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Implementing Vestibular Rehabilitation and Multidisciplinary Teams in a VA Setting

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Rachel Kansky, AuD



Patricia Gabbidon, AuD

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Rachel Kansky is a clinical audiologist. She began her career as a student trainee in the VA and transitioned to a full-time audiologist at the Miami VA in 2020. Dr. Kansky's areas of practice include vestibular diagnostics, vestibular rehabilitation therapy, aural rehabilitation, Whole Health, and telehealth. She also partakes in supervising 3rd and 4th year prospective doctoral students. She obtained her doctorate in Audiology from Nova Southeastern University.



Disclosures

- **Presenter Disclosures:** Financial: Patricia Gabbidon is employed by the Miami VA Healthcare System. Non-financial: Patricia Gabbidon has no relevant non-financial relationships to disclose. Financial: Rachel Kansky is employed by the Miami VA Healthcare System. Non-financial: Rachel Kansky: has no relevant non-financial relationships to disclose. In lieu of an honorarium, a donation has been made to AVAA in the form of AudiologyOnline CEU memberships.
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Learning Outcomes

After this course, participants will be able to:

- Identify key elements and considerations for implementing and/or refining a vestibular rehabilitation program.
- Discuss the benefits of having a VRT program, both within the organization and from a patient perspective.
- Classify the multidisciplinary team required by the type of suspected vestibular disorder.



What We Know

- 20 to 30% adults experience vertigo and dizziness, which only increases with age
- Economic burden can be as high as \$13,000 for those with bilateral vestibular hypofunction
- 1/3 adults experience a fall each year and the prevalence increases with age
- Vestibular rehabilitation therapy helps to reduce dizziness and fall risk in those with vestibular hypofunction
- VRT Goal: To help patients reduce symptoms of dizziness and regain confidence and independence

Miami VAHCS Vestibular Program

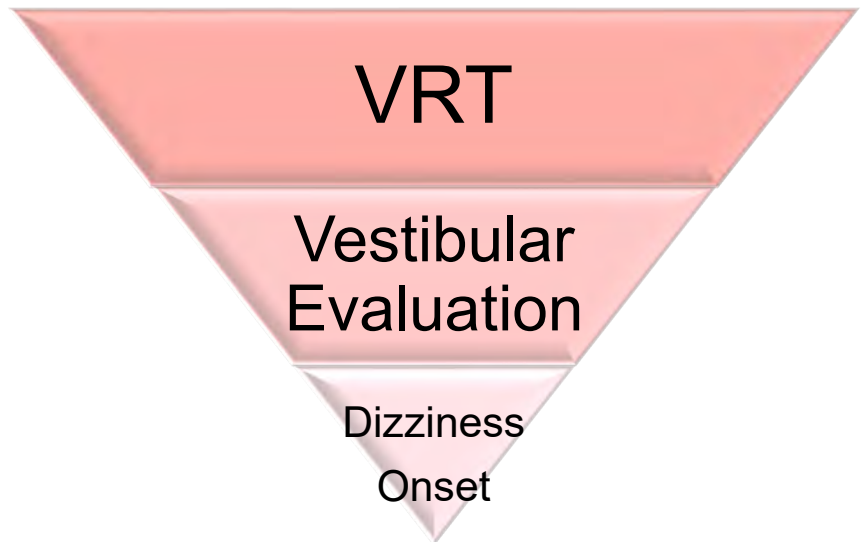
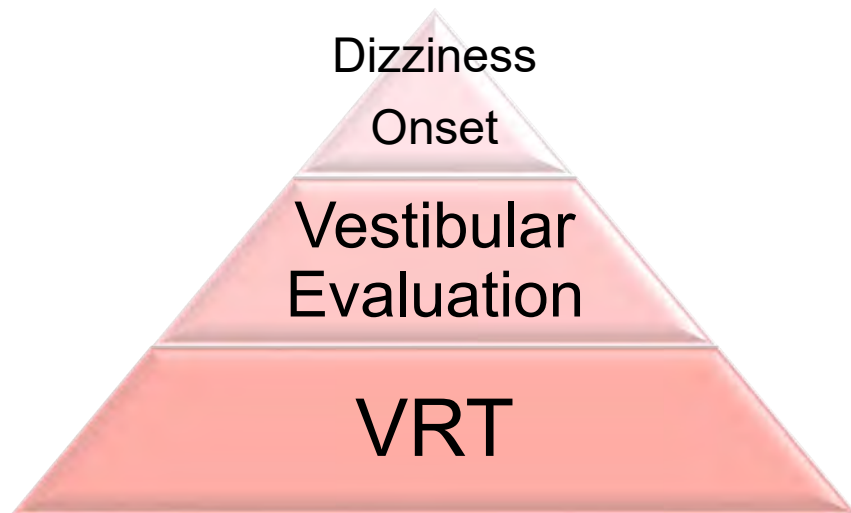
- VNG, vHIT, and VEMP testing offered at 2 facilities
- BPPV screening
- Vestibular Rehabilitation Therapy (VRT)
 - Offered since 2018
 - Face-to-face offered at two facilities
 - Virtual VRT
- Interdisciplinary Teams
 - Polytrauma/Traumatic Brain Injury
 - Functional Disorders Division
 - Speech Pathology

Comprehensive Vestibular Test Battery

- Otoscopy
- Tympanometry
- Sensory Organization Profile Test
- Video Head Impulse Test
- Videonystagmography
- Caloric testing –
monothermal/bithermal
- Cervical vestibular evoked myogenic potentials (cVEMP)
- Counseling and recommendations for care

Management of the Dizzy Patient

- Top Down vs Bottom Up Approach to Managing Vestibular Patients



Understanding the limitations of VRT and what it entails can help to better guide your approach to your vestibular evaluations regarding what to include for test battery and case history.

