Gaze Nystagmus Test
Walk-and-Turn Test
One-Leg Stand Test

Improved Sobriety Testing

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

CONTENTS

INTRODUCTION

The purpose of this Manual is to acquaint you with the most effective procedures for testing drivers at roadside to determine whether or not they are intoxicated. Police officers generally evaluate a driver's physical appearance and condition while he is still seated in the vehicle. This evaluation typically includes: 1) breath odor; 2) condition of the eyes; 3) demeanor; 4) color of the face; 5) dexterity; 6) speech; and 7) clothing. Further testing is usually given only if these preliminary evaluations cause the officer to be suspicious.

The sobriety tests contained in this training program were selected from those used by police officers throughout the country and were refined by research scientists to make them as reliable as possible in determining alcohol intoxication.

The testing and scoring procedures were standardized and the tests were evaluated in the laboratory and in the field. In the laboratory, 441 subjects were dosed to BAC levels between 0.10% and 0.19% and their performance on the three tests were scored by police officers. The scores were compared with the subjects' actual BAC's to determine how well the tests could be used to classify a suspect's BAC as above or below 0.10%. The accuracy of the tests were: Gaze Nystagmus—77%, Walk and Turn—68%, combined Gaze Nystagmus and Walk and Turn—80%, and One Leg Stand—65%.

In addition, a field evaluation was performed using Arlington County, (Virginia) and Washington, D.C., Police; and Maryland and North Carolina State Police. These agencies stopped more than 1,500 drivers for suspicion of DWI during the field evaluation. The results of a PBT, when available, were compared to the suspects' scores on the tests. The accuracy of the tests to classify a suspect's BAC as above 0.10% were: Nystagmus Gaze—82%, Walk and Turn—80%, combined Nystagmus Gaze and Walk and Turn—83%, and One Leg Stand—78%.

Although these tests are not meant to replace other tools, careful testing and scoring in accordance with the procedures outlined in this Manual will enable officers to determine the blood alcohol concentrations of 0.10 percent or more *at roadside.*

To assist officers in the learning and practice of these testing techniques, we have prepared a video tape which explains and illustrates the tests. The last part of this tape consists of practice segments in which viewers, using the score sheets at the back of this Manual, may evaluate the performance of intoxicated volunteers. In addition, the Manual explains proper testing, scoring, and decision criteria of the tests so that the material may be studied and reviewed periodically.

We suggest that you read the Manual and familiarize yourself with the scoring procedures before you view the tape. Then watch the video presentation and practice scoring the volunteers. If there is any discrepancy between your scores and those given at the end of each case, we suggest that you spend additional time in review and practice.

OVERVIEW OF THE THREE TESTS

The three tests you will study are the *Gaze Nystagmus Test,* the *Walk-and-Turn Test,* and the *One-Leg-Stand Test.* If the standardized testing and scoring procedures presented in this Manual are not followed, the decision making guidelines will not be accurate.

Of the three tests, the gaze nystagmus is the least known. It is also the most accurate in pinpointing alcohol impairment. *Nystagmus* means a jerking of the eyes. *Horizontal gaze nystagmus* refers to a jerking of the eyes as they gaze to the side. Many people will show some nystagmus (or jerking) if their eyes track to the extreme side. However, as people become intoxicated, the onset of the jerking occurs after fewer degrees of turning, and the jerking at more extreme angles becomes more distinct. With practice, you will be able to use this phenomenon to gauge intoxication.

The other two tests are more familiar to officers, but for these tests they have been modified for greater reliability. The modified Walk-and-Turn Test consists of two parts. The first part requires the suspect to balance heel-to-toe while listening to instructions. In other words, he must do two things at once—*balance* and *listen.* For an intoxicated person, doing two things at once is very difficult. The second part of the test requires that he take nine steps down a straight line, turn, and take nine steps back.

The third test, the One-Leg Stand, requires the suspect to stand on one leg for approximately 30 seconds. The time requirement is important, because it makes the test sensitive to drivers with BAC's in the 0.10 percent to 0.15 percent range, who may pass the test if they only have to balance for 15 to 20 seconds.

Each test in this battery requires that you clearly instruct the suspect and demonstrate what he is to do. In addition, you must pay close attention to certain aspects of the suspect's performance. All instructions are given with reference to a male suspect, but the procedure for a female suspect is the same.

