

SUMMARY OF VESTIBULAR SYSTEM DISORDERS

	BPPV	Vestibular Neuritis	Meniere's Disease	Fistula	Bilateral Vestibular Disorder
Vertigo	+	+	+	+	-
Type	Rotational	Rotational	Rotational	Rotational/ linear	-
Nystagmus	+	+	+	+	-
Duration	½-2 min.	48-72 hr.	30 min.-24 hr.	seconds	Permanent
Nausea	-/+	+	+	-	-
Postural ataxia	-/+	+	+	+	++
Specific symptoms	Onset latency, adaptation	Acute onset	Fullness of ear, hearing loss, tinnitus	Loud tinnitus, Tullio sign, Hennebert sign	-
Precipitating action	Positioning, turning in bed	-	-	Head trauma, ear surgery, sneezing, straining, nose blowing	-

Herdman, S.J., 1994. Vestibular Rehabilitation. Philadelphia: F.A. Davis Co.

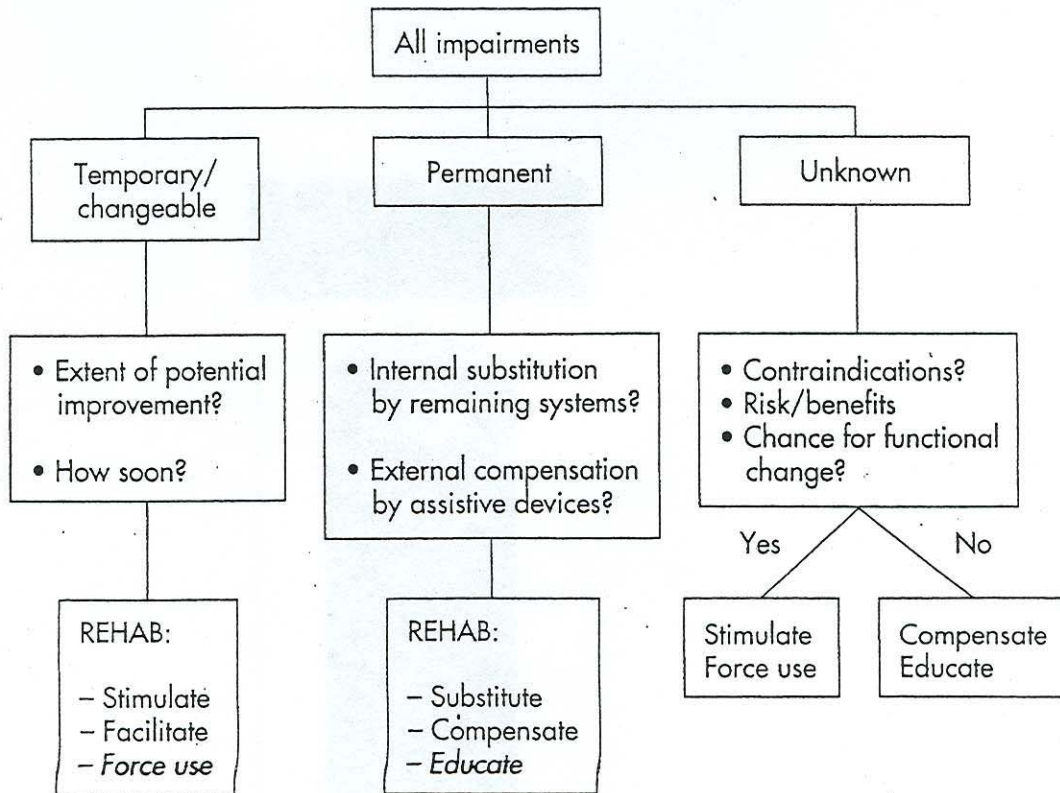
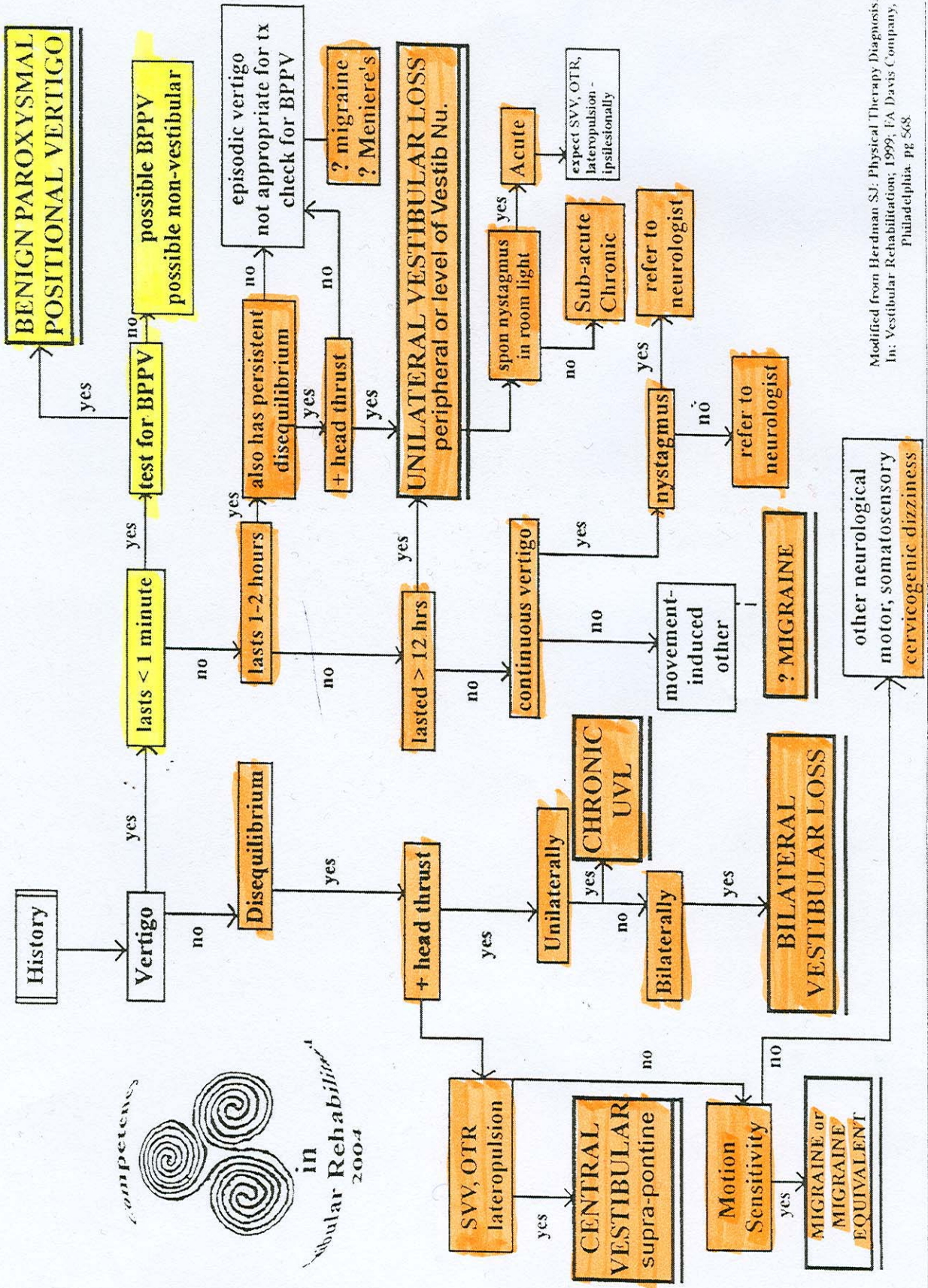


