Video head impulse testing

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Policy contains: Dizziness; head impulse testing; vestibular function; vertigo.

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Coverage policy

Video head impulse testing is clinically proven and, therefore, may be medically necessary to evaluate semicircular canal function, when all of the following criteria are met (Alhabib, 2017; American Speech-Language-Hearing Association, 2022; Bhattacharyya, 2017; Coudert, 2025; Fife, 2017; Lavender, 2025):

- The member has symptoms of a vestibular disorder (e.g., dizziness, vertigo, imbalance, falls without other medical explanation).
- History and clinical evaluation, including the standard head impulse test, is inconclusive.
- The test results will aid in determining the appropriate medical or surgical treatment for disorders of auditory, balance, and other neural systems.

Limitations

Video head impulse testing is not medically necessary as an initial, sole screening test for dizziness (Cohen, 2017; Mezzalira, 2017).

Alternative covered services

- Computerized dynamic posturography.

- Electronystagmography or videonystagmography.
- Caloric testing.
- Rotation testing.
- Qualitative vestibular assessment.
- Scleral search coil method.
- Specialty referral.
- Standard of care diagnostic testing (e.g., audiometry, visual acuity examination, radiography, and blood work).

Background

Dizziness (including vertigo) affects approximately 15% to 30% of the general population, and its prevalence rises with age. The most common causes of dizziness are vestibular disorders (Neuhauser, 2016; Piker, 2016). Congenital or acquired conditions resulting from disease or injury to the vestibular system may reduce vision and depth perception and alter balance and coordination (American Speech-Language-Hearing Association, 2022).

A battery of non-instrumented tests (direct observation) and instrumented tests using both static and dynamic measures may be performed at the bedside or in an office setting to discern the etiology of vestibular dysfunction (American Speech-Language-Hearing Association, 2022). Within the context of the individual's medical history, diagnostic testing is performed to differentiate peripheral and central etiologies based on response to visual fixation and the presence and direction of nystagmus, which is a vision condition characterized by involuntary, rapid, and repetitive horizontal, vertical, or circular movement of the eyes (American Academy of Ophthalmology, 2022).

Standard and video head impulse tests

The standard head impulse test, also known as a head thrust test, impulse rotational test, or vestibulo-ocular reflex test, is used to assess horizontal semicircular canal function (Halmagyi, 2017). During a standard, non-instrumented head impulse test, the clinician rotates the patient’s head abruptly and unpredictably in the vertical axis of the head while the patient keeps a fixed gaze on a target. A patient with vestibular impairment will move his or her eyes with the head, forcing a corrective eye movement (saccade) at the end of each head impulse to return to the target. Results may demonstrate a problem with semicircular canal function on the same side to which the head was turned prior to the corrective refixation response.

The standard procedure is noninvasive, safe, easy, and uses stimuli in the physiological range of everyday head movement, but it lacks objective documentation. The video version images the eye using sophisticated eye tracking and head velocity transducers, providing an objective record of eye movement and head movement during head impulses.

The Food and Drug Administration gave the first approval to sell a video head impulse testing system in the United States to GN Otometrics, manufacturer of the ICS Impulse, in February 2013 (GN Otometrics North America, 2013).

Findings

The evidence on video head impulse testing consistently supports its use as an objective, ear-specific measure of semicircular canal function that provides diagnostic information not obtainable through bedside examination

alone. Clinical practice guidelines from major specialty societies position video head impulse testing as the primary tool for canal-function assessment across all six semicircular canals, with multi-canal testing identified as the standard of care in expert settings. Quantitative syntheses across vestibular conditions demonstrate that video head impulse testing carries meaningful diagnostic and prognostic value in the triage of acute vestibular syndrome, the identification of canal-specific abnormalities in sudden sensorineural hearing loss with vertigo, and the differentiation of episodic vestibular conditions, while establishing that video head impulse testing and caloric testing measure distinct aspects of vestibular function and are complementary rather than interchangeable. Normative data across all six canal planes continue to be refined, with emerging proposals for unified gain thresholds that reflect the systematically lower values documented in the vertical canal planes relative to the horizontal canals.

Clinical guidelines

There is an absence of evidence-based guidelines specifying which diagnostic algorithm should be applied to clinically heterogeneous populations presenting with dizziness. Published guidelines from major specialty societies consistently recommend quantitative vestibular testing as a useful complement to history and physical examination for vestibular disorders not fully evident on clinical evaluation alone, with test selection guided by presenting symptoms, suspected etiology, and equipment availability (American Speech-Language-Hearing Association, 2022; Bhattacharyya, 2017; Fife, 2017).