As with any field sobriety testing, these tests should be given outside the vehicle in an area that is well lighted, suitable for standing and walking, and safe from traffic. Inform the suspect that you are going to administer a set of tests to determine if he is under the influence of alcohol. Be sure to mention that part of your evaluation will be based upon how well he follows instructions and performs exactly as demonstrated.

Now let's consider the tests one at a time.

GAZE NYSTAGMUS TEST

Instructions

How the test works

As explained earlier, nystagmus means a jerking of the eyes. There are a number of different kinds of nystagmus, all of them influenced by alcohol. The test you will use at roadside is a test of "horizontal gaze nystagmus"—the nystagmus that occurs when the eyes gaze to the side. Many people will show some jerking if the eyes move far enough to the side. In intoxication, however, three signs will be observed:

1) The jerking of the eyes occurs much sooner. That is, the more intoxicated a person becomes, the less he has to move his eyes to the side in order for the jerking to occur.
2) If you have a suspect move his eyes as far to the side as possible, you can estimate in a general way the extent of intoxication. The greater the alcohol impairment, the more distinct the nystagmus will be in the extreme gaze position.
3) If the suspect is intoxicated, he cannot follow a slowly moving object smoothly with his eyes.

Estimating a 45-Degree Angle

Since the extent of impairment is indicated by the angle at which nystagmus begins, you will need to learn how to estimate this angle... particularly the angle of 45-degrees, since that is the crucial point for estimating BAC.

The page after the score sheets contains a square template you can use for practice. Cut this template out and attach it to a square of cardboard the same size for support.

To use this device, hold it up so that the person's nose is above the diagonal line. Be certain that one edge of the template is centered on the nose and perpendicular to (or,

at right angles to) the face. Have the person you are examining follow a penlight or some other item until he is looking down the 45-degree diagonal. Note the position of his eye. With practice, you should be able to recognize this angle without using the template.

Examine the eyes of four or five people, so that you become familiar with what a 45-degree angle of gaze looks like. Next, practice without the device, but check your estimates periodically.

Practice until you can consistently estimate 45 degrees. Check yourself monthly with the device to be sure that your accuracy has been sustained.

Specific Procedures

Give the suspect the following instructions from a position of interrogation (that is, with your weapon away from the suspect):

I AM GOING TO CHECK YOUR EYES. (Request that the suspect remove glasses or hard contact lens at this time if they are being worn. Nystagmus is not influenced by how clearly the suspect can see the object he is to follow.) NOW KEEP YOUR HEAD STILL AND FOLLOW THIS (indicate what he is to follow) WITH YOUR EYES. DO NOT MOVE YOUR EYES BACK TO THE CENTER UNTIL I TELL YOU. (If the suspect moves his head, use a flashlight or your free hand as a chinrest.)
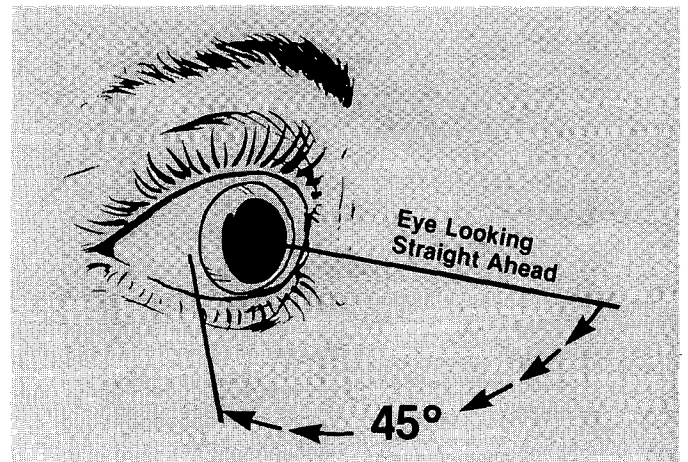
Check the suspect's right eye by moving the object to the suspect's right. Have the suspect follow the object until the eyes cannot move further to the side. Make this movement in about two seconds, and observe: 1) whether the suspect was able to follow the object smoothly or whether the motion was quite jerky; and 2) how distinct the nystagmus is at the maximum deviation.

Estimate where a 45-degree angle would be using the training procedure given on page 3.

Move the object a second time to the 45-degree angle of gaze, taking about four seconds. As the eye follows the object, watch for it to start jerking back and forth. If you think you see nystagmus, stop the movement to see if the jerking continues. If it does, this point is the angle of

onset. If it does not, keep moving the object until the jerking does occur or until you reach the imaginary 45-degree line. Note whether or not the onset occurs *before* the 45-degree angle of gaze. (The onset point at a BAC of 0.10 percent is about 40 degrees).