FIGURE 21-22. A clinical decision-making tree to illustrate the treatment-planning process in balance rehabilitation.

Umphred DA. *Neurological Rehabilitation*. 4th ed. St. Louis, MO: Mosby; 2001.

competence

 in
 Vestibular Rehabilitation
 2004



Modified from Herdman SJ: Physical Therapy Diagnosis. In: Vestibular Rehabilitation; 1999; FA Davis Company, Philadelphia. pg 568.

CM II
 CM III

Cawthorne-Cooksey Exercises for Patients with Vestibular Hypofunction

- A. In bed
1. Eye movements – at first slow, then quick
 - a. up and down
 - b. from side to side
 - c. focusing on finger moving from 3 ft. away from face
 2. Head movements at first slow, then quick; later with eyes closed
 - a. bending forward and backward
 - b. turning from side to side
- B. Sitting (in class)
1. and 2 as above
 3. Shoulder shrugging and circling
 4. Bending forward and picking up objects from the ground
- C. Standing (in class)
1. as A1 and A2 and B3
 2. Changing from sitting to standing position with eyes open and shut.
 3. Throwing a small ball from hand to hand (above eye level)
 4. Throwing ball from hand to hand under knee.
 5. Changing from sitting to standing and turning round in between.
- D. Moving about (in class)
1. Circle round centre person who will throw a large ball and to whom it will be returned.
 2. Walk across room with eyes open and then closed.
 3. Walk up and down slope with eyes open and then closed.
 4. Walk up and down steps with eyes open and then closed.
 5. Any game involving stooping and stretching and aiming such as skittles, bowls, or basketball.

Diligence and perseverance are required but the earlier and more regularly the exercise regimen is carried out, the faster and more complete will be the return to normal activity.

ACTIVITIES TO FACILITATE MOTOR COORDINATION

Methods of Promoting Ankle Strategy

Use small anteroposterior (AP) and mediolateral weight shifts, with hips extended on a variety of surfaces including a tilt board.

Alternate step-ups onto a small step without using a rail.

Use a Biomechanical Ankle Platform System (BAPS) board.

Alternate upper extremity flexion and extension.

Methods of Promoting Hip Strategy

Use large AP weight shifts on a variety of support surfaces.

Stand on a narrow support surface (i.e., balance beam).

Perform tandem standing and tandem walking.

Perform single-leg stance.

Strength and Coordination Exercises

Heel raises, toe raises.

Stationary biking, walking, jogging, rowing.

