

cranial nerve exam checklist

Cranial nerve exam checklist: A comprehensive guide for healthcare professionals and students, this article delves into the essential components of a thorough cranial nerve assessment. We will break down each of the twelve cranial nerves, detailing the specific tests and observations required for their evaluation. Understanding and mastering the cranial nerve exam checklist is crucial for diagnosing neurological disorders, assessing head injuries, and monitoring patient progress. This guide aims to provide a practical, step-by-step approach to ensure no critical aspect of the cranial nerve examination is overlooked.

- Introduction to the Cranial Nerves
- The Importance of a Cranial Nerve Exam Checklist
- Cranial Nerve I: Olfactory Nerve
- Cranial Nerve II: Optic Nerve
- Cranial Nerve III, IV, and VI: Oculomotor, Trochlear, and Abducens Nerves
- Cranial Nerve V: Trigeminal Nerve
- Cranial Nerve VII: Facial Nerve
- Cranial Nerve VIII: Vestibulocochlear Nerve
- Cranial Nerve IX and X: Glossopharyngeal and Vagus Nerves
- Cranial Nerve XI: Accessory Nerve
- Cranial Nerve XII: Hypoglossal Nerve
- Tips for Performing a Comprehensive Cranial Nerve Examination
- Documenting Your Cranial Nerve Exam Findings

Understanding the Twelve Cranial Nerves

The human nervous system is a marvel of biological engineering, and the cranial nerves represent a critical part of its intricate network. These twelve pairs of nerves emerge directly from the brain, serving specific sensory, motor, or mixed functions for the head and neck. They are fundamental to our ability to see, smell, taste, hear, move our facial muscles, swallow, and control various autonomic functions. A systematic approach to examining each of these nerves is essential for accurate clinical assessment and diagnosis of a wide range of neurological conditions.

The Indispensable Cranial Nerve Exam Checklist

A well-structured cranial nerve exam checklist is an invaluable tool for any healthcare provider involved in neurological assessment. It ensures that each nerve is systematically evaluated, minimizing the risk of omissions and providing a standardized framework for documentation. This checklist acts as a guide, prompting the examiner to perform specific tests and observe particular functions related to each cranial nerve. By adhering to a comprehensive checklist, clinicians can confidently assess cranial nerve integrity, which is vital for pinpointing the location and nature of neurological deficits.

The cranial nerves play a profound role in how we interact with our environment. From recognizing the scent of a favorite flower to the subtle nuances of facial expressions and the complex act of swallowing, these nerves are constantly at work. Any dysfunction in these pathways can lead to significant impairments in daily life. Therefore, a detailed and methodical examination, guided by a reliable cranial nerve exam checklist, is paramount for effective patient care. This structured approach not only aids in diagnosis but also in monitoring the progression of diseases and the effectiveness of treatments.

Cranial Nerve I: Olfactory Nerve (CN I) Examination

The olfactory nerve is responsible for our sense of smell. While often overlooked in routine examinations, assessing CN I is important, especially in patients with suspected head trauma or certain neurological conditions like Parkinson's disease. The primary method for testing the olfactory nerve involves presenting familiar, non-irritating scents to each nostril separately.

Olfactory Nerve Assessment Steps

- Ensure the patient's eyes are closed.
- Present a familiar scent (e.g., coffee, vanilla, cinnamon) to one nostril while occluding the other. Avoid strong or irritating substances.
- Ask the patient to identify the scent.
- Repeat the process for the other nostril with the same or a different scent.
- Document whether the patient can detect and correctly identify the scent in each nostril.

Anosmia (loss of smell) or hyposmia (reduced smell) can indicate damage to the olfactory bulb, olfactory tracts, or central olfactory pathways. Lesions in these areas can be caused by tumors, trauma, inflammation, or neurodegenerative diseases.

Cranial Nerve II: Optic Nerve (CN II) Assessment

The optic nerve transmits visual information from the retina to the brain. A comprehensive assessment of CN II involves evaluating visual acuity, visual fields, and the pupillary light reflex (though the pupillary reflex also involves CN III). This part of the cranial nerve examination is crucial for detecting a variety of visual impairments.

Visual Acuity Testing

Visual acuity refers to the sharpness of vision. The most common tool for assessing visual acuity is the Snellen eye chart. The patient should be tested with their glasses or contact lenses if they normally wear them.