If the suspect's eyes start jerking before they reach 45 degrees, check to see that some white of the eye is still showing on the side closest to the ear, as in the photograph. If no white of the eye is showing, you either have taken the eye too far to the side (that is, more than 45 degrees) or the person has unusual eyes that will not deviate very far to the side. Use the criteria of onset before 45 degrees only if you can see some white at the outside of the eye.

AN EYE DEVIATED TO 40 DEGREES—NOTE THE AMOUNT OF WHITE SHOWING ON THE OUTSIDE (CLOSEST TO THE EAR) OF THE EYE.

Repeat this entire procedure for the left eye. When observing the left eye at 45 degrees of gaze, some white of the eye again should be visible at the outside (closest to the ear) of the eye.

NOTE: Nystagmus may be due to causes other than alcohol in three or four percent of the population. These other causes include seizure medications, phencyclidine (PCP), barbiturates and other depressants. A large disparity between the performance of the right and left eye may indicate brain damage.

Scoring

You should look for three signs of intoxication in each eye. Give one point for each item checked for a maximum of six points.

1) **Onset of alcohol gaze nystagmus in the right eye occurs before 45 degrees.** Do not score this item unless some white is visible on the outside of the right eye (closest to the ear) at the point of onset.

2) **Nystagmus in the right eye when moved as far as possible to the right is moderate or distinct.** Do not score this item if you only see the faint jerking that occurs at the onset point.

3) **The right eye cannot follow a moving object smoothly.** If you score this item, be sure that the jerkiness was not due to your moving the object in a jerky manner.

4) **Onset of alcohol gaze nystagmus in the left eye occurs before 45 degrees.** If you score this item, be certain that some white is visible on the outside of the left eye (closest to the ear) at the point of onset.

5) **Nystagmus in the left eye when it is moved as far as possible to the left is moderate or distinct.**

6) **The left eye cannot follow a moving object smoothly.**

If a suspect scores four or more points out of the six possible on this test, classify his BAC as above 0.10 percent. Using this criterion you will be able to correctly classify about 77 percent of your suspects with respect to whether they are drunk or sober. That probability was determined during limited laboratory and field testing and is given simply to help you weigh the various sobriety tests in this battery as you make your arrest decision.

Test Conditions

Very few test conditions will affect gaze nystagmus. Most of the test requirements given in this Manual are designed to make the observation of nystagmus as easy as possible for the officer doing the testing.

Nystagmus can be observed directly and requires no special equipment. You will need something for the suspect to follow with his eyes, but this can be as simple as the tip of your index finger. Officers who use this test frequently have the suspect follow a penlight. The object used should be held about eye level, so that the eyes are wide open when they look directly at it. It should be held about 12 to 15 inches in front of the eyes for ease of focus.

Glasses should be removed since they may block your view of the suspect's eyes. In addition, hard contact lens may restrict the boundaries of movement of the eyes. If this appears to happen, you may still conduct the tests. You should be aware that this factor may affect the reliability of this test and you should record this condition in your field notes.

WALK-AND-TURN TEST

Instructions

Give each suspect the exact instructions listed below:

PLEASE PUT YOUR LEFT FOOT ON THE LINE AND THEN YOUR RIGHT FOOT IN FRONT OF IT LIKE THIS. *(Demonstrate heel-to-toe position.)*

(When the suspect assumes this position, continue with the instructions.) WHEN I TELL YOU TO BEGIN, TAKE NINE HEEL-TO-TOE STEPS DOWN THE LINE, TURN AROUND, AND TAKE NINE HEEL-TO-TOE STEPS BACK.

MAKE YOUR TURN BY KEEPING ONE FOOT ON THE LINE AND THEN USING YOUR OTHER FOOT TO TURN...LIKE THIS. *(Demonstrate as shown in the illustration by taking three or four heel-to-toe steps—then turning around by pivoting your left foot on the line and taking four steps with your right foot, as shown—then resuming the heel-to-toe position. Note that this is a very easy way to turn, but the suspect must follow your instructions.)*

KEEP YOUR HANDS AT YOUR SIDES, WATCH YOUR FEET AT ALL TIMES, AND COUNT YOUR STEPS OUT LOUD. DO YOU UNDERSTAND?

(Do not continue until the suspect indicates understanding, but at the same time do not repeat the whole set of instructions. You may repeat part of the instructions or answer the suspect's questions about how to perform the test. If the suspect does not watch his feet, remind him).

