Navigating Treatment in a Pandemic for Individuals Diagnosed with Fragile X Syndrome

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She/Her

Elwyn

Welcome and Hello!

- Thank you for your interest in exploring the world of genetics specifically Fragile X syndrome and other disorders associated with IDD
- 2014 Graduate of Psy.D Clinical Psychology program at Immaculata University
- Psychologist licensed in Pennsylvania since 2015
- Working with children/adolescents with Fragile X and their families since 2014 through Elwyn
- Fun fact: I love reading, cooking and spending time with my husband and three year old daughter

So what can you expect from this presentation?

Learning Objectives

- Learn and define the features of Fragile X Syndrome as well as some other genetic syndromes associated with IDD
- Learn and identify how syndrome associated information informs treatment for individuals with Fragile X
- Elwyn's Fragile X clinic
- The impact of COVID-19
- Resources/Suggestions moving forward

Acronyms

- DS: Down Syndrome
- FXS: Fragile X Syndrome
- FMR1: Fragile X Mental Retardation 1
- FMRP: Fragile X Mental Retardation Protein
- AFAB: assigned female at birth
- AMAB: assigned male at birth
- ID/D :intellectual disability/intellectual developmental delay
- DNA: deoxyribonucleic acid
- FXTAS: Fragile X Associated Tremor/Ataxia Syndrome
- FXPOI: Fragile X Associated Primary Ovarian Insufficiency

Overview

- Over 1000 IDD Associated Genetic Disorders
- Specific Syndrome Family Support
- Targeted Psychoeducational Supports
- Testing
- Registries
- Targeted Medication Trials

It all began in 1852…

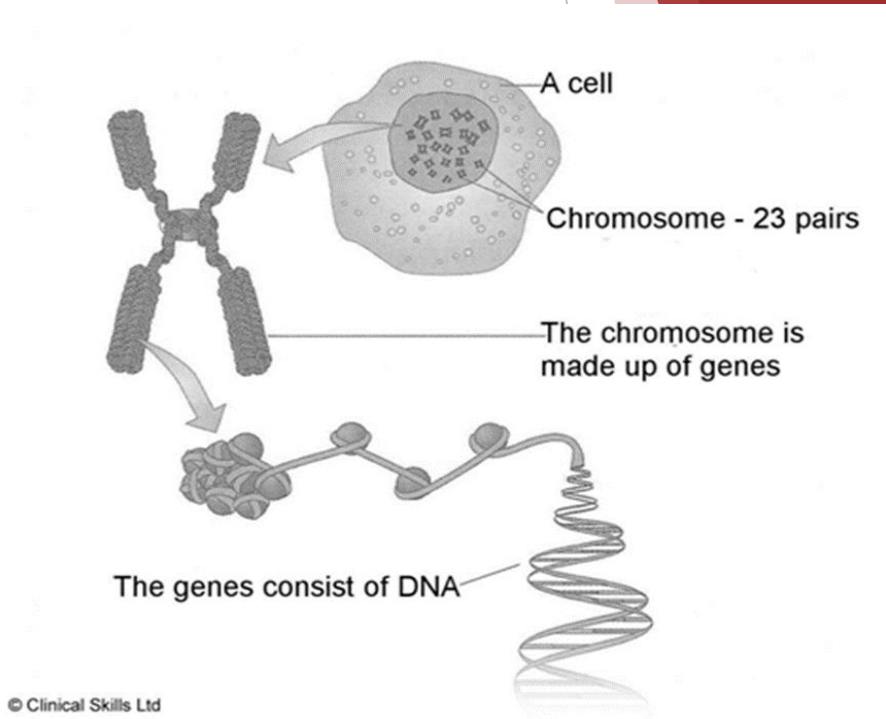
- Started in 1852 when Dr. Alfred Elwyn supported the efforts of James Richards in starting in school in Philadelphia for children with IDD
- 1857-Dorothea Dix visited the school then spoke to legislature to secure a grant for a larger school near Media, Pa.
- 1921: All children admitted to Elwyn began standardized testing with the Vineland Maturity Scale (developed in Vineland, NJ, which became a subsidiary of Elwyn)
- 1960: community based services emerge
- 1998: Elwyn becomes the provider for early learning in Philadelphia
- 2008: Residential programming in California
- Current: serving Pennsylvania, California, Delaware, New Jersey, birth throughout the lifespan, various programming, residential and community support

Intellectual and Developmental Disabilities

- Learning about IDD has been an ongoing process for many years
- Called different things throughout the years
- Treatment considerations constantly evolving
- Research into genetics ongoing

- **American Academy of Neurology, the Child Neurology Society, and the American College of Medical Genetics:**

- For people with IDD, if an associated medical diagnosis is not made after conducting an appropriate history and physical examination; genetic testing, and specifically a chromosomal microarray, is considered the first-line procedure in the diagnostic evaluation process.



