

WELCOME TO THE
CMSA-OK ANNUAL CONFERENCE

“CONSTRUCTION OF CASE
MANAGEMENT”
GENERAL SESSION





ETHICS WORKSHOP
**“INFECTIOUS DISEASE
UPDATE”**

Presented By:

David Chansholme, M.D.

Infectious Disease Consultants of OKC





ETHICS WORKSHOP
**“CARING FOR THE
AUTISTIC PATIENT”**

Presented By:

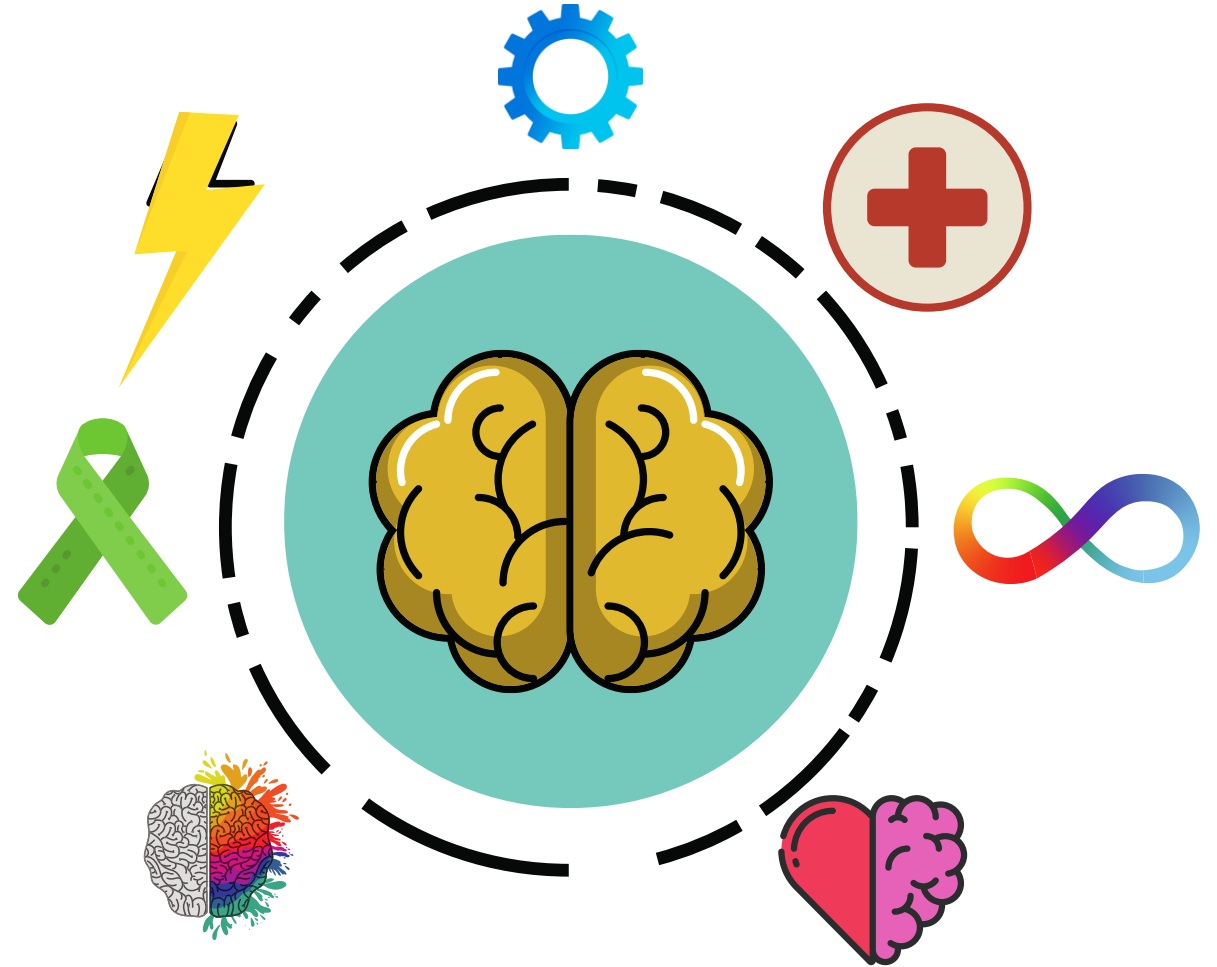
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**Oklahoma Dept. of Mental Health & Substance Abuse
Services**



Autism,

Intellectual Developmental
Disability, & Mental Health



Dr. Crystal Hernandez

Objectives



What is Autism and IDD

Define, screening, diagnosis, prevalence



Mental Health, Autism & IDD

Prevalence, facts for considerations

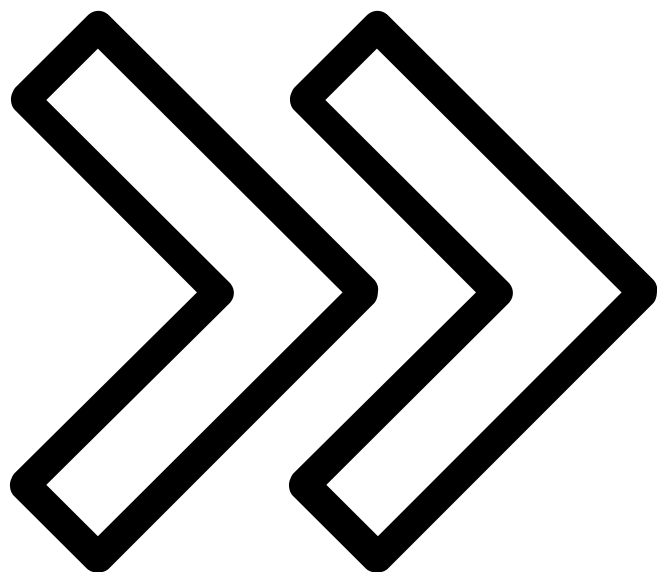


Considerations & Treatment

Inclusion in treatment, serving the whole person

What is Autism? 

Autism Spectrum



It is a neurodevelopmental disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR, 2022).

Autism refers to a broad range of conditions characterized by differences with social skills, repetitive behaviors, speech & nonverbal communication, etc.

1:36 children are Autistic (CDC, 2023).

Reminder Autistic children become Autistic adults.

Diagnostic Features-DSM 5-TR

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by all of the following, currently or by history:



- Deficits in social-emotional reciprocity (i.e., abnormal social approach and failure of normal back & forth conversation, reduced sharing of interests, emotions, or affect, or failure to initiate or respond to social interactions)
- Deficits in nonverbal communicative behaviors used for social interaction (i.e., poorly integrated verbal and nonverbal communication, abnormalities in eye contact and body language, deficits in using/understanding gestures, etc.)
- Deficits in developing, maintaining, and understanding relationships (i.e., difficulties adjusting behavior to suit various social contexts, difficulties in sharing imaginative play, difficulties making friends/absence of interest in peers.)

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least 2 of the following (currently or by history):

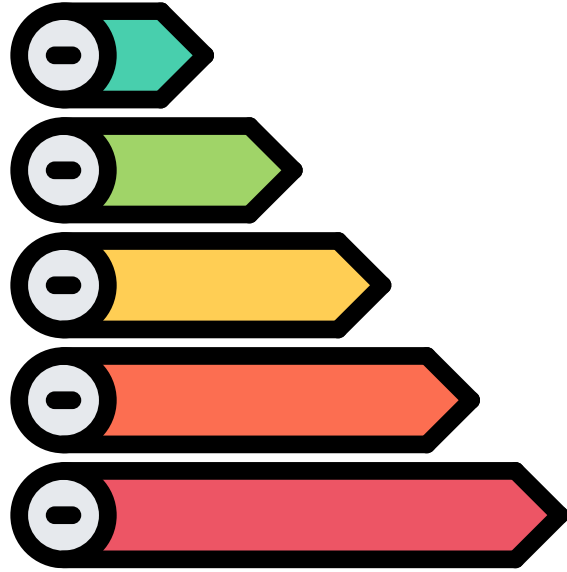
- Stereotyped or repetitive motor movements, use of objects, or speech (i.e., lining up objects, echolalia, idiosyncratic phrases)
- Insistence on sameness, inflexible adherence to routines, ritualized patterns of verbal or nonverbal behavior (i.e., rigid thinking patterns, rituals, etc.)
- Highly restricted, fixated interests that are abnormal in intensity or focus
- Hyper- or hypoactivity to sensory input or unusual interest in sensory aspects of the environment (i.e., indifference to pain/temperature, adverse reactions to sounds and textures, visual fascination with lights or movement, etc.)

C. Symptoms must be present in the early developmental period (but may not be fully manifested until social demands exceed limited capacities, or may be masked by learned strategies)

D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

E. These disturbances are not better explained by Intellectual Developmental Disorder (IDD) or global developmental delay.

(Note: IDD and Autism frequently occur together-roughly 38% have an intellectual disability)



Levels

LEVEL 3: Requiring very substantial support.

Severe deficits in verbal and nonverbal social communication skills, severe impairments in functioning, very limited initiation of social interactions, minimal response to social overtures from others. Inflexibility of behavior, extreme difficulty coping with change, or other restricted/ repetitive behaviors causing significant interference with overall functioning.

LEVEL 2: Requiring substantial support.

Marked deficits in verbal and nonverbal social communication, social impairments apparent even with supports in place, limited initiation of social interactions, and reduced/ abnormal responses to social overtures from others. Inflexibility of behavior, difficulty coping with change, restricted/ repetitive behaviors appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress and/ or difficulty changing focus/ action.

LEVEL 1: Requiring support.

Without supports in place, deficits in social communication cause noticeable impairments, difficulty initiating social interactions, and somewhat atypical/ unsuccessful responses to social overtures of others. Inflexibility of behavior causes significant interference with functioning in one or more contexts.

Screening for Autism



Screening tools are designed to help identify children who might have developmental delays.

The American Academy of Pediatrics (AAP) recommends screening all children for autism at the **18 and 24-month** well-child visits, in addition to regular developmental surveillance.

A positive screening result should be followed by a thorough assessment.

Examples: Ages and Stages Questionnaire (ASQ), Communication and Symbolic Behavior Scales (CSBS), Parents' Evaluation of Developmental Status (PEDS), **Modified Checklist for Autism in Toddlers (MCHAT)**, and Screening Tool for Autism in Toddlers and Young Children (STAT).

*It should be noted, there is no adult Screening tool recommended

Autism Diagnostic Tools



Diagnostic tools usually rely on two main sources of information—parents' or caregivers' descriptions of their child's development and a professional's observation of the child's behavior (instrument related as well as observation).

Diagnostic specialists include neurodevelopmental pediatricians, developmental-behavioral pediatricians, child neurologists, clinical psychologists, pediatric clinical psychologists, neuropsychologists, and developmental psychiatrists.

Can diagnosis as young as 18 months, but the average age of diagnosis is roughly 4 years old (7.6 years old in Oklahoma).

Examples: Autism Diagnosis Interview Revised (ADI-R), **Autism Diagnostic Observation Schedule 2 (ADOS-2)**



Autism Diagnosis

Diagnosis meeting medical standards must be conducted by one of those specialized providers (previous slide), must include diagnostic testing, must include reference to adaptive functioning and intellectual functioning, must discuss any medical conditions and factors for consideration, and must meet the DSM-5-TR diagnostic criteria.

It should be noted that a medical diagnosis opens treatment, placement, and support opportunities; however, does not negate a persons self-diagnosis (especially in adults who were often never formally diagnosed and have difficulty finding an adult autism diagnostic provider).

Autism Spectrum

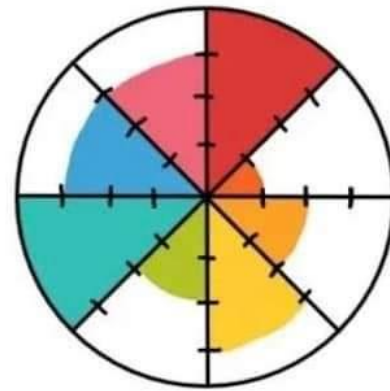
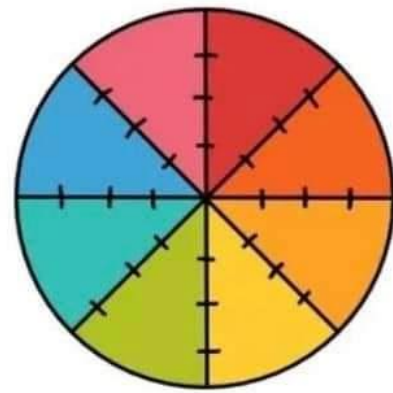
The Autism Spectrum is NOT linear



less autistic

very autistic

The Autism Spectrum looks more like:



- Social differences
- interests
- repetitions
- sensory sensitivities
- emotional regulation
- perception
- executive functioning
- other

Terms like "high functioning", "low functioning" are harmful and outdated.

Autism_sketches

Diagnostic Features-DSM 5-TR

Intellectual Developmental Disorder (IDD) has an onset during the developmental period that includes BOTH intellectual and adaptive functioning deficits in conceptual, social, and practical domains.



- Deficits in intellectual functions, such as reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and learning from experience (confirmed by both clinical assessment and individualized & standardized intelligence testing)
- Deficits in adaptive functioning fail to meet developmental and sociocultural standards for personal independence and social responsibility. (Across multiple environments & limit functioning in one or more activities of daily life)
- The onset of intellectual and adaptive deficits during the developmental period.

Diagnosis

The primary purposes of a formal diagnosis of IDD is to accurately capture and communicate the presence of IDD in an individual, establish eligibility for relevant benefits and supports, determine levels of support and services needed, and ensure protections and accommodations per the law.

- Intellectual functioning is a term that incorporates the common definitional characteristics of intelligence, the abilities currently assessed by standardized intelligence tests, and the consensus view that intellectual functioning is influenced by other human functioning dimensions and by systems of support.
- Adaptive behavior is the collection of conceptual, social, and practical skills that have been learned and are performed by people in their every day lives. Adaptive behavior includes:
 - developmental and increases in complexity with age
 - composed of conceptual, social, and practical skills
 - related to the expectations of age and demands of particular contexts
 - assessed on the basis of the individuals typical performance at home, school, work, and leisure, not their maximum performance
 - assessed in reference to the community setting that is typical for aged peers

Notes:



IDD occurs in roughly 1 to 3% of the population in the United States.

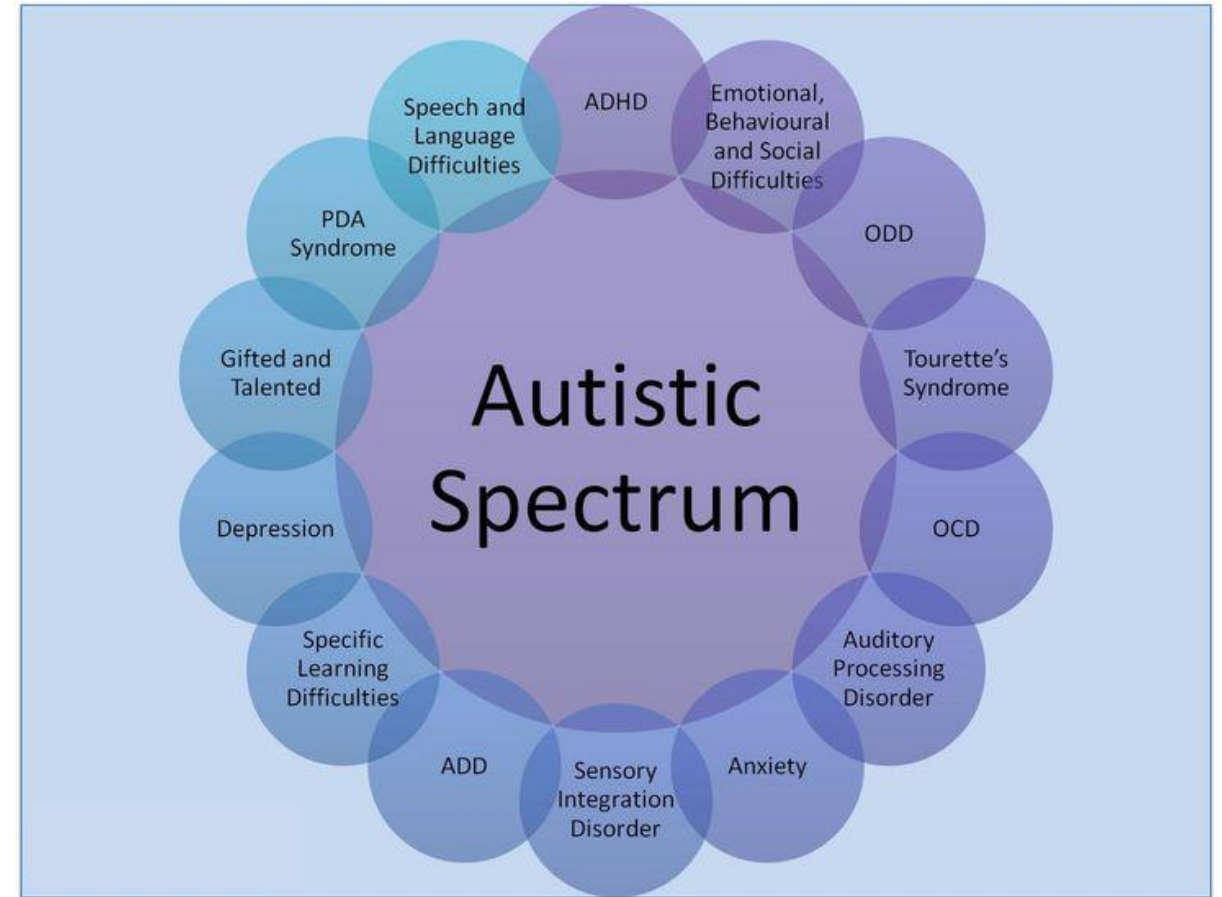
- Individuals with IDD are more likely to experience trauma and may be more vulnerable and easily hurt by those around them.
- They also may not be able to process their thoughts as easily as others or expressed them in ways that society prescribes.

Autism, IDD & Mental Health



Autistic people experience these co-occurring conditions frequently:

- 40% of Autistic individuals may experience clinical anxiety.
- 15.7% of Autistic individuals may experience clinical depression.
- 60.8% of Autistic individuals experience behavior/conduct problems.
- 48.4% of Autistic individuals have ADHD.



The symptomology can in fact be mixed, intermittent, atypical, mast, and range from poorly defined to extremely rigid.

Even key elements of some syndromes, such as delusions, hallucinations or suicidal ideation, are often very hard to recognize, especially in persons with limited verbal communication skills, who may only be able to express themselves through changes in behavior.



Communication Facts In Autism

Roughly 50% have limited verbal to no verbal communication abilities.

And another 20% present with communication difficulties or loss during times of extreme stress, such as trauma or crisis.



Alexithymia is characterized by difficulties in identifying, describing, and processing one's own feelings, often marked by a lack of understanding of the feelings and difficulty distinguishing between feelings and bodily sensations.

Although alexithymia is not a core feature of autism, recent studies have found varying degrees of this trait in Autistic individuals, roughly 50 to 85%.