Key Elements

Of a Vestibular Rehabilitation Therapy Program



VRT: Inclusion Criteria

Fixed Vestibular Lesions

- Unilateral Vestibular Weakness
- Otolith pathologies
- Central Vestibular pathologies

VRT: Exclusion Criteria

Progressive and Inconsistent Vestibular Lesions

- Meniere's disease
- 3rd window pathologies

VRT: Special Considerations

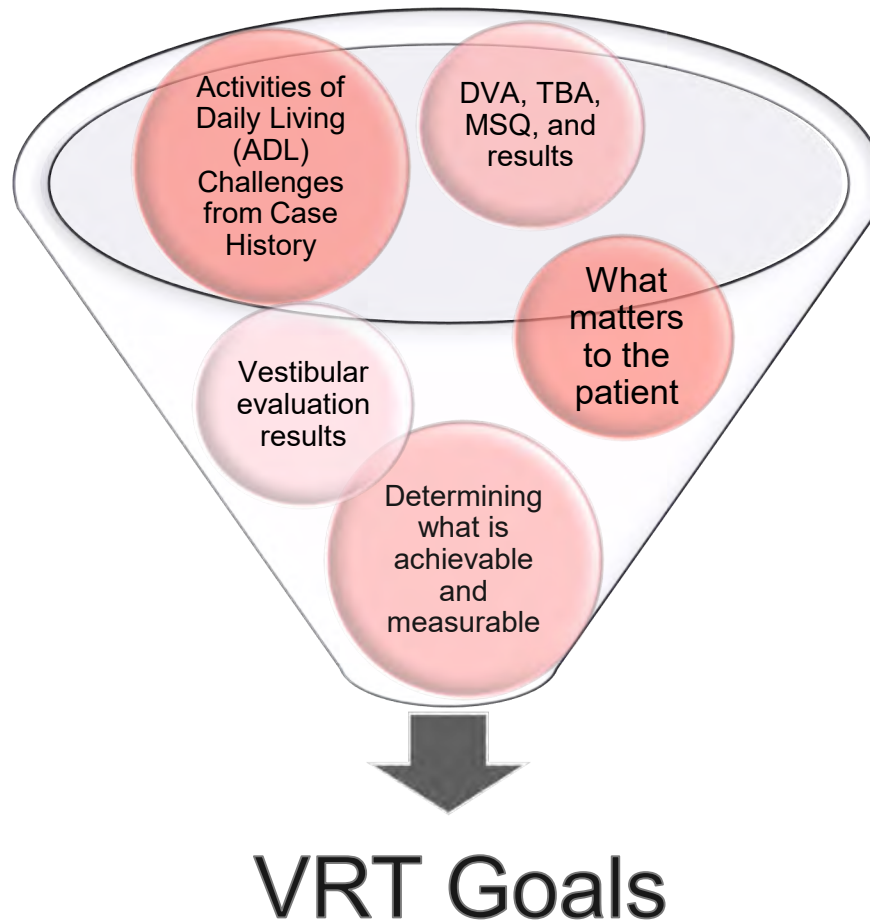
- Concussion and/or traumatic brain injury (TBI)
- Vestibular Migraines
- Bilateral Vestibular Weakness
- Persistent Postural-perceptual dizziness (PPPD)
- Mal de débarquement



VRT Initial

- Establishing a need for therapy
 - Determine where patient is in vestibular compensation journey
 - Case History
 - Baseline performance measures
 - Dynamic Visual Acuity (DVA)
 - Tinetti Balance and Gait Assessment (TBA)
 - Motion Sensitivity Quotient (MSQ)
 - Outcome measures
 - Baseline Outcome Questionnaire
 - DHI
 - Establishing goals
 - Manage expectations
 - VRT Contract

Establishing VRT Goals



VRT Contract

- Ensures patient enters program with realistic expectations
- Encourages patient compliance in program

Please identify in the columns below factors that may motivate you to commit to VRT and those that may prove to be obstacles that you know may get in the way of committing to VRT.

Motivating Factors	Obstacles



Types of VRT exercises

- Adaptation
 - Improves Vestibular Ocular Reflex (VOR) gain and gaze stabilization
 - Creating changes in the neuronal firing rate in response to head movements, reducing retinal slippage
 - Horizontal and vertical head rotations produce VOR changes
 - Incorporate various types of head movements to address various parts of vestibular system

Adaptation

- Exercise examples:
 - VOR x1
 - Patient turns head while focusing on a fixed target.
 - VOR x2
 - Target moves in the opposite direction of the head movement

VOR x1

Seated position

Standing position

Standing on Foam

Walking



VOR x2

Seated position

Standing position



Recommendation:

Gaze Stabilization Exercises

	Acute/Subacute Unilateral Vestibular Hypofunction	Chronic Unilateral Vestibular Hypofunction	Bilateral Vestibular Hypofunction
Frequency (at minimum)	3 to 5x/day	3 to 5x/daily	3 to 5x/daily
Duration	12 to 20 minutes daily	20 minutes daily	20 to 40 minutes daily
Length of Enrollment	2 to 3 sessions	4 to 6 weeks	5 to 7 weeks

Types of VRT exercises

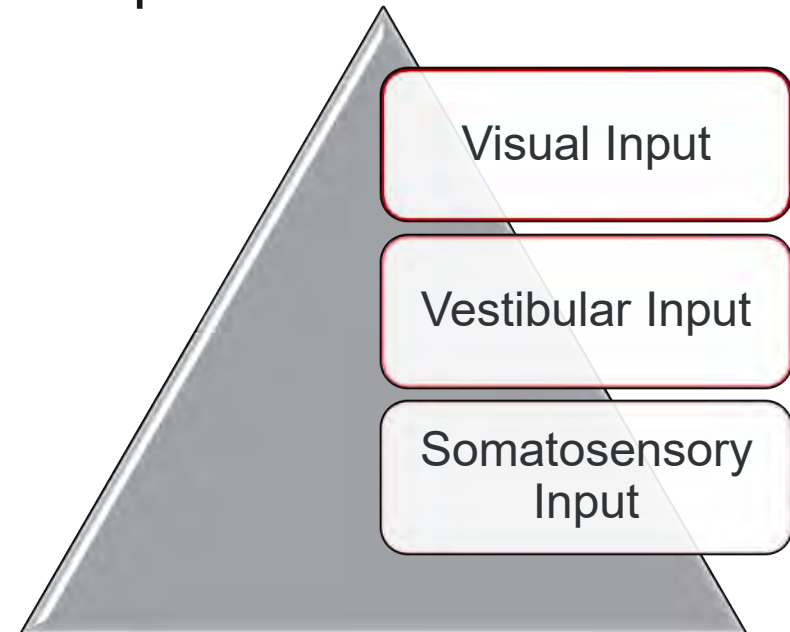
- Habituation
 - Repetitive movements that provoke a patient's symptoms
 - Caused by a decrease in the "amplitude of excitatory postsynaptic potential produced by the sensory neuron on the inter neuron and motor neuron."
 - Completed 1-2x/day with 30 second break between repetitions.
 - Select up to 4 movements to focus on per session
 - Be careful to avoid over-provoking the patient

Types of VRT Exercises

- Substitution
 - Use of other systems to substitute for vestibular loss
 - Proprioception
 - Postural Control Exercises
 - Visual
 - Saccades
 - Follow target with head and eyes
 - Smooth pursuit
 - Central Programming of eye movements
 - Maintaining gaze during anticipated head movements
 - Affected for low frequency head movements <1 Hz
 - Seen in patients with Normal Vestibular Function, Unilateral Weakness, and Bilateral Weakness
 - Cervico-ocular reflex (COR)
 - Adaptation exercises lower than 0.5 Hz

Types of VRT Exercises

- Postural Control Exercises also involve altering one of the sensory systems initially and later altering multiple sensory systems as balance improves.



