. Équipements de protection individuelle et outils de sécurisation alternatifs à la contention dans la prise en charge des troubles graves du comportement des personnes avec autisme et déficience intellectuelle (partie 2: perspectives des soignants). Neuropsychiatr Enfance Adolesc 66, 460–467. doi:10.1016/j.neurenf.2018.08.002.

an aggressive behavior occurring in the single context of a demand for a specific object and the behavior is reinforced by always having the demand met when expressed in this way. By identifying this single function, it is then possible to try to fade the behavior by implementing a behavioral program.

2. For the educational staff, who need to be trained, caring, motivated, and consistent: Teams involved in CBs with patients with NDD often suffer from a turnover of professionals, due to stress, fatigue, or frustration, leading to ruptures and discontinuity in patient support (Lecavalier et al., 2006). Providing adequate means for intervention and help in adapting support is necessary to generate a therapeutic dynamic, decrease professional risk, and avoid abuse or any negative attitude toward the patient. A preliminary consensus on a psychopedagogic program targeting the underlying cognitive deficit and adapted to the patient's needs is required before agreeing on common goals for treatment.
3. For the community, which must draw on an expanded organization of many actors supported by proactive political will: CBs are often associated with the most complex clinical pictures, which are paradoxically the most at risk of being excluded from services and facilities. Even though many variations are seen across countries (and even between

different areas in the same country), many patients are at risk of being placed far from their families or of long stays in hospital settings (Allen et al., 2007; McGill and Poynter, 2012). Patients with mild ID may also fall under the purview of criminal justice (Lindsay et al., 2013). Because of the numerous individual particularities, it is not easy to convey coherent information on needs to service agencies (Robertson et al., 2007). Accessibility to health services for medical investigations, optimal inpatient settings in neurobehavioral units for severely ill patients with resistant acute situations, developmental services for quality of life and self-achievement, and legal frameworks for autonomy, responsibility, and protection are some of the key needs.

In dealing with complex clinical situations, difficulty is found not only in encouraging complementarity between clinicians, caregivers, family, and social and administrative workers, but also in reaching a common language and developing a shared body of knowledge by offering a consistent, pragmatic, and concrete framework.

Main clinical presentations

As CBs are found in the interface between the psychoeducative and medical fields, it is not always easy to determine which actors should be involved in the first line of response. This actually depends on the CB typology, which can be categorized into four main types of clinical situations.

(1) Patients presenting behaviors that are isolated, punctual, and/or directly related to developmental issues. These behaviors mostly arise in a particular context. Once it is certain that the NDD has received the appropriate initial treatment (e.g., a prescription of methylphenidate for ADHD), these situations mostly require psychoeducational management. For instance, an episode of intense sleep disorders in a child with intellectual disabilities, if due to an environmental change, first requires reestablishing a sleeping routine. A medical consultation should take place to alleviate the intensity of the CB or in the case of resistance to psychoeducative management. This can occur, as stereotypies become more problematic when an autistic child achieves adult stature.

(2) Patients presenting paroxysmal crisis, manifesting as repeated and progressively intense disruptions from the usual state. The crisis unfolds in several phases (Whitaker, 2002): these are schematized in Fig. 22.2, starting from a stable level of functioning of an individual who is in phase with the usual activities, cognitions, affects, and physiology. The precrisis state occurs when the patient comes out of an activity with a change in affects and physiologic signs. During the crisis itself, thoughts become irrational, affects are inappropriate, physiology is in a mode of maximal excitement, and tantrums occur. Finally, in the postcrisis state, the patient returns to normal functioning. At first, educational and communication approaches are preferred. However, the assessment may fail to rapidly highlight and target the specific context of the triggering. Consequently, there may be a risk to the physical and social environment of the patient with regard to the crisis state only. Medical advice should not then be delayed (e.g., an episode of rage in a patient with pharmacoresistant epilepsy, such as hypothalamic hamartoma).

(3) Patients with CBs who are constantly in a state of precrisis and/or who frequently repeat crises, either idiosyncratically or arising in contexts that were previously well tolerated, and/or who show developmental regression. Medical and psychiatric comorbidities are frequent. Medical advice is required first in this situation, as patients at this point will not benefit from a psychoeducational program. First-line combined treatment models, including tandem psychopharmacologic and behavioral assessment and treatment development, can be particularly effective in evaluating the contributing roles of environmental or operant functions of the CB, along with underlying psychotropic-responsive psychiatric conditions (Wachtel and Hagopian, 2006).

(4) Catatonia is an extreme, rare, and often unrecognized clinical situation. This clinical syndrome occurs more often in children and adolescents with NDD (Consoli et al., 2012; Benarous et al., 2018), in particular in children with ID and/or ASD (Dhossche et al., 2010) or in children with specific genetic syndromes such as SHANK3, Down syndrome (Raffin et al., 2018), or epilepsy (Suzuki et al., 2006). Because of its potential dramatic outcome, rapid medical assessment and management are essential.

ESTABLISHMENT OF AN INTERVENTION FRAMEWORK THAT CAN CONTAIN THE RISK OF INJURY INHERENT TO BEHAVIORAL CRISIS

The management of behavioral crisis requires consistency in both educational and medical responses. These are not the same and depend on the stage of the crisis observed (Rosen, 1997; Roberts, 2000). During the stable phase, prevention strategies aim to maintain an adequate psychoeducational balance of the person along with medical prophylaxis. A response to the patient's