Research also indicates that alexithymia is linked to interoception (The sense of signals that come from inside your body) difficulties often seen in Autism, which is the awareness of one's body or the sense of the condition of the body.

This factor should definitely be considered during screening and treatment of individuals, as it can impact presentation of symptoms and treatment experiences.

Across decades and across age groups, Autistic individuals have at least a twofold increase in mental health issues compared to people without autism.

Rates of co-occurring mental health issues among Autistic adults range from, for example, 72%-82%.

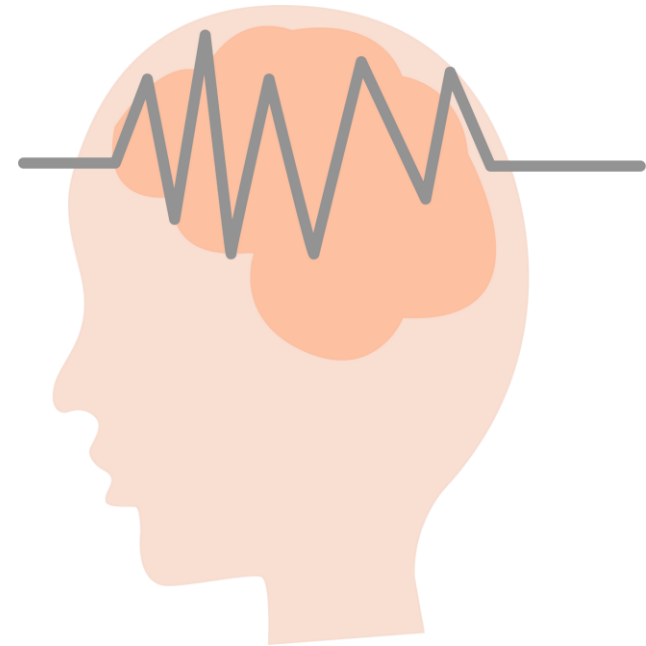
70%-95% of children and adolescents with autism have at least one co-occurring psychiatric disorder

These rates are probably higher due to diagnostic overshadowing!



Diagnostic Overshadowing

When healthcare professionals misattribute emotional & behavioral symptoms and displays to the disability rather than diagnosing a separate psychiatric disorder or conversely-everything is attributed to a psychiatric disorder without due acknowledgement of the impact of one on the other (or exploration of IDD and/or Autism testing/diagnostic process).



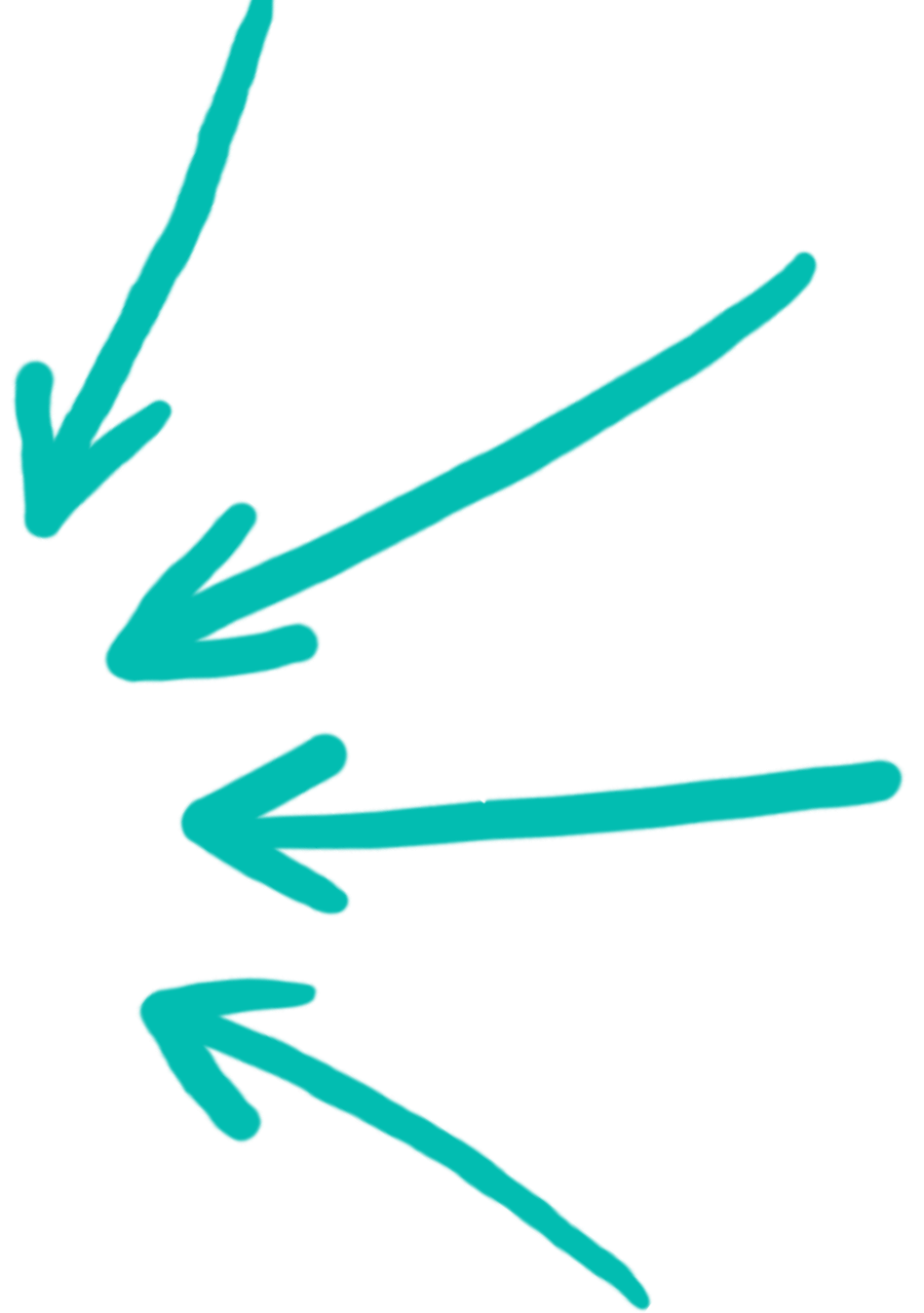
Points to Consider

Autism is recorded in males 4 times more than females.

Medical and psychological/psychiatric co-occurring conditions are extremely common.

Girls/women are more likely to receive a delayed diagnosis or be misdiagnosed until later in life.

Autism is defined by negative and positive symptoms.



Autistic young people are more likely to experience mental health issues, like depression and bipolar disorder, compared to people without autism.

Adolescents and young adults with disabilities may experience intersecting and compounding stressors that exacerbate the already poor mental health status of their age cohort.

Recent studies highlight the increased vulnerability of young people with disabilities to adverse psychosocial and mental health outcomes compared to young people without disabilities.

In a recent study of U.S. autistic youth, it was found that 78% experienced at least one mental health condition and nearly half were diagnosed with two or more mental health conditions (Conner et al., 2020).

These findings are the latest in a body of international research documenting the additional presence of mental health conditions in the autistic community, particularly among young autistic people.

Autistic people experience greater rates of co-occurring physical health conditions compared to non-autistic people.



Co-occurring medical conditions can be challenging to diagnose, particularly so for patients with autism since the core [symptoms](#) and communication differences can mask specific underlying medical problems. These often go undertreated and complicate mental health and overall well-being.

Common underlying medical conditions include:

- Epilepsy
- Gastrointestinal and immune function disorders
- Metabolic disorders
- Sleep disorders

According to recent research (May 2022) from the International Society for Autism Research:

- Roughly 32% of Autistic women are hospitalized for a psychiatric condition by the age of 25, a fraction six times higher than for women without autism.
- By Age 25, 77% of autistic women and about 62% of Autistic men have been diagnosed with a psychiatric condition.

Autistic people are at a greater risk of being victimized (bullied, abused, and taken advantage of) which places them at a greater risk for development of mental health conditions such as depression and trauma related conditions (Rodriguez et al., 2021).

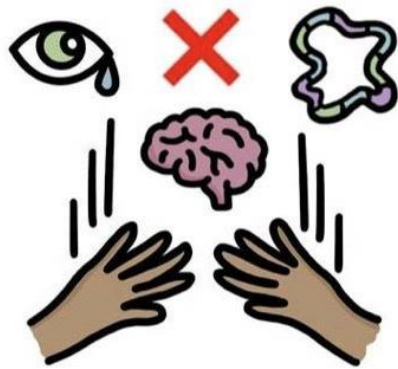
Camouflaging/masking, which are strategies used by autistic people to hide autistic traits in an effort to appear "less autistic" are also associated with poorer mental health, trauma, and exhaustion (Cage & Troxell-Whitman, 2019; Cook et al., 2021; Mandy, 2019).

*Camouflaging tends to be more present in females and those with more social awareness, and has a significantly negative impact on overall wellbeing and health.

MASKING + CAMOUFLAGING (AUTISTIC / SENSORY EDITION)

@21andsensory

**COPYING
PEOPLES
BEHAVIOUR,**
ACTIONS, GESTURES,
POSTURE, FACIAL
EXPRESSIONS
+TONE OF VOICE



**OVERTHINKING
HOW YOU HAD
APPEARED OR
ACTED IN PAST
CONVERSATIONS**
(ALWAYS MONITORING
YOURSELF)



**SUPPRESSING
STIMMING**
(SELF REGULATORY
BEHAVIOUR)
+BOTTLING UP YOUR
EMOTIONS / FEELINGS
UNTIL YOU ARE IN
A SAFE PLACE



Trauma & Burnout

Autistic people experience greater rates of suicide and suicide attempts.

Autistic individuals experience suicidal ideation and make attempts at higher rates than the non-Autistic population.

- Suicide completion and attempt rates are at least 3 times that of non-Autistics (with some research demonstrating it to be 9 times higher).
- Research demonstrates that as many as 66% of Autistic teens and adults have contemplated suicide.
- Life expectancy research demonstrated a 16-year lower life expectancy than the national average.

Autism is a lifelong neurological condition that involves overtime through highly heterogeneous trajectories.

These trends have not been studied in relation to normative aging trajectories, so collectively we continue to struggle with understanding the aging process and autism.

It is time to rethink how we study, understand, and serve this lifelong condition beyond childhood.

Most autism research has focused on the pediatric population, however, emerging research suggests that autistic adults are at a higher risk of a broad array of physical and mental health conditions including diabetes, depression, and heart disease.

Autistic individuals are also 2.5 times as likely as their neurotypical peers to die early.

Many autistic older adults often bear the consequences of having been undiagnosed or misdiagnosed for much of their lives.

Of the limited research on the overall health of autistic older adults, findings continue to demonstrate significant co-occurring conditions, including mental illness, Parkinson's disease, diabetes, and other general health concerns.

According to research in the Alzheimer's Prevention Bulletin (2022) , "A study of Medicaid and other public health records show middle aged adults with autism are 2.6 times more likely to be diagnosed with Alzheimer's and other dementia's than those without autism.

—Dr. Braden

Dr. Braden, who leads a longitudinal study exploring the link between autism and Alzheimer's, highlights that there is a great need to think about autism as a lifelong condition, rather than only found in pediatric populations, with a need to focus research on the lifespan.

"Autistic Adults will need a different level of care as they age and extra monitoring for signs of memory changes and dementia related conditions."—Dr. Braden

Sensory Considerations

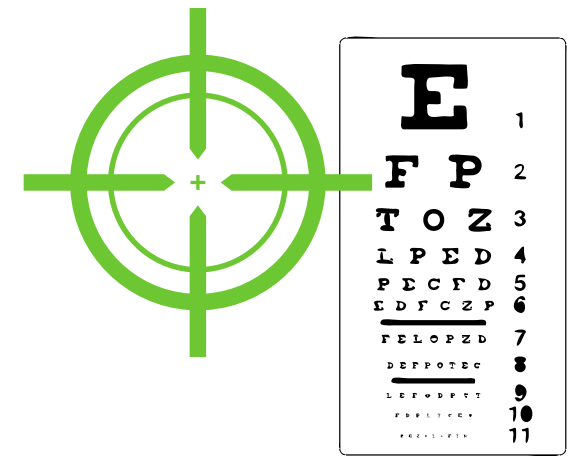


Sensory features are a part of the diagnostic criteria for Autistic individuals.

Understanding these sensory features and how to support individuals is important and can help guide interactions, reduce trauma, injuries, and critical incidents.

There are several variations of terms to describe sensory features and different patterns of sensory features.

Sight/Visual Considerations



- Strong, bold colors can be overwhelming (lights, clothing, walls)
- Patterns on walls, clothing, and furniture can be distracting and disorienting
- Sudden changes in light can be alarming; provide a warning before turning on bright lighting
- For sunlight from windows, if available, can use window shades or covers
- Filling out paperwork can be a stressful task due to the small text; provide opportunities or the option to fill out the paperwork with larger text/help to write the information for the individual.
- Individuals may need extra time to acclimate to changes in light intensity (turning lights on/off, natural light to artificial light)
- Adjust room lighting to be darker or dim the lighting
- If available, use shades to dim overhead fluorescent lighting
- Be mindful of light glare reflecting off of flooring, TVs, computers, tablets, phones, and other reflective surfaces

Sound/Auditory Considerations.



- Reduce loud or piercing sounds
 - Turn down radios/intercom and handheld radios to a minimal volume.
- Turn cell phone alarms and ringtones to silent or vibrate
- Provide warnings of potential loud noises, such as sirens or alarms, before they occur
- Play music that the individual or caretaker notes is calming for them
- Ask caregiver what words or visuals can help explain that sounds are “safe” or “okay”
- Be mindful that talking too much can be frustrating and overwhelming. If direction is needed, it should only be provided by one person at a time, in simple format
- Use a gentle tone and use direct questions at a slow pace/but firm
- Have a notepad available so that individuals can write responses instead of talking if needed
- Competing sounds can be an issue (i.e., multiple radios/songs on, people talking, etc.)
- Low intensity or common sounds can be frustrating (i.e., people crunching food, sniffing, whistling, computer sounds, fluorescent light buzzing)
- Give time to acclimate to sounds first by separating with distance or a door/another space first



Things to Consider related to Touch.

- Physical touch can feel painful and uncomfortable; provide a warning before initiating procedures requiring physical touch
- If physical touch is necessary, demonstrate that touch on a partner if possible
- Various textures (clothing and bedding fabric, medical gloves, furniture) may cause discomfort/pain and lead to avoiding/pulling away from textures
- Individuals may react strongly to being touched on or near cuts, bruises, or injuries, or they may seem not to notice such injuries
- Individuals may try to avoid or remove unfamiliar textures (face mask, gowns, gloves, bandages). Allow individuals to touch materials or instruments with their hands before using elsewhere on the body
- Inadvertent physical touch in crowded spaces (bumping into, brushing up against people) can cause physical pain and distress
- Individuals may have different preferences for texture of foods and may express dissatisfaction with food that is unrelated to taste and due to texture

Vestibular Considerations

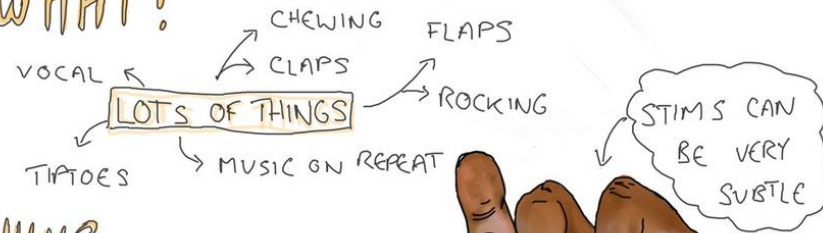


- Provide warning before starting to move the vehicle/bed/chair
- May not sustain eye contact during verbal directions or conversation
- Individual may lose balance or become dizzy while the vehicle is moving; take extra precaution when starting, stopping/ braking, or turning the vehicle/bed/chair
- Provide extra time or be prepared for a delay in response with following directions requiring body movements
- Getting into and out of vehicles/beds/chairs may cause loss of balance or clumsiness during movement
- Being placed on a stretcher and then moved backwards into an ambulance may be challenging
- Consideration of balance needs
- Consideration that clumsiness/stumbling or ability to follow finger-eye movements during tests may be due to vestibular difficulties, not drunkenness or due to concussion
- Communication may be impacted; individual may have difficulty concentrating or responding when experiencing motion sickness
- May need to provide space to allow movements such as jumping and spinning because a person may need movement to stay calm or to be alert
- Steps or uneven ground may be challenging to navigate and cause imbalance
- Provide seating options that provide support/stability or opportunities for movement like a rocking chair or cushion
- Make sure to have railings or have someone walk with them when going up/down stairs to assist with maintaining balance

★ STIMMING 101 ★

↳ "SELF-STIMULATORY BEHAVIOURS"
(GENERALLY) REPEATED ACTIONS/ACTIVITIES WHICH EITHER
EXCITE OR CALM THE SENSORY NERVOUS SYSTEM

WHAT?



WHY?

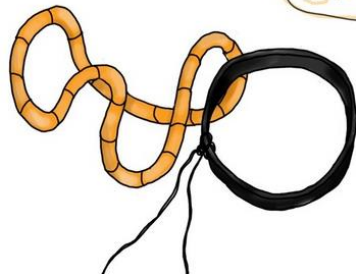
• IT IS ESSENTIAL
FOR HELPING TO COPE WITH
SENSORY INPUT

• IT CAN BE HELPFUL TO EXPRESS
EMOTIONS



LOTS OF PEOPLE
STIM!

STIMMING IS NOT BAD



THINGS LIKE TANGLES/
FIDGETS & CHEWY JEWELLERY
CAN BE HELPFUL

Some reasons Autistic People Stim (Self-Stimulate)

- to focus
- to feel better
- to self-regulate
- to feel more engaged
- to navigate things within the context of the environment
- to express emotions
- for sensory stimulation/input
- to distract from pain/sensory overload
- to help with bodily awareness
- to take a mental break without needing to physically leave the environment
- for enjoyment

Autistic people can engage in echolalia, which is the repetition of sound.

Echolalia is natural, healthy, and necessary.

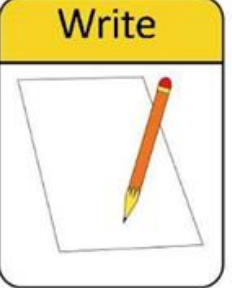
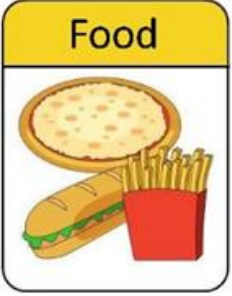
Echolalia should never be interrupted, stopped, mocked.

Echolalia is communication.

- Examples:
 - Phrases from movies, their environment, TV shows, etc.
 - Singing
 - Copying any noise or sound
 - Repeating people, even down to the exact tone
 - Repeating their own words and thoughts
- Reported reasons/purpose:
 - Comfort
 - To stim
 - To process
 - To engage and communicate

Use Visual Communication Tools when needed

How do you feel?