Types of VRT Exercises

- Postural Control Exercises strategies used to recover balance:

Ankle Strategy

Wide Stance + Shift pressure from heel to toe + Sway

Utilized by patients with a vestibular weakness

Somatosensory Dependent

Upper/Lower parts of body move in same direction

Ankle Strategy Exercises:

Small sway back & forth, side-to-side while keeping body straight (no bend in hips or knees)

Patient can reach, lift, or throw an object

Narrow stance + movement around trunk and hips

Not utilized by patients with a vestibular weakness

Vestibular Dependent

Upper/Lower parts of body move in opposite direction, forward or backward

Hip Strategy Exercises:

Practice movement around trunk at various speeds without taking a step.

Can perform on dynamic surfaces

Patients can stand on narrow beam, tandem stance, or SLS

Hip Strategy

Selecting appropriate VRT exercises for patients: Special Considerations

- Vestibular Evaluation Results
- VRT Intake Case History
 - Activities of daily living (ADL) affected
- VRT Goals
- Patient's environment where ADLs are performed

Does one size fit all?



Special Considerations for Therapy

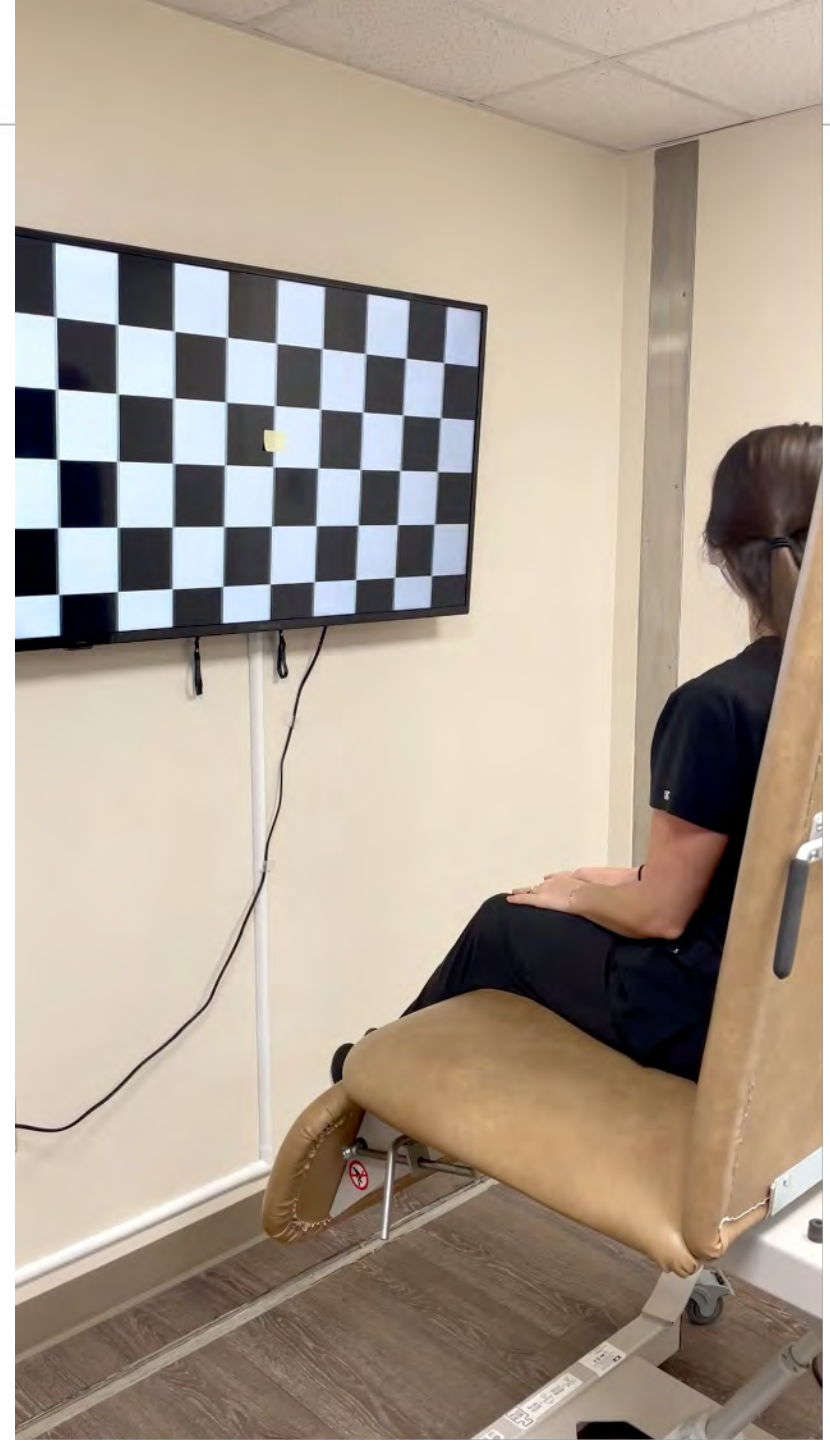
- Bilateral Weakness (BW)
 - Acute vs Chronic
 - Substitution exercises
 - COR reflex takes on the roll of VOR and helps with gaze stability
 - Smooth Pursuit
 - Assistive devices
 - Patients with a BW are at greater risk of falls
 - 65+ years of age with BW may want to consider assistive device especially in acute stage
 - Minimize dependency on assistive devices
 - Environment/ Behavior Modifications