Two consensus documents published in 2025 address video head impulse testing directly and at substantial depth in the pediatric context: the American Academy of Audiology Clinical Consensus Statement on vestibular function assessment in children (Lavender, 2025) and the International Pediatric Otolaryngology Group Consensus on Vestibular Testing in Children (Coudert, 2025). The American Academy of Audiology statement was approved by the Academy Board of Directors and published in the Journal of the American Academy of Audiology. The International Pediatric Otolaryngology Group statement was developed through a modified Delphi process involving 21 international experts from nine countries across three structured rounds, with consensus defined as 80% agreement, and published in Laryngoscope. It represents the first international consensus document on pediatric vestibular testing. The two documents are reviewed thematically below.

Video head impulse testing as the first-line tool for canal function assessment

Both guidelines endorse video head impulse testing as the primary objective measure of semicircular canal function in pediatric vestibular evaluation. The American Academy of Audiology defines its purpose as evaluating the vestibulo-ocular reflex across all six semicircular canals, providing ear-specific and canal-specific information in the horizontal, anterior, and posterior planes (Lavender, 2025). The International Pediatric Otolaryngology Group recommends video head impulse testing as the starting point of the vestibular evaluation regardless of child age, with cervical vestibular evoked myogenic potentials added only if video head impulse testing results are normal and clinical concern persists (Coudert, 2025). This sequencing is supported by evidence cited in the International Pediatric Otolaryngology Group statement showing that video head impulse testing combined with cervical vestibular evoked myogenic potentials achieves 94% diagnostic accuracy for vestibular deficits in children with hearing impairment, with no improvement from adding a third test (Coudert, 2025).

Among expert centers surveyed by the International Pediatric Otolaryngology Group, video head impulse testing was the second most frequently used vestibular test, rated 4.6 out of 5 for frequency, and produced the lowest perceived discomfort of any vestibular test at 2.2 out of 10, compared to 3.1 for cervical vestibular evoked myogenic potentials and 6.4 for the caloric test (Coudert, 2025). Both guidelines treat video head impulse testing as first-line, not adjunctive.

Multi-canal testing as the standard of care

Both guidelines draw a clinically important distinction between horizontal-canal-only assessment and comprehensive all-canal video head impulse testing. The American Academy of Audiology states explicitly that the traditional bedside head impulse test is performed mostly for the horizontal canals without goggles, whereas video head impulse testing enables objective measurement of gain and catch-up saccades across all six canal planes, including the anterior and posterior canals that cannot be reliably assessed through unaided examination (Lavender, 2025). The International Pediatric Otolaryngology Group's fourth consensus statement, which reached 81% agreement, specifies that all-canal video head impulse testing, explicitly including vertical canal testing, is the appropriate minimum assessment for four-year-old children evaluated by an expert team (Coudert, 2025). The International Pediatric Otolaryngology Group further recommends that expert centers attempt all-canal testing in children younger than four when conditions allow, identifying the stated age thresholds as indicative rather than rigid (Coudert, 2025).

Age-stratified protocol recommendations

The two guidelines arrive at compatible age-stratified conclusions through different frameworks. The American Academy of Audiology positions video head impulse testing as appropriate from age four with standard goggles, with remote camera systems extending feasibility to children as young as three months (Lavender, 2025). The International Pediatric Otolaryngology Group provides three age-based minimum assessment protocols that each achieved 81% agreement: for non-expert teams at any age, lateral video head impulse testing via remote camera or rotary chair combined with bone-conduction cervical vestibular evoked myogenic potentials; for expert teams assessing one-year-olds, the same battery with added emphasis on remote camera delivery; and for expert teams assessing four-year-olds, full all-canal video head impulse testing, rotary chair, cervical vestibular evoked myogenic potentials, and ocular vestibular evoked myogenic potentials when feasible (Coudert, 2025). A protocol for eight-year-olds failed to reach 80% consensus, primarily due to disagreement about including caloric testing (Coudert, 2025).

On device-specific feasibility, 71.4% of International Pediatric Otolaryngology Group panelists considered video head impulse testing feasible from age one with a remote camera system, and the same proportion considered standard goggles appropriate from age four (Coudert, 2025). A majority of panelists recommended assessing only the lateral canals before age two and expanding to all six canals from age two onward. Most specified a minimum of 5 reproducible traces per canal for a reliable result (Coudert, 2025).