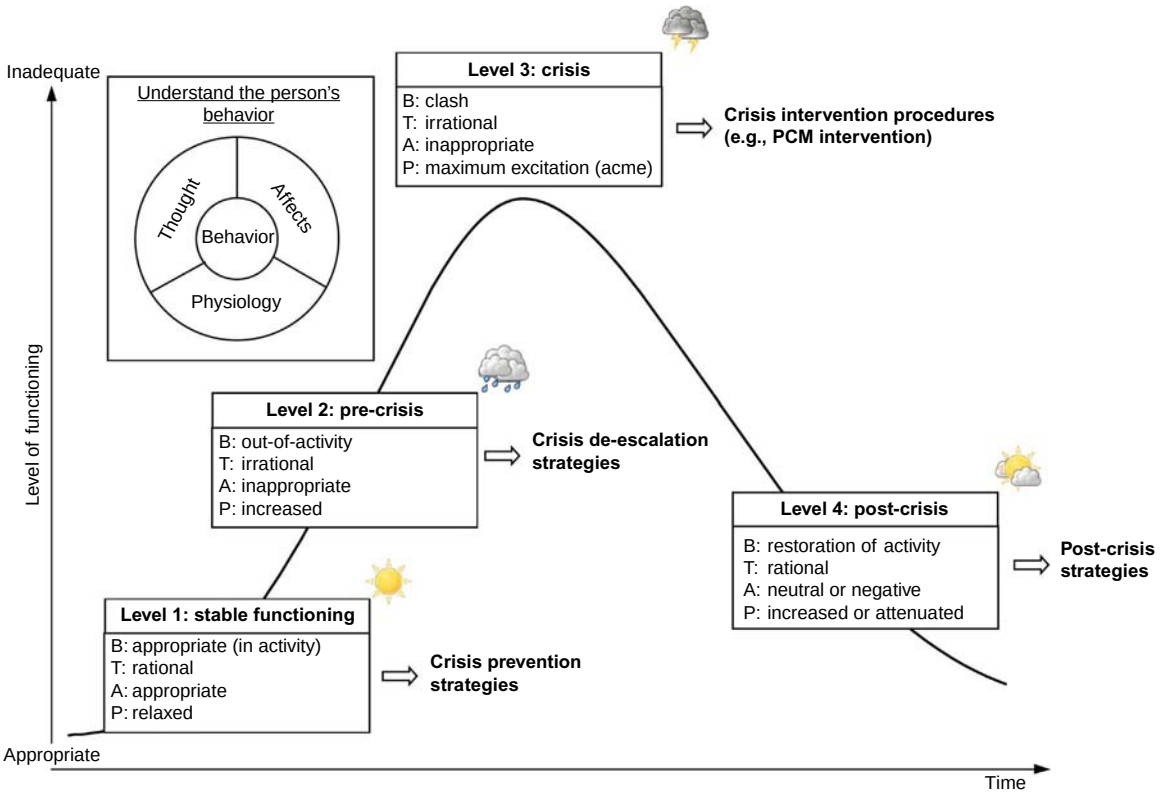

Fig. 22.2. The concept of crisis defined by its successive timeline phases. *A*: affects; *B*: behavior; *P*: physiology; *PCM*: professional crisis management; *T*: thought. Adapted from Whitaker, P., 2002. Challenging behaviour and autism: making sense-making progress. In: Paperback (Ed.). Autism Asperger Publishing Company. (pp. 132).

psychoeducational needs and a regular adjustment of expectations toward the patient are then primordial. In the precrisis stage, defusing strategies through nonphysical behavior management using an educational and communication approach are preferred.

During the crisis itself, the goal is to quickly move into the postcrisis state. Interventions must focus on the physical management of violent behavior, because it represents a critical phase. Constructing a graduated plan of crisis management often allows preventive use of constraint measures to be avoided. Unfortunately, in psychiatric practice, often people are placed in the intensive care unit (ICU) or sometimes locked in a seclusion room for several days, whereas the use of tools such as severity scales could provide more respect for the person's dignity and fundamental rights (Steinert et al., 2010; Bergk et al., 2011; Rakhmatullina et al., 2013).

As an alternative to seclusion, three types of response are possible: first, the use of personal protective equipment that can be adapted to patients as well as caregivers (Lefèvre-Utile et al., 2018a,b; Parenteau et al., 2013). For instance, protective helmets may prevent SIB complications, if adapted to the sensory needs of patients (Levy and Rotenberg, 2016). In dangerous cases, caregivers can use shields to protect themselves (Borrero et al., 2002). Mittens and sleeves can also be useful to prevent small lesions, which are often a main cause of stress and discomfort (Lang et al., 2010; Fisher et al., 2013). Conjointly, protective equipment reduced patients' sensory stimulation experienced during and after episodes of SIB (extinction mechanism) (Moore et al., 2004). Innovative security tools can help in deescalation of disruptive behaviors in pre- or postcrisis (e.g., Hoplon protective screen, therapy ball, manipulable buoy) (Lefèvre-Utile et al., 2018a,b). These protective tools are currently complicated to set up because they require a personalized ethical and clinical reflection. It is desirable to have a designated team member to handle their implementation (Paccione-Dyszlewski et al., 2012; McGonigle et al., 2014; Resources, 2020).

A second level of intervention involves the security and ergonomics of the physical environment, which should be appropriate to the patients' level of danger to themselves and others while limiting feelings of therapeutic isolation. Materials must be reinforced but also allow the person to live a daily life close to normality. Today's innovative materials allow shaping the space while providing some resistance.

Finally, concerted and graduated physical procedures are good alternatives to mechanical restraint.

Some techniques, such as Professional Crisis Management interventions from the Professional Crisis Management Association (PCMA), can help protect the patient in painless immobilization positions during periods of agitation. Different procedures can be used, such as personal safety techniques, transportation procedures, vertical immobilization procedures, and brief assisted required relaxation (BARR) using a foam mat (https://www.pcma.com/). Through a dynamic process, a nonverbal tonic dialogue takes place with the patient, who perceives that the forcefulness of the intervention lessens in concert with the patient's calmer behavior.

CONDITIONS FOR PRODUCING A CHALLENGING BEHAVIOR

A constellation of causes can trigger and perpetuate a CB. The same behavior can be the expression of several causes and a single cause can generate several CBs. The clinical approach first aims to formulate the maximum number of causal hypotheses, and then to prioritize and treat them one by one, according to a therapeutic intervention plan. The hypotheses are developmental and environmental, somatic and psychiatric. To achieve the goal of more homogeneous practices, we must go further in the construction of a semiology adapted to this population and also arrive at a shared integrative representation of problems, for a more rapid clinical process.