Isokinetics in functional patterns, including use of Kinetron®.

Rubber tubing exercises in standing.

Perturbations in standing, using functional electrical stimulation to augment synergic responses.

Movement classes (e.g., Tai Chi, modified aerobics, social dancing).

Activities to facilitate sensory organization for patients who demonstrate vestibular ocular reflex dysfunction or sensory selection problems.

Adapted from information presented by Ann Shumway-Cook, PhD, PT, at the Vestibular Rehabilitation course, Medical College of Ohio, Toledo, Ohio, February 1989.

VESTIBULAR SYSTEM TREATMENT SUGGESTIONS*

General body responses leading to relaxation

1. Slow rocking
2. Slow anterior-posterior: horizontal or vertical movement (chair, hassock, mesh net, swing, ball bolster, carriage)
3. Rocking bed or chair
4. Slow linear movements, such as in a carriage, stroller, wheelchair, or wagon
5. Therapeutic and/or gymnastic ball

Techniques to heighten postural extensors

1. Rapid anterior-posterior or angular acceleration
 - a. Scooter board: pulled or projected down inclines
 - b. Prone over ball: rapid acceleration forward
 - c. Platform or mesh net: prone
 - d. Slides
2. Rapid anterior-posterior motion in prone, weight-bearing patterns such as on elbows or extended elbows while rocking and crawling
3. Weight-shifting in kneeling, ½ kneel or standing

Facilitory techniques influencing whole body responses

1. Movement patterns in specific sequences
 - a. Rolling patterns
 - b. On elbows, extended elbows, and crawling: side by side, linear and angular motion
2. Spinning
 - a. Mesh net
 - b. Sit and spin toy
 - c. Office chair on universal joint
3. Any motor program that uses acceleration and deceleration of head
 - a. Sitting and reaching
 - b. Walking
 - c. Running
 - d. Moving from sit to stand

Combined facilitory technique: inverted tonic labyrinthine and inhibitory

1. Semi-inverted in-sitting
2. Squatting to stand
3. Total inverted vertical position

*Remember all of these treatment suggestions involve other input mechanisms and all aspects of the motor system and its components.

EXERCISES TO IMPROVE GAZE STABILITY

Enhance the Cervico-ocular Reflex

Tape a business card on the wall in front of you so that you can read it.
Move your head back and forth sideways, keep the words in focus.
Move your head faster but keep the words in focus. Continue to do this for 1-2 min. without stopping.
Repeat the exercise moving your head up and down.
Repeat the exercises using a large pattern such as a checkerboard (full-field stimulus).

Active Eye-Head Movements Between Two Targets

Horizontal Targets:

Look directly at one target being sure that your head is also lined up with the target.
Look at the other target with your eyes and then turn your head to the target (saccades should precede head movement).
Be sure to keep the target in focus during the head movement.
Repeat in the opposite direction.
Vary the speed of the head movement but always keep the targets in focus.
Note: Place the two targets close enough together that when you are looking directly at one, you can see the other with your peripheral vision. Practice for 5 min., resting if necessary. This exercise can also be performed with two vertically placed targets.

Imaginary Targets

Look at one target directly in front of you.
Close your eyes and turn your head slightly, imagining that you are still looking directly at the target.
Open your eyes and check to see if you have been able to keep your eyes on the target.
Repeat in the opposite direction. Be as accurate as possible.
Vary the speed on the head movement.
Practice for up to 5 min., resting if necessary.

Home Exercise Program
EXERCISES TO IMPROVE POSTURAL STABILITY

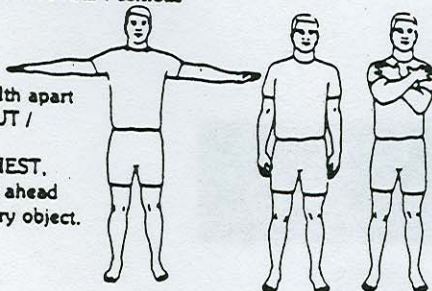
1. Practice walking
turning head from one side to the other
10 minutes, 3 times a day
2. Practice marching in place
eyes open, eyes closed
50 steps
3. Step Ups on a small step
move arms up and down as you step up and down
progress to performing above drill with eyes closed
4. Practice heel raises, toes raises
15 times each day
5. Practice rocking in a rocking chair
eyes open, eyes closed
6. Ball activities
basketball drills
soccer drills
7. Practice single leg standing
eyes open, eyes closed
progress to 30 second holds
8. Standing one leg in front of the other
eyes open, eyes closed
progress to 45 second holds
9. Perform above standing drills on a foam surface
use 2-3 inch foam surface, or a minitrampoline

Perform drills three times a day, spending at least 5 minutes on each session.

BALANCE DRILLS

STANDING STATIC Foot Apart: Varied Arm Positions

With feet shoulder width apart and arms OUT / AT SIDES / ACROSS CHEST, look straight ahead at a stationary object.

