Treatment of Previously Undiagnosed Psychiatric Disorders in Persons With Developmental Disabilities Decreased or Eliminated Self-Injurious Behavior

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Background: Self-injurious behavior (SIB) is one of the most common challenging behaviors in persons with autistic disorder or severe/profound mental retardation. Many psychotropic drugs have been evaluated for their effectiveness in SIB. Results have varied, and no one psychotropic drug has been indicated for SIB. In this prospective, open clinical study, psychotropic drugs were used to treat the previously undiagnosed psychiatric disorder in persons exhibiting SIB.

Method: Data were collected from 26 individuals with mental retardation (14 males, 12 females), 7 to 45 years of age (mean = 30.3 years), who exhibited SIB. Psychiatric diagnosis was made according to DSM-III-R and DSM-IV criteria. The Behavior Problem Inventory, Yudofsky's Overt Aggression Scale, repeated direct observation, and information on use of protective devices and Likert scales from log books were used to evaluate degree of SIB. Most of the patients were treated with different psychotropic drugs and behavior modification before they were evaluated for this study, but only 7 of them carried a psychiatric diagnosis. Data were collected between 1987 and 1997.

Results: Depressive disorders, impulse-control disorder, and anxiety disorder were the most common final diagnoses. Neuroleptics were discontinued in 5 patients and tapered by 50% to 75% in 14 patients. Antidepressants were added in 12 patients. Treatment of psychiatric disorders produced significant ($p < .001$) decrease in the severity of SIB in the 26 patients, and SIB was eliminated in 12 patients. The severity of SIB decreased to mild from a moderate, severe, or extreme degree in 11 patients and from an extreme to a severe degree in 3 patients.

Conclusion: The most effective treatment for SIB that is resistant to environment changes and behavior modification in persons with developmental disabilities is the treatment of their psychiatric disorders with the appropriate psychotropics.

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Self-injurious behavior (SIB) is a repetitive, self-directed act that results in tissue damage of the individual's body. Persons diagnosed with autistic disorder and/or severe or profound mental retardation (MR) exhibit SIB, and it is a prominent behavior of Lesch-Nyhan syndrome. Self-injurious behavior is manifested in different ways: self-striking, biting, cutting, burning, pulling, scratching, poking, picking, pinching, digging in different body parts, or placing objects in body cavities.[1] Aerophagia, psychogenic polydipsia, repeated vomiting, rumination, and pica have also been considered forms of SIB. These behaviors, however, can be signs of other medical and psychiatric disorders, side effects of psychotropic medication, and consequences of caffeine (polydipsia) or nicotine (pica) addiction.

A functional assessment of SIB should be conducted prior to any intervention. Essential parts of the functional assessment are determinations of the frequency, intensity, topography, antecedents, consequences, and presumed function of the SIB.[2] Underlying neurobiological factors have been discussed as a cause of SIB because of the strong association of the behaviors with certain disorders and syndromes.[3]

Restrictive environments, sensory impairments, and communication deficits are other predisposing factors for the appearance of SIB. Biological factors such as menses, otitis media, fatigue, allergies, or constipation may serve

as setting events, altering the antecedents and strengthening the consequences that maintain the SIB.[4] Headaches including migraine, toothaches, extremes in environmental temperature, side effects of medication, and other medical illness can become setting events as well.

Although different behavioral and/or biological hypotheses have been put forward to explain SIB, they only explain certain mechanisms, and an overall understanding of SIB is still elusive.[5]

As psychotropic drugs have appeared on the market through the years, they have been used for the treatment of SIB, but unfortunately without consideration of the psychiatric diagnosis as a mediating factor.[6–10] The limited response of SIB to different psychotropic drugs led some researchers to the hypothesis that the etiology of SIB was related to the known effects of certain psychotropic drugs on particular brain receptors or neurotransmitters.[10]

In spite of the suggestion that there is no psychopharmacologic treatment for SIB,[11] studies still appear that test the effects of atypical antipsychotic drugs on SIB without attempting to make a connection to the psychiatric diagnoses of the individuals tested.[12,13] Although the difficulty in diagnosing mental disorders in people with MR can no longer be considered a valid argument,[14] studies assessing the association of the psychiatric diagnosis with SIB and the effects of treatment of the psychiatric disorder on the frequency and severity of SIB are lacking.[15]

This prospective open clinical study was undertaken to clarify and give preliminary answers to the following question: What are the effects on the frequency and severity of SIB when psychotropic drugs are matched to and used to treat diagnosable psychiatric disorders in individuals exhibiting SIB?