Developmental and dimensional approach

A CB that repeats over time has a systemic value. It meets the needs of the person in terms of physical, cognitive, emotional, and communicative experience. It also tells us about the difficulty of the entourage for understanding, containing, and adapting to the behavior. The developmental perspective overlays a representation of the peculiarities of the person's appropriate functioning and the adequacy of the environmental responses to the patient's particular needs, given the developmental age.

The clinical characterization of NDD is no longer confined today to the simple assignment of a diagnosis, but instead goes through an extensive dimensional approach (Xavier et al., 2015). DSM-5 authorizes several comorbid neurodevelopmental disorders and therefore a more precise description of the functioning of an individual as a combination of certain symptomatic dimensions of various intensities. A complete clinical picture is therefore a summation of developmental dimensions that impedes one's personal coping strategies in some contexts. The key associated factors of behavioral deterioration are cognitive functioning (learning ability, agnosia, memory, attention, executive disorders, problem-solving strategies), emotional regulation (recognition, mentalization, modulation by self-control and/or interaction, integration of conflicting emotions), and communicative skills (receptive, expressive, fluctuation of the skills in stressful conditions) (Lundqvist, 2013).

Sensory processing difficulties are another important feature, as some people have a specific pattern of responses for perceptual stimuli (seeing, hearing, smelling, tasting, touching, proprioceptive, and vestibular functioning). They engage themselves in adaptive behaviors, such as stereotypies, balancing, motor instability, strange postural adaptations, or, alternatively, they withdraw, act passively, or show opposition to movement or balance problems (Baker et al., 2008; for review, see Hazen et al., 2014). Sensory processing is a crucial dimension to work on in a therapeutic plan: some patients with a global hypersensitive profile avoid stimulations from their environment and thus require withdrawal spaces, whereas hyposensitive persons seek stimulation, so offering them a neutral room would not be the right solution.

Sexual development assessment, in association with other dimensions, can shed light on some offending behaviors or escalations of prior CBs, especially during puberty. The biological equipment may not be in line with the patient's cognitive and emotional maturation, and the intentions may sometimes be misattributed to sexual harassment, whereas it is often a stressful situation for the patient requiring special support (Beddows and Brooks, 2016).

A good example of the interest in an extended developmental diagnosis strategy is the screening for ASD in the adult population initially labeled with ID. Autism implies a particular mode of understanding and reactions in relation to the environment. People with autism have difficulties in understanding social stimuli, enduring temporal transitions, and integrating perception, which all generate compensatory behaviors (Iarocci and McDonald, 2006). Alternatively, the motor executive particularities are sometimes deferred, producing awkwardness with variable levels of activity and particular modes of exploration of objects that are not always understood by caregivers. ASD patients lack coping strategies in social situations, leading to CBs (Williams et al., 2018). Also, an environmental or psychosocial stress can generate a CB, because the CB takes the person back into a known sequence and recreates homeostasis of the environment, i.e., a stable loop, familiar and predictable. ASD screening is thus important in ID because of the difficulty in coping with social situations.

The dimensional approach may often bridge the gap between a person's general cognitive abilities and the real capacities for functional adaptation. For example, this may be the case when a disharmonic development is highlighted (i.e., a discrepancy between mild ID and a

severe delay in emotional maturation due to deprivation). A rigorous description of the individual according to the dimensional and developmental approach (which then locates the person's behaviors according to their maturation stage or its developmental trajectory) is a basic condition for carrying out a useful functional analysis. This is a step-by-step approach to all the dimensional specificities of the challenging situation, aiming to assign one or more functions to a behavior mirroring maladaptive strategies for managing life situations. Such hypotheses help to structure the implementation of a psychoeducational program. Expressions of loneliness, frustration, and boredom or stress reactions can be some of the many manifestations caused by an inadequate environment. This environment must be adapted, considering the characteristics of the physical world (perceptual cues helping to integrate space, sequences, and transitions, and configuration of meals, bedtime, workplace, etc.), the interpersonal world (peers, group, family, staff), or the social setting (institutionalization, autonomy, professional achievement, scholar integration, responsibility toward justice, etc.).

Even with the finest granularity, the description of a complete clinical picture may not be enough to enable the implementation of an efficient program. Functional analysis sometimes leads to inconsistent inferences, especially in situations of behavioral regression. Patients do not seem accessible then for educational support and the incidence of medical comorbidities must be considered.

Comorbidities

We studied the causes of CBs in a group of 70 consecutive patients with severe ASD/ID and CB hospitalized in the Interdepartmental Temporary Emergency Reception Unit (USIDATU), a neurodevelopmental unit, in Paris (Guinchat et al., 2015). We found that behavioral disorders and developmental and environmental issues explained one-third of the crises. Physical and psychiatric comorbidities were evoked in the remaining two-thirds of the cases. In the same series, it appeared that the duration of hospitalizations was much shorter as soon as the comorbidities were treated and, conversely, the duration was longer and improvement was less substantial when it was necessary to work on a CB intrinsically linked to developmental issues. Apart from providing shelter and an environment that is coherent and not very stimulating, the hospital environment responds rather poorly to the developmental and environmental problems of these patients. Thus to allow continuity in psychoeducational care, the hospital should be able to offer an environment close to that of socioeducational institutions, within the framework of health units specializing in mental handicaps. Finally, the more varied and acute the behavioral disorders were, the higher the risk that comorbidity was the cause of the crisis. Table 22.3 lists the main medical and psychiatric comorbidities and the proposed clinical and paraclinical exams to seek for them.