(Once the suspect indicates understanding, say...) BEGIN AND COUNT YOUR FIRST STEP FROM THE HEEL-TO-TOE POSITION AS "ONE."
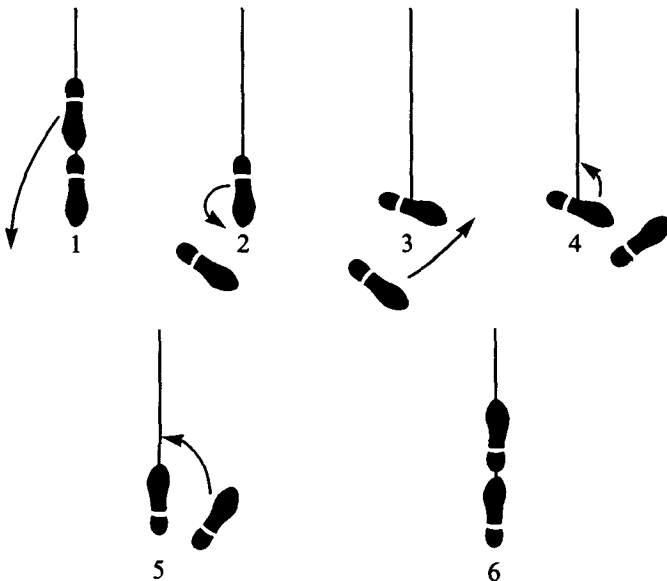
Scoring

You may observe a number of different behaviors when a suspect performs this test. Research, however, has demonstrated that the behaviors listed below are the most likely to be observed in someone with a BAC of 0.10 percent or more. In scoring this test, give only one point for each item observed (even if it is observed more than once) with a maximum score of 9 points.

1) **Cannot keep balance while listening to the instructions.** Two tasks are required at the beginning of this test. The suspect must balance heel-to-toe on the line and, at the same time, listen carefully to the instructions. Typically, the person who is intoxicated can do only one of these things. He may listen to the instructions, but not keep his balance. Score this item if the **suspect does not maintain the heel-to-toe position throughout the instructions.** Do not score this item if the suspect sways or uses his arms to balance but maintains the heel-to-toe position.

2) **Starts before the instructions are finished.** The intoxicated person may also keep his balance, but not listen to the instructions. Since the first words you said in giving instructions for this test were: "When I tell you to begin," score this item if the subject does not wait. Other aspects of not listening to the instructions are included in the other items.

3) **Stops while walking to steady self.** The suspect pauses for several seconds after one step. Do not score this item if the suspect is merely walking slowly.

4) **Does not touch heel-to-toe.** The suspect leaves a space of one half inch or more between the heel and toe on any step. Also score this item if the suspect does not walk straight along the line.

5) **Steps off the line.** The suspect steps so that one foot is entirely off the line. Only count this item once, even if the suspect steps off several times.

6) **Uses arms to balance.** The suspect raises one or both arms more than six inches from his sides in order to maintain his balance.

7) **Loses balance while turning.** The suspect removes the pivot foot from the line while turning. That is, score this item if both feet are removed from the line. Also score this item if the suspect clearly has not followed directions in turning; for example, he pivots in one movement instead of the four step movement that he was instructed to perform.

8) **Incorrect number of steps.** Score this item if the suspect takes more or less than nine steps in each directions.

9) **Cannot do the test.** Score this item if the suspect steps off the line three or more times, is in danger of falling, or otherwise demonstrates that he cannot do the test. If this item is scored, the suspect gets 9 points for this test, the maximum score.

Should the suspect have difficulty with this test, (for example, if he steps off the line) have him repeat the test from the point of difficulty, not from the beginning. This

test tends to lose its sensitivity if it is repeated several times.

Observe the suspect from three or four feet away and remain motionless while he performs the test. Being too close or excessive motion on your part will make it more difficult for the suspect to perform, even if he is sober.

If the suspect scores two or more points on this test, classify his BAC as above 0.10 percent. Using this criterion, you will be able to correctly classify about 68 percent of your suspects with respect to whether they are drunk or sober. So your decision point on the Walk-and-Turn Test is *two*.

Test Conditions

This test should be given on level ground, on a hard, dry, non-slippery surface, and under conditions in which the suspect would be in no danger should he fall. Require him to perform the test elsewhere, or confine your decision to the results of the Gaze Nystagmus Test if these conditions cannot be met.