- Ask the patient to read the smallest line they can on the Snellen chart from a standard distance (usually 20 feet).
- Record the visual acuity for each eye separately (e.g., 20/20, 20/40).
- If the patient cannot read the chart, assess their ability to count fingers at a specific distance or detect hand movements.

Visual Field Testing (Confrontation Method)

Visual field testing assesses the peripheral vision of the patient. The confrontation method is a bedside technique that compares the examiner's visual field with the patient's.

- Sit directly opposite the patient at eye level, about 2-3 feet apart.
- Ask the patient to cover one eye with their hand or a card, ensuring they do not look at the examiner's eye.
- The examiner also covers their own eye on the same side as the patient's covered eye.
- Instruct the patient to look directly at the examiner's open eye.
- Bring a small moving target (e.g., your finger, a pen) into the patient's visual field from behind them, in all four quadrants (superior, inferior, nasal, temporal).
- Ask the patient to indicate when they first see the target. Compare their response to when the examiner sees the target.
- Repeat for all quadrants and for the other eye.

Deficits in visual fields, such as hemianopia (loss of half the visual field) or quadrantanopia (loss of a quarter of the visual field), can localize lesions within the optic nerve, optic chiasm, optic tract, or visual cortex.

Ophthalmoscopic Examination

Using an ophthalmoscope allows for direct visualization of the optic disc (papilla), the point where the optic nerve fibers exit the eye. This is crucial for detecting conditions like papilledema (swelling of the optic disc), which can be a sign of increased intracranial pressure, or optic neuritis, an inflammation of the optic nerve.

- Dim the lights in the room.
- Hold the ophthalmoscope like a pen, placing your thumb and index finger on the viewing wheel.
- Place the lens wheel on zero.
- Hold the ophthalmoscope against your own eye socket and look through it.
- Bring the instrument towards the patient's eye from the side, aiming your line of sight towards their pupil.
- Locate the red reflex, a reflection of the light from the ophthalmoscope in the pupil.
- Advance the ophthalmoscope to bring the optic disc into focus. Observe its color, margins, and the presence of any hemorrhages or exudates.
- Systematically scan the retina to assess the blood vessels and the macula.

Cranial Nerves III, IV, and VI: Oculomotor, Trochlear, and Abducens Nerves (CN III, IV, VI) Examination

These three cranial nerves work in concert to control eye movements. CN III (Oculomotor) innervates most of the extraocular muscles, including the superior rectus, inferior rectus, medial rectus, and inferior oblique, as well as the levator palpebrae superioris (which elevates the eyelid). CN IV (Trochlear) innervates the superior oblique muscle, and CN VI (Abducens) innervates the lateral rectus muscle. A thorough assessment involves evaluating the size and reactivity of the pupils, the position of the eyes, and the ability to move the eyes in all directions.

Pupillary Light Reflex

This reflex tests the afferent pathway of CN II and the efferent pathway of CN III.

- Dim the lights in the room.
- Shine a light from the side into each pupil alternately.
- Observe for direct pupillary constriction (ipsilateral response) and consensual pupillary constriction (contralateral response).

- Note the size of the pupils when the light is off (e.g., 3 mm, 4 mm) and their reactivity to light (e.g., brisk, sluggish, non-reactive).

Anisocoria (unequal pupil size) can be a normal finding in some individuals, but a significant difference that changes with light or gaze can indicate pathology.

Extraocular Muscle Movements (EOMs)

This assessment evaluates the function of CNs III, IV, and VI by having the patient follow a moving target.

- Ask the patient to keep their head still and follow a finger or pen with their eyes only.
- Move the target in a H-pattern, moving it horizontally, then up and to the right, down and to the right, up and to the left, and down and to the left.
- Observe for smooth, coordinated movements in all directions and in each eye.
- Note any limitations in movement, presence of nystagmus (involuntary rapid eye movements), or diplopia (double vision).
- Specifically, movement outwards (abduction) is primarily controlled by CN VI, while movement inwards (adduction) and most other movements (up, down, and nasal) are controlled by CN III. Superior oblique (CN IV) is responsible for downward and outward rotation, and inferior oblique (CN III) for upward and outward rotation.