Medical conditions

Because of language delays, poor integration of body scheme representation, and atypical sensory perceptions or reports of pain, individuals with ASD and ID may be less likely to report specific discomforts and may present with CBs when they have a medical condition (Whitney and Shapiro, 2019). In almost one-third of the cases, the occurrence of CBs is due to somatic comorbidities (Guinchat et al., 2015). The physical comorbidities involved in CBs include four levels of complexity:

(1) The etiological disorder is also the cause of the NDD (ASD or ID). This list includes genetic or metabolic pathologies, epileptic encephalopathies, or cerebral palsy. Genetic conditions may be associated with both an increased risk of CB within the syndrome's behavioral phenotype and increased rates of psychiatric illness associated with certain syndromes. For example, a psychotic deterioration in adolescence often occurs in 22q13 deletion, 22q11 deletion, and 15q11 deletion syndromes (Denayer et al., 2012). In Cornelia de Lange syndrome, subjects often present SIBs (e.g., self-biting, SIB directed toward their hands), mood fluctuation, and separation anxiety. Following a developmental trajectory, SIBs begin during the first decade of life, increase as the children grow older, are at their worst during the second and third decades, and are markedly reduced in adult life (Thomas Gualtieri, 2002). A list of phenotypic specificities of genetic syndromes is available at the Society for the Study of Behavioral Phenotypes (SSBP) (www.ssbp.org.uk/site/index.php). These conditions also involve organic disorders or malformations that have a functional, painful, and subsequent behavioral impact (e.g., obesity in patients with Prader-Willi syndrome, a syndrome characterized by severe hypotonia, poor suck, and feeding difficulties in early life, followed by hyperphagia with obsessive/compulsive food searching and central obesity in childhood if uncontrolled, as well as skin picking behaviors) (Angulo et al., 2015; Tauber et al., 2017).

(2) Associated or aggravating disorders are chronic manifestations that generate more handicaps and worsen the NDD functional outcome: seizure

Table 22.3

Main medical and psychiatric comorbidities associated with challenging behaviors (CBs) in individuals with autism and/or intellectual disability

Comorbidity	Behavior	Screening
Neurologic comorbidities		
Seizures	On/off clinical symptoms, previous history, videos from caregivers	EEG
Other brain acute state	Neurologic exam	MRI, PET-scan Lumbar puncture for CSF examination
Painful conditions[a]		
Gastroesophagitis, ulcer	Vomiting, gastroesophageal reflux, pica, hyperphagia, decreasing CB after eating, gripping	Numeration (anemia), iron deficiency Eso-gastroduodenal endoscopy under general anesthesia with biopsy for *Helicobacter pylori* search
Dental	Refusal to eat	Dental scan
Constipation, sub-occlusion	Stripping off, psychomotor instability, pushing effort, overflow diarrhea, secondary encopresis, stool spreading, coprophagy, meteorism, loss of appetite	Abdominal X-ray, immediate cure of enemas and laxative trials
Headache	Twirling	
Otitis, sinusitis	Localized self-injurious behaviors (ear, nose)	Otoscopy, sinus CT scan
Urinary infection, prostatitis	Psychomotor instability, gripping, urologic symptoms	Urinalysis
Psychiatric comorbidities		
Anxiety disorder	Vegetative symptoms (e.g., shortness of breath, racing heart, tremors, paleness), overreactivity, avoidance behavior, onychophagia	Heart rate monitoring
Depression	Hypomimic face, crying, withdrawal, rumination, pseudo-obsessive compulsive disorder, cognitive rigidity, loss of elective interests, recent SIB	
Bipolar disorder (e.g., manic episode)	Insomnia, disinhibition, masturbation, moving objects, increase production (e.g., drawing), wandering, irritability more than euphoria	
Catatonia	Psychomotor symptoms	Bush-Francis rating scale (adult) Pediatric catatonia rating scale
Schizophrenia-like disorders	Cognitive degradation, disorganization, tightness, listening attitude	
Iatrogenic consequences of psychotropic use	Monitor all prescriptions	Therapeutic window

[a]Search for idiosyncratic behaviors.
SIB: self-injurious behaviors.

(Tuchman and Rapin, 2002), sensory deficits, peripheral sensory neuropathy, gastrointestinal disorders (Buie et al., 2010), endocrine or metabolic disorders, atopy, skin and/or systemic dermatological diseases, and nutritional deficiencies.

(3) Undercurrent disorders are mainly conditions generating pain or discomfort that the patient often has difficulty in locating and communicating. Ear, dental, skin, abdominal, and urogenital examinations are compulsory (De Winter et al., 2011). The Dutch tool from their Centre for Consultation and Expertise provides information on the top 70 most frequent organic problems associated with CB in ID (available at: https://somatiek.cce.nl/somatic-conditions).

(4) Side effects of medication may also be involved, particularly in the case of polymedication. At least 48% of adults with CB have received a prescription for an antipsychotic drug (Kiernan et al., 1995). Physical and psychologic adverse experiences due to medication are frequent and can remain unrecognized because their expression can mimic developmental or psychiatric symptoms (e.g., dyskinesia and stereotypy; or akathisia and agitation). Long-term polymedication with its anticholinergic burden

is a current issue (O'Dwyer et al., 2016). Also, unusual adverse effects can be misdiagnosed (e.g., behavioral modifications with levetiracetam; chorea with hydroxyzine; extrapyramidal syndrome with sodium valproate). This problem sometimes requires a progressive therapeutic window.

The symptoms of a somatic disorder are often misattributed to ID. It is not obvious to some practitioners that some behaviors can be atypical expressions of health problems. Certain behaviors have characteristics that lead to specific diagnoses. The topography, frequency, or duration of an SIB can be informative (see Table 22.3). Observing pica requires a search for iron deprivation, vitamins B9, B12, and trace-element deficiencies. But these relationships may be inconsistent and sometimes nonintuitive, such as the association between obsessive rigid behaviors in ASD and gastrointestinal symptoms (Marler et al., 2017).