Some people have difficulty with balance even when sober. People more than 60 years of age, over 50 pounds overweight, or with physical impairments that affect their ability to balance should not be given this test. Individuals wearing heels more than two inches high should be given the opportunity to remove their shoes.

The Walk-and-Turn Test requires a line that the suspect can see. If a natural line is not present, draw one in the dirt with a stick or on the sidewalk with chalk. Walking parallel to a curb is also adequate.

The suspect must be able to see to perform this test. That is, his eyes must be open, and at night adequate lighting must be available. If you can see the suspect clearly, then the lighting is adequate; otherwise, use a flashlight to illuminate the line.

Requesting that the suspect watch his feet makes the test more difficult for the intoxicated person. Be sure that the suspect is doing so, or make an immediate correction. Individuals who cannot see out of one eye may also have trouble with this test because of poor depth perception.

COMBINED SCORING OF NYSTAGMUS GAZE AND WALK-AND-TURN TESTS

The Decision Table below is designed to help you classify those suspects with a potential BAC of 0.10 percent or more. You will recall that the decision point on the Nystagmus Gaze Test was a score of *four*, while on the Walk-and-Turn Test it was a score of *two*. However, a suspect may score higher on one test and lower on the other. How do you make your decision? Find the box on the Decision Table where the two test scores intersect and see if it falls in the shaded area. (For, example, suppose a suspect scored only three on the Nystagmus Gaze but got a *two* on the Walk-and-Turn. Is he intoxicated? The Decision Table says *yes*. But if he scored three on the Nystagmus Gaze and only one on the Walk-and-Turn, the Table says his BAC is probably below 0.10 percent.)

Using this method, your chances of correctly classifying your suspects as to whether they are intoxicated or sober are about 80 percent.

DECISION TABLE

Nystagmus Gaze Test Score

ONE-LEG-STAND TEST

Instructions

Give the suspect the exact instructions listed below:

PLEASE STAND WITH YOUR HEELS TOGETHER AND YOUR ARMS DOWN AT YOUR SIDES, LIKE THIS. *(Demonstrate how you want the suspect to stand.)*

WHEN I TELL YOU TO, I WANT YOU TO RAISE ONE LEG ABOUT SIX INCHES OFF THE GROUND AND HOLD THAT POSITION. AT THE SAME TIME COUNT RAPIDLY FROM 1001 TO 1030, while watching your foot. Like this. *(You assume the position, as the officer in the photograph is doing, and count aloud, "1001, 1002, 1003, etc.")*

DO YOU UNDERSTAND? *(Do not continue until the suspect indicates that he understands.)* BEGIN BY RAISING EITHER YOUR RIGHT OR YOUR LEFT FOOT.

(At the end of the count or after about 30 seconds, if the count is slow, tell the person to put his foot down—if necessary.)

Scoring

You may observe a number of different behaviors when a suspect performs this test. Researchers, however, have found that those behaviors listed below are the most likely to be observed in someone with a BAC of 0.10 percent or higher. In scoring this test, give only one point for each item observed, even if it is observed more than once. The maximum possible score on this test is five points.

1) **The suspect sways while balancing.** This refers to a side-to-side or back-and-forth motion while the suspect maintains the one-leg-stand position.

2) **Uses arms for balance.** He moves his arms six or more inches from the side of his body in order to keep this balance.

3) **Hopping.** He is able to keep one foot off the ground, but resorts to hopping on the anchor foot in order to maintain balance.

4) **Puts foot down.** The suspect is not able to maintain the one-leg-stand position, putting his foot down one or more times during the 30-second count.

5) **Cannot do test.** Score this item if the suspect puts his foot down three or more times during the 30-second count or otherwise demonstrates that he cannot do the test. If you score this item, give the suspect five points—the maximum for this test.

Remember that time is critical in this test. Research has shown that a person with a BAC of 0.10 percent can maintain his balance for up to 25 seconds, but seldom as long as 30.

If an individual scores two or more points on the One-Leg-Stand, there is a good chance his BAC is 0.10 percent or higher. So your decision point on this test is *two*. Using that criterion, you will correctly classify about 65 percent of the people you test as to whether they are sober or intoxicated.

Test Conditions

Like the Walk-and-Turn Test, the One-Leg-Stand should be given on level ground, on a hard, dry, non-slippery surface, and under conditions in which the suspect will be in no danger should he fall. If these guidelines cannot be followed at the place where you stop the driver, you may be able to move to a better location. If not, base your decision on the Gaze Nystagmus Test alone.