Comfort Items



- Comfort items can be a great tool in creating rapport and a safe and therapeutic environment.
- Make sure to assess items for safety prior to allowing access.
- Comfort items can be calming, produce and enforce feelings of safety and happiness, and are great for stimming as well.
- When unsure what a comfort item may be, ask the individual or their caretaker.
- Comfort Items do not need to be expensive, intricate, or makes sense to others.

The significance is what they represent to the person being served.

To an outsider, a person with autism having a meltdown might appear like someone having a temper tantrum, but the circumstances are often more complex than what meets the eye.

- A meltdown is defined as an intense reaction to sensory overwhelm.
- When a person with autism is overwhelmed, he/she knows no other way to express it other than with a meltdown.
 - Meltdowns Are genuine cries of distress.
- This might involve emotional verbal outbursts such as screaming and crying or physical reactions like kicking, biting or hitting, pacing, crying, yelling, self-injury, hyperventilating, or withdrawal.
 - May Occur when there is disruption in routine or patterns, when the demands are put on the person unexpectedly, when there's heightened stress, when confrontation occurs, or when there's big emotions in a situation.
- Meltdowns can feel like panic, fear, time as frozen, and losing control.
- Things that did not help during a meltdown:
 - Getting angry, raising of voices, demanding that the person stop, punishment, forcing the person to keep enduring the trigger, withholding preferred/comfort items.

DE-ESCALATION

strategies for meltdowns

Don't yell to be heard over a screaming child

Avoid making demands

Remain non-judgmental

Validate their feelings, but not their actions

Silence

Don't try to reason

Be aware of your body language

Avoid the word "no"

Respect personal space

Answer questions, but ignore verbal aggression

Acknowledge your child's right for refusal

Use a distraction

Practice deep breathing exercises

Take a walk or a short movement break

Get down to your child's level

Decrease sensory stimulation

Reflective listening

Use calming visual input

Things that can assist during a meltdown:

- Changing environment, quiet, noise canceling headphones/earbuds, stim toys or objects, healthy stimming, distraction, grounding skills, sensory objects, fresh air, sunglasses, other appropriate interventions.

Clinical Training



- Most clinicians and doctors receive very little training on Intellectual Developmental Disabilities and Autism, especially related to the intersectionality with mental illness.
 - specific training is often lacking at every level within the clinical education system, including undergraduate, graduate, post doctorate training, and continuing education.
- Often, traditional mental health systems and environments fail to understand IDD and Autism and instead misdiagnose or deny services, referring out or feeling ill-equipped to handle the needs of these individuals.

Understanding & Treating the Whole Person



- Reminder: Co-occurring conditions can and do occur frequently.
- Differential diagnosis is important, but so is comprehensively treating someone with co-occurring conditions.
- Individuals with Autism and IDD can be at risk for suicide and a mental health screening is critical and should never be skipped.

- Around half of all persons with IDD and Autism receive psychotropic medication, and then 1/3 of cases medication is prescribed to manage 'problem behaviors' such as aggression or self-injury, in the "absence" of a diagnosed psychiatric disorder.
- The 19th World Congress of Psychiatry in 2019 made efforts to focus on the Intersectionality of IDD, Autism, and mental illness. This effort along with many others demonstrate the advancements and willingness to understand and treat, co-occurring conditions compassionately and equitably.

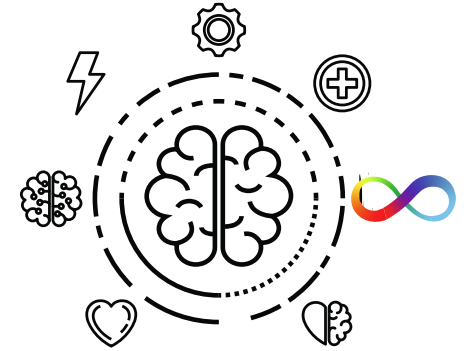
Ensuring that every person feels seen, heard, valued, and free to be their authentic self is vital.

The whole person must be welcomed, treated, and understood.

Remember that every Autistic person is unique, is impacted differently, has different strengths and needs, and that it is very common to be misdiagnosed and undiagnosed.

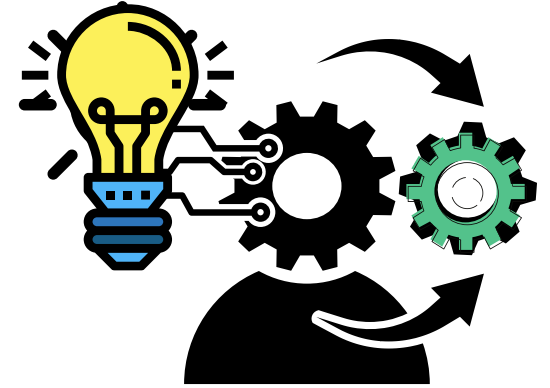
Providers do not need to be experts to serve somebody, they can learn as they go and do better when they know.

Things to consider:



- Honor the diagnosis if already available.
- Screen/Assess if suspected.
 - this includes locating diagnostic providers and/or engaging the Department of Human Services (possibly DDS and APS if appropriate).
- Integrate supports and services (support groups, PT,OT, Speech, ABA, etc.) into all treatment, plans, and discharge plans however needed.
- Train staff (initially and ongoing)
- Craft and enforce policies related to inclusion and understanding.
- Honor the way a person wishes to identify (Autistic, On the Spectrum, Person with Autism, etc.).
- Think Outside of the box when it comes to accommodations and acceptance-innovate.

System Accommodations



- You can and should treat the co-occurring conditions, seeking consults and training when needed.
 - Screening and Diagnostic evaluations should occur if undiagnosed/misdiagnosed, when presenting as possible Autism in patients.
- Autism is never a reason to deny someone needed mental health service when they present with mental illness, mental health needs, or mental health crisis.
- Minor accommodations work, are easy to make, and would benefit so many with unique needs.
 - Open access to low-stimulus areas, scheduled low-stimulus areas, lighting adaptations, adaption to meal needs, noise adaptations, social stories and other communication devices.

- Provide structured programming, consistent routines, visual schedules.
- Individualized Communication systems such as sign language or picture exchange communication systems (PECS).
- Limit social demands to fit the needs/tolerance.



When we know better,
we must do better.

Resources for Families, Stakeholders, and individuals



Determine if there are any orders or a guardianship you need to be aware of and work within.

If available, include caretakers in treatment planning and discharge processes.

Collaborate with other service providers, including other state agencies that specialize in services for this population.

Family/caregiver engagement and supports are essential in comprehensively serving this population.

Caregivers have significant mental health challenges, including anxiety, chronic stress, depression, isolation, & hopelessness.

Caregivers should be routinely screened for mental health conditions, be provided treatment and resources that are affective and low barrier.

Some Resources

- Autism Foundation of Oklahoma
- Arc of Oklahoma
- Autism Oklahoma
- Center for Learning and Leadership at OUHSC
- Oklahoma Autism Network
- Oklahoma Disability Law Center
- Oklahoma Family Network
- Pervasive Parenting Center
- SoonerSuccess
- Developmental Disabilities Services (DHS)
- Developmental Disabilities Council of Oklahoma
- Autistic Adults of Oklahoma

SENSORY KITS

for law enforcement
emergency first responders
healthcare workers
and anyone serving
autistic individuals



AFO's sensory kits include thoughtful tools for easing anxiety and increasing communication for individuals with autism and other disabilities in high-stress situations.

OUR SENSORY KITS INCLUDE:

- ❑ A durable tote bag w/ zipper
- ❑ Noise-canceling headphones
- ❑ A weighted lap pad
- ❑ Picture communication cards in English & Spanish
- ❑ A notepad & pen
- ❑ Activity & puzzle books
- ❑ Sunglasses for dimming bright lights
- ❑ Assorted sensory/ fidget items (for all ages)
- ❑ Sanitizing wipes



Scan this QR code to visit our website.

Psychiatric Safe Ideas:

- Paper printouts in place of actual items
- Rubber sensory items
- Stickers for calming/soothing
- Weighted lap pads that are wipeable/that can be sanitized
- Soft items without strings, buttons, rivets, zippers, etc.



Contact

Dr. Crystal Hernandez

[Email Address](mailto:chpsyd@gmail.com)
chpsyd@gmail.com

559.904.8790

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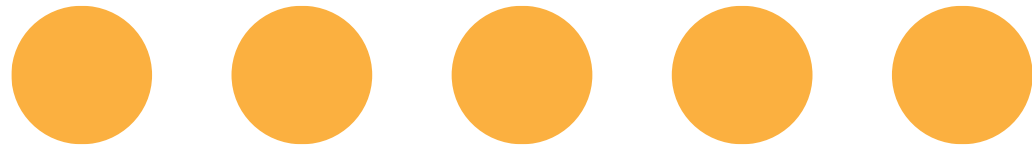
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THANK YOU





ETHICS WORKSHOP

**“PEDIATRICS - AN
OUNCE OF
PREVENTION”**

Presented By:

Jordan Pope, M.D., FAAP

Just Kids Pediatrics





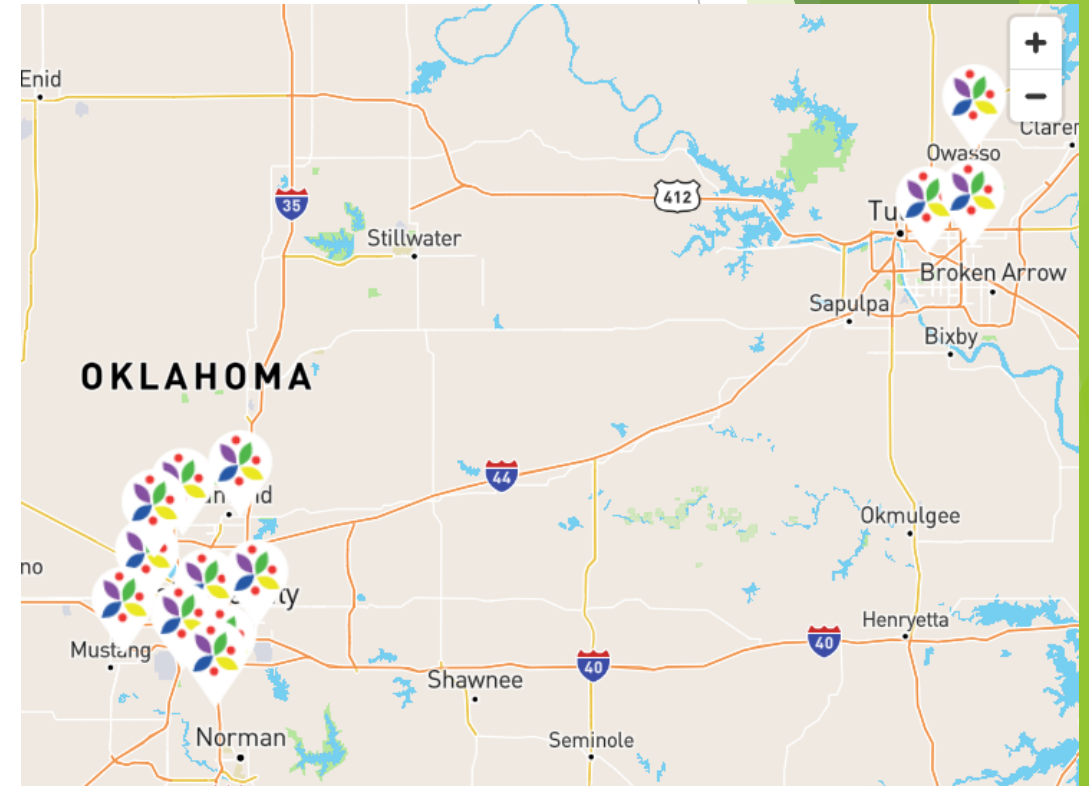
PEDIATRICS

An Ounce of Prevention

Jordan Pope, MD, FAAP
Medical Director
Just Kids Pediatrics
JustKidsPeds.com



- ▶ Pediatric Primary Care and Urgent Care
365 days per year
- ▶ 9 OKC Metro and 3 Tulsa Metro locations
- ▶ Locally, privately owned
- ▶ Also offering Speech Therapy,
Occupational Therapy, Physical Therapy
- ▶ Goal of expanding to offer nutritionist,
exercise, counseling services
- ▶ Bilingual clinic in Capital Hill
- ▶ 24/7 Nurse triage
- ▶ Striving to serve kids, their caregivers and
our community



Financial Disclosures

▶ None

Intro to Pediatrics

- ▶ Branch of medicine that handles the development, care and disease of babies and children
- ▶ Training includes Bachelor's Degree, 4 years of medical school, 3+ years of residency
 - ▶ 18,000 hours of clinical training prior to becoming an attending physician
 - ▶ Maintenance of certification every 5-10 years
 - ▶ Continuing medical education annually
- ▶ Subspecialty training includes 3 additional years of research and clinical practice
 - ▶ ER
 - ▶ Cardiology
 - ▶ Gastroenterology



Pillars of Pediatrics

- ▶ Supporting healthy development for the child in present and future
 - ▶ Transition into adulthood as happy, healthy individuals
- ▶ Child's health is dependent on caregivers and support system
 - ▶ Partner with family
 - ▶ Partner with child on developmentally appropriate level
 - ▶ Educating children on concepts of health
 - ▶ Partners in decision making
 - ▶ Asthma
 - ▶ Mental health
 - ▶ Birth control/sexual health



Pillars of Pediatrics

The well child check

- ▶ Growth
 - ▶ Nutrition
 - ▶ Body image
 - ▶ Physical activity
- ▶ Development
 - ▶ Milestones
 - ▶ Behavior
 - ▶ School
 - ▶ Mental Health
- ▶ Immunization and disease prevention
- ▶ Safety

Immunization

- ▶ Disease prevention is at the heart of what pediatricians do
- ▶ Disease prevention as an investment
 - ▶ Child's health in the present and future
 - ▶ Cost saving
 - ▶ Time off work for caregivers
 - ▶ Time out of school
 - ▶ Costly medications, ER visits, hospitalizations
- ▶ Perspective
 - ▶ Meningitis requires 21 days of antibiotics
 - ▶ Rotavirus patients are ill for approximately 1 week
 - ▶ RSV patients miss daycare for at least 1 week

IMMUNIZATIONS THE ERAS TOUR

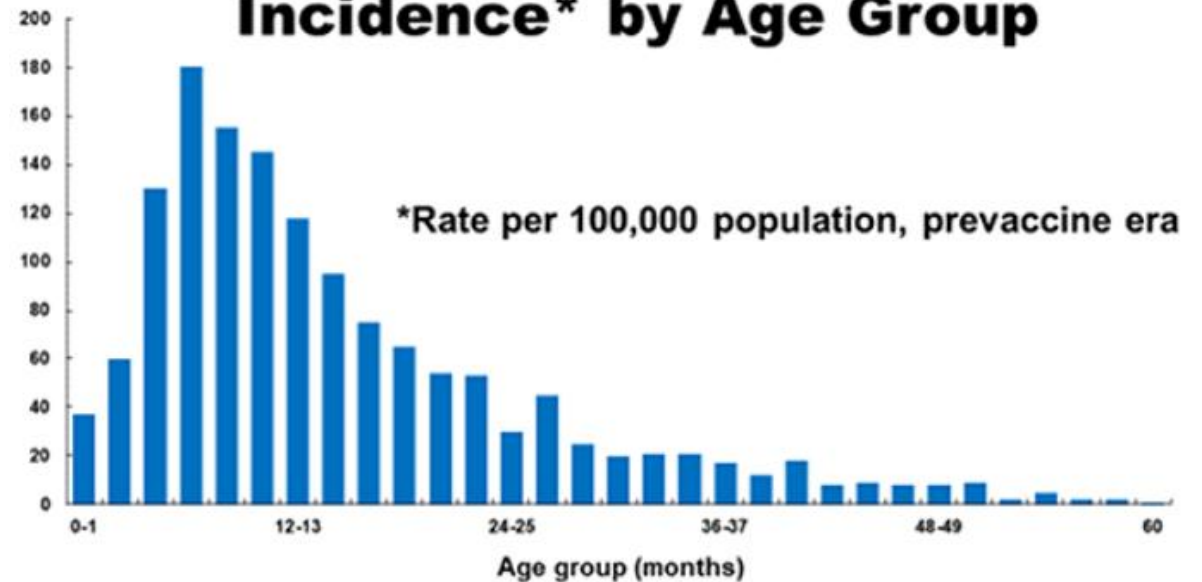


Haemophilus Influenzae, Type B (Hib)


- ▶ Prior to development of a vaccine, Hib was the leading cause of bacterial meningitis in children <5 years of age
 - ▶ 6% mortality rate
 - ▶ 30% of survivors left with hearing impairment or other neurologic sequelae
 - ▶ Epiglottitis, pneumonia, septic arthritis, cellulitis
- ▶ Treatment is with antimicrobials

***Haemophilus influenzae* type b, 1986**

Incidence* by Age Group



Source: Centers for Disease Control and Prevention

A large crowd of people is gathered at a concert or festival. The scene is illuminated by bright, colorful stage lights, primarily in shades of blue and green. The crowd is dense, and the atmosphere appears to be one of a major event. The background shows the structural elements of a large arena or stadium.