Special Considerations for Therapy

- Otolith Organs
 - Prolonged head tilts
 - Bouncing on Swiss ball and/or trampoline
 - Patients with Vestibular weakness (VW) and otolith dysfunction perform similar post VRT to those with only vestibular weakness
- PPPD
 - Complex visual stimuli
 - Gate stabilization
 - Addressing Mental Health Component

Exercise

Example: PPPD



Varying VRT

- Gradually increase rate of movement
 - Habituation & Adaptation exercises
 - Greatest Improvements in VOR occurs at frequencies addressed
- Vary
 - Stimuli type
 - Fixed vs. moving
 - Background behind stimuli
 - Proprioceptive input



Metronome Apps

- Apple



Metronome 4+
Precision Metronome & Timer
ONYX Apps
Designed for iPad
#184 in Music
★★★★★ 4.7 • 22.5K Ratings
Free · Offers In-App Purchases
[View in Mac App Store](#)

- Android



Metronome Beats
Stonekick
4.7 ★

VRT Follow-up

- Duration of exercises
- Monitor progress
 - Review therapy goals
 - Review at-home exercises progress
 - Complete DHI
- Tailor exercises to patient's progress
- Patient compliance is key



How to determine discharge?

- Review factors that could be impeding improvement:
 - Medication & Age
 - These factors increase the amount of time before discharge from VRT, but no effect on therapy outcome
 - Avoidance of dizziness provoking movements and of light post vestibular pathology onset
 - Mental Health Status
 - Depression or Anxiety
- Disregarding Mythical Factors:
 - Early administration of treatment closer to onset of dizziness vs later
 - Longer duration of exercises vs shorter

How to determine discharge?

- Review Initial VRT results
- Evaluate patient-centered goals
- Compare DHI between sessions
- Discuss Contract
- Recognize plateau in therapy
- Observe potential symptom increase
- Remind yourself of the purpose for enrollment

Hybrid Model Exploration

During the COVID19 pandemic (and beyond)



VRT Modalities

- Face-to-face
- Virtual
- Hybrid
 - Initial VRT Face-to-face
 - Follow-up sessions are virtual



Exploration of Hybrid Modality

Follow-up VRT sessions included:

- Reviewing therapy goals
- Adaptation and habituation exercises tailored to Veteran's goals and performance on the MSQ and the DVA.
- Completion of the DHI (administered orally, via Secure Message, or by U.S. Post Service)



Exploration of Hybrid Modality

- At the initial VRT session:
 - Patients who were enrolled in the VRT program, opted to continue appointments in-person or participate via VVC (VRT-VVC).
- DHI measures and patient-performance data were recorded to monitor outcomes.
- Pending outcome measures and symptom resolution, veterans were discharged from Audiology service or referred to other services for further management, if needed.



Figure 1

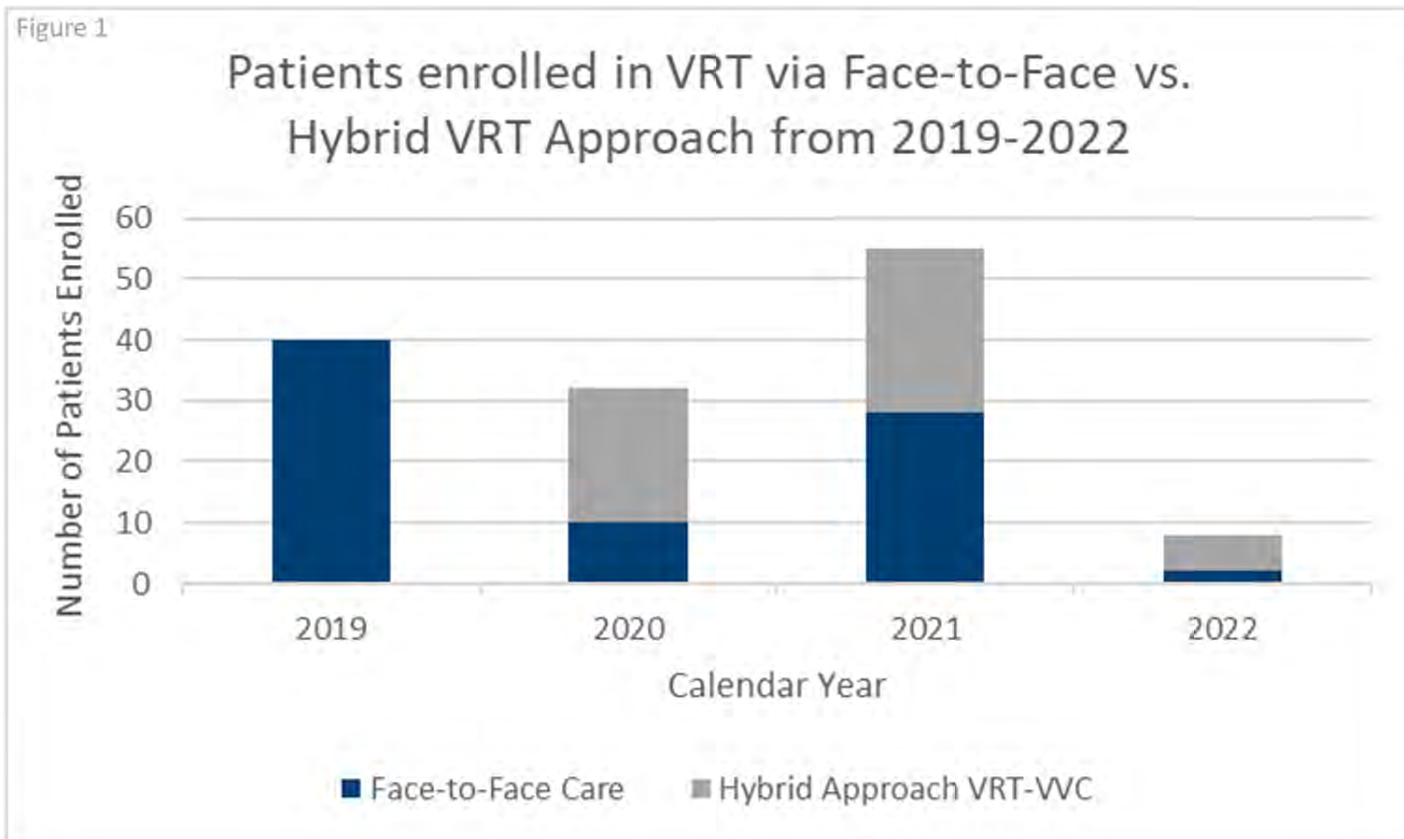
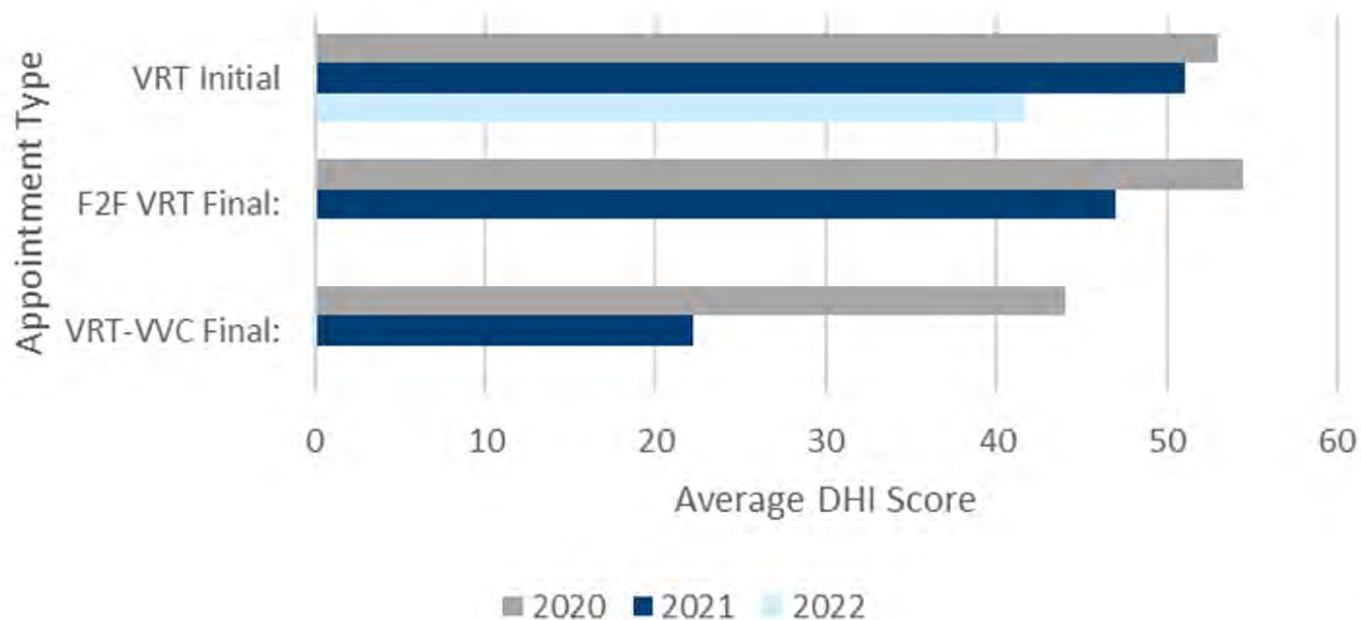