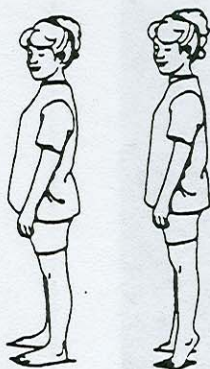


STANDING STATIC Eyes Closed: Feet Heel-Toe "Tandem"

Stand with RIGHT / LEFT foot directly in front of the other. Close eyes and visualize upright position. Perform with arms OUT / AT SIDES / ACROSS CHEST.



ANKLE/FOOT Standing Bilateral Heel Rise



ANKLE/FOOT

Standing Toe Raise

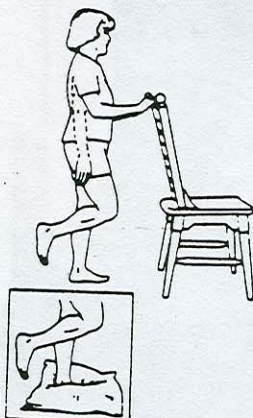
Rock back on heels.



STANDING STATIC Single Leg (Varied Surfaces)

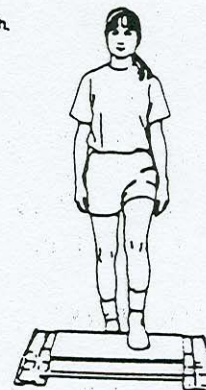
Holding on to support, lift RIGHT / LEFT leg up while maintaining balance over single leg.

Progress to removing hands from support surface for longer periods of time



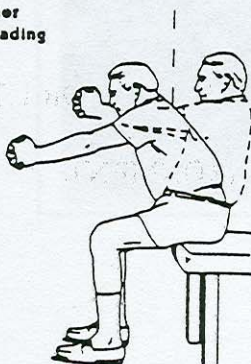
CLOSED CHAIN Proprioception, Quad Strength, Timing, Coordination: Forward Step-up

Move onto step, one foot then the other. Step back off the same way.



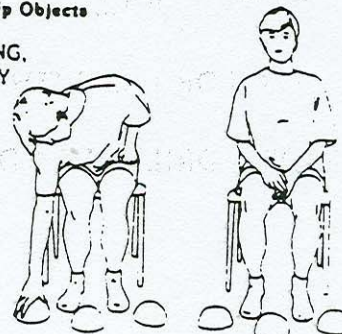
SITTING Unsupported Anterior / Posterior Weight Shift: Lower Trunk Leading

Sit with feet flat on floor, hands clasped together in front. Lean forward through hips bringing nose over knees. Return. Then lean backward through hips.



HABITUATION Bending / Picking Up Objects

SITTING / STANDING, SLOWLY / QUICKLY bend head down and pick up object placed on floor. Return to upright position.



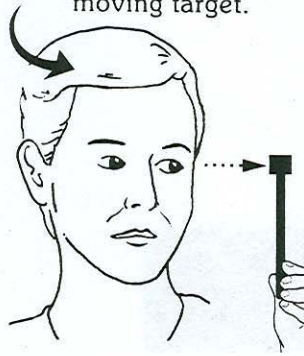
EYE EXERCISES - 2

Movements: Head / Eyes (Pictorial Reference)

Eyes fixed on target, head moves opposite direction of moving target.



Eyes fixed on target, head moves same direction as moving target.

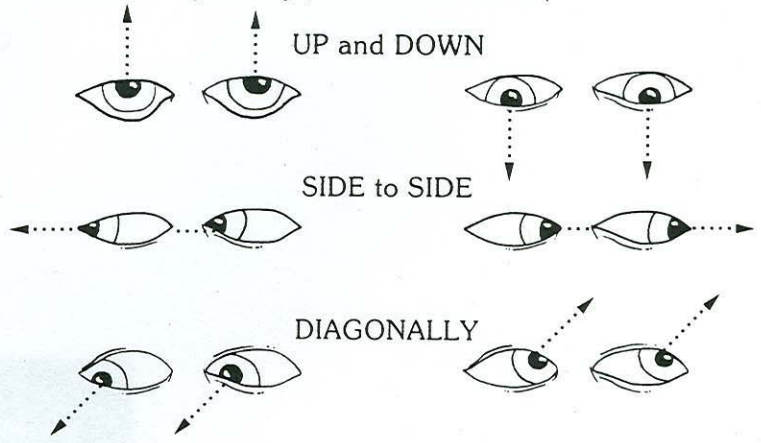


*Therapist: Use this card with Eye Exercise 3 and 4.

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EYE EXERCISES - 1

Movements: Eyes Only (Pictorial Reference)



*Therapist: Use this card with Eye Exercises 3 through 6.

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EYE EXERCISES - 4

Visuo-Vestibular: Head / Eyes Moving in Opposite Direction

Holding a single target, keep eyes fixed on target. Slowly move target UP-DOWN / SIDE TO SIDE / DIAGONALLY

while moving head in opposite direction of target for ___ seconds each direction.

Perform in _____ position.

Repeat ___ times per session. Do ___ sessions per day.

Repeat using full field stimulus _____.