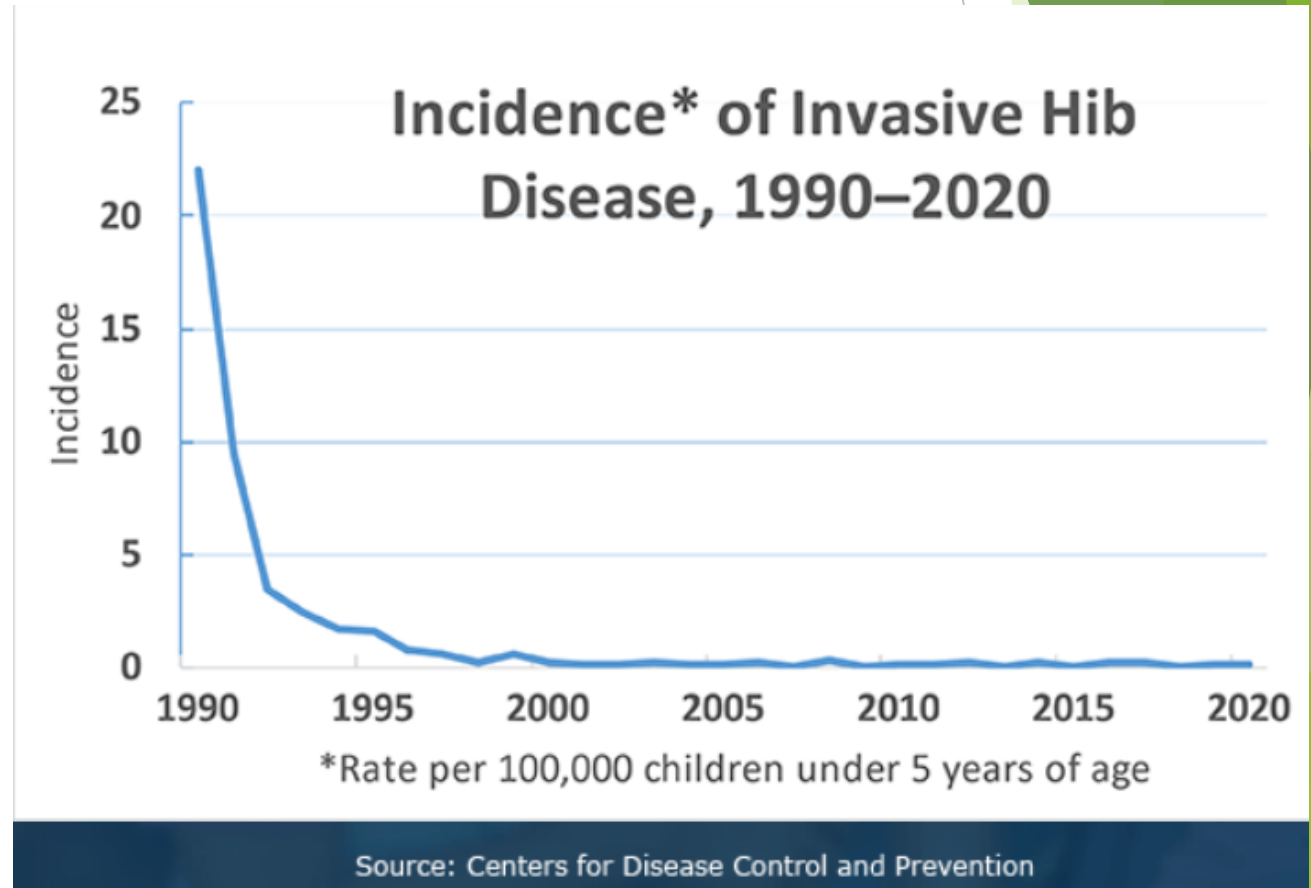
Haemophilus Influenzae, Type B

US CDC data from 1980s

- ▶ 1:200 children <5yrs of age infected
- ▶ 20,000 cases of invasive Hib per year in 1980s
 - ▶ Almost all hospitalized
 - ▶ ~1,200 died
 - ▶ ~6,000 with neurologic sequelae

Haemophilus Influenzae, Type B

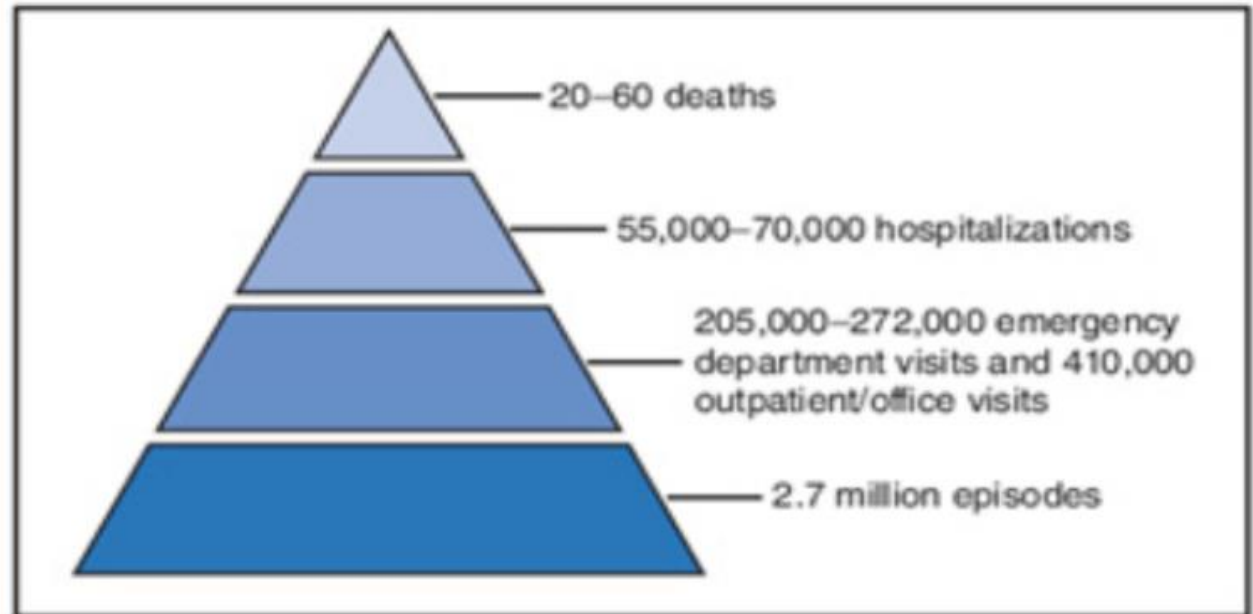
- ▶ Vaccine introduced in late 1980s
 - ▶ Inactivated bacterial vaccine
- ▶ WHO recommends use for all children in primary series
 - ▶ 2,4,6, 12-15 months
 - ▶ 95% of vaccinated children develop protective antibody levels
 - ▶ Indicated for additional age groups who are immunocompromised (sickle cell, HIV)
- ▶ US had 35 cases in 2021
 - ▶ >99% reduction after vaccine introduced
- ▶ Health care savings estimate at \$0.95 billion



Rotavirus

- ▶ Virus causing severe gastroenteritis in children <5 years of age
 - ▶ Diarrhea, vomiting, fever, abdominal pain
- ▶ Prior to vaccination in 2006, rotavirus caused 450,000 deaths worldwide each year due to dehydration
- ▶ Treatment is supportive

Annual incidence in children <5 years of age prior to introduction of rotavirus vaccine -- United States



Source: Centers for Disease Control and Prevention



Rotavirus

- ▶ 2018 data shows 92% reduction in rotavirus cases compared to pre-vaccine era
- ▶ Estimated 382,000 hospitalizations avoided due to rotavirus vaccine
- ▶ Estimate health care cost of \$187m

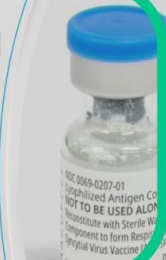
- ▶ Vaccine is 2 or 3 dose series in infancy
- ▶ Live attenuated vaccine
- ▶ Administered orally

Respiratory Syncytial Virus (RSV)



RSV VACCINE FOR PREGNANT WOMEN

- GIVEN BETWEEN **32-36 WEEKS** GESTATIONAL AGE
- PROTECTS NEWBORN FOR **6 MONTHS**



Beyfortus™ (nirsevimab-alip) Injection **50 mg / 0.5 mL**

For Intramuscular Injection Only

Store the pre-filled cartridge in original carton to protect from light until time of use. Must be administered by a healthcare provider.

Five 0.5 mL single-dose pre-filled syringes



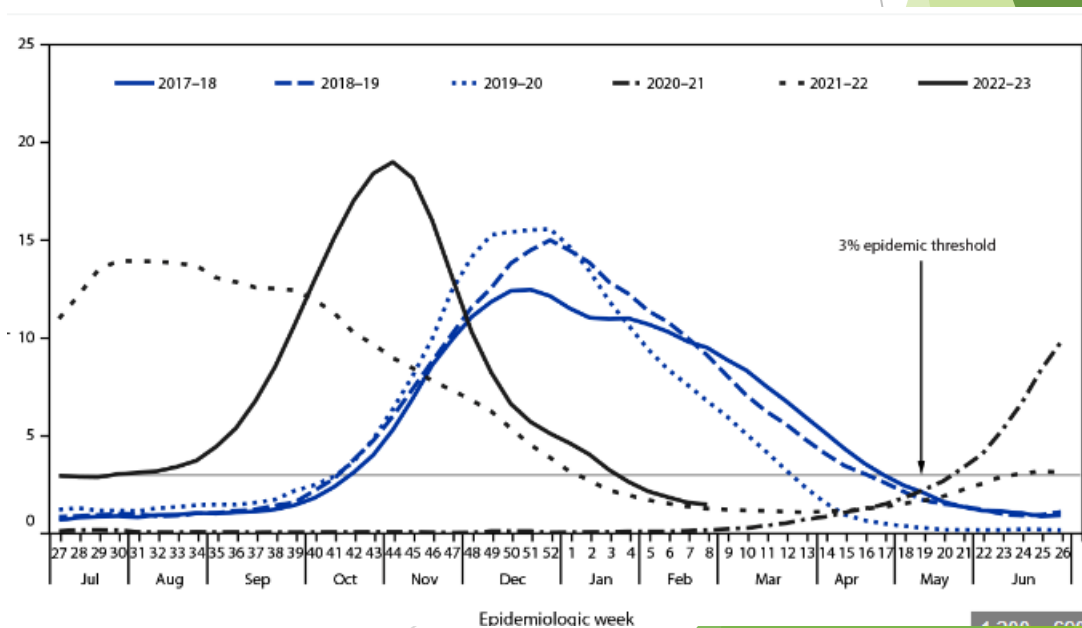
HEALTH ALERT
RSV VACCINES COULD BE AVAILABLE FOR BABIES, YOUNG KIDS BY THE END OF AUGUST



BEST LIFE LIFESAVING RSV VACCINE APPROVED FOR SENIORS **5:25 89°** **ACTION NEWS 5**

RSV

- ▶ Common cause of severe lower respiratory tract infection in young children and the elderly
 - ▶ Common cause of upper respiratory infection in older children and adults
- ▶ Common symptoms include cough, congestion, runny nose, wheezing, respiratory distress and dehydration
- ▶ In children <5 yrs, each year in the US
 - ▶ 2.1m doctor's office visits
 - ▶ 80,000 hospitalizations
 - ▶ 300 deaths
 - ▶ Healthcare cost \$709m
- ▶ Treatment is supportive





RSV Immunization

- ▶ Monoclonal antibody administration
 - ▶ Passive immunization
 - ▶ Immediate, short term
 - ▶ Does not require the patient's immune system to mount a response
 - ▶ Used for nearly 20 years
 - ▶ Restricted availability for infants
 - ▶ Extreme preemies
 - ▶ Chronic lung disease
 - ▶ Congenital heart disease
 - ▶ Cost prohibitive
 - ▶ \$2,000 for 0.5ml injected monthly x 5 months = \$10,000
 - ▶ Difficult to obtain approval



RSV Immunization 2023

- ▶ Widely available monoclonal antibody
 - ▶ Will provide immediate, short-term protection against invasive RSV
 - ▶ Will protect children at their most vulnerable
- ▶ Available as single dose injection for infants 0-8 months during RSV season
 - ▶ Children with chronic illness may qualify in their 2nd RSV season
- ▶ Very well tolerated
 - ▶ Side effects include soreness at the injection site or rash
- ▶ CDC, ACIP, AAP recommend all babies receive as early as possible in RSV season
- ▶ Cost \$500 per injection

RSV Immunization Data

The NEW ENGLAND
JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

JULY 30, 2020

VOL. 383 NO. 5

Single-Dose Nirsevimab for Prevention of RSV in Preterm Infants

M. Pamela Griffin, M.D., Yuan Yuan, Ph.D., Therese Takas, B.S., Joseph B. Domachowske, M.D.,
Shabir A. Madhi, M.B., B.Ch., Ph.D., Paolo Manzoni, M.D., Ph.D., Eric A.F. Simões, M.D., Mark T. Esser, Ph.D.,
Anis A. Khan, Ph.D., Filip Dubovsky, M.D., Tonya Villafana, Ph.D., and John P. DeVincenzo, M.D.,
for the Nirsevimab Study Group*

- ▶ 70% reduction in outpatient visits
- ▶ 80% reduction in hospitalization

Questions?



Sources

- ▶ <https://www.cdc.gov/vaccines/vpd/hib/index.html>
- ▶ <https://www2.cdc.gov/nip/isd/YCTS/mod1/courses/rota/index.html>
- ▶ <https://www.cdc.gov/vaccines/ed/youcalltheshots.html>
- ▶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4652939/>
- ▶ <https://publications.aap.org/pediatrics/article-abstract/110/4/653/64557/Impact-of-Universal-Haemophilus-influenzae-Type-b?redirectedFrom=fulltext>
- ▶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9377037/>
- ▶ <https://www.beyfortus.com/hcp/efficacy-and-safety#Efficacy>
- ▶ <https://www.nejm.org/doi/full/10.1056/nejmoa1913556>



ETHICS WORKSHOP

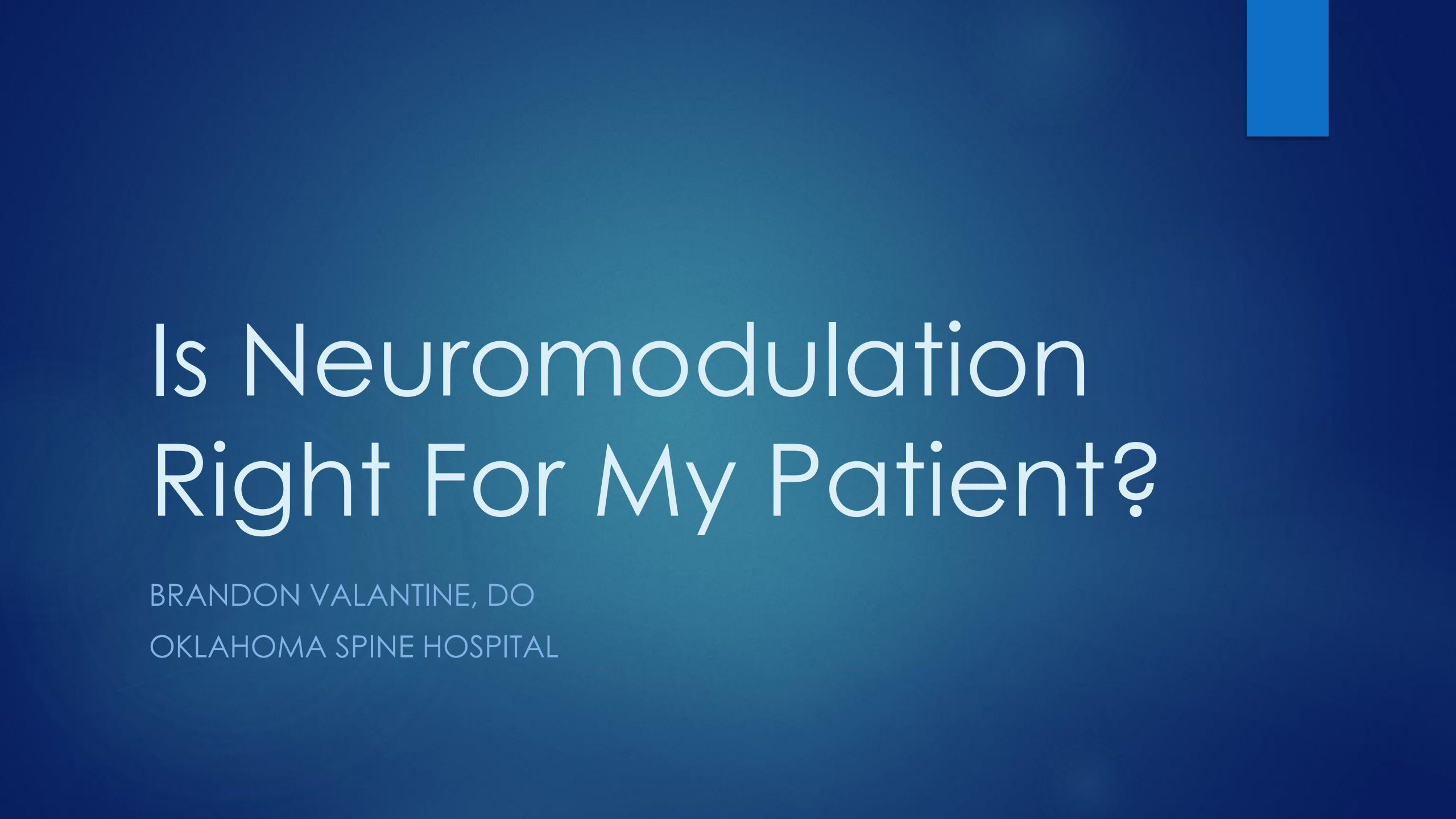
**“TREATING THE WC
PATIENT WITH SPINAL
CORD STIMULATORS”**

Presented By:

Brandon Valantine, D.O.

Oklahoma Spine Hospital Pain Management





Is Neuromodulation Right For My Patient?

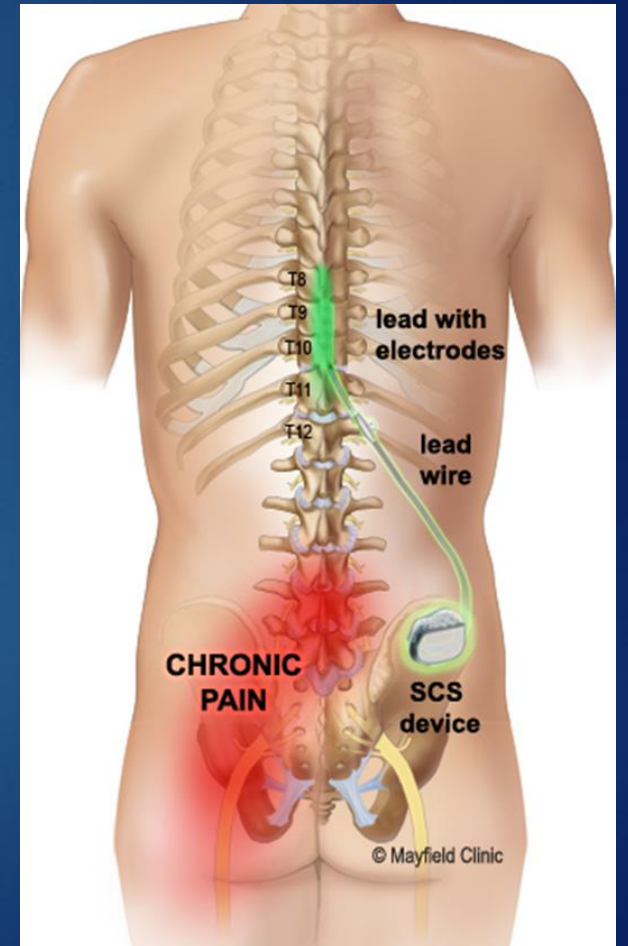
BRANDON VALANTINE, DO
OKLAHOMA SPINE HOSPITAL

Overview

- ▶ What is Spinal Cord Stimulation
- ▶ Mechanism of action
- ▶ Patient selection
- ▶ Indications and contraindications
- ▶ Efficacy
- ▶ Equipment
- ▶ Different therapies
- ▶ Trial and implant
- ▶ Risks and complications
- ▶ Literature review
- ▶ Peripheral nerve stimulation

