Consensus of the Fragile X Clinical & Research Consortium on Clinical Practices

Behavior Problems in Fragile X Syndrome

First Issued: June 2011
Last Updated: October 2012

Introduction

Fragile X syndrome (FXS) is a genetic disorder caused by a mutation in the FMR-1 gene. Many effects of this mutation result in abnormal brain cell signaling, which in turn affects learning and behavior. In many, though not all cases, FXS causes significant behavioral problems in individuals, which can be detrimental to their interactions with family, peers, teachers and the wider society. There is no cure for the condition at this time, therefore management is largely focused on managing the problems. Behavioral management tools may include drug and/or other modalities, but typically involves the combined efforts of a multidisciplinary team that ideally includes a psychologist, psychiatrist, occupational therapist, and educators, all working together with the family.

The primary behavioral problems seen in fragile X syndrome may include elements of anxiety, ADHD, sensory defensiveness, hyperarousal, aggression and autism, all compounded by intellectual deficits (particularly language/communication problems). Sleep disturbances may be an additional compounding factor.

Diagnosing/Recognizing Behavioral Problems

Diagnosis of fragile X syndrome is the key to management. Two characteristic behavioral traits typically overlay the other behavioral issues: sensitivity to sensory stimuli and a tendency towards hyperarousal. The latter can result in quick loss of capacity for self-regulation, manifesting in aggressive outbursts or self-abusive behaviors. Difficulty handling transitions, new environments, and changes in routine present additional behavioral challenges. A behavior management plan must take all these issues into account.

Potential problems in any given individual should be actively investigated and managed accordingly. The behavioral evaluation should include the following:

- An occupational therapy evaluation for sensory defensiveness, a state whereby the sensory environment is perceived much more intensely than is typical. (Examples include fluorescent bulb flickering and typical classroom noise that the individual may experience as unbearable.)
- A careful evaluation for autism.
- A systematic evaluation of the environment to ascertain potential triggers for hyperarousal.
- A functional behavioral analysis to ascertain the precipitating factors for the maladaptive behaviors seen in the individual.
- Evaluation for anxiety and ADHD.
- A sleep assessment.
- Determination of cognitive strengths and weaknesses.

Current Treatment Guidelines

The most important consideration in evaluating treatment options is that they be developmentally and cognitively appropriate for each individual. It is also helpful to remember that effective management of sleep disorders, communication problems, and medical issues (seizures, ear related issues, pes planus) will all help mitigate behavioral problems. General treatment guidelines follow below for the various behavioral issues seen in FXS.

Sensory defensiveness: Effective intervention typically involves a sensory program developed by an OT, focused on desensitization and/or amelioration of disturbing sensations. This may well be combined with CBT, coping strategies and anxiolytic therapies amongst others depending upon the needs of the individuals.

Hyperarousal: The key to management is to identify the antecedents that predispose towards the loss of control. These antecedents are then either avoided or, if this is impossible, calming interventions are put in place. The goal is to teach the individual to recognize the signs of dysregulation before loss of control, and then be able to self-calm and soothe. Interventions by caregivers or teachers may include time-out, deep pressure, offering of headphones, etc. The choice of self-soothing activity depends on the individual's cognitive capabilities and may range from external aids such as chew toys or objects to be held to moving themselves into a time-out or other self directed measure.

Anxiety: This is present to some extent in the vast majority of individuals with FXS. While behaviors associated with anxiety tend to be ameliorated to a degree by standard medications, cognitively appropriate psychotherapy is the preferred treatment of choice. Modalities include but are not limited to cognitive behavior therapy and biofeedback, and may involve the acquisition of coping skills. Drug choices are similar to the general population's (see Consensus Document on Medications) and should be viewed as adjunctive therapy that supports implementation of more definitive treatments.

ADHD: This condition is common in both males and females with FXS. Once confirmed in individuals, medication is the preferred treatment, as ADHD does not appear to be amenable to other interventions. However, it is essential to consider that other underlying issues, or simply young age, may present as ADHD. Management may therefore involve observation and/or other modalities as the assessment and management plan evolves. Evaluation usually has to include whether ADHD or anxiety is most prominent, as they often co-exist and mutually exacerbate each other. The condition deemed to be more severe is typically the one for which medication would be started first. The other condition would then be observed to determine to what degree it resolves as symptoms in the other abate. If still present, then appropriate additional medication may need to be introduced.

Aggression: This is often a defensive behavior in FXS, and treatment depends upon the cause, which may be any of the behaviors or precipitating causes mentioned above, or reflect untreated pain such as ear infections. If aggression is severe or not responding to management strategies, then medication may be necessary. Atypical antipsychotics are often helpful, particularly very low dose Aripiprazole, though positive effects have also been reported with Risperidone.