Eyelid Examination

Ptosis, or drooping of the upper eyelid, is often indicative of CN III palsy.

- Observe for any asymmetry in the position of the upper eyelids.
- Gently lift the upper eyelid to assess if the palpebral fissure widens significantly, which might suggest underlying weakness.

Cranial Nerve V: Trigeminal Nerve (CN V) Examination

The trigeminal nerve is a mixed nerve with both sensory and motor functions. Its sensory component provides sensation to the face and scalp, while its motor component innervates the muscles of mastication (chewing). Testing CN V involves assessing facial sensation and jaw strength.

Sensory Examination

The trigeminal nerve has three divisions: ophthalmic (V1), maxillary (V2), and mandibular (V3). Sensation should be tested in each of these distributions.

- Close the patient's eyes.
- Using a soft brush or cotton wisp, gently touch the skin on the patient's forehead (V1), cheeks (V2), and jawline (V3) on both sides.
- Ask the patient to indicate when they feel the touch and if it feels the same on both sides.
- For a more detailed assessment, a sharp object (like a broken tongue depressor tip) can be used to test for sharp sensation, and the blunt end for dull sensation, in the same areas.

Impaired sensation in a particular dermatome may indicate a lesion affecting the trigeminal nerve or its central pathways.

Motor Examination (Muscles of Mastication)

This part of the examination assesses the motor fibers of CN V, which innervate the temporalis and masseter muscles.

- Ask the patient to clench their jaw firmly.
- Palpate the temporalis and masseter muscles on both sides to assess their strength and tone.
- Ask the patient to open their mouth against resistance (examiner places hand under the chin).
- Observe for any deviation of the jaw towards one side when opening the mouth, which can suggest weakness in the pterygoid muscles on the opposite side.

Corneal Reflex

This reflex tests the sensory limb of CN V (afferent) and the motor limb of CN VII (efferent).

- Gently touch the cornea of the eye with a fine wisp of cotton. Avoid touching the eyelashes or the conjunctiva.
- The expected response is a bilateral blink.
- If the patient has decreased sensation on their face from CN V damage, they may not blink.
- If the motor limb (CN VII) is damaged, the blink response may be absent or reduced on the affected side.

Cranial Nerve VII: Facial Nerve (CN VII) Examination

The facial nerve controls the muscles of facial expression, provides taste sensation to the anterior two-thirds of the tongue, and innervates the lacrimal and salivary glands. A comprehensive evaluation includes testing facial symmetry, strength of facial muscles, and taste.

Facial Symmetry and Expression

Observe the patient's face at rest for any asymmetry. Then, ask them to perform various facial movements.

- Ask the patient to smile or show their teeth. Note any drooping of the corners of the mouth or flattening of nasolabial folds.
- Ask the patient to close their eyes tightly. Assess the strength and symmetry of eyelid closure.
- Ask the patient to puff out their cheeks. Observe if air escapes equally from both sides.
- Ask the patient to raise their eyebrows. Note any asymmetry in forehead wrinkling.

Lower motor neuron lesions (affecting the nerve after it exits the brainstem) typically cause weakness of all facial muscles on the ipsilateral side, including the forehead. Upper motor neuron lesions (affecting the corticobulbar tract before the facial nucleus) usually spare the forehead muscles due to bilateral cortical innervation.

Taste (Anterior Two-Thirds of Tongue)

This aspect of the exam is often omitted but is important for a complete assessment.

- Ensure the patient's eyes are closed.
- Apply a sweet, sour, salty, or bitter substance to each side of the anterior tongue using a cotton swab.
- Ask the patient to identify the taste.
- Rinse the mouth between applications of different tastes.

Cranial Nerve VIII: Vestibulocochlear Nerve (CN VIII)

Examination

The vestibulocochlear nerve has two main functions: hearing (cochlear division) and balance (vestibular division). The examination focuses on assessing hearing and looking for nystagmus or other signs of vestibular dysfunction.

Hearing Assessment

Basic hearing can be assessed at the bedside using simple tests.

- Ask the patient if they have any hearing difficulties.
- Rub your fingers together near each of the patient's ears.
- Ask the patient to report if they can hear the sound and if it sounds equal in both ears.
- Whisper a few words or numbers close to each ear and ask the patient to repeat them.
- For more formal testing, audiometry can be performed.