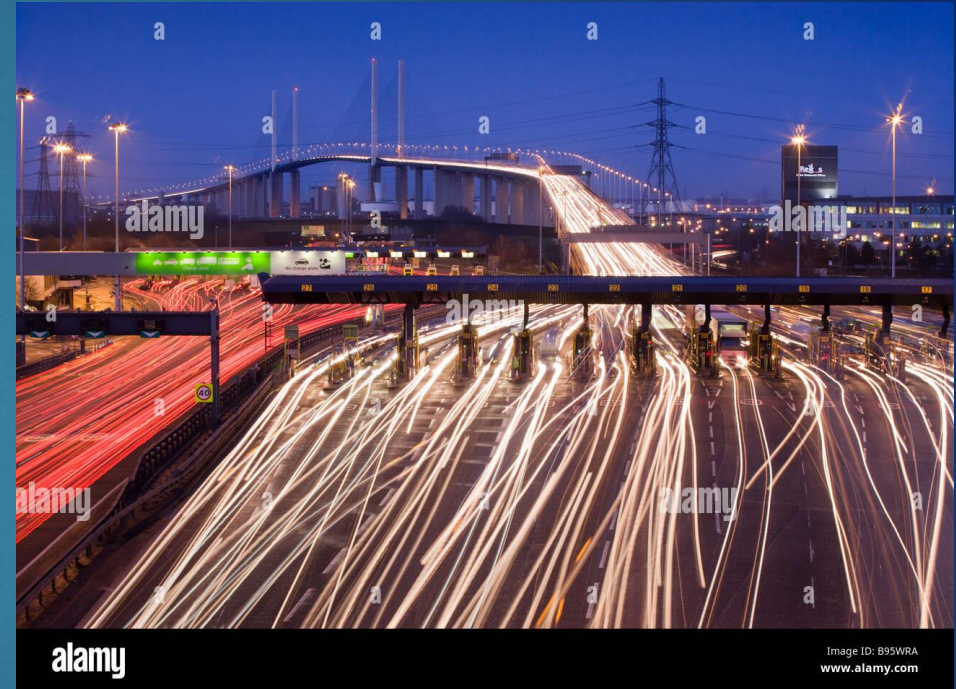
Spinal cord stimulation (SCS)

- ▶ Non-drug, FDA approved therapy option
- ▶ Safe and effective therapy
 - ▶ In use for over 40 years
 - ▶ Has helped thousands of people find pain relief
 - ▶ Is minimally invasive and fully reversible
- ▶ Can be tested first to determine effectiveness (trial)
- ▶ Clinically effective and cost-effective option for chronic neuropathic pain patients ¹



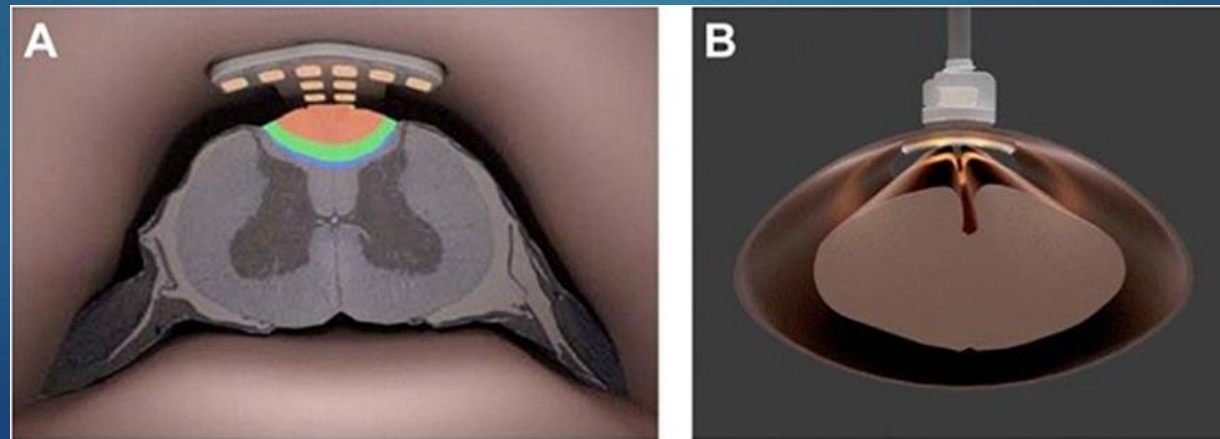
Mechanism of action

- ▶ Gate Theory²
- ▶ Multifactorial



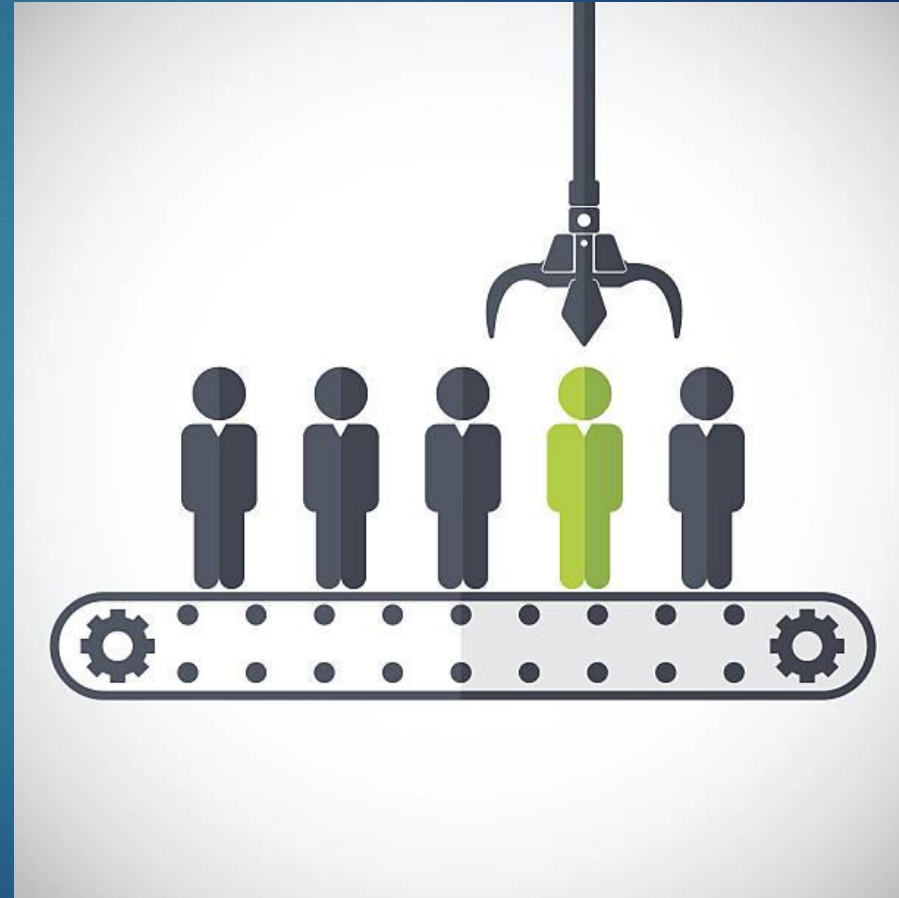
Mechanism of action

- ▶ Neuromodulation of dysregulated pain pathways via: ³⁻⁶
 - ▶ Spinal and supraspinal mechanisms
 - ▶ Wide dynamic range neuron suppression
 - ▶ Activation of GABAergic systems
 - ▶ Modulations of glial cells (microglia and astrocytes in the CNS)



Patient Selection

- ▶ Indications
- ▶ Contraindications
- ▶ Special Considerations



Indications

- ▶ Chronic pain (> 3 months) that's failed conservative therapy and/or surgery
- ▶ Post laminectomy syndrome/ Failed back surgery syndrome (FBSS)
 - ▶ Radiculopathy, Axial or both
- ▶ Complex regional pain syndrome (CRPS)
- ▶ Painful diabetic peripheral neuropathy (PDPN)
- ▶ Painful peripheral vascular Disease
- ▶ Intractable angina

Contraindications

- ▶ Patient has no pain
- ▶ Unable to operate device
- ▶ Uncontrolled coagulopathy
- ▶ Platelet counts below 50,000
- ▶ Failed trial
- ▶ Pregnant

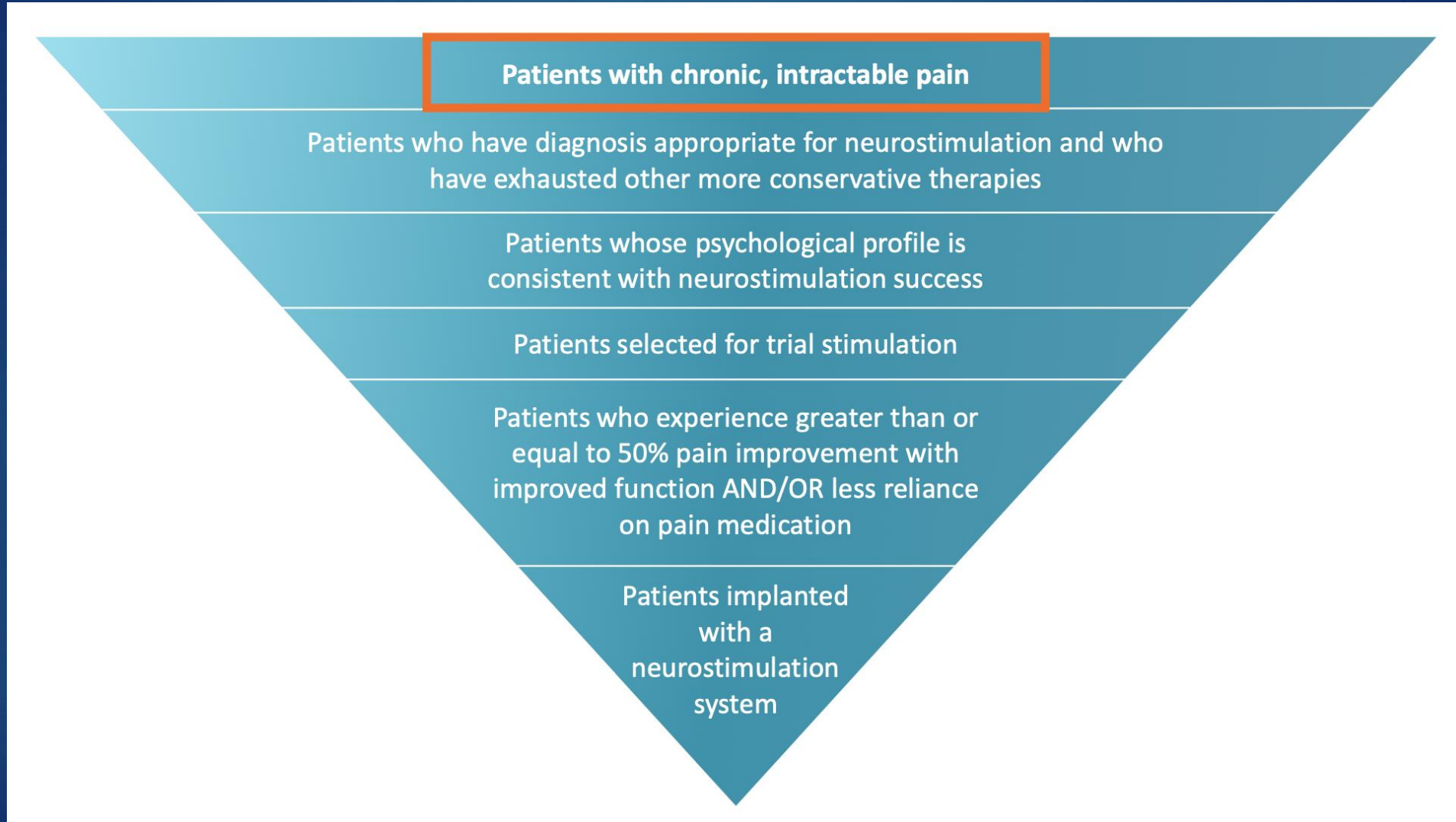


Special considerations

- ▶ Other implantable devices
- ▶ Coagulopathy's and anticoagulants
- ▶ Infection
- ▶ Laboratory evaluation
- ▶ Psychological screening
 - ▶ May be predictive of treatment outcome ⁷
 - ▶ No standardized test, highly dependant on psychologist or psychiatrist
 - ▶ Minnesota Multiphasic Personality Inventory and Pain Catastrophizing Scale
 - ▶ Secondary gain, malingering



Screening paradigm for SCS



Equipment

- ▶ Stimulation leads (percutaneous vs paddle)
- ▶ Implantable pulse generator
- ▶ Lead anchors
- ▶ Extension cable
- ▶ Charging cable
- ▶ Remote control



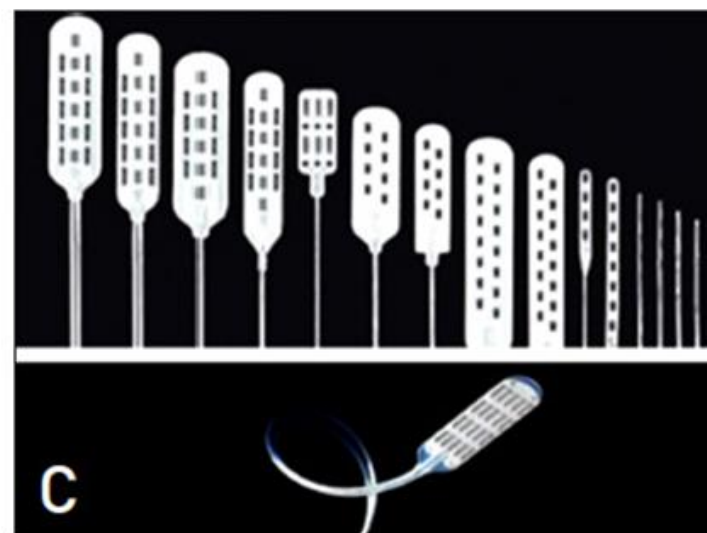
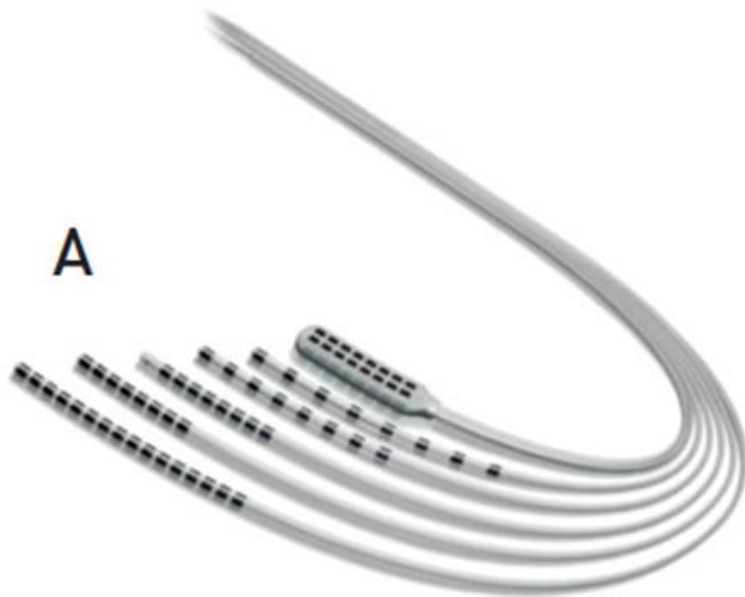


Figure 2. Images of various lead types used for spinal cord stimulation (percutaneous or surgical). Contact points vary from 4 to 16 for cylindrical leads and from 4 to 20 for surgical leads. Leads with different electrode spacing are available from different manufacturers.






A: Image provided courtesy of Boston Scientific.






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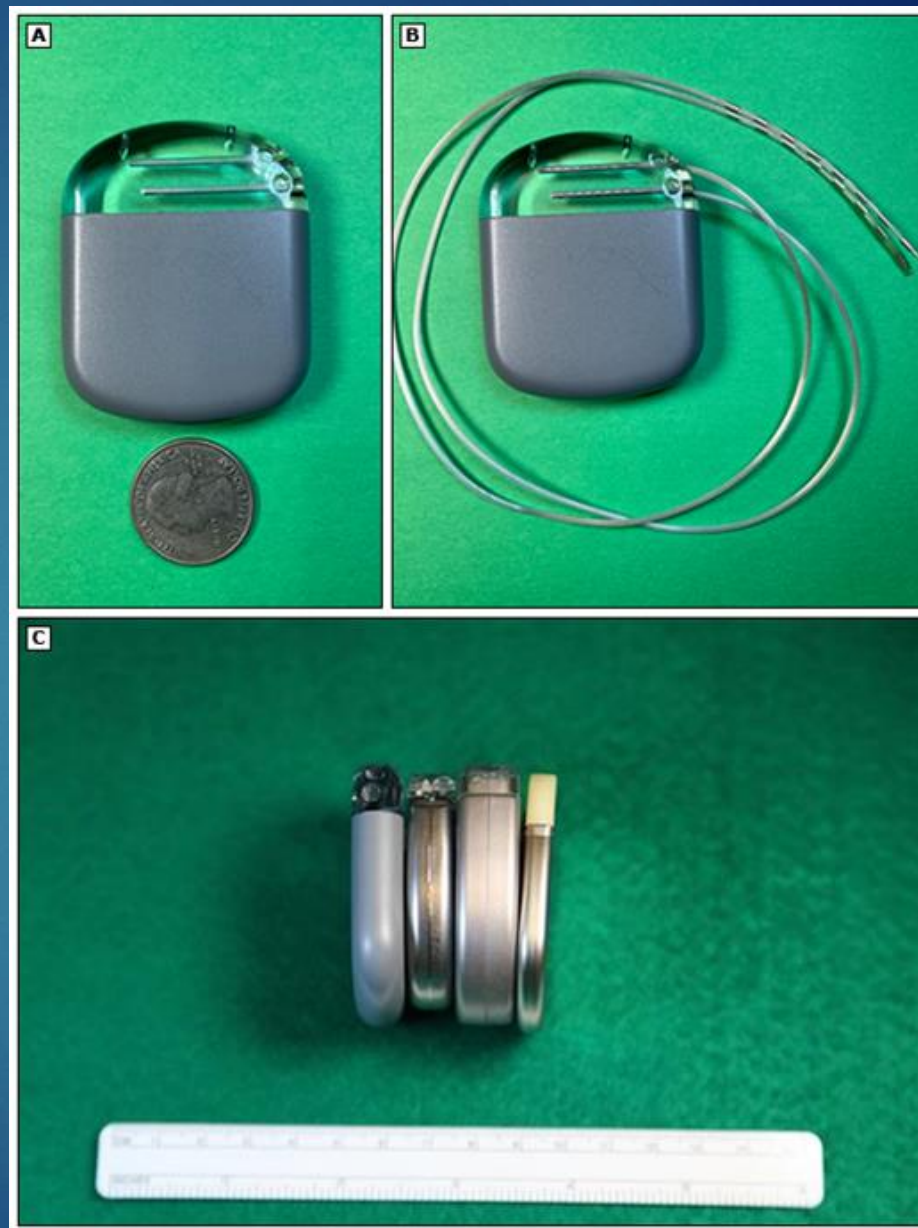
B: Image courtesy of Medtronic, Inc.

Reproduced with permission from Medtronic, Inc. ©2012

C: Image Copyright of St. Jude Medical, Inc. All rights reserved.