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EYE EXERCISES - 3

Visuo-Vestibular: Head / Eyes Moving in Same Direction

Holding a single target, keep eyes fixed on target. Slowly move target, head and eyes in same direction UP-DOWN / SIDE TO SIDE / DIAGONALLY

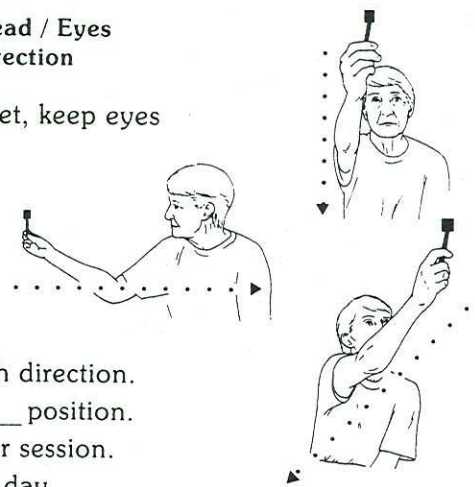
for ___ seconds each direction.

Perform in _____ position.

Repeat ___ times per session.

Do ___ sessions per day.

Repeat using full field stimulus _____.



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EYE EXERCISES - 6

Oculomotor: Saccades

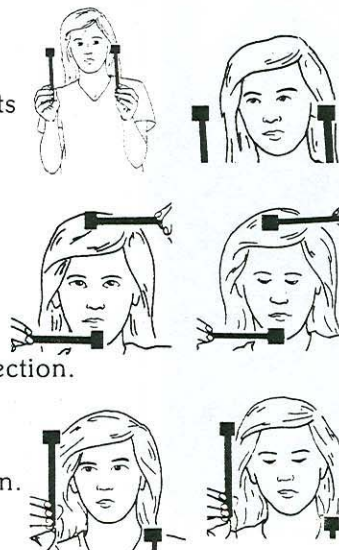
Holding two stationary targets placed ___ inches apart SIDE TO SIDE / UP-DOWN / DIAGONALLY, move eyes quickly from target to target as head stays still.

Move ___ seconds each direction.

Perform in _____ position.

Repeat ___ times per session.

Do ___ sessions per day.



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EYE EXERCISES - 5

Oculomotor: Smooth Pursuits

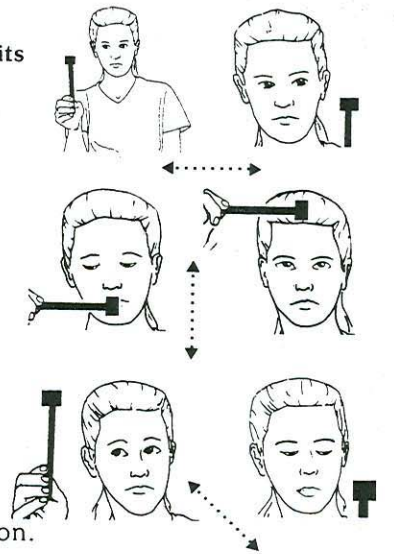
Holding a single target, keep eyes fixed on target. Slowly move it SIDE TO SIDE / UP-DOWN / DIAGONALLY while head stays still.

Perform in _____ position.

Move ___ seconds each direction.

Repeat ___ times per session.

Do ___ sessions per day.

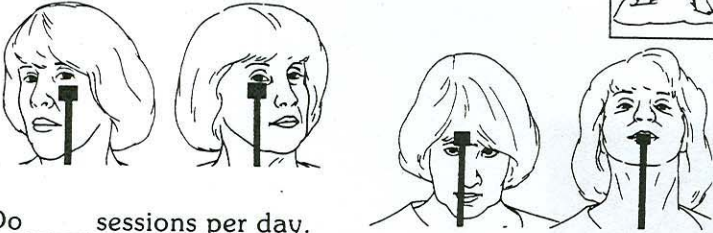


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EYE EXERCISES - 14

Gaze Stabilization: Standing Feet Apart (Compliant Surface)

On pillow with feet apart, keep eyes still on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



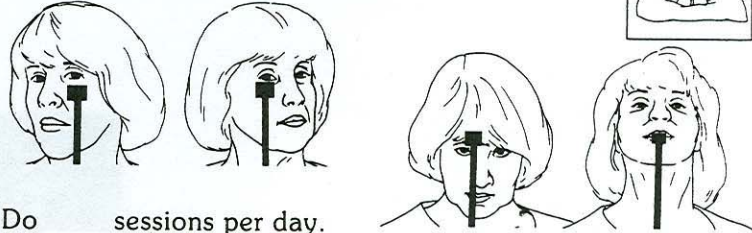
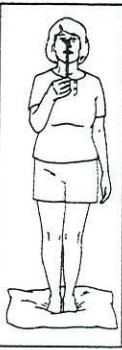
Do ___ sessions per day.

Repeat using full field stimulus _____ . Copyright VHI 1997 (BVS)

EYE EXERCISES - 15

Gaze Stabilization: Standing Feet Together (Compliant Surface)

On pillow with feet together, keep eyes still on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



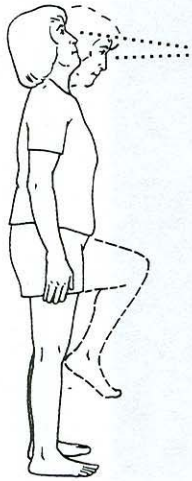
Do ___ sessions per day.