Normative standards and interpretation criteria

The American Academy of Audiology provides canal-specific normative vestibulo-ocular reflex gain values for children aged four to 12 years (Lavender, 2025). Mean lateral canal gains are 0.96 for the left canal and 1.04 for the right, both with a standard deviation of 0.09 and a clinically accepted normal range of 0.80 to 1.20. Vertical canal gains in this age group are meaningfully lower: left anterior mean 0.80, right anterior 0.90, left posterior 0.91, and right posterior 0.83, with a lower cutoff of approximately 0.60 (Lavender, 2025). These canal-specific values cannot be substituted by adult normative data in pediatric interpretation.

On saccade interpretation, the American Academy of Audiology distinguishes between overt saccades, which occur at least 100 milliseconds after the head movement ends, and covert saccades, which occur during the movement itself beginning around 70 milliseconds after impulse onset (Lavender, 2025). A pathological saccade must appear consistently on more than 50% of impulses and have a magnitude exceeding half the size of the head movement. Isolated or low-magnitude eye movements are not considered clinically significant (Lavender, 2025). Low gain paired with consistent catch-up saccades in a given canal plane indicates peripheral vestibular

dysfunction on the side and direction of the head thrust. The protocol calls for 20 acceptable impulses per canal, with poor-quality tracings excluded before analysis (Lavender, 2025).

The caloric test's diminished role

Both guidelines reflect a clear directional consensus among pediatric vestibular specialists that caloric testing should be deemphasized in favor of video head impulse testing-centered assessment. The International Pediatric Otolaryngology Group reports that 76.2% of panelists agreed that the caloric test has low clinical yield in pediatric populations and should not be performed systematically, narrowly missing the 80% consensus threshold (Coudert, 2025). Panelists who did not endorse its deemphasis still restricted it to second-intention use: when video head impulse testing and vestibular evoked myogenic potential results are normal but vestibular dysfunction remains suspected, or in specific contexts such as pre-cochlear implantation evaluation or follow-up for congenital cytomegalovirus (Coudert, 2025).

The caloric test ranked last in frequency among vestibular tests at 2.9 out of 5 and first in perceived child discomfort at 6.4 out of 10 (Coudert, 2025). The American Academy of Audiology similarly describes caloric testing as typically poorly tolerated by young children and provides burden-reduction modifications for circumstances where it must be used (Lavender, 2025). The two guidelines converge on deemphasizing caloric testing as a routine component of pediatric vestibular assessment.

Systematic reviews

The foundational comparative evidence for video head impulse testing derives from systematic reviews of retrospective and prospective nonrandomized cohort studies of low to moderate quality (Abouzayd, 2017; Alhabib, 2017; Verbecque, 2017). These reviews found that video head impulse testing provides distinct and complementary diagnostic information in the workup of individuals with vestibular complaints when the clinical examination is inconclusive, and that the video modality may improve detection of covert saccades not visible to the unaided examiner (Abouzayd, 2017; Alhabib, 2017; Verbecque, 2017). A systematic review of 16 studies (Manzari, 2021) involving 933 individuals found the diagnostic ability of video head impulse testing for vestibular neuritis to be high, supporting its use as a complement or alternative to caloric and rotational tests, particularly at onset. A systematic review of 11 studies (Ooi, 2022) indicated moderate effectiveness of head impulse testing, with or without supplementary tests, in diagnosing vertigo.

A systematic review of seven studies (Bosmans, 2021) involving 235 individuals examined video head impulse testing findings in older adults with cognitive impairment. The review found that video head impulse testing was unable to correlate the degree of cognitive decline with vestibulo-ocular reflex measurements, representing a knowledge gap in the evidence base for this subpopulation (Bosmans, 2021).

Pediatric normative data and test feasibility

Two systematic reviews address video head impulse testing in children specifically and provide convergent data on normal performance across development. A systematic review of 25 studies (Dasgupta, 2025) involving 1,691 pediatric individuals found a mean horizontal canal vestibulo-ocular reflex gain of 0.96 (± 0.07) across 20 studies reporting normative data, while six controlled studies demonstrated markedly lower gains in children with vestibular disorders at approximately 0.68 (± 0.16), yielding a pooled effect size of 1. Testing was typically completed in 10 to 15 minutes, supporting feasibility in clinical settings (Dasgupta, 2025).

A systematic review and meta-analysis of 20 studies (Wu, 2022) examined video head impulse testing findings in pediatric individuals undergoing cochlear implantation and found no significant post-operative changes in vestibular dysfunction on video head impulse testing measures (Wu, 2022).