METHOD

Subjects

Consent for treatment was obtained from legal guardians, and data were collected from 26 patients seen by the authors between 1987 and 1997 in different settings. These settings included 1 tertiary clinic, 1 developmental center, and 3 group homes. Although more than 600 individuals with different challenging behaviors, degrees and etiologies of MR, and psychopathology were evaluated, these 26 cases were selected because (1) SIB was the most prominent challenging behavior, (2) staff kept reliable baseline and treatment data, (3) proximity of the residence to the clinic made follow-up possible, (4) tissue damage made the evaluation more accurate, (5) the psychiatric diagnoses were made with a certain degree of confidence on the basis of the presenting signs and/or symptoms and information obtained from the parents and staff, and (6) the parents, guardians, treatment team, and the treating psychiatrist or physician followed the recommendation for changes in the treatment as new psychotropic drugs and elimination or changes in the doses of the psychotropic drugs being administered were introduced.

Ten of the 26 patients were involved in 2 incomplete open clinical pilot studies of monotherapy with the β-blocker propranolol (5 patients) and the opioid receptor blocker naltrexone (5 patients) versus placebo. The studies were abandoned because of lack of effects, side effects, and difficulty obtaining consent for more participants in the studies.

All patients had been treated with behavior modification, protective devices, and different psychotropic drugs previously in their settings, and all possible medical, neurologic, or other causes of SIB were excluded first. The patients were brought to the authors for consultation because all previous attempts to treat the SIB had failed. In most patients, SIB was a chronic challenging behavior, and in many it dated back to the patient's childhood.

The selected patients were 14 males and 12 females, 7 to 45 years of age (mean age = 30.3 years). Twelve patients had a profound, 12 a severe, and 2 a moderate degree of MR. Seventeen subjects carried the diagnosis of autism, which was reconfirmed, and 9 of the 26 had been diagnosed with epilepsy. Etiology of MR was secondary to Down syndrome in 2 patients, to prematurity and perinatal factors in 2 patients, to tuberous sclerosis in 1 patient, and to congenital malformation and multiorgan hypoplasia in 1 patient. The etiology of MR was unknown in 20 patients, in spite of an extensive medical, neurologic, and genetic workup that was done in the past. Further neurologic/genetic workup was initiated in patients suspected of having fragile X syndrome or syndromes associated with MR or autism.

Diagnoses

The DSM-III-R,[16] from 1987 to 1994, and the DSM-IV,[17] from 1994 to 1997, were used for Axis I psychiatric disorders after review of the previous and current files of the person being evaluated. Information was obtained from parents, guardians, and staff regarding the developmental history, history of behavior problems, past and current psychiatric signs and symptoms, and family history of psychiatric problems, when available. Direct observations, and interactive interviews in the presence and with the help of the informants familiar with the patient, were conducted with each patient. Videotapes were made and pictures of the tissue injury were taken for 19 patients. Each patient was seen more than 5 times, and 9 had been followed for more than 10 years. Although the diagnosis of psychiatric disorders in persons with severe/profound MR is difficult to make by using DSM criteria, it is not an unobtainable goal.[14,18–21] In all cases, psychiatric diagnoses were made by the consensus of the treatment team before treatment was implemented. Autistic disorder was not part of the Axis I disorders being treated.

Table 1. Taxonomy of Self-Injurious Behavior[a]

Degree	Severity	Protective Device
Mild	Mild tissue damage	None
Moderate	Moderate tissue damage (redness, calluses)	None
Severe	Severe tissue damage (bleeding, calluses, cauliflower ears, scars)	Intermittent use of mittens, helmets, immobilizers, or none
Extreme	Extreme tissue damage (bleeding, sutures, scars, cauliflower ears, hematomas, pulling teeth or nails, broken bones, secondary blindness)	Nearly constant use of 1 or more immobilizers, or none

[a]For each degree of self-injurious behavior, the behavior may occur sporadically or many times per day.

Table 2. Psychiatric Diagnosis Made in 26 Subjects With Self-Injurious Behavior, N

Diagnosis	Before Treatment	Final Evaluation	Comorbid Diagnosis (final evaluation)
Major depression	0	12	5
Impulse-control disorder	0	12	11
Bipolar disorder	0	6	3
Anxiety disorder	0	5	5
Schizophrenia	4	1	1
Pica	2	2	2
Stereotypic habit disorder	0	1	0
Psychotic disorder NOS	1	2	2

Abbreviation: NOS = not otherwise specified.

Evaluation of SIB and Other Challenging Behaviors

To quantify the degree of SIB, data were obtained from the following:

1. The Behavior Problem Inventory,[22] completed by parents or staff before and during the evaluation through direct questioning by the evaluation team.
2. The Overt Aggression Scale,[23] completed by parents or staff when incidents occurred for at least 2 weeks before the evaluation, before treatment changes were made, and during treatment.
3. Individualized scales used by the agencies and report of incidents and use of protective devices in the log books.
4. Direct observation, videotaping, and pictures of tissue damage.