Repeat using full field stimulus _____ . Copyright VHI 1997 (BVS)

EYE EXERCISES - 17

Gaze Stabilization: Marching in Place

While marching in place on SOLID / COMPLIANT SURFACE _____, keep eyes fixed on a single stationary target placed on wall ___ feet away and move head up and down for ___ seconds. Repeat while moving head side to side for ___ seconds.



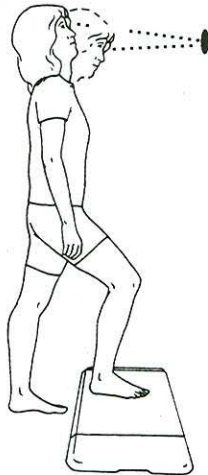
Do ___ sessions per day.

Repeat using full field stimulus _____ . Copyright VHI 1997 (BVS)

EYE EXERCISES - 16

Gaze Stabilization: Standing With Foot on Step

With RIGHT / LEFT foot on a ___ inch step, keep eyes fixed on a single stationary target placed on wall ___ feet away and move head up and down for ___ seconds. Repeat while moving head side to side for ___ seconds.



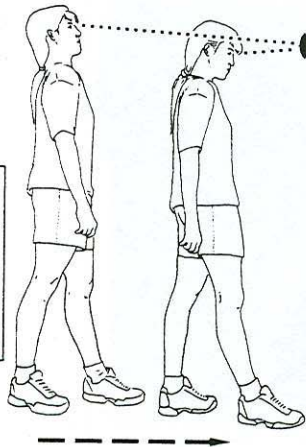
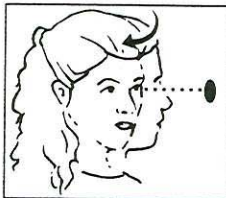
Do ___ sessions per day.

Repeat using full field stimulus _____ . Copyright VHI 1997 (BVS)

EYE EXERCISES - 18

Gaze Stabilization: Walking Toward Target

Keeping eyes fixed on a single stationary target, walk toward target placed on wall ___ feet away at eye level. Moving head up and down for ___ seconds. Repeat while moving head side to side for ___ seconds.



Do ___ sessions per day.

Repeat using full field stimulus _____ . Copyright VHI 1997 (BVS)

EYE EXERCISES - 8

Gaze Stabilization: Tip Card

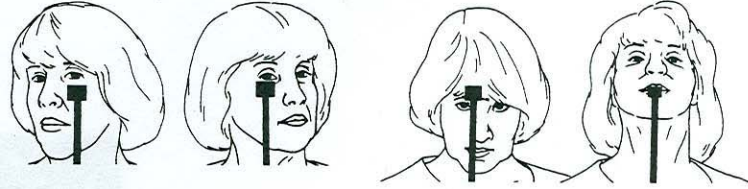
1. Target must remain in focus, not blurry, and appear stationary while head is in motion.
2. Perform exercise with small head movement (45° to either side of midline).
Speed of head motion should be increased as long as target remains in focus.
4. If you use glasses, wear them while performing exercises.
5. These exercises may provoke symptoms of dizziness or nausea. Work through these symptoms. If too dizzy, slow head movement down slightly. Rest between each exercise.
6. Exercises demand concentration, avoid distractions.
7. For safety, standing exercises must be performed close to a counter or next to someone.

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EYE EXERCISES - 9

Gaze Stabilization: Sitting

Keep eyes fixed on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



Do ___ sessions per day.

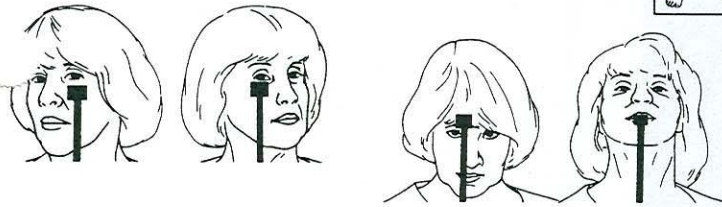
Repeat using full field stimulus _____.

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EYE EXERCISES - 10

Gaze Stabilization: Standing Feet Apart

Keep eyes fixed on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



Do ___ sessions per day.

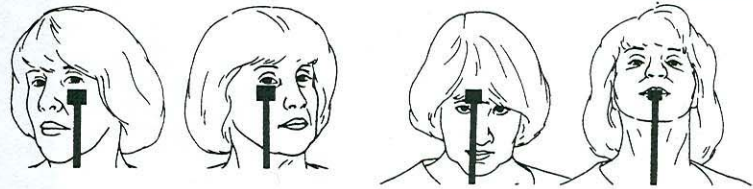
Repeat using full field stimulus _____.

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EYE EXERCISES - 11

Gaze Stabilization: Standing Feet Together

Keep eyes fixed on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



Do ___ sessions per day.