Prenatal Decision Making

- A primary factor deciding to terminate or continue a pregnancy is the severity of the disorder diagnosed.
- Increased age correlates with termination of a pregnancy when severe anomalies are present
- Serious congenital anomalies may disproportionately affect children from family with the youngest pregnant individual due those individuals being more likely to continue these pregnancies
- Genetic counseling can be helpful although questions often remain about future quality of life

Syndromes

- A disease or disorder with more than one identifying feature or symptom
- IDD is most associated with changes in DNA post conception
- Hereditary gene mutations occur less frequently
- Knowledge of specific individual syndromes is important in treatment which includes genetic synopsis, physical/behavioral characteristics, medical concerns, best practices for support

What are some genetic syndromes?

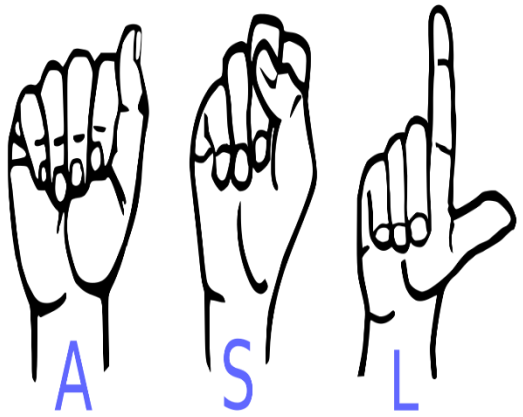
- Down syndrome (Trisomy 21)
- Approximately 50% of trisomy 21 pregnancies end in miscarriage during the 1st trimester, about 40% during the second trimester
- Three different types
- 1 out of 700 births
- Often DS and IDD are seen as synonymous, however DS has its own set of identifying features (genetics, behavioral, developmental)
- Most behavioral studies have been done
- Most babies born to parent under age 35 despite risk increasing with age

Characteristics and considerations

- Congenital heart defects, eye problems, hypothyroidism, teeth crowding, obesity
- Regular medical care to identify/treat these concerns
- Developmental rate slows as age progresses
- Receptive language tends to be stronger than expressive
- Articulation challenges
- Speech delays related to hearing impairment and oral structure differences

Interventions for learning

- Using sign language, technology, pictures and expressive speech for communication
- Breaking tasks into small steps
- Inclusive settings
- Focusing on adaptive behaviors which tend to be higher than what IQ predicts



Other genetic syndromes associated with IDD

- Smith Magenis Syndrome
  - Genetics changes on chromosome 17
  - No cure, rare
  - Associated with intellectual disability, low muscle tone, significant sleep disturbance, impulsivity, self injury
  - Good sense of humor, strength in long term memory
- Prader Willi Syndrome
  - Usually caused by a deletion in chromosome 15, passed down by AMAB parent
  - No cure, rare
  - Associated with intellectual disability, obesity, constant hunger, delayed puberty, short stature
  - Strong receptive skills, outgoing, visual spatial abilities can be strong

Fragile X Syndrome

- FMR1 gene located on the X chromosome, this gene is responsible for a very important protein that is most abundant in nerve cells
- Mutation on this gene causes less or absent protein production (full mutation in FXS has a fully shut down FMR1 gene)
- FMR1 gene appears in 4 forms; defined by the number of a pattern of DNA called CGG repeats
- Repeats range from 30 to 1000
- >200 repeats means the individual has FXS (55 to 200 repeats pre-mutation)
- Most common inherited syndrome associated with IDD; second most common genetics syndrome associate with IDD after DS
- Level of ID/D varies
- Prevalence: AMAB 1 in 3600 to 4000; AFAB 1 in 4000 to 6000