Figure 1. Miami VAHCS patients enrolled in VRT face-to-face and VRT-VVC Hybrid approach from 2019-2022.

Figure 2

DHI Scores Across Face-to-Face VRT and VRT-VVC Hybrid Approach Modalities



Exploration of Hybrid Modality

- As the years progressed, greater improvement between Initial DHI and Final DHI scores were noted.
 - These findings suggest that the VRT-VVC was feasible and beneficial for both clinicians and veterans.
- The Hybrid VRT-VVC approach provided services to some patients who may have otherwise deferred services due the following limitations:
 - Travel limits/restrictions
 - Risk of COVID19 exposure
 - Busy personal/work schedule

Exploration of Hybrid Modality

- Limitations of VRT-VVC may include:
 - Internet connectivity/reliability
 - Potentially skewed DHI results if questionnaire was verbally administered between clinician and veteran
 - Variable visualization of veterans' eyes (for nystagmus or catch-up saccades)
 - At-home distractions
 - Limited ability to intervene should patient's dizziness escalate

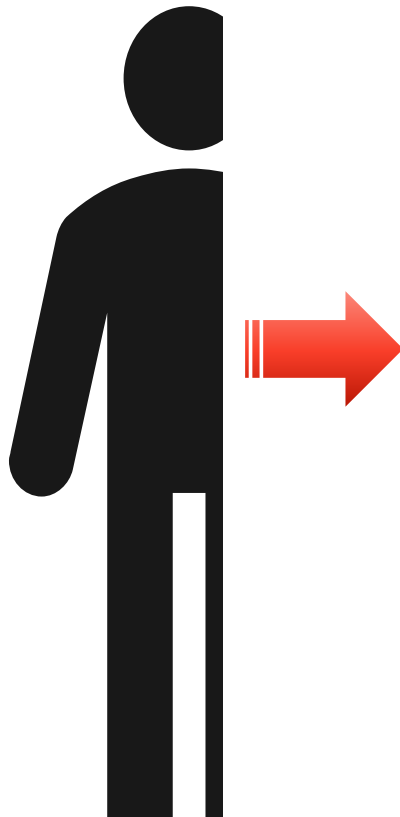


Exploration of Hybrid Modality

***VRT-VVC** served to be an **effective model** for **veterans** who were enrolled.*



The Patient Experience



"At home treatment is ideal due to transportation difficulty."

"VRT via VA Video Connect has allowed for much needed and appreciated treatment while safe guarding my life (exposure to COVID19)."

"I have reaped much benefit from VRT and am implementing what I've learned on my own."

"The ability to coordinate directly with the provider was extremely beneficial."

Multidisciplinary Approach

In the Vestibular Clinic



Which path to choose:

Audiology

or

Another
Service?