Repeat using full field stimulus _____.

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EYE EXERCISES - 12

Gaze Stabilization: Standing Feet Partial Heel-Toe

With feet in partial heel-toe position keep eyes fixed on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



Do ___ sessions per day.

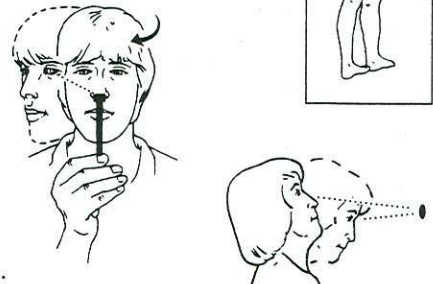
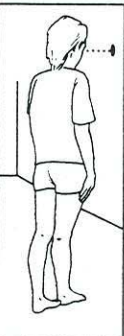
Repeat using full field stimulus _____.

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EYE EXERCISES - 13

Gaze Stabilization: Standing Feet Heel-Toe Tandem

With feet in full heel-toe position keep eyes fixed on single stationary target held in hand or placed on wall ___ feet away and move head side to side for ___ seconds. Repeat while moving head up and down for ___ seconds.



Do ___ sessions per day.

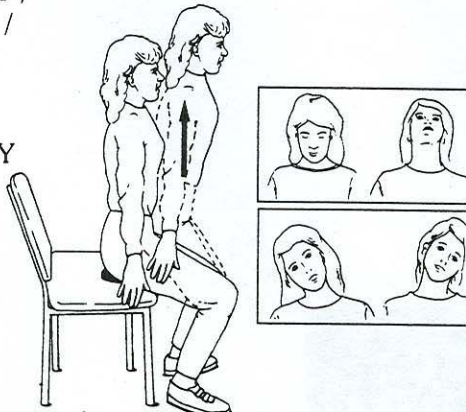
Repeat using full field stimulus _____.

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OTOLITH STIMULATION - 1

Sit to Stand: Varied Speeds (With Head Tilts)

With head UPRIGHT /
or tilted FORWARD /
BACKWARD /
RIGHT / LEFT,
stand up
SLOWLY / QUICKLY
with eyes
OPEN / CLOSED.



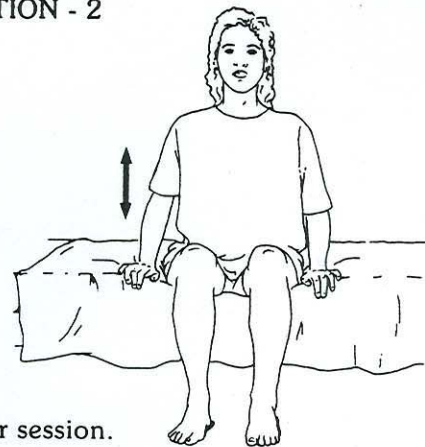
Repeat ___ times per session.
Do ___ sessions per day.

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OTOLITH STIMULATION - 2

Bouncing: On Bed

While sitting
at edge of bed,
bounce up and down
with eyes
OPEN / CLOSED.



Repeat ___ times per session.
Do ___ sessions per day.
 Repeat with eyes fixed
on stationary target.

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OTOLITH STIMULATION - 3

Jumping: In Place

Jump in place
with eyes
OPEN / CLOSED.



Repeat ___ times per session.
Do ___ sessions per day.

Repeat with eyes fixed on stationary target.

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OTOLITH STIMULATION - 4

Head Tilt: Forward

Maintain head
tilted forward,
while performing
exercise(s)* _____

_____.



**Therapist: On a copy of this card, fill in titles and numbers of exercises patient is to perform with this head position. Then photocopy that copy along side corresponding exercise cards.*

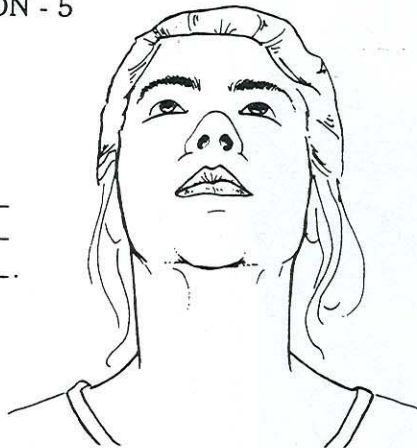
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OTOLITH STIMULATION - 5

Head Tilt: Backward

Maintain head
tilted backward,
while performing
exercise(s)* _____

_____.



**Therapist: On a copy of this card, fill in titles and numbers of exercises patient is to perform with this head position. Then photocopy that copy along side corresponding exercise cards.*

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OTOLITH STIMULATION - 6

Head Tilt: Lateral

Maintain head tilted to RIGHT / LEFT
while performing exercise(s)* _____
_____.



**Therapist: On a copy of this card, fill in titles and numbers of exercises patient is to perform with this head position. Then photocopy that copy along side corresponding exercise cards.*

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HABITUATION - 1

Tip Card

1. Goal of habituation training is to assist in decreasing symptoms of vertigo, dizziness, or nausea provoked by specific head and body motions.