Weber and Rinne Tests

These bedside tests can help differentiate between conductive and sensorineural hearing loss.

- **Weber Test:** Strike a tuning fork (e.g., 512 Hz) and place the vibrating end on the midline of the patient's forehead. Ask where the sound is heard. Normally, it is heard equally in both ears (midline). If heard louder in one ear, it suggests conductive hearing loss in that ear or sensorineural hearing loss in the opposite ear.
- **Rinne Test:** Strike a tuning fork and place the vibrating end on the mastoid process until the patient can no longer hear it (bone conduction). Then, move the vibrating end near the ear canal (air conduction). Normally, air conduction is heard longer than bone conduction (positive Rinne). If bone conduction is heard longer or equally, it suggests conductive hearing loss.

Vestibular Assessment

While a full vestibular exam is complex, a basic assessment can be made by observing for nystagmus and asking about vertigo or dizziness.

- Observe the patient's eyes at rest for any spontaneous nystagmus.
- Ask the patient to follow a moving target (as described for CN III, IV, VI) and note any nystagmus induced by gaze.

- Inquire about dizziness or vertigo, particularly when changing positions.

Cranial Nerves IX and X: Glossopharyngeal and Vagus Nerves (CN IX, X) Examination

These two nerves are closely related and often tested together. CN IX (Glossopharyngeal) is primarily sensory, providing taste sensation to the posterior third of the tongue and general sensation to the pharynx, palate, and tympanic membrane. CN X (Vagus) has extensive motor and sensory functions, including innervating the muscles of the pharynx, larynx, and soft palate, providing parasympathetic innervation to thoracic and abdominal viscera, and carrying taste sensation from the epiglottis.

Pharyngeal Sensation and Gag Reflex

The gag reflex is a crucial test for the integrity of CN IX and X.

- Ask the patient to open their mouth.
- Depress the tongue with a tongue depressor and gently touch the posterior pharyngeal wall on each side.
- Observe for a gagging sensation and the elevation of the uvula and soft palate.
- The afferent limb is primarily CN IX, and the efferent limb is primarily CN X.

A diminished or absent gag reflex can indicate a lesion of either nerve. It's important to note that the gag reflex can sometimes be elicited with a tongue blade on the uvula, which tests CN IX primarily.

Palate and Uvula Position

The soft palate and uvula are innervated by CN X.

- Ask the patient to say "Ahhh."
- Observe the movement of the soft palate and uvula. Normally, the soft palate elevates symmetrically, and the uvula remains in the midline.
- If one side of the palate fails to elevate, it suggests weakness of the ipsilateral vagus nerve. The uvula will deviate away from the weakened side when the patient says "Ahhh."

Swallowing Assessment

Difficulty swallowing (dysphagia) can be a symptom of CN IX or X dysfunction.

- Observe the patient swallowing a sip of water.
- Note any signs of aspiration, coughing, or hoarseness.

Cranial Nerve XI: Accessory Nerve (CN XI) Examination

The accessory nerve innervates the sternocleidomastoid and trapezius muscles, which are important for head turning and shoulder shrugging. Testing CN XI involves assessing the strength of these muscles.

Shoulder Shrugging

This tests the trapezius muscle.

- Ask the patient to shrug their shoulders against resistance provided by the examiner.
- Assess for equal strength and contraction of both trapezius muscles.

Head Turning (Sternocleidomastoid Muscles)

This tests the sternocleidomastoid muscles.

- Ask the patient to turn their head to one side against resistance.
- Then, ask them to turn their head to the other side against resistance.
- Observe and palpate the sternocleidomastoid muscles for strength and symmetry.

Weakness in shoulder shrugging or head turning can indicate damage to CN XI.

Cranial Nerve XII: Hypoglossal Nerve (CN XII) Examination

The hypoglossal nerve innervates the intrinsic and extrinsic muscles of the tongue, which are crucial for speech, swallowing, and mastication. Testing CN XII involves assessing tongue protrusion, movement, and any presence of fasciculations or atrophy.

Tongue Protrusion and Movement

- Ask the patient to protrude their tongue.
- Observe if the tongue protrudes in the midline.
- Ask the patient to move their tongue from side to side and to move it up and down inside their mouth.
- Assess for any deviation, weakness, or abnormal movements.