Note that aggression can also be triggered by hyperarousal, which diminishes the child's ability to control his behavior. The child will commonly lash out, either at the offending individual or at someone he trusts. (He then commonly feels shame and confusion about his behavior and once calm will usually apologize.) At these times it is important to determine what the behavioral trigger is and eliminate if at all possible the arousing stimuli. If that is not possible, it can be helpful to present the child with soothing activity before he has to confront an arousing situation. This can help reduce the likelihood of an aggressive outburst.

Feeding Problems: Though not by definition a behavioral problem, feeding time may be fraught with frustration. Problems often result from a combination of sensory and mechanical issues. The child may overstuff their mouth, be aversive to specific textures, and have hypotonic oral muscles. Feeding can require patient and very gradual introduction of new foods, and often involves working with a speech therapist to help develop appropriate use of the mouth and oral cavity.

Self-Abuse: Many individuals with fragile X syndrome engage in self-abusive behaviors, the most familiar of which is biting their hands. This results from substantial oral tendencies that see them putting many things in their mouths (including hands and pieces of clothing). While hands-to-mouth may have begun as a form of self-soothing, the child may quickly learn that people respond to this behavior, thus changing its impetus to become a call for attention. One intervention method is to ignore the behavior (as long as it is not dangerous to the person). A second is to provide the individual with an alternate form of oral gratification such as a chewy toy. Eliminating the behavior requires a determination of what in the environment is creating the child's need to self-soothe and then ameliorating the problematic stimuli.

It should be noted that children with fragile X syndrome can become obstinate. The seeming docile, lovable child will suddenly become reluctant to cross a threshold, go out of the house, or disengage in an activity. This results from the aversion to change discussed above. In many cases, this aversion drives the obstinacy. One way to manage it is to give the child a "job" to perform through the transition, such as carrying something for another person so he has to cross over the boundary between two places but is focused on the task at hand rather than the transition. Make whatever activity you are asking of him important and reward him so he feels praised. Try to provide the activity before the actual transition (e.g. before the bell rings for a change of class) so the child is complying with one activity and not having to cope with environmental stimuli and fear of transition at the same time. Also, providing the child (and in fact, individuals of all ages) with a picture schedule helps define the activity and reduce the anticipatory anxiety associated with it.

Autism: Applied Behavioral Analysis (ABA) therapy can be helpful, likely provided in conjunction with sensory integration techniques and awareness of gaze aversion as a sensory overstimulating effect in FXS (rather than a reflection of socially cued indifference).

Common Q & A

What should I tell my patients?

Individuals with FXS tend to be very caring and empathic. However, because of the overstimulation of their nervous system they are at much higher risk for behavioral issues, especially anxiety and related problems.

What to do in acute situations?

Behaviorally related problems such as aggressive outbursts or impulsive running away may precipitate a crisis situation. In this instance the child should be taken to a known location with a "safe" room/location, ideally one that he or she is familiar with. This will usually allow the trauma to recede and the precipitant can be managed in a calmer manner.

Who do I call in a crisis?

This depends upon your individual situation. Typically the primary choice would be the health care provider who knows your child best. Another option is to call your local Fragile X clinic. Even if they have not seen you they should be able to give you basic advice, as can the National Fragile X Foundation online at www.fragilex.org or telephone (800) 688-8765. In an emergency, as with anyone, you should call 911.

Additional Resources

Advances in the Treatment of Fragile X Syndrome
Hagerman, Berry-Kravis, Kaufmann, Ono, Tartaglia, Lachiewicz, Kronk, Delahunty, Hessl, Visootsak, Picker, Gane and Tranfaglia
http://www.fragilex.org/oldfx/pdf/Hagerman_et_al_2008_TX_of_FXS_peds.pdf

10 Rules of Time-Out
Karen Riley, PhD
Pp 18-21
http://www.fragilex.org/resources/foundation-quarterly/?id=24a

Strategies for Day-to-Day Life
Mouse & Tracy
Pp 22-25
http://www.fragilex.org/resources/foundation-quarterly/?id=26a

Author Note

This guideline was authored by Jonathan Picker MD, PhD, and Vicki Sudhalter, PhD. It was reviewed and edited by consortium members both within and external to its Clinical Practices Committee. It has been approved by and represents the current consensus of the members of the Fragile X Clinical & Research Consortium.

Funding: This project was made possible by Cooperative Agreement U01DD000231 from the Centers for Disease Control and Prevention to the Association of University Centers on Disabilities (AUCD) and RTOI 2008-999-03 from AUCD to W.T. Brown in support of the National Fragile X Clinical and Research Consortium. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

The Fragile X Clinical & Research Consortium was founded in 2006 and exists to improve the delivery of clinical services to families impacted by any Fragile X-associated Disorder, and to develop a research infrastructure for advancing the development and implementation of new and improved treatments. Please contact the **National Fragile X Foundation** for more information at (800) 688-8765 or www.fragilex.org.