A systematic examination should aim to identify the various somatic discomforts and how the patients with a disability "act" or express their pain, whether by:

- Strategies to avoid pain or discomfort, such as a very constipated or bloated autistic patient relieving the discomfort as much as possible by removing all clothing, because elastic bands or belts are annoying and these patients feel less constrained by social norms.
- Miscommunication, such as unexplained behaviors (withdrawing, opposition, grasping, aggressiveness), caused in part by the inability of some children with autism to verbalize their pain and seek relief appropriately. For example, a patient may grasp a caregiver (arm and/or hair) during gastritis or urinary tract infection/prostatitis, to seek help.
- An increase of stress and irritability related to the painful sensation (Goodland, 2001), worsening the communicative skills (Barney et al., 2009).
- An arousal of the sympathomimetic system, such as postural hypotension, lability of blood pressure, tachycardia, sweating, or manifestations that themselves generate significant anxiety (Schlereth and Birklein, 2008; Ferguson et al., 2017).
- Reduced awareness of body signals, disorganization of sensory motor integration through pain itself (Bennett, 1999), or autonomic dysregulation (Woodard et al., 2012; Mazurek et al., 2013) can increase adaptive behaviors.
- A change in awareness and confusion due to a medical condition (as in delirium) or an excessive psychotropic medication.

Psychiatric comorbidities

The psychiatric comorbidities of people with NDD constitute a field with very scarce literature. There has been an ongoing idea that disabilities protect against mental illness, which is now obsolete. The frequency of traumatic life-event ruptures and difficulties in self-realization are major risk factors for psychiatric decompensation. As first reported in the Isle of Wight studies four decades ago, and then confirmed by many other studies, there is an increased prevalence of psychiatric illness among young adults with ID, at an estimated three- to fourfold higher rate than the neurotypical population (Rutter et al., 1976; Borthwick-Duffy, 1994; White et al., 2005). In ASD, Tsakanikos and colleagues found comorbid psychopathology in up to 42% of cases (Tsakanikos et al., 2007). The most frequently diagnosed disorder was schizophrenia, followed by depression, adjustment disorder, and anxiety. Adolescence is a period of dramatic risk, as regression is frequently encountered at this age.

Basically, every diagnosis can be encountered in the context of CB. The challenge is to differentiate symptoms from long-standing traits and to reconstruct a semiology with a patient that does not self-contribute to his examination: the patient is nonverbal and has poor communication skills; or the patient has lost his spontaneous speech (e.g., because of mustism).

Behavioral patterns of reaction to stress, either in regressive mode or in psychologic disorganization, often overlap with the characterization of psychiatric symptoms. Also, some symptoms such as delusion can easily be mistaken due to false beliefs related to the patient's developing age and maturity. Observing a deviation of the expected developmental trajectory or a regression compared to the functional baseline of individuals is an essential cue for identifying a psychiatric comorbidity. The Oxford Textbook of the Psychiatry of Intellectual Disability (Bhaumik and Alexander, 2020) provides a good synthesis of the symptoms related to psychiatric syndromes in this population and an overview of the current diagnosis tools.

Since repetitive behaviors may, in part, serve to instill predictability and reassuring routines in individuals with ASD/ID, depression may engender increased stereotyped behaviors or displeasing perseverative thoughts (Ghaziuddin et al., 2002), leading to pseudo-obsessive compulsive disorder or even to the occurrence of SIB. Identifying and successfully treating an underlying psychiatric cause is of primary importance. In addition to behavioral and body-mediated therapies, antidepressants can be proposed. In life-threatening and refractory forms of depression, electroconvulsive therapy needs to be considered (Consoli et al., 2013).

Catatonia often complicates a somatic or psychiatric condition in this population (Dhossche, 2014). Catatonia is important to recognize, using appropriate scales available for adults (Bush et al., 1996) or children

(Benarous et al., 2016), because of the therapeutic implications. First, the symptomatic approach is based on the use of high doses of benzodiazepines (e.g., lorazepam up to 20 mg/day) or electroconvulsive therapy; second, antipsychotics should not be used because of the risk of malignant catatonia; third, comorbid medical conditions are highly prevalent and must be screened systematically to tailor treatment to the underlying medical condition when possible (Wachtel et al., 2010; Benarous et al., 2018; Ferrafiat et al., 2018).

INTEGRATIVE REASONING

Multimodal framework (Fig. 22.3)

When facing CBs, professionals will seek a medical, environmental, or psychiatric cause. The behavior itself can have comorbid consequences that sustain it or generate other behaviors. There are multiple levels of feedback that constantly interact and intertwine over the long term. Medication often complicates the picture when it reinforces the CB through its side effects. After a few years, the expression of the CB emanates from the entanglement and the accumulation of multiple causes, worsening the developmental outcome. As it is not always possible to identify cascading events linking causes to each other, the clinician must break out a linear causal pattern to conduct a multifactorial analysis and follow a step-by-step therapeutic process, using a working diagnosis of the CB. The selected intervention is based on the formulation of a hypothesis that seems the most plausible and easiest to target. Its effect must be quantitatively and qualitatively assessed, in order to promptly reevaluate its relevance and proceed eventually to the next hypothesis.

We pursue a multimodal framework for the acute evaluation and treatment of these challenging conditions based on a comprehensive multidisciplinary treatment approach. It requires a hospitalization with rigorous monitoring, which includes both somatic and psychoeducational approaches, in order to avoid a fragmented view of the person. It is necessary to adopt a decision-making scheme according to an empirical but very systematic and consistent approach. It is important that the same clinician updates his knowledge and reconsiders his hypothesis, preferably through in situ observations. It is therefore important to train doctors who are aware of patients with disabilities and limited verbal skills in all medical specialties, from pediatric to adult care, and who are interested in building this unique and rewarding clinical specialty. The case presentation that follows is an attempt to illustrate this integrative reasoning. It has been detailed in Cravero et al. (2017a,b).