Self-injurious behavior was characterized according to the data obtained as mild, moderate, severe, or extreme by consensus of the treatment team, using the descriptions shown in Table 1. Ratings of the severity of SIB were assumed to represent an ordinal ranking with not necessarily equal intervals between the ranks. Accordingly, statistical significance of differences in the severity of SIB before and after treatment was assessed using the Wilcoxon signed rank test[24] and also, following Krauth's[25] cautionary advice, the more conservative sign test.[24] As an effect in the direction of decreased SIB was anticipated and would be considered meaningful, 1-tailed tests were performed.

The process of obtaining consent for changes in medication (changing to higher doses, adding new medications, or eliminating medications) increased the duration of the medication trial. The duration of medication changes until the patient's psychiatric status was stabilized and final characterization of SIB was obtained was in the range of 3 to 12 months.

Self-injurious behavior was the most severe challenging behavior in all of the cases, but it was not the only challenging behavior, as illustrated by the data compiled below from 2 patients.

Patient A. This 30-year-old man with autism and profound MR exhibited daily severe self-injury (punching self in head with both arms, kicking self in legs, hitting self in groin and side of body or ribs when aroused); daily aggressive behavior when staff attempted to put on his helmet or boxing gloves; rectal digging, mouthing feces and/or smearing them when constipated; noncompliance with bathing, dressing, shaving, and eating; and sleep disturbances.

Patient B. This 32-year-old woman with autism and profound MR exhibited daily, low-to-severe-intensity tantrums (bouncing up and down on chair, hyperventilating, becoming self-abusive and/or aggressive); daily low-to-moderate-severity SIB, usually at home, when agitated (head-banging, biting the palms of her hands, slapping her face and back of her neck, and stomping her feet or kicking herself); daily low-to-moderate-severity disruptions consisting of loud screeches when agitated (usually before becoming aggressive), and when agitated sometimes headbutting others (usually peers); eating toilet paper a few times a month or attempting to eat the inside of a diaper; noncompliance with toothbrushing and putting on shoes and socks; avoiding socialization; constipation leading to rectal digging; and sleep disturbances.

RESULTS

Of the 26 patients, a psychiatric diagnosis had been made previously in only 7 by the treating physicians (psychiatrist, neurologists, internists) and the patients' psychologists. The diagnosis (and degree) of MR with behavior problem or SIB was the carrying diagnosis in the other 19 patients. In half of the cases, autism was a diagnosis in the patient's file at one point, but it was dropped or was not carried on. Major depression, impulse-control disorder, anxiety disorder, and bipolar disorder were the most common new and final diagnoses made in this group. In many cases, other comorbid psychiatric diagnoses were given as well (Table 2).

Table 3. Subject Characteristics, Changes Made in Diagnoses and Prescription of Psychotropic Drugs, and Changes Observed in Self-Injurious Behavior (SIB)

Subject	Sex	Age (y)	Degree of MR	Autism	Etiology of MR	Previous Diagnoses	Previous Medications	New Diagnoses	New Medications	Frequency/Severity of SIB/Aggressive Behavior: Before Treatment	Frequency/Severity of SIB/Aggressive Behavior: After Treatment
1	M	30	Profound	Yes	Unknown	SIB (old)	Naltrexone trial	MD	Paroxetine	Moderate	None
2	F	32	Severe	No	Unknown	SIB (new), seizures	Phenytoin, phenobarbital	MD	Paroxetine	Moderate	None
3	F	32	Profound	Yes	Unknown	SIB (old)	None	MD	Clomipramine, paroxetine, buspirone	Moderate	Mild
4	M	34	Moderate	Yes	Unknown	SIB (new)	Chlorpromazine, haloperidol	MD	Clomipramine	Mild	None
5	M	30	Profound	No	Perinatal	SIB (old), left hemiparesis, seizures	Carbamazepine, thioridazine	Impulse-control disorder, MD	Carbamazepine, amoxapine, paroxetine	Severe	None
6	F	7	Profound	Yes	Unknown	SIB (old)	Diazepam, haloperidol, propranolol, naltrexone	MD	Fluoxetine	Severe	Mild
7	F	12	Moderate	Yes	Unknown	SIB (old)	Carbamazepine, haloperidol, thioridazine, chloral hydrate	MD, recurrent	Fluoxetine	Moderate	Mild
8	M	25	Profound	Yes	Tuberous sclerosis	SIB, seizures	Phenytoin, carbamazepine, valproate, haloperidol, pindolol, naltrexone	MD, chronic	Valproate, paroxetine	Extreme	None
9	M	30	Profound	No	Down syndrome	SIB (old)	Thioridazine	MD, panic disorder	Paroxetine,[a] trazodone, alprazolam, thioridazine↓	Severe	Mild
10	F	34	Profound	No	Premature birth	Schizophrenia, SIB (old)	Thioridazine, clorazepate	MD with psychotic features	Nortriptyline, fluphenazine (small dose)	Severe	Mild
11	M	25	Profound	Yes	Unknown	SIB (old), pica, seizures	Phenytoin, carbamazepine, clorazepate	MD, pica	Amoxapine, carbamazepine, clorazepate (small dose)	Severe	None
12	F	33	Profound	Yes	Unknown	SIB, seizures	Chlorpromazine, thioridazine, mesoridazine, doxepin, phenytoin	MD, impulse-control disorder	Fluoxetine, risperidone, valproate, naltrexone	Extreme	Severe
13	M	25	Severe	Yes	Unknown	SIB (old), seizures	Phenytoin	Mood disorder NOS	Time sequence: (a) Carbamazepine, (b) Carbamazepine and naltrexone, (c) Carbamazepine and lithium	 Extreme Moderate Moderate	 Moderate Moderate None
14	F	45	Severe	No	Congenital dwarfism, multiorgan hypoplasia	SIB (old)	Buspirone, clonidine, mesoridazine	Bipolar I	Valproate, mesoridazine	Severe	Mild
15	F	45	Severe	No	Unknown; right lobectomy (traumatic brain injury)	SIB (old), aggressive behavior, seizures	Phenytoin, mesoridazine, propranolol	Bipolar II	Carbamazepine, trazodone, thioridazine, pindolol (lithium and SSRI could not be tolerated)	Severe	Mild

