Ice Pack Test

The ice pack test is performed by holding an ice cube, wrapped in a towel or a surgical glove, over the levator palpebrae superioris muscle of a ptotic eye for 2-10 minutes. Improvement of ptosis is said to be specific for myasthenia gravis: cold improves transmission at the neuromuscular junction (myasthenic patients often improve in cold as opposed to hot weather). This phenomenon is not observed in other causes of ptosis. A pooled analysis of several studies gave a test sensitivity of 89% and specificity of 100% with correspondingly high positive and negative likelihood ratios. The test is easy to perform and without side effects (cf. Tensilon test).

Whether the ice pack test is also applicable to myasthenic diplopia has yet to be determined. False positives have been documented.

References
Larner AJ. The place of the ice pack test in the diagnosis of myasthenia gravis. *International Journal of Clinical Practice* 2004; 58: 887-888

Cross References
Diplopia; Fatigue; Ptosis

Ideational Apraxia
- see APRAXIA

Ideomotor Apraxia (IMA)
- see APRAXIA

Illusion

An illusion is a misinterpretation of a perception (cf. delusion, hallucination). Illusions occur in normal people when they are tired, inattentive, in conditions of poor illumination, or if there is sensory impairment. They also occur in disease states, such as delirium, and psychiatric disorders (affective disorders, schizophrenia).

Examples of phenomena which may be labeled illusory include:
- Visual: metamorphopsia, palinopsia, polyopia, telopsia, Pulfrich phenomenon, visual alloesthesia
- Auditory: palinacusis
- Vestibular: vertigo

References
Impersistence is an inability to sustain simple motor acts, such as conjugate gaze, eye closure, protrusion of the tongue, or keeping the mouth open. It is most commonly seen with lesions affecting the right hemisphere, especially central and frontal mesial regions, and may occur in association with left hemiplegia, neglect, anosognosia, hemianopia, and sensory loss. These patients may also manifest perseveration, echolalia and echopraxia.

Impersistence is most often observed following vascular events but may also be seen in Alzheimer’s disease and frontal lobe dementias, and metabolic encephalopathies. Impersistence of tongue protrusion

Imitation Synkinesis
- see MIRROR MOVEMENTS
and hand grip may be seen in Huntington’s disease. Neuro-psychologically, impersistence may be related to mechanisms of directed attention which are needed to sustain motor activity.

References
Fisher M. Left hemiplegia and motor impersistence. Journal of Nervous and Mental Disease 1956; 123: 201-218

Cross References
Anosognosia, Echolalia; Echopraxia; Hemianopia; Milkmaid’s grip; Neglect; Perseveration; Trombone tongue

Inattention
- see NEGLECT

Incontinence
Urinary incontinence may result from neurological disease. Neurological pathways subserving the appropriate control of micturition encompass the medial frontal lobes, a micturition centre in the dorsal tegmentum of the pons, spinal cord pathways, Onuf’s nucleus in the spinal cord segments S2-S4, the cauda equina, and the pudendal nerves. Thus the anatomical differential diagnosis of incontinence is broad. Moreover incontinence may be due to inappropriate bladder emptying or a consequence of loss of awareness of bladder fullness with secondary overflow. Other features of the history and/or examination may give useful pointers as to localization. Incontinence of neurological origin is often accompanied by other neurological signs, especially if associated with spinal cord pathology (see Myelopathy). The pontine micturition centre lies close to the medial longitudinal fasciculus and local disease may cause an internuclear ophthalmoplegia. However, other signs may be absent in disease of the frontal lobe or cauda equina.

Causes of urinary incontinence include:

- Idiopathic generalized epilepsy with tonic-clonic seizures; however, the differential diagnosis of “loss of consciousness with incontinence” also encompasses syncopal attacks with or without secondary anoxic convulsions, nonepileptic attacks, and hyperekplexia
- Frontal lobe lesions: frontal lobe dementia; normal pressure hydrocephalus
- Spinal cord pathways: urge incontinence of multiple sclerosis; loss of awareness of bladder fullness with retention of urine and overflow in tabes dorsalis
- Sacral spinal cord injury; degeneration of the sacral anterior horn cells in Onuf’s nucleus (multiple system atrophy)
- Cauda equina syndrome; tethered cord syndrome (associated with spinal dysraphism)
- Pelvic floor injury.
Neurogenic incontinence may be associated with urgency, which results from associated abrupt increases in detrusor pressure (detrusor hyperreflexia); this may be helped by anticholinergic medication (e.g., oxybutynin). In addition there may be incomplete bladder emptying, which is usually asymptomatic, due to detrusor sphincter dyssynergia; for post-micturition residual volumes of greater than 100 ml (assessed by in-out catheterization or ultrasonography), this is best treated by clean intermittent self-catheterization.