Case presentation

J. was a 7-year-old boy with nonverbal autism and intellectual disability admitted for severe SIB in the context of a genetic syndrome (1q21.3 microdeletion). Behavioral problems started before the age of 2 years, with intense and repeated mutilations of cheekbones and eyes, culminating in a bilateral blindness at the age of 4 years from intumescent white cataracts after numerous surgical complications. The patient was hospitalized three times in a child psychiatry unit thereafter, with inconclusive antipsychotic treatments. He showed a major developmental regression at home after the loss of sight, with grasping behavior to adults, loss of walking, increase in SIB, and a diet almost exclusively made up of dairy products since he refused solid oral intake.

Clinical framework

The first axis was behavioral. Via a functional analysis, we searched for functions (e.g., sensorimotor recruitment, attention seeking, demand avoidance, expression of a refusal, and probably pain) likely to maintain SIBs. First, we hypothesized that SIBs were motivated by sensory stimulation as a maladaptative behavior in response to his blindness and to his proprioceptive dysfunction (see the following). We used a helmet as protective equipment. Second, we focused on identifying maintaining contingencies for SIB. When his mother visited him, the patient would stay for 10 min in her arms, cuddling her very hard and displaying fewer SIBs. But when she refused the physical contact with him, SIBs were continuous. Our second hypothesis was that a social positive reinforcement had operated. Third, we noticed that SIBs were also frequent during the transportation procedure. We hypothesized that SIBs were a way to escape from difficult instruction. To help him manage transfers, we used some specific nursery rhymes to increase his comprehension.

The second axis was medical. Physically, J. was underweight (weight 25% percentile), had a −0.5 SD size, with a body mass index of 14.2 kg/m^2. In addition to acquired blindness, he presented dysmorphic features: a broad-based flat nose, poor dental status, xerostomia and lanugo, thin legs, genu valgus, genu recurvatum, hyperlaxity, clinodactyly of 4th and 5th fingers of the right hand and the left and right fifth toe. His head circumference was in the norms. The possibility of epilepsy was considered but ruled out. We also searched treatable painful conditions. Upper gastrointestinal endoscopy, conducted as part of postprandial vomiting and a microcytic anemia evoking ulcerative lesions, found Helicobacter pylori gastritis and an absence of hiatal hernia. Examination of ears, nose, and throat revealed ear infections and inflammation of the sinus mucosa.

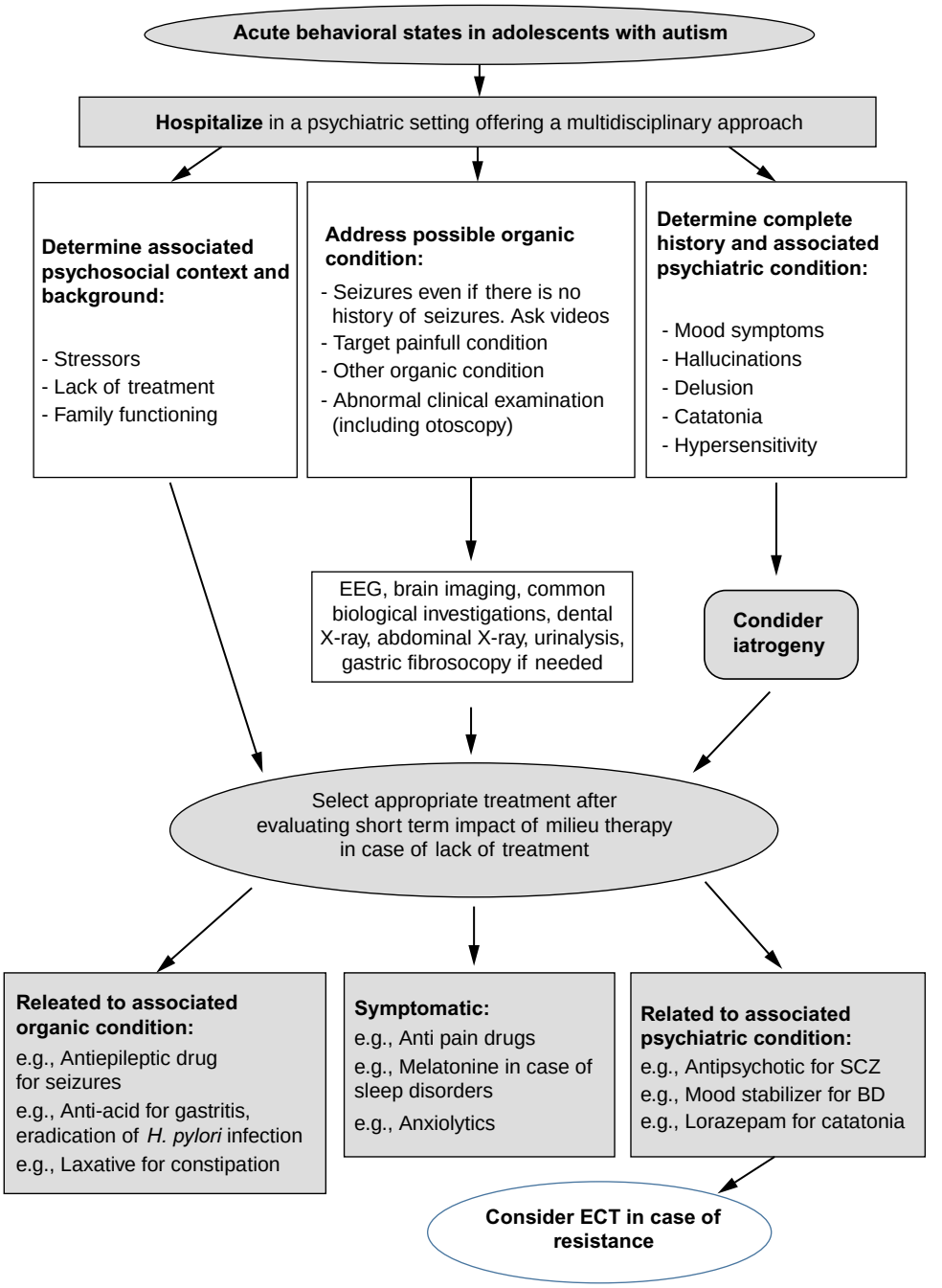

Fig. 22.3. Acute behavioral states in adolescents with autism: a multimodal framework for evaluation and treatment. *BD*: bipolar disorder; *ECT*: electroconvulsive therapy; *EEG*: electroencephalography; *H. pylori*: *Helicobacter pylori*; *SCZ*: schizophrenia. From Guinchat, V., Cravero, C., Diaz, L., et al., 2015. Acute behavioral crises in psychiatric inpatients with autism spectrum disorder (ASD): recognition of concomitant medical or non-ASD psychiatric conditions predicts enhanced improvement. Res Dev Disabil 38, 242–255. doi:10.1016/j.ridd.2014.12.020.