continued

Table 3. Subject Characteristics, Changes Made in Diagnoses and Prescription of Psychotropic Drugs, and Changes Observed in Self-Injurious Behavior (SIB) (cont.)

Subject	Sex	Age (y)	Degree of MR	Autism	Etiology of MR	Previous Diagnoses	Previous Medications	New Diagnoses	New Medications	Frequency/Severity of SIB/Aggressive Behavior: Before Treatment	Frequency/Severity of SIB/Aggressive Behavior: After Treatment
16	M	34	Severe	Yes	Unknown	Schizophrenia, SIB, aggressive behavior	Thiothixene	Mood disorder NOS, explosive disorder	Thiothixene↓, propranolol, valproate, risperidone	Severe	Mild
17	M	45	Severe	No	Unknown	Schizophrenia, SIB, aggressive behavior	Haloperidol, 20 mg/day	Intermittent explosive disorder, bipolar I	Valproate, lithium, haloperidol↓, propranolol	Severe SIB Severely aggressive behavior	None Mild
18	M	30	Severe	No	Unknown	Aggressive behavior, SIB, seizures	Valproate, mesoridazine	Mood disorder NOS, depressed phase, impulse-control disorder	Valproate, lithium, trazodone	Moderate SIB Severely aggressive behavior	None None
19	M	25	Severe	Yes	Unknown	SIB (old), aggressive behavior	Haloperidol (high dose)	Impulse-control disorder	Haloperidol↓, propranolol	Moderate SIB Severely aggressive behavior	None None
20	M	30	Severe	Yes	Unknown	SIB (old)	Haloperidol, desipramine	Impulse-control disorder, anxiety disorder (social)	Haloperidol, pindolol, paroxetine, desipramine	Extreme	Mild
21	M	41	Severe	Yes	Unknown	SIB (old), destructive behavior	Haloperidol	Impulse-control disorder, anxiety disorder (social)	Haloperidol↓, propranolol	Home, moderate; outside, moderate	Home, none; outside, mild
22	F	23	Severe	Yes	Unknown	SIB (old)	Haloperidol, 20 mg/day, lithium, paroxetine, naltrexone, risperidone	Impulse-control disorder, anxiety disorder (separation)	Haloperidol↓, propranolol, clorazepate	Extreme	Severe
23	M	28	Profound	Yes	Down syndrome	SIB (old)	Naltrexone	Stereotypic movement disorder, SIB	Naltrexone, paroxetine[b]	Severe	None
24	F	39	Profound	Yes	Unknown	SIB (old), pica, psychotic disorder NOS	Thioridazine	Psychotic disorder NOS, impulse-control disorder, pica	Fluphenazine, propranolol	Extreme	Mild
25	F	14	Profound	Yes	Unknown	SIB, aggressive behavior, seizures	None	Psychotic disorder NOS, impulse-control disorder	Haloperidol, risperidone, propranolol, valproate	Extreme	Mild
26	F	40	Severe	No	Unknown; fetal alcohol syndrome? Neglect?	SIB; aggressive and destructive behavior; schizophrenia, chronic UT	Mesoridazine, valproate	Schizophrenia, intermittent explosive disorder	Risperidone, pindolol, clonazepam, naltrexone	Extreme SIB Extremely aggressive behavior	Severe None

[a]Discontinued due to rash.
[b]Discontinued due to elevated liver transaminases.
Abbreviations: F = female, M = male, MD = major depression, MR = mental retardation, NOS = not otherwise specified, SSRI = selective serotonin reuptake inhibitor, UT = undifferentiated type.
Symbol: ↓ = dose decrease.