A systematic review (Moreno Valencia, 2026) synthesized normative vestibulo-ocular reflex gain parameters for the EyeSeeCam system, analyzing seven studies contributing data from 404 participants. Horizontal gain values clustered between 0.90 and 1.10 across studies, with a median lower cutoff of approximately 0.80 (Moreno Valencia, 2026). The review proposes a unified lower cutoff of 0.70 across all six semicircular canals, including horizontal, anterior, and posterior bilaterally, to better reflect the systematically lower gain values documented in the vertical canal planes (Moreno Valencia, 2026). The review identifies the absence of standardized protocols across centers and devices as the principal obstacle to pooled normative data analysis and calls for multicenter studies using uniform methodology (Moreno Valencia, 2026).

Meta-analyses

Diagnostic accuracy across vestibular presentations

Meta-analytic evidence confirms video head impulse testing's diagnostic accuracy across several distinct clinical contexts. A systematic review and meta-analysis of 13 studies (Ferri, 2025) involving 905 individuals presenting to emergency departments with acute vestibular syndrome evaluated video head impulse testing's accuracy for identifying posterior circulation stroke; the pooled diagnostic test accuracy meta-analysis was based on 8 studies (n = 624). Pooled sensitivity was 84% (95% confidence interval [CI] 70% to 92%) and specificity was 85% (95% CI 61% to 95%), with a positive likelihood ratio of 5.56, a negative likelihood ratio of 0.18, and a diagnostic odds ratio of 30.23 (Ferri, 2025). A normal video head impulse testing result in this context substantially reduces the probability of stroke, positioning the test as a valuable frontline triage instrument in emergency settings where distinguishing vestibular neuritis from posterior circulation stroke is clinically urgent (Ferri, 2025). A meta-analysis of five studies (Elsherif, 2021) involving 253 individuals found video head impulse testing valuable in diagnosing benign paroxysmal positional vertigo, detecting vestibulo-ocular reflex gain abnormalities in the lateral, posterior, and anterior canals on the affected side.

Canal specificity and the prognostic value of the posterior canal

A systematic review and meta-analysis of 13 studies (Guo, 2026) involving 1,141 individuals with sudden sensorineural hearing loss with vertigo found that posterior semicircular canal abnormality was the most prevalent video head impulse testing finding in this population, with a pooled prevalence of 50% (95% CI 0.40 to 0.60). Reduced posterior canal gain was associated with a 4.14-fold increased risk of poor hearing recovery (95% CI 2.64 to 6.51; $p < 0.05$). Reduced horizontal canal gain carried a 3.06-fold increased risk (95% CI 1.72 to 5.44; $p < 0.05$) (Guo, 2026). Reduced anterior semicircular canal gain was not significantly associated with poor hearing recovery (odds ratio 1.38; 95% CI 0.77 to 2.48; $p = 0.29$), indicating that the prognostic relationship is specific to the posterior and horizontal canals rather than a generalized effect of canal dysfunction (Guo, 2026). The posterior canal, not the horizontal canal, was the primary site of dysfunction, a finding that would have been missed in any protocol limited to horizontal canal assessment (Guo, 2026). This evidence supports multi-canal video head impulse testing as a clinical standard in this population.

Differentiating Meniere's disease from vestibular migraine

Two meta-analyses addressed video head impulse testing's ability to distinguish Meniere's disease from vestibular migraine, two episodic vestibular conditions with substantially overlapping presentations, and together they offer a nuanced picture of where video head impulse testing does and does not contribute in this differential. A meta-analysis of 21 studies (Vosbeek, 2025) involving 3,096 individuals, including 1,561 with Meniere's disease and 1,535 with vestibular migraine, found that individuals with Meniere's disease were significantly more

likely to exhibit canal paresis on caloric testing (odds ratio 7.00; 95% CI 5.69 to 8.61; p < 0.001), an abnormal horizontal video head impulse testing result (odds ratio 3.38; 95% CI 2.39 to 4.78; p < 0.001), and corrective saccades on video head impulse testing (odds ratio 3.52; 95% CI 2.11 to 5.88; p < 0.001) (Vosbeek, 2025). Caloric testing showed stronger overall discriminatory power, but video head impulse testing findings contributed independent discriminatory value, suggesting that abnormal video head impulse testing findings can help differentiate the two conditions in individuals who do not fully meet formal diagnostic criteria for either (Vosbeek, 2025).

A complementary meta-analysis of 11 studies (Tsilivigkos, 2025) involving 804 individuals, including 362 with vestibular migraine, 307 with Meniere's disease, and 135 healthy controls, reached a more qualified conclusion. The pooled mean difference in video head impulse testing gain across four eligible studies was -0.0203 (95% CI -0.0789 to 0.0383; p = 0.50), indicating no statistically significant difference between the two groups on gain alone (Tsilivigkos, 2025). The authors concluded that video head impulse testing gain in isolation has limited utility in this differential, but that saccade pattern analysis, including the characteristics of covert saccades, may offer additional discriminatory value as more systematic data become available (Tsilivigkos, 2025).
Read together, the two meta-analyses indicate that saccade analysis rather than gain reduction is the more informative video head impulse testing metric in this differential, and that video head impulse testing contributes most meaningfully alongside caloric testing rather than as a standalone discriminator.