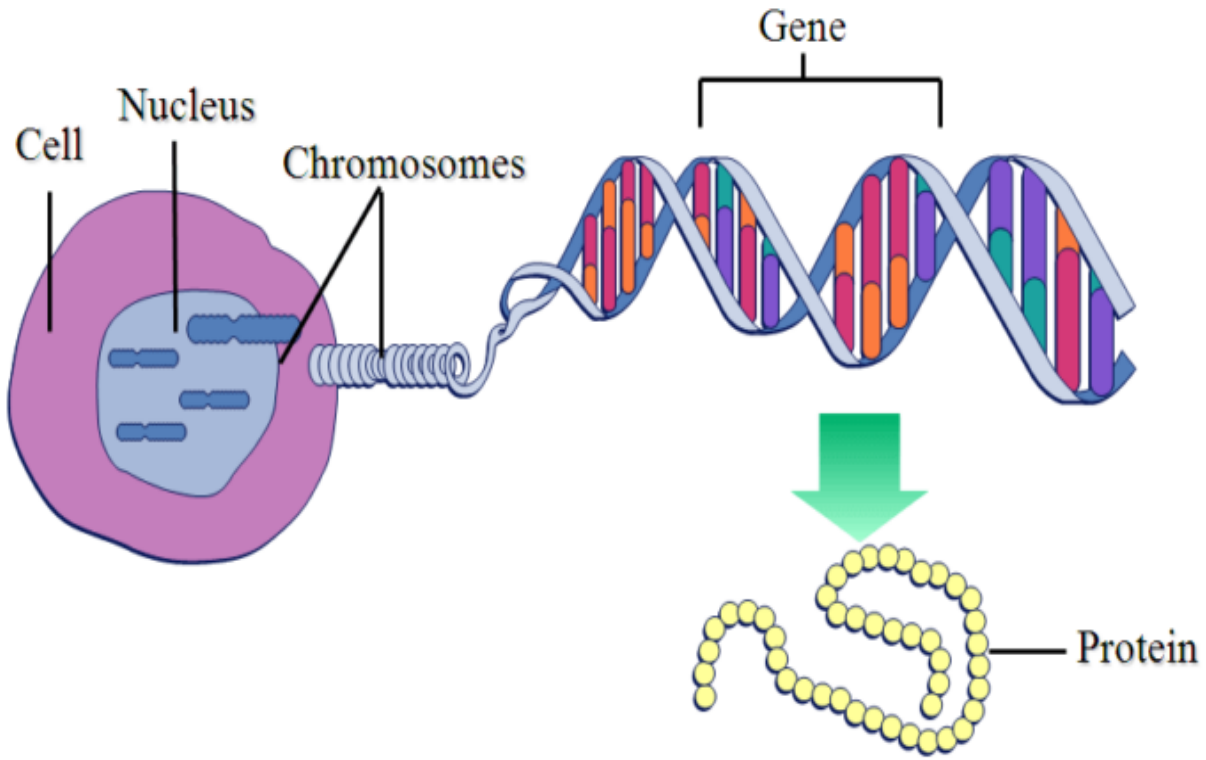


Figure 1. DNA

Diagnosis

- FMR1 DNA test: Southern Blot Analysis Test determines if the gene has a full mutation, it's approximate size, whether it's methylated and if mosaicism is present
- The polymerase chain reaction analysis: (determines the number of repeats that are present in the Fragile X gene; not the test of choice to diagnose full mutation but accurate in determining pre-mutation and normal gene repeat numbers

Inheritance and symptoms

- AFAB have a pre-mutation (not full FXS) that can be passed on to their children (50/50 chance of the child having the full mutation)
- AMAB cannot pass on to their AMAB children but can pass on the pre-mutation to their AFAB children
- Cognitive impairment tends to be mild to moderate overall however AFAB tend to demonstrate milder symptoms
- AFAB tend to present with learning disabilities in math
- AMAB tend to present with challenges in sequential processing of information

- Language development can be delayed
- Integrating other forms of communication can be helpful to facilitate speech development
- Echolalia
- Perseveration on topics (AMAB)
- Speech affected by anxiety and/or when asked to maintain eye contact suggesting sensory processing challenges
- Speech therapy in school and out as needed

- Arched palates, teeth crowding
- Early feeding difficulties
- Hypotonia (low muscle tone)
- Ear infections
- Heart murmurs
- Mitral valve prolapse suggesting underlying connective tissue dysplasia (tends to develop in adolescence and approximately 50% or AMAB affected)
- Head and facial characteristics can include long narrow face with prominent jaw, forehead and ears however these tend to become more pronounced later in life

Multidisciplinary lens to treatment

- Individualized support with a collaborative team approach
- Genetics counselors
- Speech and language therapists
- Physical and occupational therapists
- Developmental pediatricians
- Special education professionals
- Psychologists/psychiatrists/therapists
- Other specialized medical practitioners (cardiologists, ENTS, dieticians, feeding specialists etc.)