Table 4. Psychotropic Drugs Prescribed Before and After Evaluation in 26 Patients With Self-Injurious Behavior, N

Drug	Treatment Before Evaluation	Final/Effective Treatment
Neuroleptics	19	14[a]
Antidepressants	3	15
Antianxiety	5	5
Lithium	1	3
β-Blockers	5	9
Naltrexone	5	2
Anticonvulsants	10	12
For seizures	9	9[b]
For self-injurious behavior	1	0
For mood disorder	0	3

[a]Doses decreased by 50%–75%.
[b]Changes in type occurred in 5 cases.

Table 5. Changes in the Overall Frequency/Severity of Self-Injurious Behavior With Treatment of the Underlying Psychiatric Diagnosis Among 26 Patients, N

Frequency/Severity of Self-Injurious Behavior	Before Treatment	After Treatment
None	0	12
Low frequency/severity group		
Mild	1	11
Moderate	7	0
Total	8	11
High frequency/severity group		
Severe	10	3[a]
Extreme	8	0
Total	18	3

[a]Frequency decreased.

The patients' age, sex, degree and etiology of MR, diagnosis of autism, previous and new diagnoses, previous and new medications, and degree of SIB before and after treatment are given in Table 3.

The categories of psychotropic drugs prescribed before and after participation in the study are compiled in Table 4. In 5 patients, neuroleptics were discontinued, and in 14, the doses of neuroleptics were tapered by 50% to 75%. Antidepressants, β-blockers, and mood stabilizers were introduced according to the main psychiatric diagnoses. In 5 patients with seizure disorder, the anticonvulsant phenytoin was replaced with other anticonvulsants (carbamazepine or valproate) for their concomitant mood-stabilizing properties.

The effects of the treatment of the psychiatric disorders on the frequency and severity of SIB can be seen in Table 5. The 2 groups with mild and moderate severity/frequency were combined into the low frequency/severity group, and the 2 groups with severe and extreme severity/frequency were combined into the high frequency/severity group to increase the number of cases in each cell (Table 5).

A total of 17 of the 26 patients were diagnosed in the past or rediagnosed with autistic disorder. The number of patients with and without autism and the degree of SIB they exhibited before and after treatment of psychiatric disorders other than autism are shown in Tables 6 and 7.

Table 6. Pretreatment Degree of Self-Injurious Behavior in Autistic (N = 17) and Nonautistic (N = 9) Groups, N

Group	None	Mild	Moderate	Severe	Extreme	Total
Autistic	0	1	5	4	7	17
Nonautistic	0	0	2	6	1	9
Both groups	0	1	7	10	8	26

Table 7. Posttreatment Degree of Self-Injurious Behavior in Autistic (N = 17) and Nonautistic (N = 9) Groups, N

Group	None	Mild	Moderate	Severe	Extreme	Total
Autistic	8	7	0	2	0	17
Nonautistic	4	4	0	1	0	9
Both groups	12	11	0	3	0	26

In 12 patients, SIB was completely eliminated with treatment. Elimination of SIB was observed in patients not only from the low frequency/severity group but also from the high frequency/severity group. In 11 other patients, the frequency/severity of SIB moved from the moderate, severe, or extreme category to the mild category. Whereas before treatment there were 18 patients in the high frequency/severity group, only 3 patients remained in this group after treatment, and the frequency of SIB in these 3 patients decreased by 50%.

The percentages of autistic and nonautistic patients showing different levels of severity of SIB before and after treatment of their psychiatric diagnoses are shown in Figures 1 and 2. There was no difference in the degree of reduction of SIB between the 2 groups.

Both the Wilcoxon signed rank test and the sign test revealed a significant decrease in severity of SIB from pretreatment to posttreatment at the $p < .001$ level.

The effect of treatment of psychiatric disorders on SIB followed the decrease of psychiatric signs and symptoms, and maintained modification programs remained the same or were abandoned in cases in which SIB was eliminated.

At follow-up, exacerbation of SIB was noted during medical illness, environmental changes, and relapse/recurrence of the psychiatric disorder. Treatment of medical illness, changes in the patient's environment, and adjustment of psychotropic drug treatment again decreased or eliminated SIB.