The sinus scanner showed a chronic rhinosinusitis. The dental examination revealed numerous cavity lesions.

Interventions

The treatment plan was tailored according to the major hypotheses made in the two axes. Significant clinical improvement was observed (Fig. 22.4) after 13 months of hospitalization involving simultaneous medical, psychoeducational, and sensorimotor treatments. Medical treatment included: (1) opiate blockers (naltrexone 100 mg/day) to decrease the endorphin sensation seeking procured by SIB; (2) prevention of the risk of intestinal obstruction by chronic constipation using laxatives,

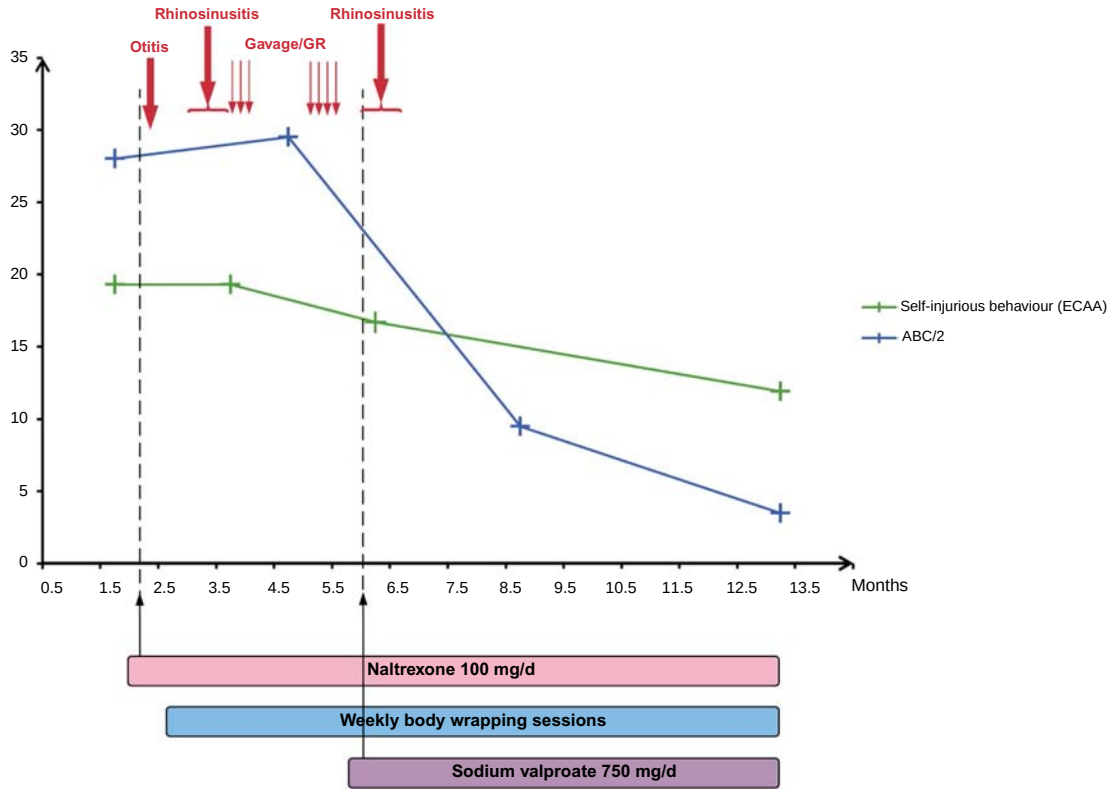

Fig. 22.4. J.'s improvement during hospitalization. *ABC*: aberrant behavior checklist; *ECAA*: *Échelle des Comportements Auto-Agressifs*; *GR*: gastroesophageal reflux; *TBW*: therapeutic body wrap. From Cravero, C., Guinchat, V., Claret-Tournier, A., et al., 2017a. Traitements médicamenteux reçus par les enfants, adolescents et jeunes adultes avec trouble du spectre autistique en France : un état des lieux basé sur l'expérience parentale. Neuropsychiatr Enfance Adolesc 65, 33–41. doi:10.1016/j.neurenf.2016.10.002; Cravero, C., Guinchat, V., Xavier, J., et al., 2017b. Management of Severe Developmental Regression in an autistic child with a 1q21.3 microdeletion and self-injurious blindness. Case Rep Psychiatry 2017, 7582780. doi:10.1155/2017/7582780.

sequential enemas, and a decrease of an antipsychotic drug prescribed prior to his admission; (3) alleviation of physical discomfort by treatment of dental pain (dental care), ear infections (antibiotics), rhinosinusitis episodes (nebulized corticosteroids), Helicobacter pylori gastritis (antibiotics), and gastroesophageal reflux (antireflux medication and split meals); (4) management of sleeping disorders with melatonin (6 mg in the evening) and continued eye lubrication-hydration by ophthalmic drops; (5) supplements for iron-deficiency anemia; (6) a mood stabilizer (sodium valproate 750 mg/day) assuming cyclothymia; (7) support and parental guidance, which were naturally assured, whenever possible, throughout the hospitalization.