The complementary relationship between video head impulse testing and caloric testing

Across multiple meta-analyses, the relationship between video head impulse testing and caloric testing emerges as consistently complementary rather than substitutive. A systematic review and meta-analysis of 11 studies (Vallim, 2021) involving 2,670 individuals with chronic dizziness found that video head impulse testing produced altered results in 21% of individuals, compared with 55% altered results on caloric testing. A systematic review and meta-analysis of 12 studies (Tamanini, 2023) involving 708 individuals found that 64% showed abnormalities on caloric testing compared with 28% on video head impulse testing, with approximately 47% exhibiting normal video head impulse testing results alongside abnormal caloric results (Tamanini, 2023).
Caloric testing evaluates low-frequency lateral canal function while video head impulse testing assesses high-frequency function across all six canal planes. The divergence between the two tests in a given individual reflects genuine differences in what each measures rather than measurement error (Tamanini, 2023; Vallim, 2021). These findings are consistent with the Tsilivigkos and Vosbeek meta-analyses, which found that caloric testing retained stronger discriminatory power than video head impulse testing in the Meniere's disease versus vestibular migraine differential even as video head impulse testing findings contributed independent discriminatory value (Tsilivigkos, 2025; Vosbeek, 2025).

Other evidence

The prospective and retrospective studies informing this policy reflect the early evidence base for video head impulse testing as an objective diagnostic tool and are of low to moderate quality. Four prospective non-randomized comparative studies (Cohen, 2017; Eza-Nunez, 2016; Mezzalira, 2017; Ross, 2016) and one retrospective comparative study (Skoric, 2017) examined video head impulse testing diagnostic performance across vestibular presentations, with caloric testing and the bedside head impulse test among the most common reference comparators. An inter-rater reliability study of 171 individuals presenting with acute vestibular syndrome (Machner, 2021) found video head impulse testing to be highly accurate in differentiating vestibular neuritis from stroke, supporting its potential as a feasible triage screening tool in emergency settings. A separate study of 327 individuals (Li, 2022) found discrepancies between head impulse and caloric testing in 21% of

vertigo cases, most commonly characterized by positive caloric results alongside negative head impulse test results, reinforcing the complementary nature of the two modalities.
In 2026, we restructured the Findings section from a sequential to a thematic organization and incorporated two newly published clinical guidelines from the American Academy of Audiology and the International Pediatric Otolaryngology Group and five newly published quantitative syntheses addressing video head impulse testing diagnostic accuracy in acute vestibular syndrome triage, prognostic applications in sudden sensorineural hearing loss with vertigo, differential diagnosis of Meniere's disease and vestibular migraine, and normative threshold development across all six semicircular canals.

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On March 16, 2026, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were "Head Impulse Test" (MeSH), "reflex/diagnosis" (MeSH), "Head impulse test," "head thrust test," "impulse rotational test," and "vestibulo-ocular reflex test." We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

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Policy updates

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1/2019: references updated. The policy ID was changed from CP# 09.01.16 to CCP.1163/2020: references updated.
3/2021: Policy references updated.
3/2022: Policy references updated.
3/2023: Policy references updated.
3/2024: Policy references updated.
4/2025: Policy references updated.
4/2026: Policy references updated.

Related codes

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy CCP.1359 This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

Code	Code description
92540	Basic vestibular evaluation, includes spontaneous nystagmus test with eccentric gaze fixation nystagmus, with recording, positional nystagmus test, minimum of 4 positions, with recording, optokinetic nystagmus test, bidirectional foveal and peripheral stimulation, with recording, and oscillating tracking test, with recording (report when all four component tests are performed on the same day; do not report in conjunction with 92541, 92542, 92544, or 92545)
92541	Spontaneous nystagmus test, including gaze and fixation nystagmus, with recording
92542	Positional nystagmus test, minimum of 4 positions, with recording
92544	Optokinetic nystagmus test, bidirectional, foveal or peripheral stimulation, with recording
92545	Oscillating tracking test, with recording
92547	Use of vertical electrodes (add-on code; list separately in addition to code for primary procedure for each vestibular test performed, 92537–92546)
92700	Unlisted otorhinolaryngological service or procedure (for use pending assignment of dedicated video head impulse testing Category I CPT codes approved by the AMA CPT Editorial Panel, October 2025; MAC-priced)