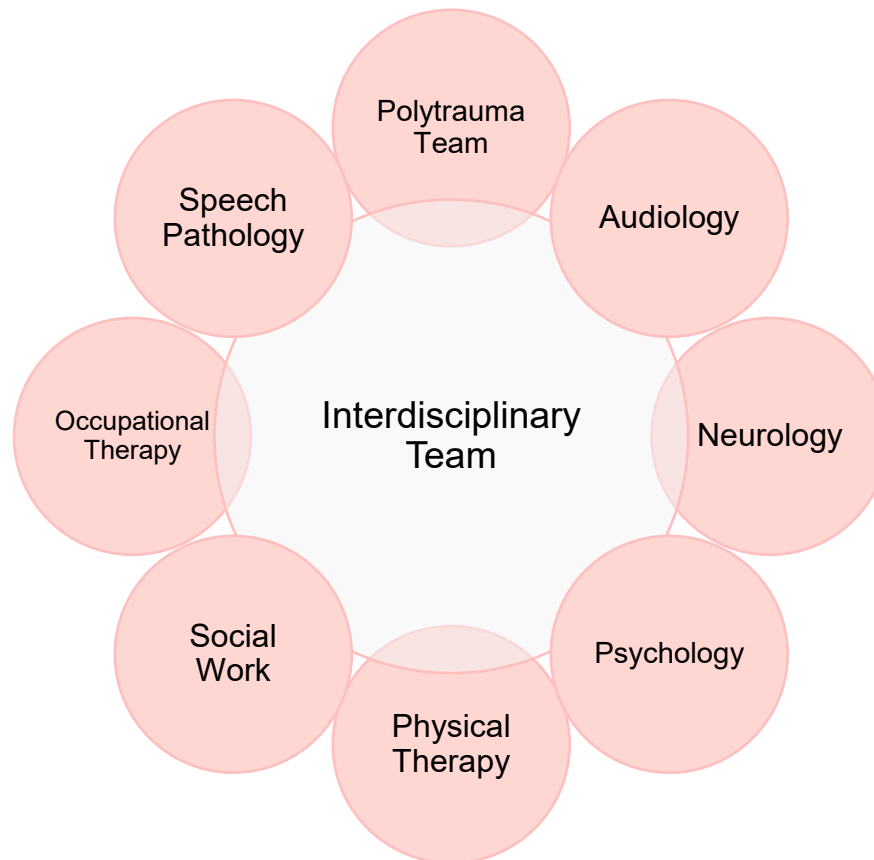


Importance of Multidisciplinary Relationships

- Medical management of chronic comorbid conditions
 - Diabetes Mellitus Type II
 - Hyper/hypotension
 - Migraines
 - Autoimmune Diseases
 - Anxiety
 - Depression
 - Traumatic head injuries/concussions
 - Non-vestibular balance pathologies
- Fall Prevention/Balance Training

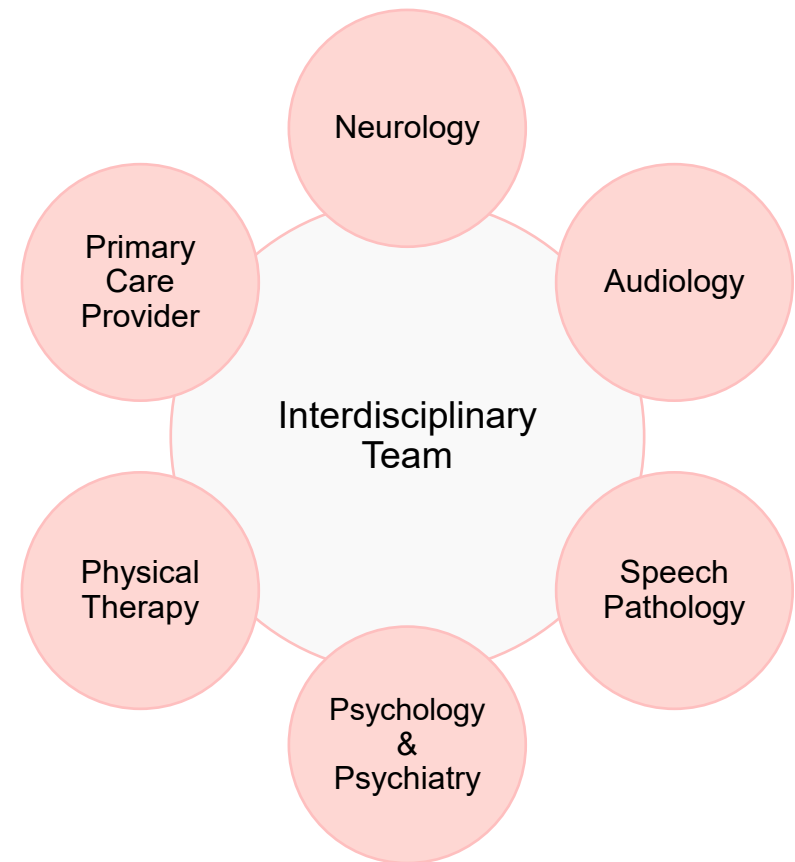


Polytrauma Interdisciplinary Team

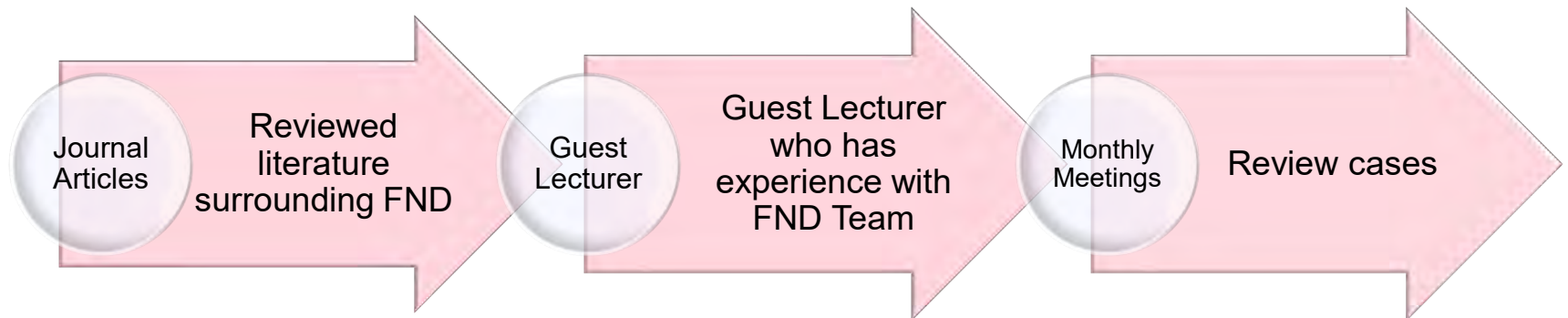


Functional Neurological Disorders (FND) Division

- Established 2022 at the Miami VA HCS
- 1st known FND division in the VA



Functional Neurological Disorders Division (FND)