If the hypoglossal nerve is damaged on one side, the tongue will deviate towards the weakened side upon protrusion due to the unopposed action of the genioglossus muscle on the intact side.

Tongue Strength and Fasciculations

- Ask the patient to press their tongue against the inside of their cheek while you apply resistance externally.
- Assess for equal strength on both sides.
- Observe the tongue for any spontaneous, involuntary muscle contractions (fasciculations) or signs of muscle wasting (atrophy).

Tips for Performing a Comprehensive Cranial Nerve Examination

A systematic and organized approach is key to performing an efficient and thorough cranial nerve examination. Familiarizing yourself with the anatomical pathways and functions of each nerve will greatly enhance your ability to detect subtle abnormalities.

- **Be Organized:** Follow a consistent order, such as the numbering of the cranial nerves (I to XII).
- **Use Appropriate Equipment:** Have essential tools like a Snellen chart, ophthalmoscope, otoscope, tongue depressors, cotton wisp, and tuning forks readily available.
- **Patient Comfort:** Ensure the patient is comfortable and understands each instruction before performing the test.
- **Compare Sides:** Always compare findings from one side of the body to the other to identify asymmetries.

- **Test Bilaterally:** When testing sensory or motor functions, test both sides of the face or body.
- **Watch for Non-Verbal Cues:** Pay attention to the patient's facial expressions and any signs of discomfort or confusion.
- **Integrate with Other Assessments:** The cranial nerve exam is often integrated with a general neurological examination, including assessment of motor strength, sensation in the limbs, reflexes, and coordination.
- **Practice Regularly:** The more you perform the exam, the more proficient you will become in recognizing normal and abnormal findings.

Documenting Your Cranial Nerve Exam Findings

Accurate and concise documentation is crucial for tracking patient progress, communicating with other healthcare professionals, and for medico-legal purposes. Each component of the cranial nerve examination should be clearly recorded.

- **Record Normality:** For each nerve, clearly state that the examination was normal or specify the abnormalities found. For example, "CN II: Visual acuity 20/20 bilaterally, visual fields intact by confrontation, optic discs sharp."
- **Quantify Abnormalities:** Where possible, quantify findings. For visual acuity, use the Snellen chart readings. For pupillary size, note the diameter in millimeters. For weakness, describe the grade of motor strength (e.g., 4/5).
- **Describe Specific Deficits:** Clearly articulate any deficits, such as "right hemianopia," "left facial droop," "absent gag reflex on the left," or "tongue deviates to the right on protrusion."
- **Use Standard Terminology:** Employ accepted medical terminology to ensure clarity and avoid misinterpretation.
- **Note Patient Subjective Complaints:** Include any subjective symptoms reported by the patient related to cranial nerve function, such as blurred vision, double vision, tinnitus, or dizziness.
- **Date and Time:** Always date and time your documentation.

A well-documented cranial nerve exam checklist forms an essential part of the patient's medical record, providing a detailed snapshot of neurological function at the time of examination.

Frequently Asked Questions

What is the primary purpose of a cranial nerve exam checklist?

The primary purpose of a cranial nerve exam checklist is to ensure a systematic and comprehensive evaluation of the 12 pairs of cranial nerves, aiding in the identification of neurological deficits and potential underlying conditions.

Which cranial nerves are typically assessed for visual acuity and fields of vision during an exam?

Cranial nerves II (Optic) and III (Oculomotor) are primarily assessed for visual acuity and fields of vision. The Optic nerve transmits visual information, while the Oculomotor nerve controls pupillary constriction and eyelid movement, both crucial for vision assessment.

What common tests are included in a cranial nerve exam checklist for assessing facial sensation and motor function?

For facial sensation, light touch and pinprick tests using a cotton wisp and a broken tongue depressor are common. For motor function, assessing facial symmetry, eyebrow elevation, eye closure, teeth clenching, and smiling/grimacing are typical components, primarily evaluating cranial nerves V (Trigeminal) and VII (Facial).

How does a cranial nerve exam checklist help in diagnosing specific neurological conditions?

By systematically assessing each nerve's function, a checklist helps pinpoint which nerve(s) are affected, providing clues to the location and nature of a neurological issue. For example, weakness in tongue movement might point to cranial nerve XII (Hypoglossal) dysfunction, potentially related to stroke or a tumor.