Learning considerations

- AMAB: strengths in verbal labeling, simultaneous learning, receptive vocabulary, visual perception, imitation, activities of daily living
- AFAB: strengths in vocabulary, comprehension, short term visual memory, reading, writing, spelling
- AMAB: difficulties with higher level thinking, complex problem solving, sequential tasks, quantitative skills, motor planning, communication, socialization
- AFAB: difficulties with abstract thinking, understanding spatial relationships, focus and impulse control
- AFAB and AMAB: math difficulties

Educational Interventions

- Helping parents advocate for special education support
- Early intervention when developmental delays are present
- Evaluation for special education support when the child begins kindergarten to determine needs
- Using pictures, preferred objects that the individual demonstrates interest
- Clocks, cooking, license plates might be helpful with number concepts
- Indirect explanation: teach task to another person, builds confidence
- Focus on using the person's strengths
- Teach complete tasks, don't break down into steps (showing how to make a sandwich from start to finish)

- Routines and structure that are consistent
- Concrete language with directions
- Avoiding abstract language
- Role playing to practice skills
- Quiet and calm environment with built in breaks throughout the day
- Teach individual to request a break when needed
- Small group and/or one to one instruction
- Adequate time for processing
- Sensory diet if needed

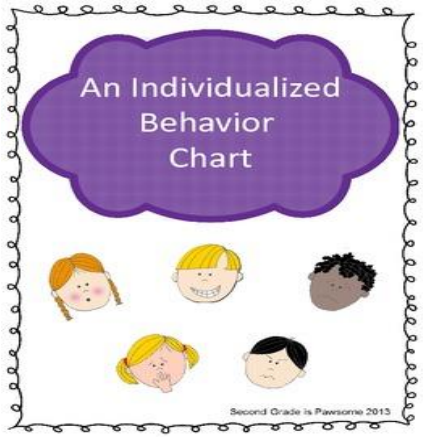
- Visual schedules with transitional objects
- Social skills lessons and social stories
- Simplify visual materials to reduce clutter
- Indirect questioning including child, teacher and a peer rather than direct questioning with just the child
- Asking child to finish task after you begin it
- Avoid forcing eye contact
- Using technology such as computers, tablets etc. as indicated

Behavioral considerations

- Common presenting behavioral challenges related to anxiety, social skill deficits, attention, impulse control, hyperactivity, self injury, aggression and hyperarousal
- Hyperarousal is a common feature for individuals with FXS, biologically driven and triggered by increases in environmental and social stimulation
- Hyperarousal can trigger disorganization, repetitive speech/movement and avoidance of that environment
- Associated diagnoses include ADHD, Generalized Anxiety Disorder, Social Anxiety Disorder, ASD, Intellectual Disability

Behavior management

- Medical evaluation to rule out any medical concerns, sleep studies
- Management of seizures if present
- Functional behavioral assessment to determine target behaviors, antecedents and consequences
- Behavioral specialist can be vital working with all involved along with other behavioral health professionals



- Traditional behavior plans have focused on consequence based treatment meaning interventions being applied before the behavior occurs
- Front loaded behaviors plans that utilize antecedent strategies are more effective
- Preventive strategies help with the facilitation of new skills
- Applied Behavioral Analysis may also be effective;wide variability among different programs
- Prioritize behaviors of concern
- Teach skills to the child and adults involved

Medication management

- Medication may be warranted following psychiatric and/or developmental evaluation
- Stimulants, SSRIs, antipsychotics for irritability and tantrums that behavior management strategies have been effective
- Medication along with behavior management strategies contribute to a comprehensive treatment approach
- Cognitive Behavioral Therapy can be helpful in addressing symptoms of anxiety

Common triggers for challenging behaviors

- Forced eye contact
- Unclear directions and/or expectations
- Instructions that are spoken too quickly
- Lack of structure and routine
- Loud environments
- Crowds
- Transitions
- Waiting without a clear reason why and lack of understanding regarding time
- Hyperarousal, heightened emotions, excitement

Associated conditions

- Fragile X Associated Tremor/Ataxia Syndrome (FXTAS)
- First described in AMAB grandparent of children with Fragile X
- Healthy until onset of symptoms (adult onset)
- AMAB carriers over the age of 50, can present in AFAB adult however less frequent, milder symptoms
- Some diagnosed had no family history of FXS and did not know they carried the FMR1 pre-mutation
- Not all carriers will develop FXTAS, but all those diagnosed with FXTAS are carriers
- Tremors and problems with balance