In certain cases, the psychotropic drug that controlled the psychiatric illness was changed and new psychotropic drugs were introduced by other prescribers as these drugs came onto the market. The SIB and other behavior were exacerbated or relapsed until the previous regimen or other medication from the same category to which there was a good previous response was reintroduced.

The frequency and severity of aggressive behavior decreased as well in patients who exhibited this behavior, as shown in Table 3 (patients 17, 18, 19, and 26).

Figure 1. Pretreatment Degree of Self-Injurious Behavior in Patients With and Without Autism

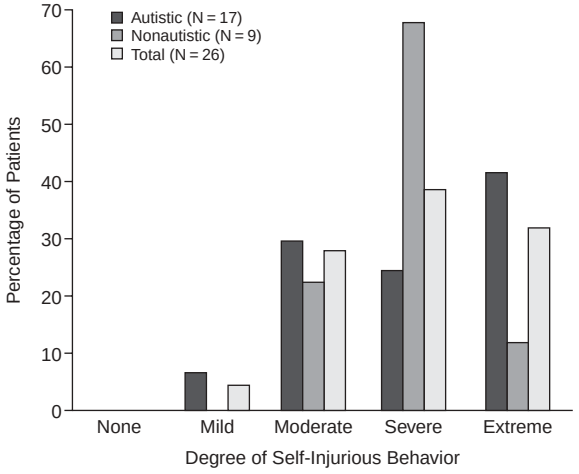
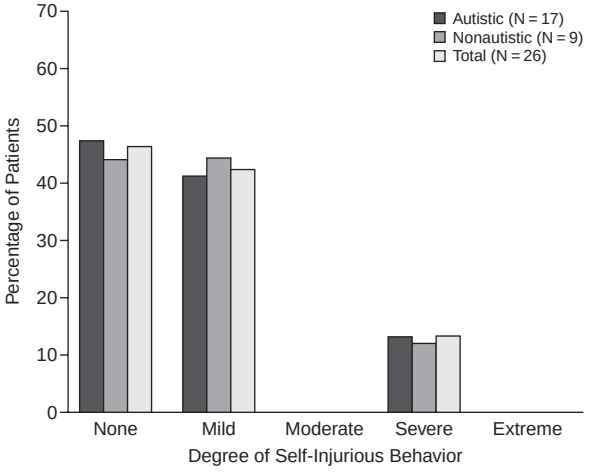


Figure 2. Posttreatment Degree of Self-Injurious Behavior in Patients With and Without Autism



DISCUSSION

Some individuals exhibit only SIB, but often SIB is only one of many challenging behaviors the individual exhibits. Self-injurious behavior has been suggested to be a core characteristic of depression in adults with Down syndrome,[26,27] a "behavior equivalent" and characteristic of depression in persons with MR and depression,[18,28] and a potential marker of depressive disorder in the above population.[20,21]

The DSM-IV[17] has incorporated SIB into the Axis I diagnosis of stereotypic movement disorder, making it a psychiatric disorder. Review of the literature on biological treatments of SIB suggests that it is considered a separate psychiatric disorder by many clinicians and researchers and that it is treated as such with all of the psychotropic drugs available, with different degrees of response.[6–10]

On the basis of the response of SIB to different psychotropic drugs, etiologic hypotheses have been generated. The use of only the opioid receptor blockers (naloxone, naltrexone) and the dopamine blockers (fluphenazine, clozapine) was based on previously formulated etiologic hypotheses of SIB.[29–35]

Responses of SIB to different psychotropic drugs argue against considering SIB a unique sign of a particular psychiatric disorder or in itself a separate psychiatric disorder. The most plausible explanation for the observed response is the matching of the undiagnosed psychiatric disorder with the category of psychotropic drug tried. It appears that SIB is a challenging behavior being exhibited in different psychiatric disorders and not a characteristic symptom of any particular disorder. There is no evidence that SIB is a psychiatric disorder, although it has been treated as such. In the few cases in which the frequency/severity of SIB and the way it was exhibited suggested addictive disorder, a good response to opioid receptor blockers was achieved. In such cases, SIB can be considered a symptom of an addictive disorder,[31] as there are similarities between the driven behaviors of the addicted person to obtain the substance to which he/she is addicted and the attempts of the person with this type of SIB to inflict pain on his or her body.

The association of major depression, unipolar or bipolar type, and SIB has been made more clearly than with other disorders.[10,18,20,21,26–28,36] Mace and Mauk[37] evaluated children with mental retardation and SIB by using a behavioral and a biomedical model to make biobehavioral diagnoses. Those authors proposed 4 subtypes according to the rate of SIB, its severity, co-occurrence with stereotypies, and agitation or agitation when SIB is interrupted, and they suggested corresponding psychotropic drugs for each subtype.