Certain individuals are likely to have trouble with this test even when sober. People over 60 often have very poor balance. (Since very few elderly people are stopped at roadside, specific guidelines have not been established for them on this test.) This also applies to people who are 50 or more pounds overweight and to those with physical impairments that interfere with balance.

In administering this test, make certain the suspect's eyes are open and that there is adequate lighting for him to be able to have some frame of reference. If you can see the suspect fairly well, then the light is adequate. Otherwise, use a flashlight to illuminate the ground. In total darkness, the One-Leg-Stand is difficult even for sober people.

Observe the suspect from about three feet away and remain relatively motionless while he is performing the test. Being too close—just as in the Walk-and-Turn Test—makes the test more difficult. And, again, individuals with heels over two inches high should be given the opportunity to remove their shoes.

If the suspect puts his foot down, instruct him to continue the count from the point at which the foot touched the ground. And if the person counts very slowly, terminate the test after 30 seconds have elapsed.

CONCLUSION

All drivers whose behavior suggests impairment should be given, at minimum, the Gaze Nystagmus Test. The combination of all three tests, particularly when the first two are charted on the Decision Table, will give you firm data on which to base your arrest decision.

With practice, the techniques described in this Manual will become routine—and to help you get started practicing, you will find on the following pages the 45-Degree Angle template and several scoring sheets.

SCORING SHEET (check as many as you observe)

Gaze Nystagmus Test

- [ ] Nystagmus in right eye is moderate or distinct when eye is moved as far as possible to the right.
- [ ] Right eye cannot follow moving object smoothly.
- [ ] Onset of gaze nystagmus in right eye occurs before 45 degrees (some white is visible).
- [ ] Nystagmus in left eye is moderate or distinct when eye is moved as far as possible to left.
- [ ] Left eye cannot follow moving object smoothly.
- [ ] Onset of gaze nystagmus in left eye occurs before 45 degrees (some white is visible).
- [ ] **Total Score (Decision Point: 4)**

Walk-and-Turn Test

- [ ] Cannot keep balance while listening to instructions.
- [ ] Starts before instructions are finished.
- [ ] Stops while walking to steady self.
- [ ] Does not touch heel to toe.
- [ ] Loses balance while walking (i.e., steps off line).
- [ ] Uses arms for balance.
- [ ] Loses balance while turning.
- [ ] Incorrect number of steps.
- [ ] Cannot do test (steps off line three or more times).
- [ ] **Total Score (Decision Point: 2)**

One-Leg-Stand Test

- [ ] Sways while balancing.
- [ ] Uses arms to balance.
- [ ] Hopping.
- [ ] Puts foot down.
- [ ] Cannot do test (puts foot down three or more times).
- [ ] **Total Score (Decision Point: 2)**

Decision Table

Gaze Nystagmus Test Score

Notes:

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SCORING SHEET (check as many as you observe)

Gaze Nystagmus Test

☐ Nystagmus in right eye is moderate or distinct when eye is moved as far as possible to the right.

☐ Right eye cannot follow moving object smoothly.

☐ Onset of gaze nystagmus in right eye occurs before 45 degrees (some white is visible).

☐ Nystagmus in left eye is moderate or distinct when eye is moved as far as possible to left.

☐ Left eye cannot follow moving object smoothly.

☐ Onset of gaze nystagmus in left eye occurs before 45 degrees (some white is visible).

☐ Total Score (Decision Point: 4)

Walk-and-Turn Test

☐ Cannot keep balance while listening to instructions.

☐ Starts before instructions are finished.

☐ Stops while walking to steady self.

☐ Does not touch heel to toe.

☐ Loses balance while walking (i.e., steps off line).

☐ Uses arms for balance.

☐ Loses balance while turning.

☐ Incorrect number of steps.

☐ Cannot do test (steps off line three or more times).

☐ Total Score (Decision Point: 2)

One-Leg-Stand Test

☐ Sways while balancing.

☐ Uses arms to balance.

☐ Hopping.

☐ Puts foot down.

☐ Cannot do test (puts foot down three or more times).

☐ Total Score (Decision Point: 2)

Decision Table

Gaze Nystagmus Test Score

	0	1	2	3	4	5	6
Walk & Turn Test Score 0							
1							
2							
3							
4							
5							
6							
7							
8							
9							

Notes:

Eight-Inch Square Template