These exercises may initially increase symptoms; however, be persistent and work through symptoms. With repetition and time the exercises will assist in reducing or eliminating symptoms.

3. Exercises should be **stopped / discussed** with instructor if you experience any of the following:

- Sudden change or fluctuation in hearing.
- New onset of ringing in ear, or increase in current intensity.
- Any fluid discharge from ear.
- Any pain in ear.
- Severe pain in neck or back.

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HABITUATION - 2

Long Sitting to Lying on Back

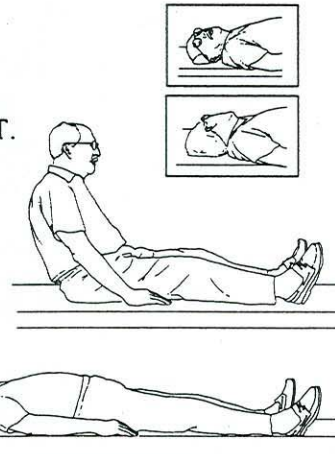
Sit with legs extended, head UPRIGHT and CENTERED / ROTATED 45° TO RIGHT / LEFT. SLOWLY / QUICKLY

lie on back without pillow and maintain position until symptoms subside, plus _____ seconds.

Get up SLOWLY / QUICKLY and maintain this position until symptoms subside, plus _____ seconds.

Repeat entire sequence _____ times per session.

Do _____ sessions per day.

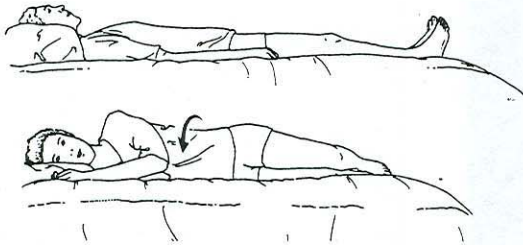


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HABITUATION - 3

Rolling

With pillow behind head, start on BACK / RIGHT / LEFT side. Roll SLOWLY / QUICKLY onto RIGHT / LEFT side. Maintain position until symptoms subside, plus _____ seconds. Return SLOWLY / QUICKLY onto back.



Repeat entire sequence _____ times per session.

Do _____ sessions per day.

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HABITUATION - 4

Diagonals

SITTING / STANDING SLOWLY / QUICKLY

bring head down with nose in direction of RIGHT / LEFT knee. Maintain position

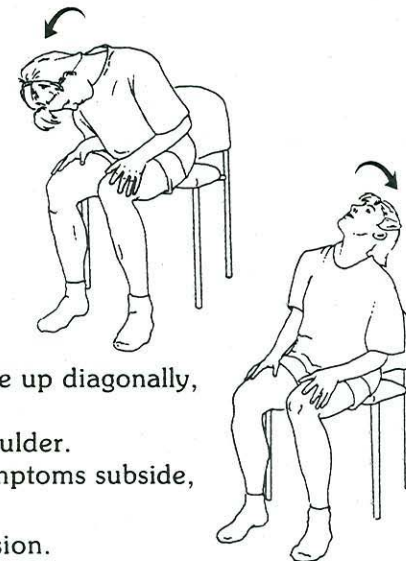
until symptoms subside, plus _____ seconds.

SLOWLY / QUICKLY come up diagonally, extending back of head toward RIGHT / LEFT shoulder.

Maintain position until symptoms subside, plus _____ seconds.

Repeat _____ times per session.

Do _____ sessions per day.



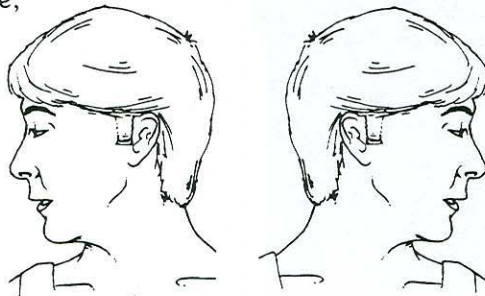
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HABITUATION - 5

Head Motion: Side to Side

While in _____ position, tilt head down 30°, SLOWLY / QUICKLY move head RIGHT / LEFT with eyes OPEN / CLOSED.

Let symptoms subside, plus _____ seconds, with each repetition.



Repeat _____ times per session.

Do _____ sessions per day.

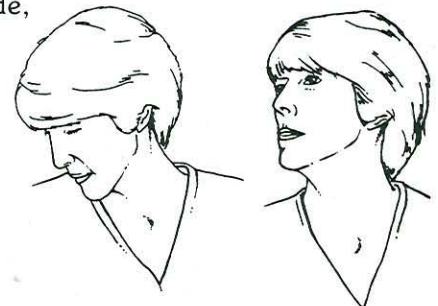
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HABITUATION - 6

Head Motion: Up / Down

While in _____ position, turn head 45° to RIGHT / LEFT. SLOWLY / QUICKLY move head UP / DOWN with eyes OPEN / CLOSED.

Let symptoms subside, plus _____ seconds, between each repetition.



Repeat _____ times per session. Do _____ sessions per day.

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