					
Model	St. Jude (Abbott) Infinity 5	St. Jude (Abbott) Infinity 7	Boston Scientific Vercise PC	Boston Scientific Vercise Gevia	Boston Scientific Vercise Genus P8/P16
No. of channels	2	2	2	2	1/2
Weight (gram)	49	58	55	26	58
Size (mm)	56×50×13	67×50×14	71×50×11	51×46×11	72×50×12
RC	No	No	No	Yes	No
Freq. range (Hz)	2–240	2–240	2–255	2–255	2–255
Pulse width (µs)	20–500	20–500	10–450	20–450	20–450
TF	MSS	MSS	A	A	A
CF	CA	CA	MICC	MICC	MICC
Directional lead	Yes	Yes	Yes	Yes	Yes
MRI safety	C	C	U	C	C
LFP sensing	No	No	No	No	No

					
Model	Boston Scientific Vercise Genus R16	Medtronic Activa PC	Medtronic Activa RC	Medtronic Activa SC	Medtronic Percept PC
No. of channels	2	2	2	1	2
Weight (gram)	27	67	40	44	61
Size (mm)	52×46×11	65×49×15	54×54×9	55×60×11	68×51×12
RC	Yes	No	Yes	No	No
Freq. range (Hz)	2–255	2–250	2–250	3–250	2–250
Pulse width (µs)	20–450	60–450	60–450	60–450	20–450
TF	A	IL	IL	IL	IL
CF	MICC	No	No	No	No*
Directional lead	Yes	No	No	No	No
MRI safety	C	C	C	C	C
LFP sensing	No	No	No	No	Yes



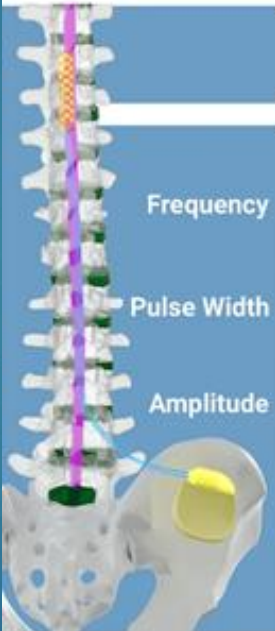
Over 80 percent of patients with SCS will need an MRI within five years of implantation ⁸




Different Therapies

Parasthesia based

Parasthesia free

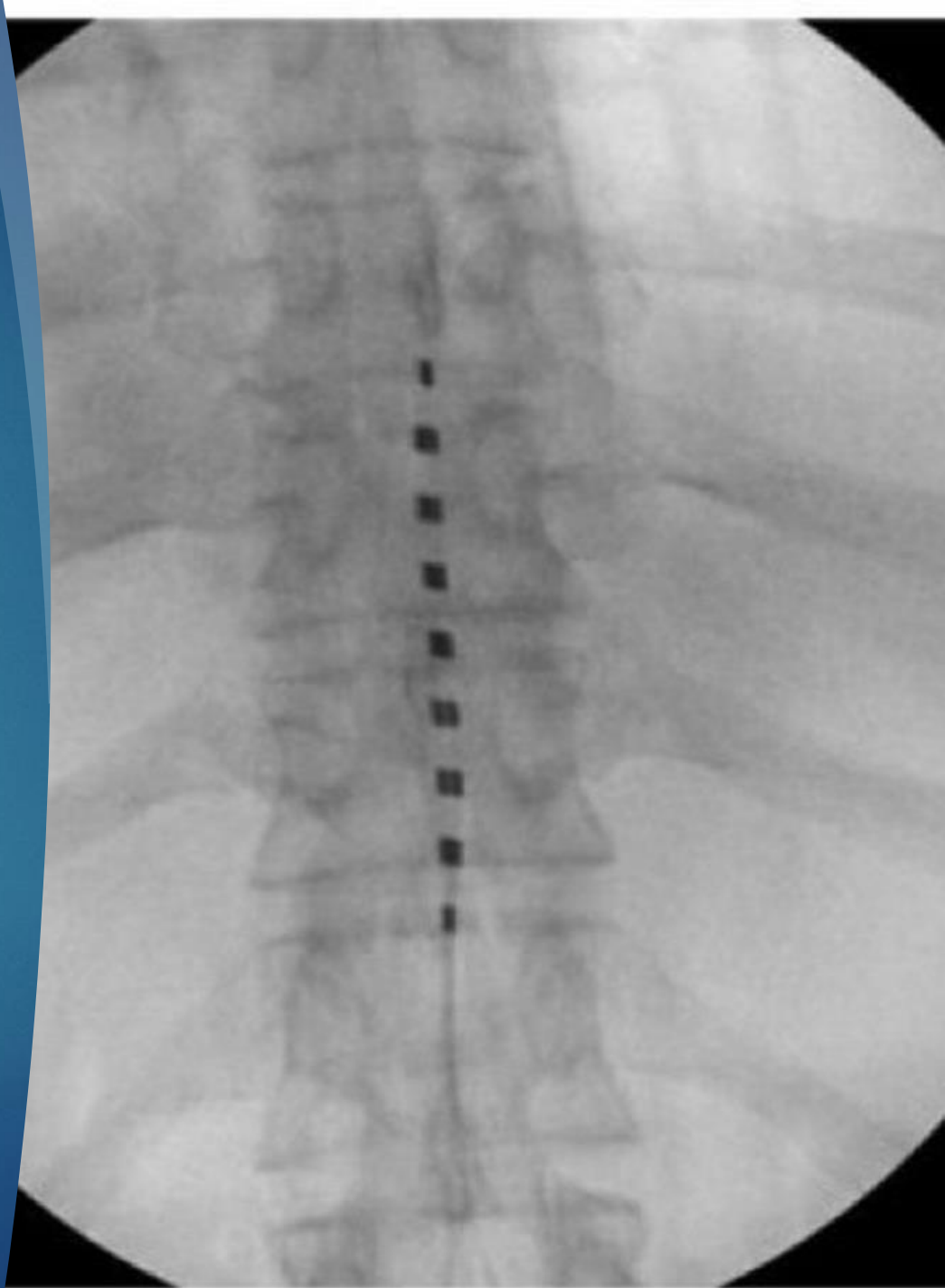
- High Frequency (HF)
- Burst
- Differential target multiplexed (DTM)
- Closed loop evoked compound action potential



	TCS	BURST	HF
Frequency	10-150 Hz	InterBurst 40 Hz IntraBurst 285-332 Hz	650-1200 Hz
Pulse Width	10-500 μ s	- 10-500 μ s	10-500 μ s
Amplitude	0.1-25 mA	50-70% ST	60-65% ST
			

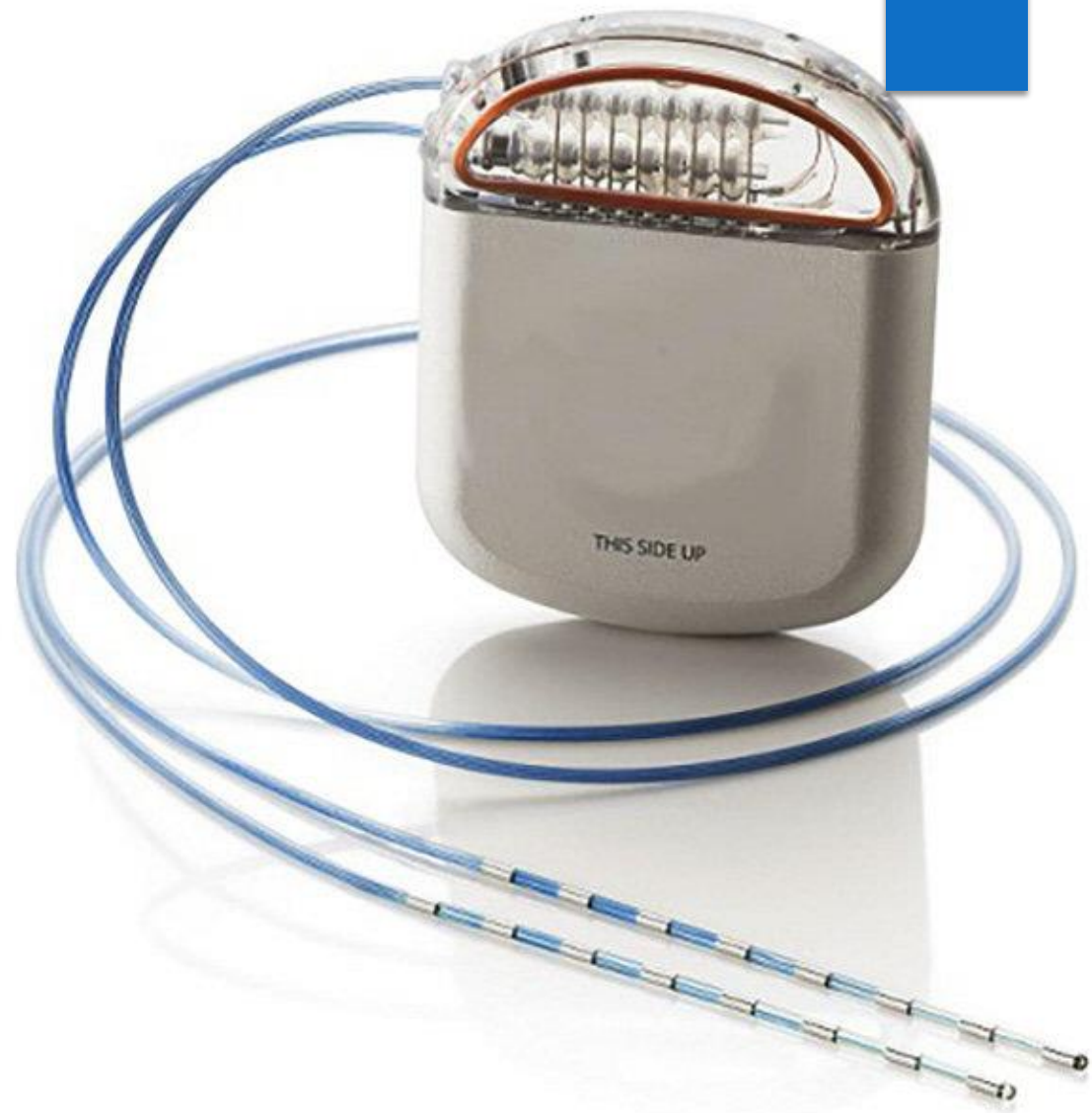
Trial

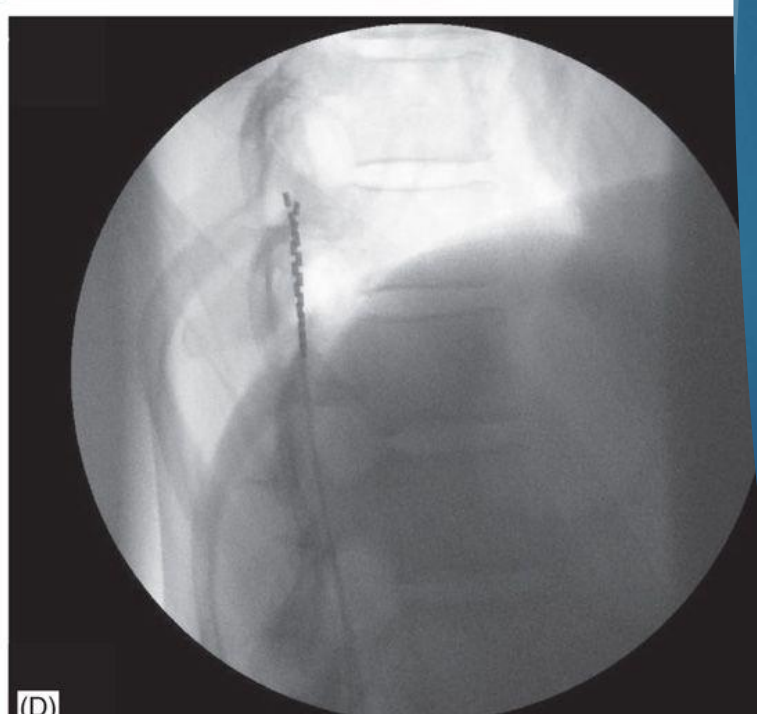
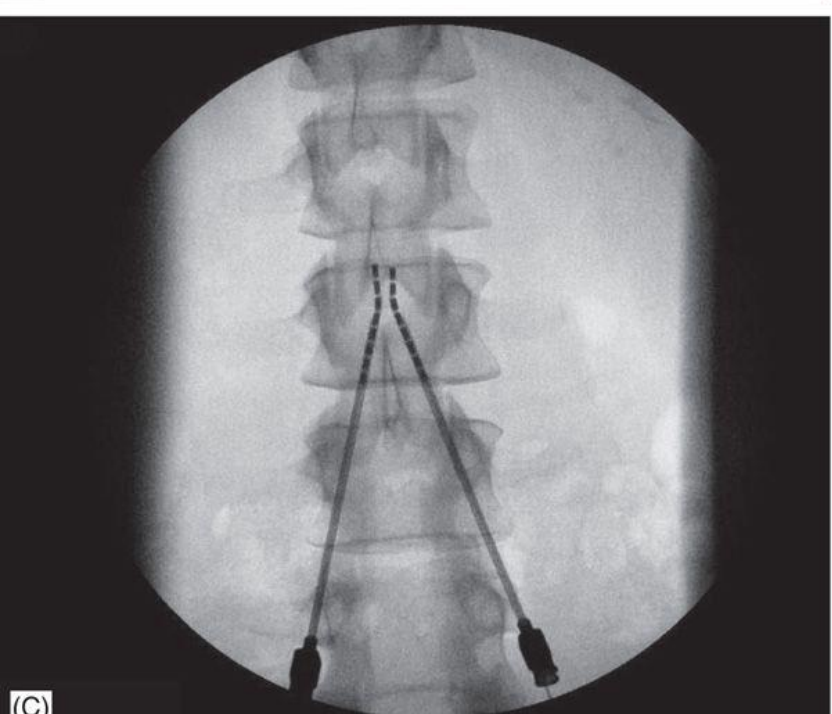
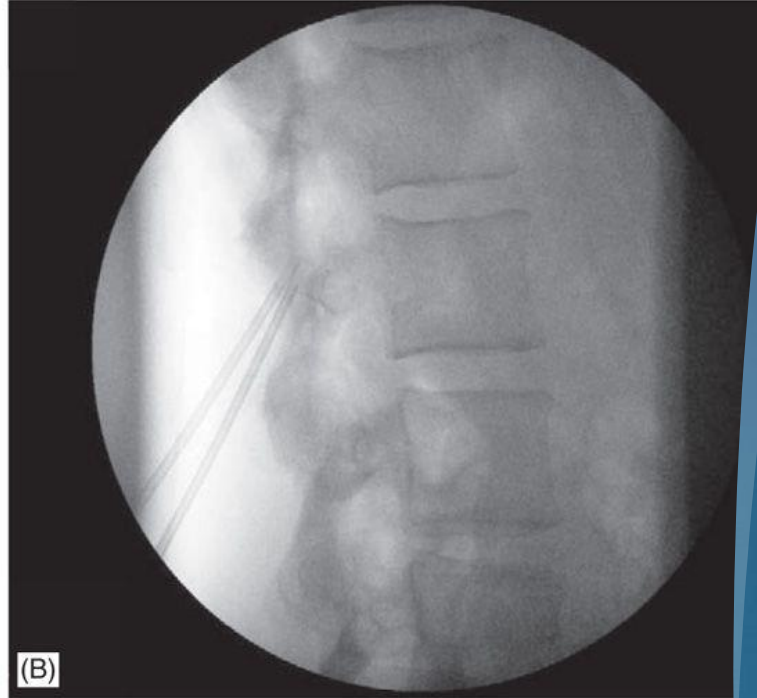
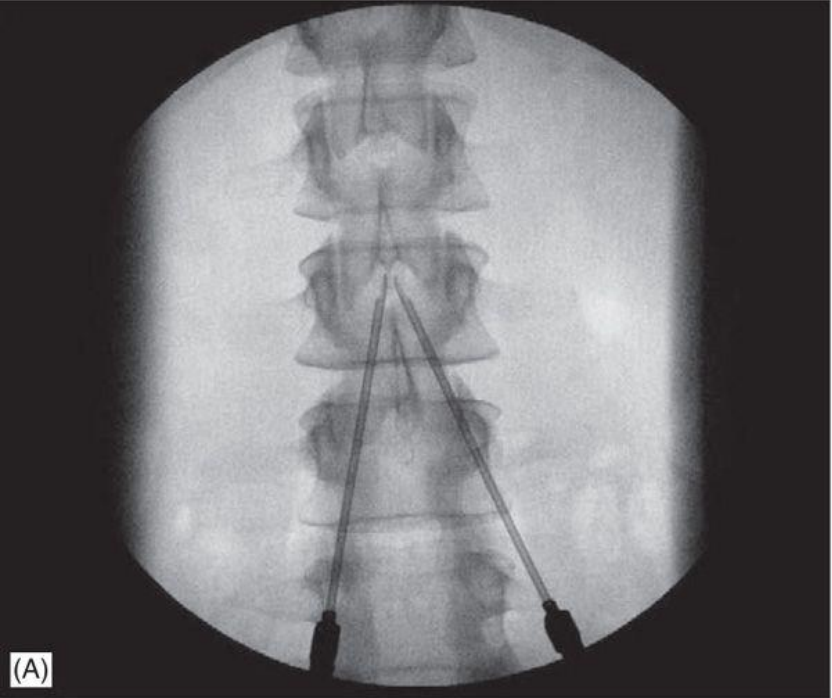
- ▶ 5-7 day “test drive”
- ▶ Temporary leads placed in epidural space
- ▶ Approximately 30 minutes procedure
- ▶ External battery secured to back
- ▶ Leads removed in office at follow up
- ▶ What determines a successful trial?