References

Cross References
Cauda equina syndrome; Dementia; Frontal lobe syndromes; Hyperekplexia; Internuclear ophthalmoplegia; Myelopathy; Seizures; Urinary retention

Intention Myoclonus
- see MYOCLONUS

Intermanual Conflict
Intermanual conflict is a behavior exhibited by an alien hand (le main étranger) in which it reaches across involuntarily to interfere with the voluntary activities of the contralateral (normal) hand. Diagonistic dyspraxia probably refers to the same phenomenon. The hand acts at cross purposes to the other following voluntary activity. A “compulsive grasping hand” syndrome has been described which may be related to intermanual conflict, the difference being grasping of the contralateral hand in response to voluntary movement. Intermanual conflict is more characteristic of the callosal, rather than the frontal, subtype of anterior or motor alien hand. It is most often seen in patients with corticobasal degeneration, but may also occur in association with callosal infarcts or tumors or following callosotomy.

Cross References
Alien hand, alien limb; “Compulsive grasping hand”; Diagonistic dyspraxia

Intermetamorphosis
A form of delusional misidentification in which people known to the patient are believed to exchange identities with each other (cf. Fregoli syndrome, in which one person can assume different physical appearance).

References
Cross References
Delusion

Internal Ophthalmoplegia
- see OPHTHALMOPARESIS, OPHTHALMOPLEIGA

Internuclear Ophthalmoplegia (INO)
Internuclear ophthalmoplegia, or medial longitudinal fasciculus syndrome, consists of ipsilateral weakness of eye adduction with contralateral nystagmus of the abducting eye (ataxic or dissociated nystagmus), but with preserved convergence. This may be obvious with pursuit eye movements, but is better seen when testing reflexive saccades or optokinetic responses when the adducting eye is seen to “lag” behind the abducting eye. INO may be asymptomatic or, rarely, may cause diplopia, oscillopsia, or a skew deviation. INO may be unilateral or bilateral. The eyes are generally aligned in primary gaze, but if there is associated exotropia this may be labeled wall-eyed monocular/bilateral internuclear ophthalmoplegia (WEMINO, WEBINO syndromes).

The most common cause of INO by far is demyelination, particularly in young patients, but other causes include cerebrovascular disease (particularly older patients), Wernicke-Korsakoff syndrome, encephalitis, trauma, and paraneoplasia.

A similar clinical picture may be observed with pathology elsewhere, hence a “false-localizing” sign and referred to as a pseudo-internuclear ophthalmoplegia (q.v.), especially in myasthenia gravis.

References

Cross References
Diplopia; “False-localizing signs”; One-and-a-half syndrome; Optokinetic nystagmus, Optokinetic response; Oscillopsia; Pseudo-internuclear ophthalmoplegia; Saccades; Skew deviation

Intrusion
An intrusion is an inappropriate recurrence of a response (verbal, motor) to a preceding test or procedure after intervening stimuli. Intrusions are thought to reflect inattention, and may be seen in dementing disorders or delirium. These phenomena overlap to some extent with the recurrent type of perseveration.

The term intrusion is also used to describe inappropriate saccadic eye movements which interfere with macular fixation during pursuit eye movements.

References
Cross References
Delirium; Dementia; Perseveration; Saccadic intrusion, Saccadic pursuit

Inverse Marcus Gunn Phenomenon
- see JAW WINKING; PTOSIS

Inverse Uhthoff Sign
- see UHTHOFF’S PHENOMENON

Inverted Reflexes
A phasic tendon stretch reflex is said to be inverted when the movement elicited is opposite to that normally seen, e.g., extension of the elbow rather than flexion when eliciting the supinator (brachioradialis) jerk; flexion of the forearm when tapping the triceps tendon (paradoxical triceps reflex); and flexion (hamstring contraction) rather than extension of the knee when tapping the patellar tendon.

The finding of inverted reflexes may reflect dual pathology, but more usually reflects a single lesion which simultaneously affects a root or roots, interrupting the local reflex arc, and the spinal cord, damaging corticospinal (pyramidal tract) pathways which supply segments below the reflex arc. Hence, an inverted supinator jerk is indicative of a lesion at C5/6, paradoxical triceps reflex occurs with C7 lesions; and an inverted knee jerk indicates interruption of the L2/3/4 reflex arcs, with concurrent damage to pathways descending to levels below these segments.

References

Cross References
Reflexes

Ipsipulsion
- see LATEROPULSION

Iridoplegia
Paralysis of the iris, due to loss of pupillary reflexes. This may be partial, as in Argyll Robertson pupil or Holmes-Adie pupil, or complete as in the internal ophthalmoplegia of an oculomotor (III) nerve palsy.

Cross References
Argyll robertson pupil; Holmes-adie pupil, Holmes-adie syndrome; Oculomotor (III) nerve palsy; Ophthalmoparesis, Ophthalmoplegia; Pupillary reflexes