Subtype 1 corresponds to an addictive disorder in which the person is addicted to internal opioids, for which naltrexone is suggested; subtype 2, to stereotypic movement disorder with SIB, for which haloperidol is suggested; subtype 3, to obsessive-compulsive disorder, for which fluoxetine is suggested; and subtype 4, to affective and impulse-control disorder, for which lithium, propranolol, or clonidine is suggested. Although these subtypes have been loosely associated with certain psychiatric disorders, their clinical use has been uncertain. Our data suggest a close association of SIB mainly with major depression, anxiety, and impulse-control disorders. In 2 patients, the diagnosis was psychotic disorder not otherwise specified, and in 1 (patient 26, Table 3), the diagnoses of schizophrenia chronic undifferentiated and intermittent explosive disorder were made. This individual, with a history of her mother's use of alcohol during preg-

nancy, was neglected and physically abused as a child. She developed schizophrenia at 14 years of age and experienced positive symptoms (auditory hallucinations, inappropriate affect, and bizarre behavior) at times during the last 10 years she had been followed up, in spite of being treated with high doses of different neuroleptics through the years. Severe scars on her abdomen were the result of SIB in the past. She was treated initially with β-blockers for aggressive/destructive behaviors in the form of intermittent explosive outbursts. Afterwards, incidents of taking radiators off the walls and attempting to throw them out through the window or pushing and hitting peers and staff decreased dramatically. Self-injurious behavior in the form of pulling out stray teeth or toenails emerged after aggressive outbursts subsided and naltrexone, 150 mg every other day, was added. When the data were compiled 4 years ago, she had moved from an extreme to a severe degree of SIB. She has been incident-free of both aggressive and self-injurious behaviors for the last 2 years.

In patient 23, naltrexone decreased SIB, but when paroxetine was added for depressive features, SIB was eliminated. Both paroxetine and naltrexone were discontinued because of increased liver transaminases. At the 6-month follow-up, the subject was free of SIB.

In patient 6, the diagnosis of major depression was made from the presentation (insomnia, crying, agitation, sad facies, lack of energy and appetite); lack of response to diazepam, haloperidol, propranolol, and naltrexone, which did not alleviate any of the symptoms; and family history of affective disorder. She had responded well to fluoxetine, 5 mg twice weekly, for 6 years. At 13 years of age, she had a hypomanic episode, which was controlled with carbamazepine, 300 mg daily. She has been doing very well taking the above dose of carbamazepine and fluoxetine, 5 mg daily. Medical problems such as toothaches, otitis, or constipation triggered the reappearance of SIB.

The presence of SIB for only 1 year in 75% of individuals exhibiting it[38] suggests an association of SIB with an adjustment disorder or a single episode of major depression. The observation of SIB during the depressive phase of bipolar I or II disorder, its fluctuation with mood cycling, and replacement of SIB with aggressive behavior during the hypomanic/manic phase suggest a stronger association of major depression with SIB.[21,39] However, a study of 3 very large statewide client databases found no correlations between psychiatric disorders and challenging behaviors.[40] Similarly, a recent study[41] did not find evidence for considering SIB a depressive equivalent, as has been suggested.[18,28] Suicidal and homicidal ideation, aggressive and self-destructive behaviors in patients without MR, are associated with different psychiatric disorders, but have not been considered as Axis I psychiatric diagnoses. Suicidal ideation has only been considered as 1 of the 9 criteria of major depressive disorder (DSM-IV).[17] Similarly, SIB cannot be considered as an Axis I psychiatric diagnosis and be treated as such with any psychotropic as it appears on the market.

Although SIB appears to be associated more frequently with depressive disorders, anxiety, impulse-control, and psychotic disorders can trigger the appearance, reappearance, or exacerbation of SIB. As not all individuals with intellectual disabilities diagnosed with the above disorders exhibit SIB, psychiatric disorders can be considered only as setting events[4] for SIB.

Certain psychiatric symptoms or personality characteristics, such as impulsivity, irritability, anxiety, and other stimulus-seeking characteristics, and depressed mood can be considered predisposing factors for SIB, but studies of this association are lacking. Psychiatric disorders can affect the threshold for the appearance of such behavior through changes in personality and/or temperamental characteristics. Studies of temperamental or personality differences of individuals with MR exhibiting SIB with or without diagnosable psychiatric disorder versus other individuals with no history of SIB will clarify and answer the above questions.