Implant

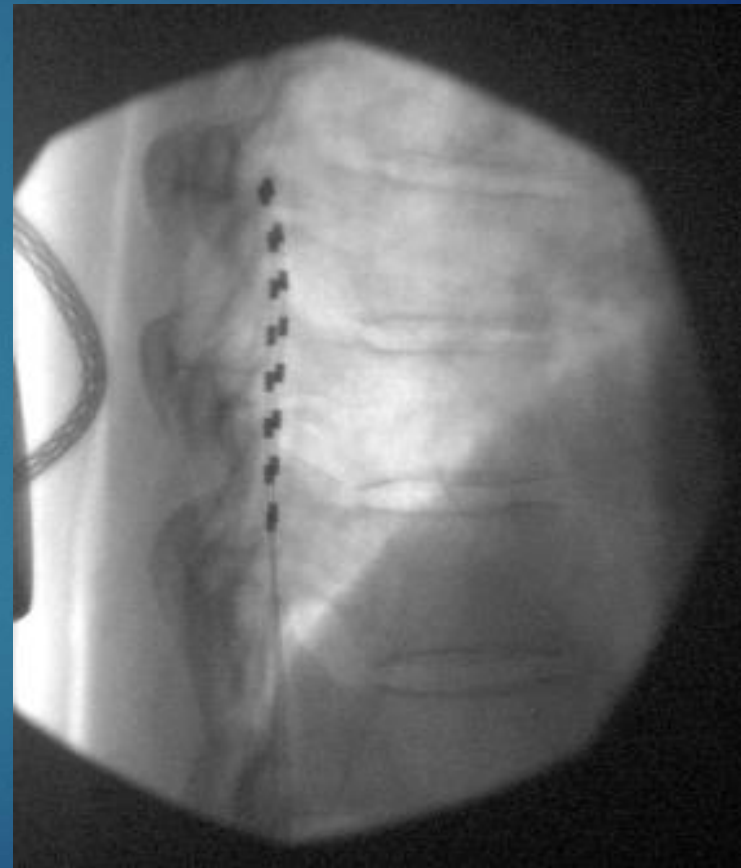
- ▶ Two 5cm incisions
- ▶ 2 leads and 1 IPG
- ▶ Entire device implanted subcutaneously
- ▶ Follow up in office 10 days post-op

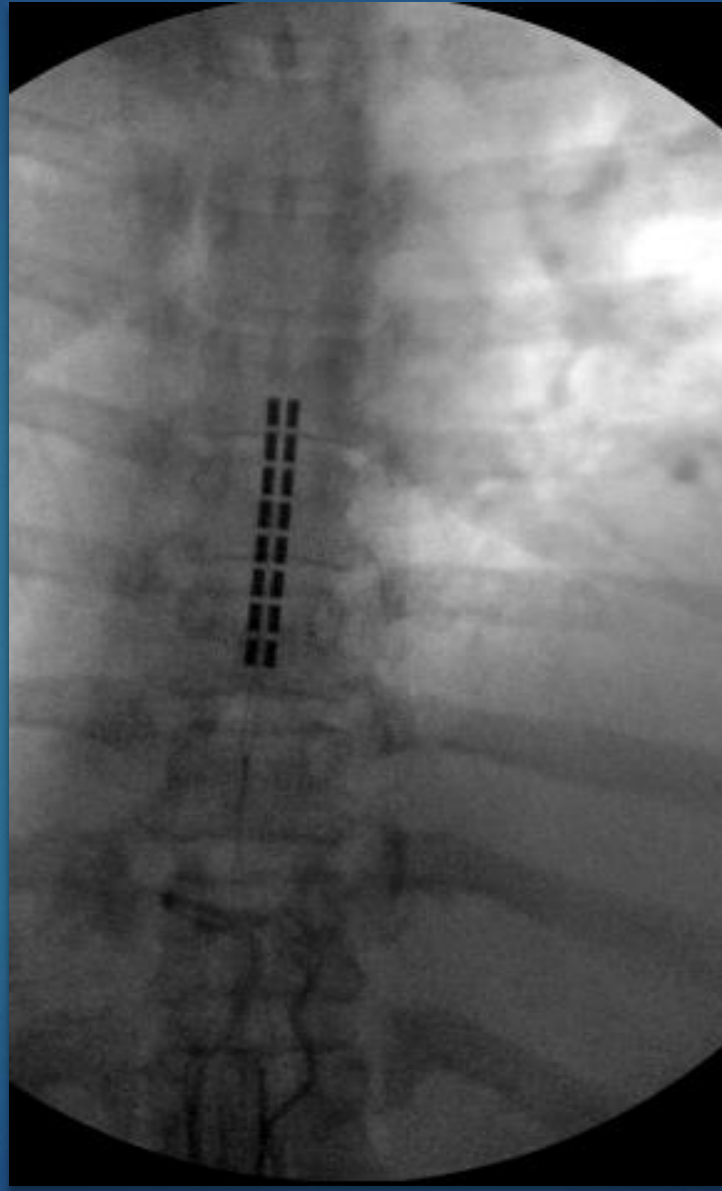
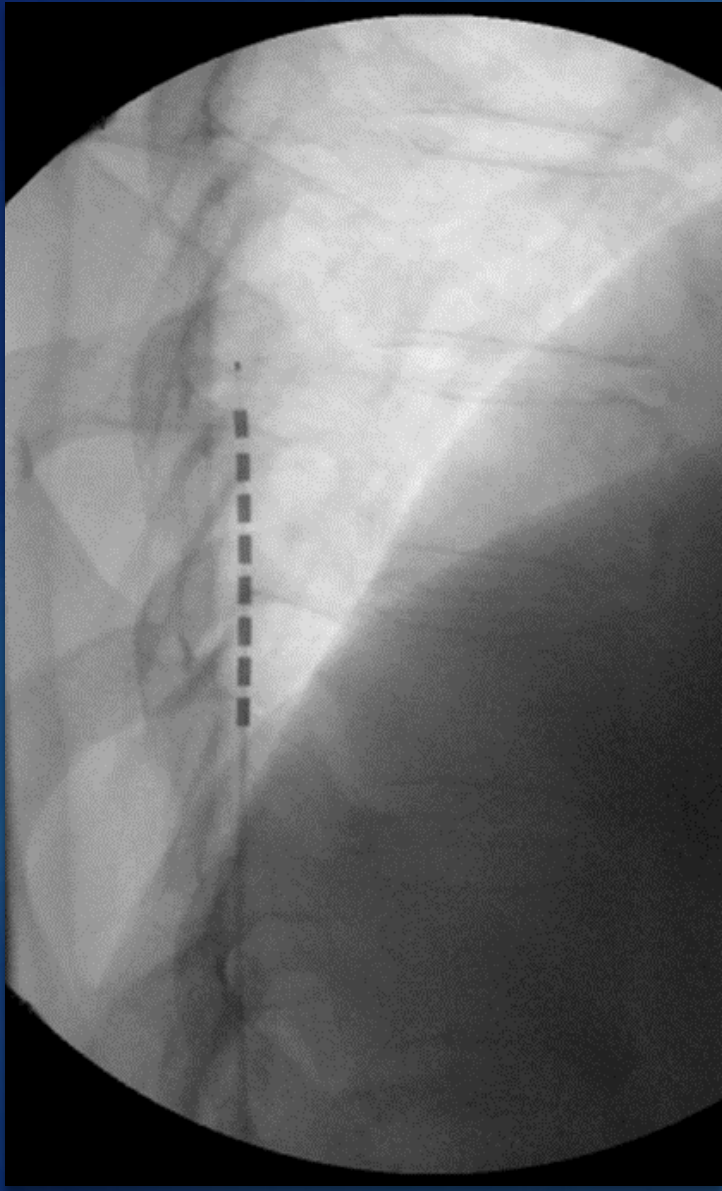




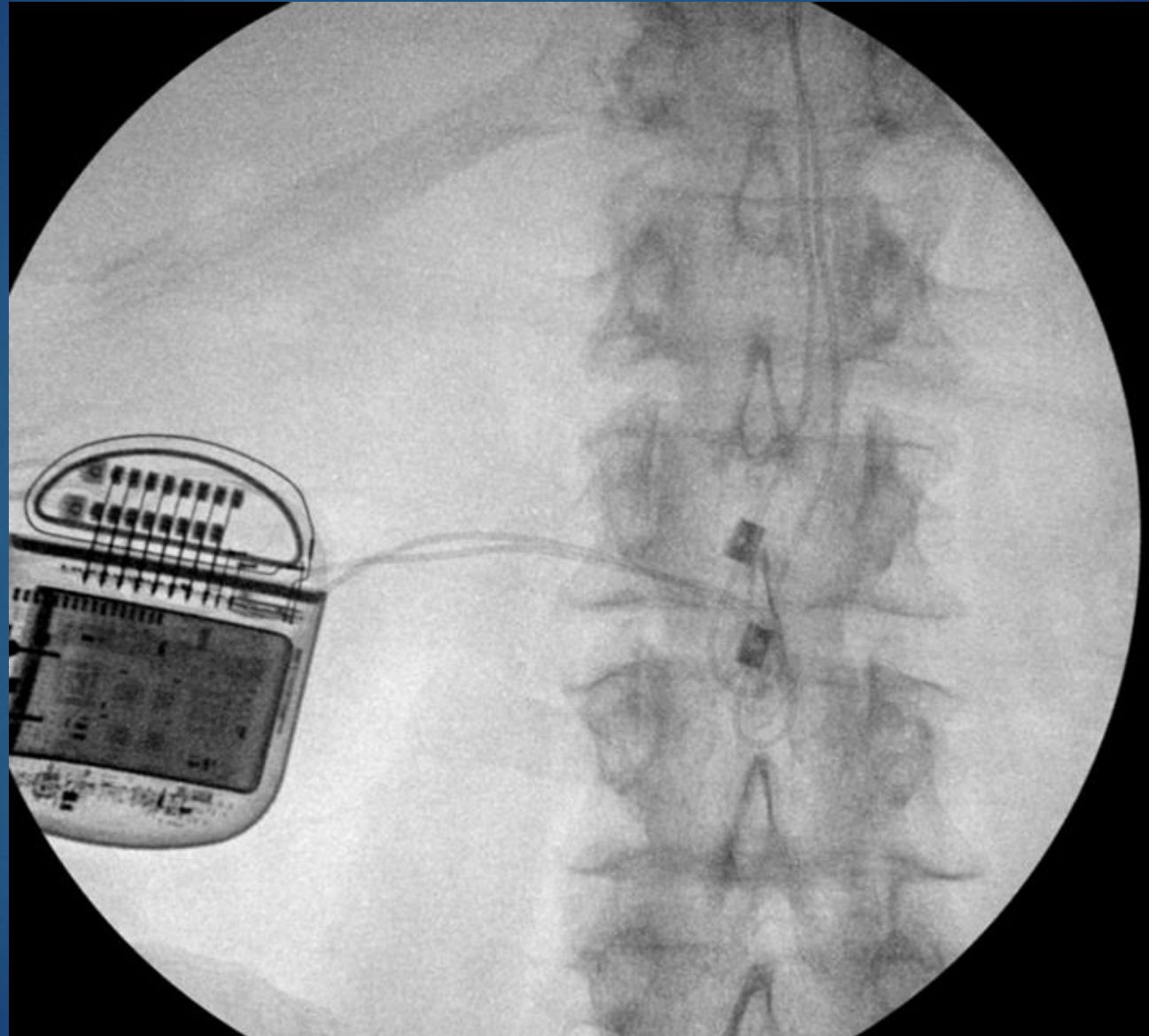
Tuohy lead placement

Percutaneous Leads





Surgical Paddle Lead



Risks and complications

- ▶ Lead migration (13.2 – 22.6%)^{9,12}
- ▶ Lead fracture (5.9 – 9.1%)^{10,11}
- ▶ Seroma
- ▶ Infection (2.5%).^{14,15}
- ▶ Dural puncture, cerebral spinal fluid leak
- ▶ Spinal cord trauma (0.03 - 0.25%).^{9,16}
- ▶ Spinal epidural hematoma (0.25 – 0.3%)¹⁶

Perioperative concerns for patients with SCS

- ▶ Electrosurgical instruments
- ▶ Neuraxial anesthesia
- ▶ Magnetic resonance imaging (MRI) compatibility

Literature Review

Efficacy

Parasthesia vs
Parasthesia free
(supra vs sub-
perception)

Cost
effectiveness

Safety

Spinal Stimulation for the Treatment of Intractable Spine and Limb Pain: A Systematic Review of RCTs and Meta-Analysis

Objective: To synthesize the evidence regarding the effect of spinal stimulation (SS) vs medical therapy (MT) and the effect of newer SS technologies vs conventional SS on pain reduction in patients with intractable spine or limb pain.

Methods: A comprehensive literature search was conducted by a reference librarian. The literature search encompassed January 1, 1995 - December 31, 2017. Reviewers worked independently to select and appraise trials. Random-effect meta-analysis and frequentist indirect comparison methods were used to compare the three interventions. Results were expressed as odds ratio (OR) or weighted mean difference (WMD) with 95% CIs.

Results: We identified 12 trials enrolling 980 patients. Compared with MT, SS significantly increased the odds of reducing pain by 50% or more in three trials (OR, 13.01; 95% CI, 4.96-34.17) and significantly reduced pain as measured by visual analogue scale scores in three trials (WMD, 1.43 scale points; 95% CI, 0.16-2.71). Using the common comparator of MT, newer stimulation technology (eg, high-frequency 10 kilohertz spinal stimulation, Burst, dorsal root ganglion) was associated with increased odds of pain relief compared with conventional SS (OR, 2.07; 95% CI, 1.35-3.19).

Conclusions: In patients with intractable spine/limb pain, SS was associated with better pain reduction than MT. New stimulation technology was likely associated with better pain reduction than conventional stimulation.

Table 25 Evidence Summary for Spinal Cord Stimulation

Source, year	Design	Sample size	Level of evidence	Outcome measures	Results
FBSS					
North et al, 2005 ⁵¹²	Randomized controlled trial	60	I-A	Success defined as >50% pain relief and patient satisfaction	At six months, 47.4% of FBSS patients had successful outcome with SCS versus 11.5% of the reoperation cohort
Kumar et al, 2008 ^{513,514}	Randomized controlled trial	100	I-A	Success defined as >50% pain relief	At 24 months, 47% of FBSS patients had successful outcome with SCS versus 7% of the conventional medical management cohort
Kapural et al, 2016 ^{515,516}	Randomized controlled trial	198	I-A	Success defined as >50% pain relief	At 24 months, ≥50% pain reduction of LBP was seen in 76.5% of 10 kHz SCS patients compared to 49.3% in the paresthesia-based arm (p<0.001). Also, responder rate was 72.9% in the 10 kHz SCS arm versus 49.3% in the paresthesia-based arm for leg pain (p<0.001).
De Andres et al, 2017 ⁵¹⁷	Randomized controlled trial	60	I-A	VAS (leg and back)	At 12 months, the authors reported that pain scores did not differ between the two arms. This was also true of the other primary outcome measures
Deer et al, 2018 ⁵¹⁸	Randomized controlled trial	121	I-A	Mean daily VAS score, responder rate (defined as ≥30% pain relief)	Superiority of burst stimulation over paresthesia-based stimulation was achieved (p < 0.017). Also, 60% of patients were responders to burst stimulation versus 51% with tonic stimulation.
Mekhail et al, 2020 ⁵¹⁹	Randomized controlled trial	134	I-A	Success defined as >50% pain relief	At 12 months, 83.1% of the ECAP-controlled arm had >50% pain relief versus 61% of the control arm.
Non-operated back pain					
Al-Kaisy et al, 2018 ⁵²⁰	Prospective case series	20	I-B	Pain relief, disability, opioid use	Reductions in VAS (79±12 mm to 10±12mm), disability (ODI; 53±13 to 19.8±12), and opioid use were seen at 36 months.
Baranidharan et al, 2021 ⁵²¹	Prospective case series	25	I-B	Pain relief, disability, quality of life, opioid use	At 12 months, back pain VAS scores improved by 4.6 points and leg pain VAS scores improved by 2.7 points. ODI was reduced by 22.1 points. EQ-5D-5L was increased by 23 points. Opioids were discontinued in 42.8% of patients.
Lumbar spinal stenosis					
Costantini et al, 2010 ⁵²²	Retrospective case series	69	I-C	Pain relief, disability, medication usage	VAS improved from baseline 7.4±2.3 to 2.8±2.4 (p<0.05). Opioid use decreased from 29% of patients to 13%, NSAIDs from 75% to 49%, antidepressants from 33% to 20%, and antiepileptics from 32% to 9% (p<0.05). ODI decreased from 34.3±7.6 to 15.7±13.1 (p<0.05)
Kamihara et al, 2014 ⁵²³	Retrospective case series	41	I-C	Success defined as continued SCS use for one year or more after implantation	95.1% of patients continued to use their SCS for one year or more after implantation

Abbreviations: FBSS, failed back surgery syndrome; SCS, spinal cord stimulation; LBP, low back pain; VAS, visual analog scale; ECAP, evoked compound action potential; ODI, Oswestry Disability Index; EQ-5D, EuroQOL Health Questionnaire; NSAID, nonsteroidal anti-inflammatory drug.

Effects of Rate on Analgesia in Kilohertz Frequency Spinal Cord Stimulation: Results of the PROCO Randomized Controlled Trial

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Sarah Love-Jones, MBBS[‡]; Nikunj K. Patel, MD[§]; Jianwen Wendy Gu, PhD[¶];
Amarpreet Bains, PhD^{**}; Que Doan, BS[¶]; Michael Moffitt, PhD[¶]

Objective: The PROCO RCT is a multicenter, double-blind, crossover, randomized controlled trial (RCT) that investigated the effects of rate on analgesia in kilohertz frequency (1–10 kHz) spinal cord stimulation (SCS).

Materials and Methods: Patients were implanted with SCS systems and underwent an eight-week search to identify the best location ("sweet spot") of stimulation at 10 kHz within the searched region (T8–T11). An electronic diary (e-diary) prompted patients for pain scores three times per day. Patients who responded to 10 kHz per e-diary numeric rating scale (ED-NRS) pain scores proceeded to double-blind rate randomization. Patients received 1, 4, 7, and 10 kHz SCS at the same sweet spot found for 10 kHz in randomized order (four weeks at each frequency). For each frequency, pulse width and amplitude were titrated to optimize therapy.

Results: All frequencies provided equivalent pain relief as measured by ED-NRS ($p < 0.002$). However, mean charge per second differed across frequencies, with 1 kHz SCS requiring 60–70% less charge than higher frequencies ($p < 0.0002$).

Conclusions: The PROCO RCT provides Level I evidence for equivalent pain relief from 1 to 10 kHz with appropriate titration of pulse width and amplitude. 1 kHz required significantly less charge than higher frequencies.

Keywords: Chronic pain, double-blind, high frequency, high frequency SCS, kilohertz SCS, PROCO, randomized controlled trial, sub-perception SCS

Conflict of Interest: Dr. Thomson and Dr. Love-Jones are consultants for Boston Scientific. Mr. Patel has received an honorarium from Boston Scientific. The remaining authors have no conflicts of interest to disclose.

INTRODUCTION

Based primarily on differences in clinical observations, currently available spinal cord stimulation (SCS) therapies can be broadly categorized into at least two modalities: paresthesia SCS ("classical" SCS) and sub-perception SCS (e.g., burst, kHz). Paresthesia SCS is generally characterized by programming stimulation parameters (including electric field configuration) such that the patient experiences paresthesia, and the paresthesia topography overlaps the pain topography as much as possible. This modality of stimulation typically results in analgesia in minutes to hours, and in many cases notable decreases in pain are reported during post-op recovery. Further, the stimulation parameter settings used for paresthesia SCS require relatively less charge per second (as compared to present sub-perception SCS settings) which can positively affect device longevity (primary cell implantable pulse generators [IPGs] or patient charging burden [rechargeable IPG]).