What are some key elements of a cranial nerve exam checklist for evaluating hearing and balance?

The checklist typically includes gross hearing tests (whispered voice, watch tick), Weber and Rinne tests (using a tuning fork) for conductive vs. sensorineural hearing loss, and observation for nystagmus (involuntary eye movements) which can indicate vestibular dysfunction. These primarily assess cranial nerve VIII (Vestibulocochlear).

Why is it important to follow a structured cranial nerve exam checklist rather than performing tests ad hoc?

Following a structured checklist ensures that no cranial nerve is overlooked and that the assessment is performed consistently. This systematic approach reduces the risk of missing subtle abnormalities and improves the reliability and comparability of findings, especially when multiple healthcare providers are involved or for tracking changes over time.

Additional Resources

Here are 9 book titles related to a cranial nerve exam checklist, with descriptions:

1. *Illustrated Atlas of the Cranial Nerves*

This comprehensive atlas provides detailed anatomical illustrations and descriptions of each cranial nerve, tracing their pathways from the brainstem to their target organs. It's an invaluable resource for understanding the spatial relationships and functional anatomy critical for performing a thorough cranial nerve exam. The book includes diagrams showing common pathologies affecting each nerve, aiding in the interpretation of clinical findings.

2. *Clinical Neurology: A Practical Guide to Examination*

This practical guide walks the reader through the systematic approach to neurological examination, with a dedicated section on assessing the cranial nerves. It emphasizes the bedside techniques required to elicit specific responses and interpret them in the context of neurological function. The book offers case studies and differential diagnoses to enhance diagnostic skills.

3. *Neuroanatomy for the Medical Student: A Case-Based Approach*

Designed for students, this book uses clinical cases to illustrate neuroanatomical principles, including those related to the cranial nerves. By linking anatomy to clinical presentations, it helps learners understand why specific tests are performed during a cranial nerve exam and what deficits might indicate. The case-based format fosters problem-solving and critical thinking.

4. *Pocket Atlas of Neurological Examination*

This portable atlas is an excellent companion for learning and performing the cranial nerve exam in a clinical setting. It features concise descriptions of each test, accompanied by clear, high-quality images or diagrams demonstrating the correct technique. The book's compact size makes it ideal for quick reference at the patient's bedside.

5. *Principles of Neuro-Ophthalmology: Diagnosis and Management*

Focusing on the visual system, this book delves deeply into the assessment of cranial nerves III, IV, VI, and II, which are crucial for eye movements and vision. It explains the intricate anatomy and physiology of these nerves and outlines systematic approaches to diagnosing neuro-ophthalmic disorders. The text provides a detailed understanding of pupillary reflexes and visual field testing relevant to the cranial nerve exam.

6. *Facial Nerve Anatomy and Surgical Approaches*

While focused on surgical aspects, this book offers an in-depth exploration of the facial nerve (cranial nerve VII), its anatomical course, and its functions in motor control of facial muscles and sensation. Understanding the complex pathways and potential sites of injury is essential for interpreting findings during a facial nerve examination. It provides detailed anatomical diagrams and descriptions of relevant tests.

7. *Vestibular and Auditory Disorders: A Clinical Approach*

This book addresses the assessment of cranial nerves VIII (vestibulocochlear nerve), focusing on hearing and balance. It outlines diagnostic procedures for evaluating auditory function and vestibular integrity, which are critical components of a comprehensive neurological exam. The text explains the neurophysiological basis of these sensations and common disorders affecting the nerve.

8. *The Neurologic Examination: An Integrated Approach*

This foundational text offers a holistic view of the neurologic examination, integrating the

assessment of all major neurological systems, including the cranial nerves. It provides detailed step-by-step instructions for performing each part of the cranial nerve exam, emphasizing the correlation between findings and underlying neuroanatomy. The book also covers common neurological conditions and their diagnostic signs.

9. *Clinical Assessment of the Cranial Nerves: A Practical Handbook*

This handbook is specifically designed as a practical guide for performing and interpreting cranial nerve examinations. It presents a clear, checklist-style approach, breaking down each nerve's assessment into manageable steps. The book includes tips for common pitfalls and how to interpret abnormal findings for rapid clinical decision-making.

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