Whole Health Wheel

*“It’s not what’s the matter **with** you,
but what matters **to** you.”*



Whole Health

- Recreational programs
- Whole Health group therapy
 - Miami VA Whole Health Program
- Mindfulness Meditation
 - Being present vs autopilot
 - Helps with a mangled mind
 - Choosing kindness
 - Accepting thoughts that may appear during meditation
 - No expectations for mediation
 - Taking time for yourself
 - Focused attention or open monitoring
- Support



Whole Health

- Patients may be referred to Whole Health for one-on-one coaching or group class formats
- Patients have the opportunity to focus on what matters to them and make themselves a priority
- Helping patients bring kindness and compassion inward



Tai Chi, Yoga, Mindfulness

Tai Chi and VRT both improve the balance systems in different ways

- Tai Chi increases lower extremity neuromuscular patterns
- VRT improves upper body movements

Yoga participants tend to have:

- Increase in CVEMP P1, N1, P1-N1 amplitudes when compared to non-yoga participants
- Reduction in CVEMP asymmetry ratio

Tai Chi, Yoga, Mindfulness

- Group treatment including mindfulness, cognitive behavioral practices, and Vestibular Rehabilitation Therapy resulted in participants having better "coping, functionality, and satisfaction and decreases overall health care utilization in vestibular patients."



Case Study

VRT Progression



Case Study: Case History

42-year-old male veteran seen for audiological and vestibular test battery in Miami clinic in September 2019

- Symptoms: Spinning, feeling like walls are moving around him, imbalance, “constantly moving,” nausea, fear of falling
 - Constant symptoms over the past 24-48 hours
 - Provoked by:
 - Driving
 - Rightward gaze
- Initial event: Playing video games with niece the night prior
- Pertinent medical history: Generally healthy/no known comorbid conditions



Case Study: Evaluation

DHI: 88/100

Abnormal Vestibular Test Results:

- Abnormal SOP Test
 - Condition 2: Sway to right
 - Condition 4-6: Fall
 - Fukuda Stepping Test: > 45 degree rightward turn
- Spontaneous right-beating nystagmus in both vision denied and vision enabled conditions
- Saccade testing: WNL

Case Study: Evaluation

DHI: 88/100

Abnormal Vestibular Test Results:

- Optokinetic stimuli: Symmetric but reduced
- Dix-Hallpike, Positional testing: Persistent right-beating nystagmus in most conditions
- Calorics: 31% left unilateral weakness
- vHIT: Low gain in the left lateral canal with covert and overt saccades observed

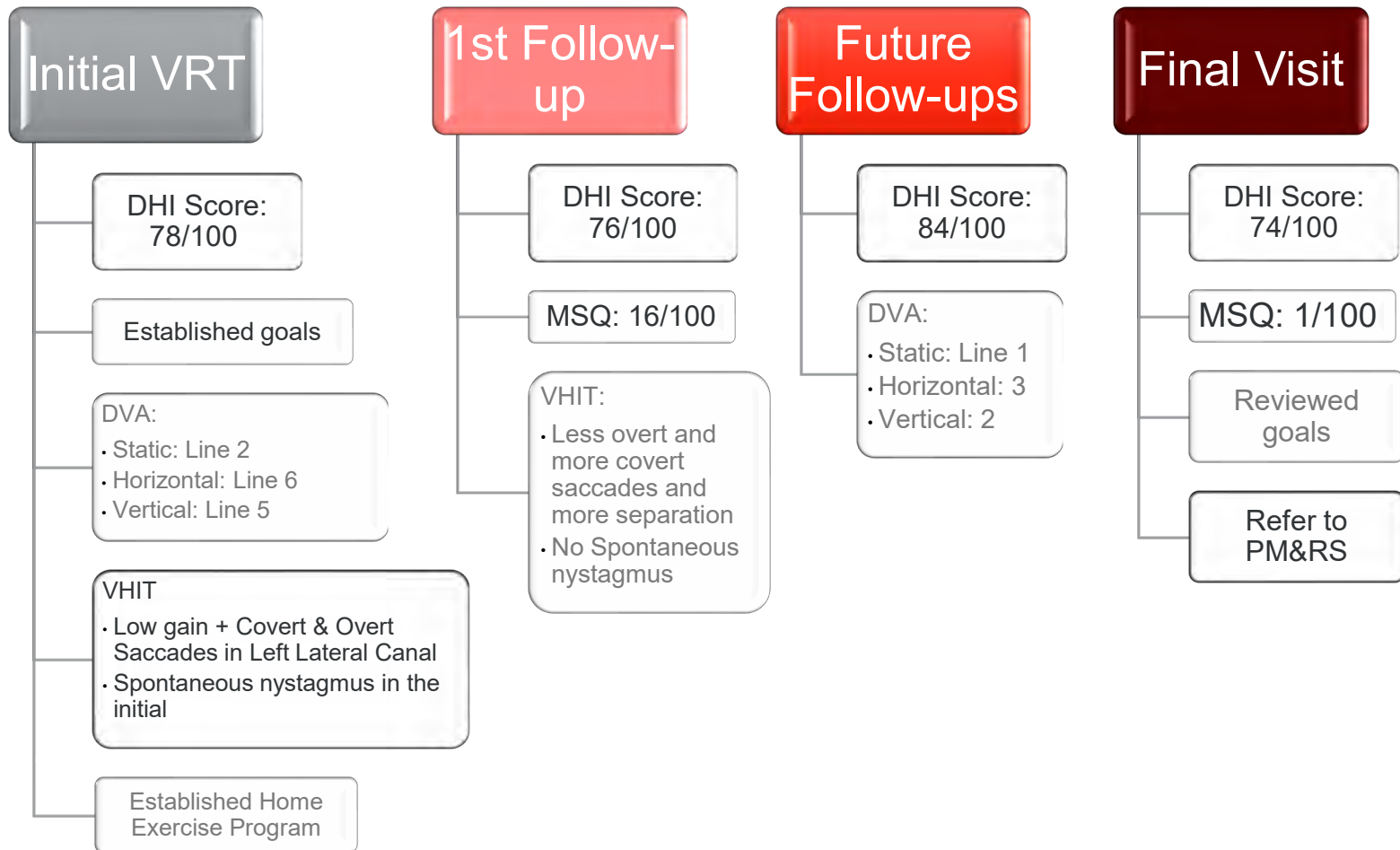
Case Study: Post Evaluation

Plan:

- Veteran referred to Vestibular Rehabilitation Therapy (VRT) with Audiology



Case Study: Session Overview

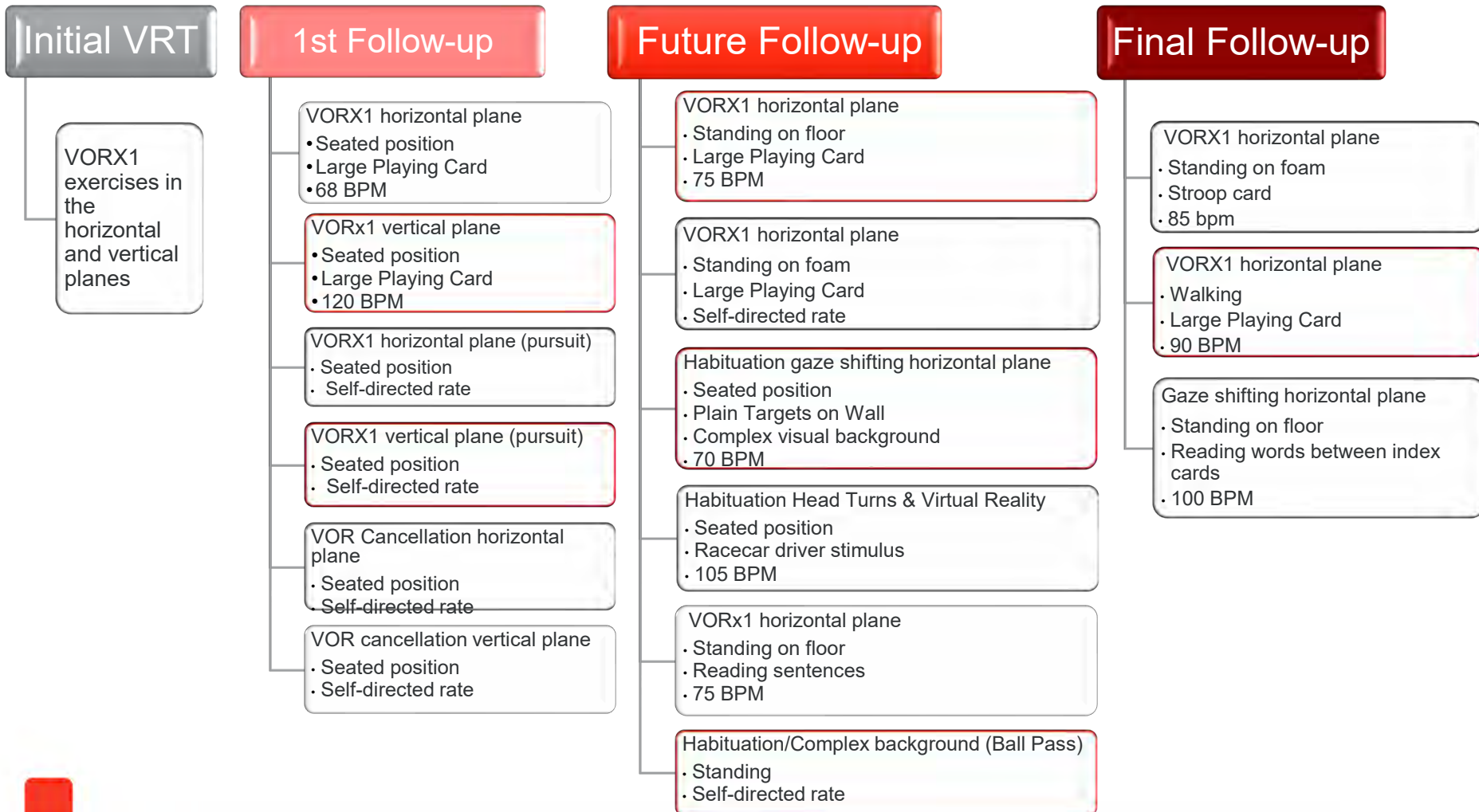


Case Study: Goals

- Goals established
 1. Be able to jog with limited to no dizziness
 2. Reduce fatigue due to dizziness
 3. Return to work (driving for transportation service)
- Exercise Progression:
 - Position: Seated, standing, standing on foam, walking
 - Target: Simple or Complex
 - Background: Plain or Busy
 - Speed: Slow or Fast

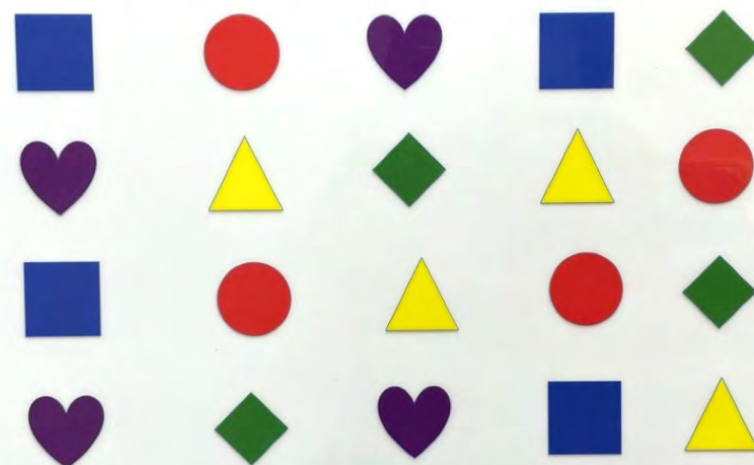


Case Study: Exercise Progression





BLUE	YELLOW	GREEN	RED
YELLOW	RED	BLUE	GREEN
RED	BLUE	GREEN	BLUE
GREEN	RED	YELLOW	GREEN



The neighbor who said business is better

Go change your car color is red

Agree with him only to find out

Battle cry and be better than

Women view men with gre

March around without

Forward March said

Small boat with a picture has become

Built the government with the force almost

March around without a care in your

Go change ve

Forw

Forward March said the boy had a

Battle cry and be better than ever

Down by the time is real enough

Agree with him only to find out



Summary

- Diagnosing AND treating your patient with dizziness can be a powerful tool
- VRT Program $\neq$ One size fit all
- The patient's motivation to comply with the home exercise program will help promote a positive prognosis
- A hybrid approach to VRT can be successful for the patient
- Creating a multidisciplinary team approach to help manage the vestibular/dizzy patient is critical to treat the patient as a whole



Thank you for attending!

Q & A



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