In contrast, sub-perception SCS is characterized by programming parameters that do not cause the patient to feel paresthesia. This modality of stimulation tends to have longer wash-in and wash-out times, and typically results in analgesia in several hours to days. The stimulation parameter settings evaluated and published thus far for sub-perception SCS use relatively more charge per second (as

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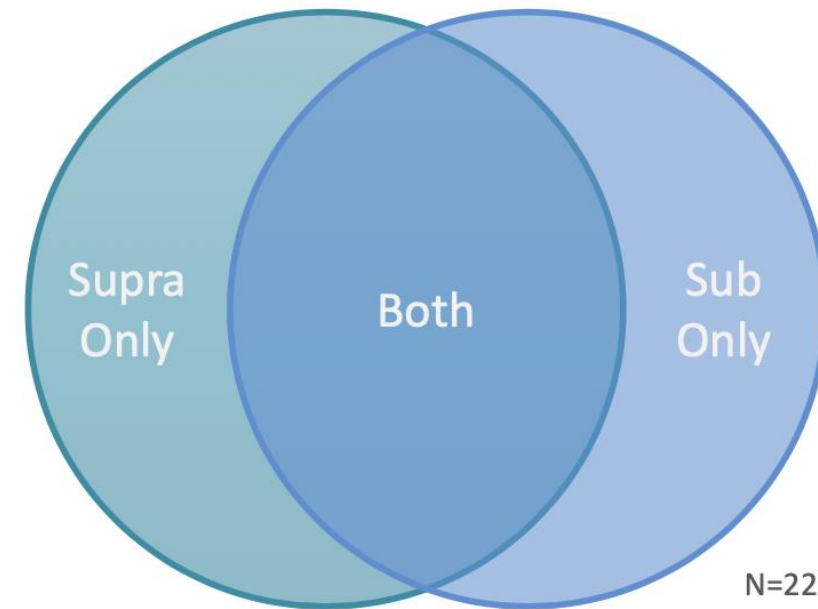
^{**} Clinical, Boston Scientific Neuromodulation, Valencia, CA, USA

For more information on author guidelines, an explanation of our peer review process, and conflict of interest informed consent policies, please go to <http://www.ley.com/WileyCDA/Section/Id-301854.html>

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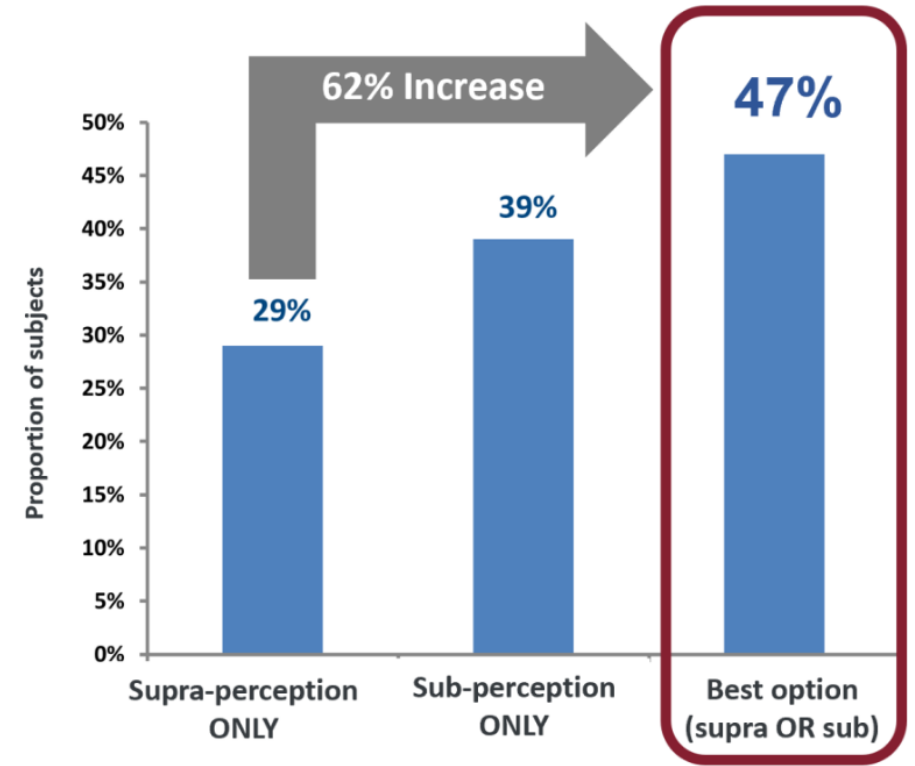
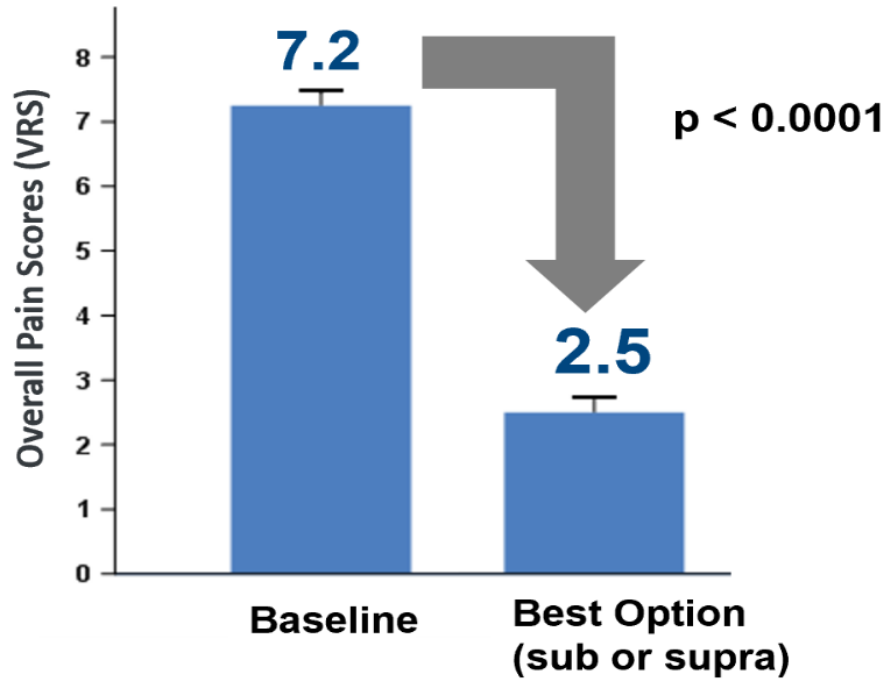
PATIENTS HAVE DIFFERENT RESPONSES TO DIFFERENT THERAPIES



~1/4th of SCS responders get effective pain relief from **only one mechanism**

WHISPER RCT:

- Sub-Perception SCS at $\leq 1.2\text{kHz}$ in a highly-disabled, previously-implanted cohort (n=140)





Responder rate increased 62% when patients could choose the most effective waveform options (post-hoc analysis)

Literature review: Cost savings

- ▶ SCS resulted in an annual cost savings of \$30,221 attributed to less ER visits, less diagnostic tests, and lower health care utilization ²⁰
- ▶ Cost of success for SCS was \$48,357 compared to cost for success with repeat spine surgery being \$105,928 ²⁰
- ▶ In a retrospective observational study of 762 patients healthcare resource utilization increased in the year following SCS implantation with longer pain-to-SCS time ²¹
- ▶ SCS not cost effective in peripheral arterial disease, questionable in angina pectoris

Literature review: Safety ²²

Long-term safety of spinal cord stimulation systems in a prospective, global registry of patients with chronic pain

Richard L Rauck , Eric Loudermilk, Simon J Thomson, Jose Francisco Paz-Solis, Louis Bojrab, John Noles, Jan Vesper, Joseph Atallah, Daniel Roth, Joseph Hegarty, Michel Prud'Homme, Gregory M Phillips, Stephen G Smith, Mohab Ibrahim, Channing D Willoughby, Jon B O Bray, Mayank Gupta, ... See all authors 

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 Sections  PDF/EPUB

 Tools  Share

Abstract

Aim: The availability of long-term (>2 years) safety outcomes of spinal cord stimulation (SCS) remains limited. We evaluated safety in a global SCS registry for chronic pain. **Methods:** Participants were prospectively enrolled globally at 79 implanting centers and followed out to 3 years after device implantation. **Results:** Of 1881 participants enrolled, 1289 received a permanent SCS implant (1776 completed trial). The annualized rate of device explant was 3.5% (all causes), and 1.1% due to inadequate pain relief. Total incidence of device explantation >3 years was 7.6% (n = 98). Of these, 32 subjects (2.5%) indicated inadequate pain relief as cause for removal. Implant site infection (11 events) was the most common device-related serious adverse event (<1%). **Conclusion:** This prospective, global, real-world study demonstrates a high-level of safety for SCS with low rate of explant/serious adverse events.

Literature Review Summary

- ▶ Safe
- ▶ Efficacious
- ▶ Cost effective for certain chronic pain syndromes
- ▶ Low risk profile
- ▶ Onset of chronic pain and time to implant correlate with outcomes
- ▶ Combination of paresthesia and paresthesia free stim is important
- ▶ Tremendous improvement in technology, therapy options and literature over the last decade!!!

Peripheral Nerve Stimulation









- ▶ Direct stimulation of nerves outside of the neuroaxis
- ▶ Early limitations
- ▶ Technological advancements (ultrasound)
- ▶ External battery system
- ▶ Great for localized, unilateral, single joint or extremity pain

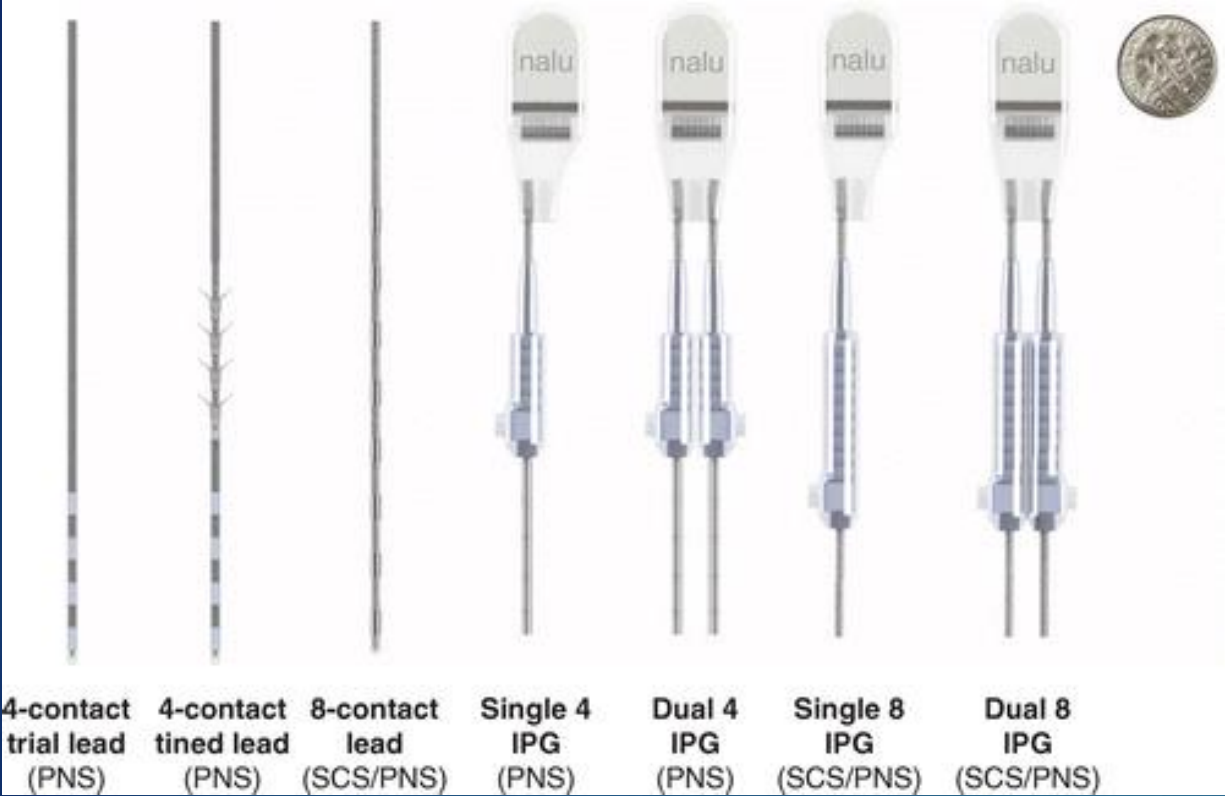
Patient Considerations

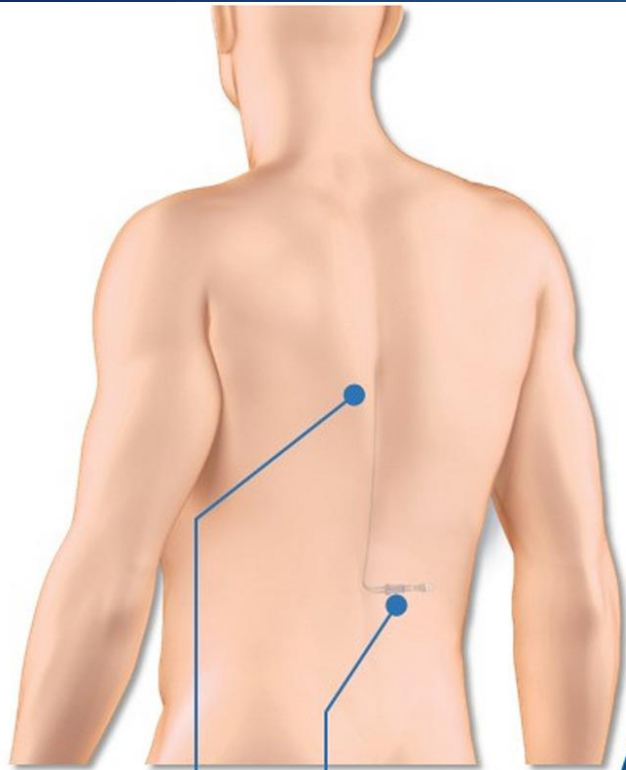
- ▶ Now an option to wear external battery
 - ▶ Fear of implanted battery
 - ▶ Body habitus/ cosmesis
 - ▶ Less invasive (1 scar vs 2 if used for SCS)
 - ▶ Easy to recharge battery
- ▶ Avoiding additional surgeries (battery replacements or system upgrades)
 - ▶ Younger patient less surgeries over lifetime
 - ▶ Lower cost over lifetime
- ▶ Possible pocket pain mitigation compared to SCS

Classes of IPG systems

	Primary Cell IPG	Rechargeable IPG	Micro-IPG
Size (Comparison to Scale)			
Incision / Scar Size			
Power Source	Battery inside IPG	Battery inside IPG	External/wearable battery
Expected IPG Service Life	~3-4 years ^{1,2}	~7-8 years ^{1,2}	18 years
Battery Replacement	Surgery required	Surgery required	N/A – external battery, no surgery required
Battery Management	Battery cannot be recharged	Variable battery recharge burden (daily to weekly) ³	External battery can be swapped with a fully charged one in <60 seconds

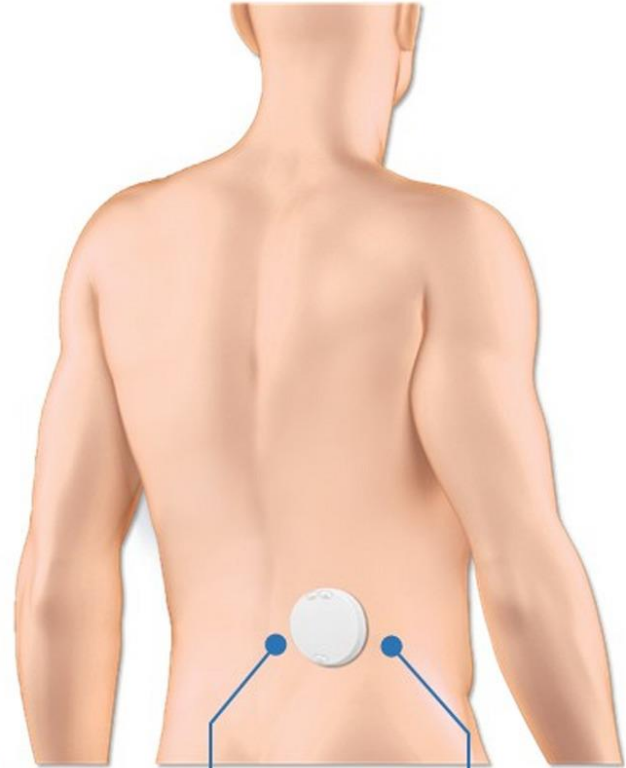
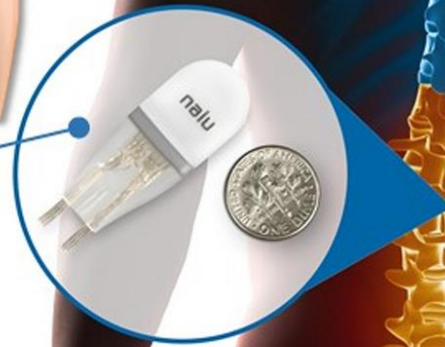
Equipment





Leads

mIPG



Adhesive
Clip



Therapy
Disk



PNS Targets

- ▶ Low back pain
 - ▶ Superior cluneal nerves
- ▶ Knee pain
 - ▶ Genicular Nerves or Saphenous nerve
- ▶ Shoulder pain
 - ▶ Suprascapular Nerve
- ▶ Foot and ankle pain
 - ▶ Sciatic, tibial and common peroneal

Literature

ORIGINAL ARTICLE

Peripheral Nerve Stimulation and Clinical Outcomes: A Retrospective Case Series

Nafiseh S. Warner , MD^{*†}; Kalli K. Schaefer, ^{*}; Jason S. Eldrige, MD[‡]; Tim J. Lamer, MD^{*}; Matthew J. Pingree, MD^{*•5}; Markus A. Bendel, MD^{*}; Matthew A. Warner , MD[§]; Richard H. Rho, MD^{*}; William D. Mauck, MD^{*}

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Abstract

Purpose: Peripheral nerve stimulation (PNS) is a rapidly expanding field within neuromodulation; however, there is limited data on therapeutic efficacy. This study describes the indications and clinical outcomes for patients undergoing PNS for chronic pain states.

Patients and Methods: This is a retrospective case series of adults undergoing PNS implantation from 2004 to 2017 at an academic medical center. The primary outcomes were changes in numeric rating scale (NRS) pain scores, opioid utilization in oral morphine milligram equivalent (MME), and

Results: A total of 72 patients underwent PNS implantation, including 59 patients that received a preceding PNS trial (59/78; 76% progression rate) and 13 that did not receive a PNS trial. The most common indication for stimulation was occipital neuralgia (47%) followed by lower-extremity neuropathies (17%). PNS implantation was associated with 6-month reductions in pain scores (7 [6, 8] baseline vs. 4 [2, 5] 6 months; $P < 0.001$) and opioid utilization (eg, median 60 [31, 104] vs. 18 [0, 52] MME among those with baseline opioid use; $P < 0.001$). Median functional improvement was 73% (50%, 88%). Seven patients (10%) suffered a postoperative surgical site infection at a median of 50 (30, 124) days, of which five

- ▶ Retrospective case series at Mayo Clinic 2020
- ▶ Reviewed a total of 72 patients who underwent PNS implant (largest sample size to date)
- ▶ Median pain score dropped from 7 (baseline) to 4 (6 months)
- ▶ Median MME dropped from 60 (baseline) to 18 (6 months)

Conclusion

- ▶ Broader understanding of SCS and PNS therapy
- ▶ Neuromodulation has been proven effective and safe
- ▶ Better patient selection based on indications and psychosocial screening, routine trial stimulation and advances in technology may result in long-term success for chronic pain
- ▶ Technology and data has drastically progressed over the last decade
- ▶ Not for everyone!!! (right patient for the right procedure)

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