Psychoeducational treatment was involved after the functional analysis, comprising the following strategies. (1) Reinforcing factors (such as music or Tom-Tom to reward and encourage desired behaviors) were found and used. (2) Behavioral therapy targeting CBs was employed. The initial use of protective equipment helped to reduce the likelihood of bodily injury and also reduced the sensory stimulation experienced during SIBs. Thereby, the protective equipment served as an extinction mechanism. Given blindness, we proposed to use nursery rhymes and sonorous and tactile objects to improve spatial referencing and transition times between different places and different activities. Positive reinforcement based on reinforcing factors also permitted an improvement in communication skills, decreasing deviant communication and inappropriate behaviors and increasing social initiations. (3) Finally, parental mediation, with difficult instruction in the unit and at home, improved mother-son interactions.

Psychomotor treatment was based on a sensorimotor approach to ASD and adapted to the patient's sensory characteristics. We focused on embodiment, proprioception, and tonic regulation. First, we proposed weekly sessions of therapeutic body wrap (TBW) to help J. experience a unified body feeling, relaxation, and being held (video demo available at https://doi.org/10.5281/zenodo.1157306). Second, we proposed exercises focusing on oral and manual coordination. Third, we developed tailored background and postural supports, designed to promote postural-motor acquisition.

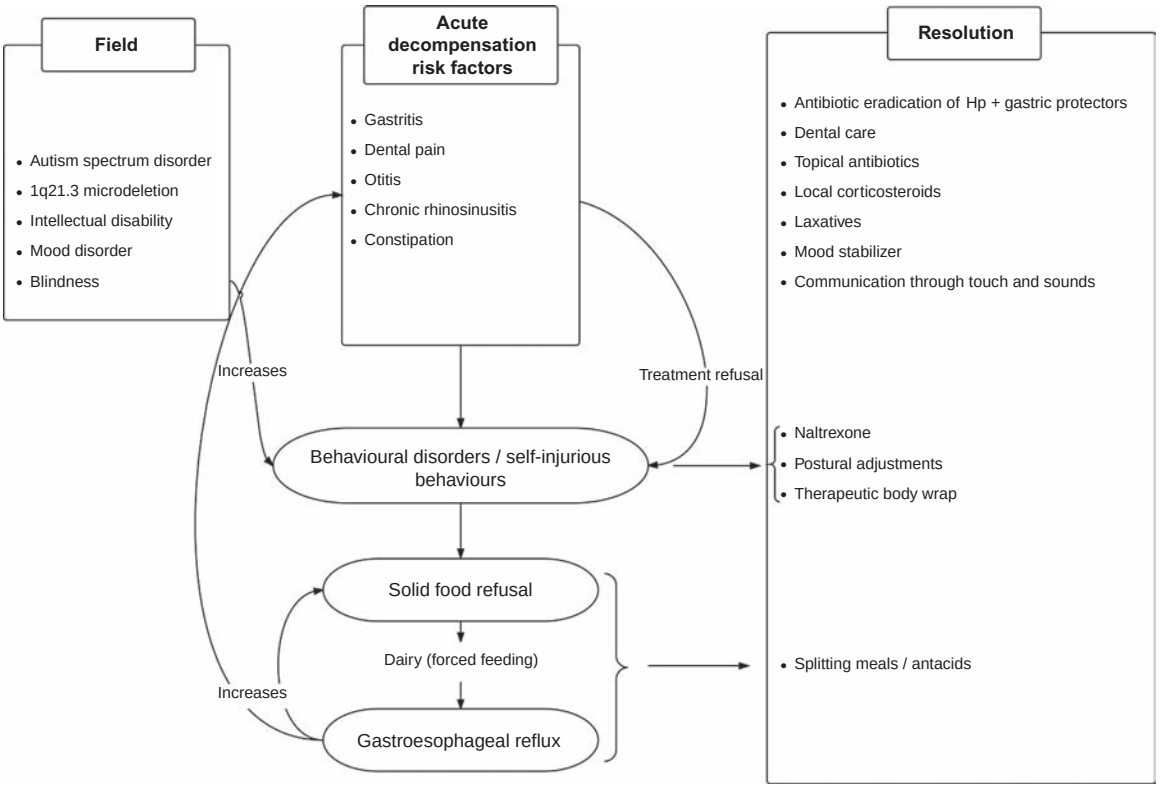

Fig. 22.5. Precipitating factors of acute behavioral crises and implemented therapeutics in the case of J. *Hp*: *Helicobacter pylori*. From Cravero, C., Guinchat, V., Claret-Tournier, A., et al., 2017a. Traitements médicamenteux reçus par les enfants, adolescents et jeunes adultes avec trouble du spectre autistique en France : un état des lieux basé sur l'expérience parentale. Neuropsychiatr Enfance Adolesc 65, 33–41. doi:10.1016/j.neurenf.2016.10.002; Cravero, C., Guinchat, V., Xavier, J., et al., 2017b. Management of Severe Developmental Regression in an autistic child with a 1q21.3 microdeletion and self-injurious blindness. Case Rep Psychiatry 2017, 7582780. doi:10.1155/2017/7582780.

This support care was based on the patient's sensory characteristics (tactile and olfactory hyposensitivity, auditory and vestibular hypersensitivity, and lack of visual flow). This work on multimodal integration, integration of one's body, tonic fit, postural and motor acquisitions, sensory integration, and untying of fine motor skills, played a key role in the possibilities of exploring his environment and in reducing SIBs—mostly in the resumption of developmental dynamics, including the most dramatic effect: the resumption of walking and standing up despite blindness. The treatment plan is summarized in Fig. 22.5.

ABBREVIATIONS

ASD, autism spectrum disorder; BARR, brief assisted required relaxation; CB, challenging behavior; ECT, electroconvulsive therapy; ICU, intensive care unit; ID, intellectual disability; NDD, neuro developmental disorder; PBS, positive behavioral support; PCMA, professional crisis management association; USIDATU, interdepartmental temporary emergency reception unit.

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