The observed effects on the frequency/severity of SIB when the psychiatric disorder was treated with the appropriate psychotropic drugs were better than in other studies[6,8,24,35,42] that used psychotropics for SIB without taking into consideration and treating the psychiatric disorder. The elimination or reduction in the doses of neuroleptics decreased the possibility of their long-term side effects. In individuals diagnosed with a psychotic disorder, SIB responded well when the individuals were treated with a neuroleptic alone or in combination with other psychotropic drugs according to the comorbid disorders. All of the patients in this study were previously seen by more than 1 psychiatrist, who prescribed different psychotropics for SIB without making a psychiatric diagnosis. It appears that the psychiatrists (1) did not have training or experience in the psychiatric aspects of MR, (2) never considered or understood that patients with MR are more vulnerable to the same psychiatric disorders diagnosed in the rest of the population, (3) did not have time or information in the files to make diagnosis, and/or (4) were considering SIB as part of the "behavioral disorder" associated with MR and prescribed the psychotropics suggested by the literature as effective for SIB.

We have also observed that for those patients in whom behavior modification fails to completely eliminate SIB, treating a diagnosable psychiatric disorder with relevant psychotropic drugs at appropriate doses leads to greater efficacy of the behavioral program. The overall functioning of the patients improved with the treatment. According to informants, reversal or control of the psychiatric signs and symptoms and decrease or elimination of SIB permitted regular participation in programs again, participation in more social activities, and better interaction between the patients and staff or peers.

The unavailability of research diagnostic criteria for persons with MR is the limitation of this prospective study. In one third of the patients, the final diagnosis was made not during the first visit but during follow-up visits, with appropriate changes of psychotropics according to the identified psychiatric diagnosis. In spite of the difficulty of diagnosing persons with MR, the clearly positive results that were obtained suggest that the psychiatric disorder of a person exhibiting SIB—and not the SIB—must be the target of the treatment with psychotropic drugs.

Our data suggest that it is inappropriate to use any psychotropic drug to treat SIB or aggressive behavior in people with MR without considering psychiatric disorder as a predisposing factor. The negative effects[43] of the use of long-term haloperidol treatment for challenging behaviors in children with autism[44,45] must curtail our enthusiasm in prescribing the new atypical antipsychotics that have been suggested to be effective in treatment of aggressive behaviors in children and adults with autism.[42,46] Double-blind, placebo-controlled trials that attempt to match psychiatric diagnoses in persons with MR and SIB or aggressive behavior to the relevant psychotropic agent must be encouraged.

CONCLUSIONS

The present study suggests the following:

1. SIB is one among other challenging behaviors in certain individuals with MR and/or autism that is caused by as yet unknown mechanisms and has different functions.
2. SIB is associated with different syndromes and psychiatric disorders, especially depressive, anxiety, and impulse-control disorders, but is not a criterion for any one of these disorders.
3. Psychiatric disorders may be associated with SIB because the neural processes underlying these conditions affect the sensitivity of the individual to antecedent cues and reinforcing or punishing consequences. Thus, a person who is anxious or depressed may resist efforts to work or engage in social behavior because the rewards typically associated with such behaviors are reduced in value. Accordingly, the appearance of SIB during such an anxious/depressed phase may be reinforced by withdrawal of social demands when SIB appears, a classic negative-reinforcement paradigm resulting in behavior that is very difficult to eliminate with behavioral techniques. Conversely, impulsiveness is often associated with lack of attention to, and learning from, punishing consequences and increased attraction to arousing, rewarding stimuli. Thus, this personality trait may increase the likelihood that SIB will be positively reinforced by the attention this behavior elicits from others.
4. Psychotropic drugs have been tested and approved for the treatment of various psychiatric disorders and should be used for these disorders in people with MR who exhibit challenging behaviors until proved otherwise.
5. SIB does not appear to have the characteristics of an Axis I psychiatric disorder. In a small percentage of individuals with MR, SIB can be considered an addictive behavior either leading to self-administration of internally produced opioids[31] or associated with stereotypic movement disorder.

Drug names: alprazolam (Xanax and others), buspirone (BuSpar and others), carbamazepine (Tegretol, Epitol, and others), chlorpromazine (Thorazine, Sonazine, and others), clomipramine (Anafranil and others), clonazepam (Klonopin and others), clonidine (Catapres, Duraclon, and others), clorazepate (Tranxene, Gen-Xene, and others), clozapine (Clozaril and others), desipramine (Norpramin and others), diazepam (Valium, Diastat, and others), divalproex sodium (Depakote), doxepin (Sinequan and others), fluoxetine (Prozac and others), fluphenazine (Prolixin, Permitil, and others), haloperidol (Haldol and others), mesoridazine (Serentil), naloxone (Narcan and others), naltrexone (ReVia), nortriptyline (Aventyl, Pamelor, and others), paroxetine (Paxil), phenytoin (Dilantin and others), pindolol (Visken and others), propranolol (Inderal, Innopran, and others), risperidone (Risperdal), thiothixene (Navane and others), trazodone (Desyrel and others).

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