Other symptoms of FXTAS

- Resting tremors
- Short term memory problems
- Decision making challenges/executive functioning
- Can be difficult to discern from other conditions
- Important to obtain family history, MRI and assessment of current symptoms

FXTAS Treatment

- Clinics with specialists available
- No cure
- Reduce symptoms and slow progression
- Medications, speech/occupational/physical therapy
- Gait training
- counseling

Fragile X Associated Primary Ovarian Insufficiency (FXPOI)

- Ovaries not functioning fully in someone who is a carrier
- Number and quality of eggs resemble an older person
- Symptoms include irregular or absent menstrual cycles, infertility, hot flashes, premature ovarian failure
- AFAB who have ovarian insufficiency or elevated hormone level for ovarian function should have FMR1 testing
- Can get pregnant, risk of having a child with FXS
- Other fertility assistance

How Elwyn supports individuals with FXS

- A monthly clinic (via telehealth)
- Involves the child/ren, parent/caregivers and other professionals identified by the family
- Psychologist from Elwyn, Developmental Pediatrician from Children's Hospital of Philadelphia
- Opportunity to discuss concerns and ask questions
- Provide resources and referrals as needed; discuss research opportunities
- Elwyn is a part of the Fragile X Clinic and Research Consortium

Elwyn's clinic

- Elwyn is a large organization and though the clinic is small, we can make internal referrals as needed
- Early learning
- Approved private schooling
- Outpatient therapy
- Medication management
- Intensive Behavioral Health Services (IBHS)
- Residential and work day programs

Research opportunities

- Registries exist to collect data to understand
- Registries for those with FXS, permutation (carriers)
- Research studies for individuals with FXS, carriers, FXTAS, FXPOI
- Research can involved medication trials, studies on specific interventions, surveys, questionnaires etc.
- Child and adult opportunities
- Pandemic has potentially limited in person however many participants can participate virtually/at home

Community Connection

- Community Support Network includes local chapters led by volunteers to support those affected by FXS
- Parent volunteer who has lived experience
- Local chapters organize events for parents, families and siblings
- Provides support to families and clinics, help with navigating IEPs, transitional planning, fundraisers
- Virtual options during the pandemic to stay connected
- Sibling and Self Advocate Network

Impact of COVID-19

- Individuals with FXS are not at higher risk unless there is another underling condition/s
- Individuals with FXS are often managing symptoms of anxiety and challenges interacting with others
- COVID-19 has placed limits on social interactions/gatherings and led to increased time at home
- Routines have changed along with educational structure
- Mask wearing and social distancing can be challenging to explain and practice
- Vaccinations and testing
- All of these things can trigger increased anxiety

What can we do?

- Practice introducing a mask and using one
- Allow to choose style/color of mask
- Some individuals may have increased sensitivity so trying to find a style that is sustainable to wear
- Maybe the individual can make or design

- Continue routines as much as possible at home
- Visual schedules
- Prepping for events that can be anxiety provoking
- Reminders of helpful coping skills
- Spend time outside when you can safely
- Engage in new activities together

Back to school

- Virtual learning challenging for many children in general
- In person learning has resumed for most
- Good time to check in regarding IEPs if applicable
- Meet and greets if a new teacher/school if possible
- Can take some time getting back into the routine of going to school
- Patience is key for everyone

Ongoing telehealth

- The use of telehealth has many pros when it comes to access to Elwyn's clinic (or any clinic)
- Eliminates transportation barriers
- Flexibility in scheduling
- Safety regarding the spread of COVID-19
- More individuals can attend these appointments
- Less anxiety for the child being able to stay at home
- Still able to discuss concerns, treatment options, research options etc.

Socialization

- Socialization remains an important element for individuals with FXS
- May have experienced some regression due to not being in school, not being able to attend community/recreational activities
- Start slowly to integrate social activities if safe
- Virtual play dates/meet-ups facilitated by parents and caregivers
- Using shared interests and preferred activities for motivation

Ongoing support

- Ever changing environment
- Support through all changes
- Discuss all changes
- Utilize all resources available
- Consistency as much as possible
- Reaching out for support when needed

Resources

- Elwyn

  Elwyn.org
- The National Fragile X Foundation

  fragilex.org
- Prader Willi Syndrome Association USA

  pwsausa.org
- Parents and Researchers Interested in Smith Magenis Syndrome

  prisms.org
- National Down Syndrome Society

  ndss.org

Thank You!

I want to thank you for taking the time to view this presentation and to RCPA for this opportunity.

Questions/Comments

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