WHY IT MATTERS

Dizziness affects 30-60% of patients after mild traumatic brain injury (mTBI); 15-30% develop chronic symptoms beyond 3 months. Six distinct mechanisms operate, often in combination, each with specific treatment. Prolonged rest worsens outcomes; early mechanism-targeted rehabilitation is the standard of care (CISG 6th, Amsterdam 2022; ONF 3rd ed).

■ **Every post-concussive patient deserves a Dix-Hallpike + supine roll. Traumatic BPPV is the highest-yield diagnosis - over-represented after head injury, frequently missed.**

SIX MECHANISMS - LOOK FOR ALL OF THEM

Mechanism	Clinical signature -> First-line action
1. Traumatic BPPV (post / horizontal)	Brief positional vertigo on rolling, lying, looking up. Higher incidence after trauma; multiple canals possible. Action: Dix-Hallpike + supine roll; Epley or Gufoni / log-roll manoeuvre.
2. Labyrinthine concussion / vestibulopathy	Constant unsteadiness with motion sensitivity; abnormal head impulse; sometimes hearing change. Action: VOR x1 gaze stabilisation, habituation, balance retraining.
3. Post-traumatic vestibular migraine	Recurrent vertigo with photo/phonophobia or headache; visual triggers. Action: lifestyle (sleep, hydration, caffeine, screens), trigger diary, prophylaxis if frequent.
4. Cervicogenic dizziness	Worse with neck movement or sustained posture; suboccipital tenderness; reduced cervical ROM. Action: cervical physiotherapy, manual therapy, postural retraining.
5. Autonomic / orthostatic (OH, POTS)	Symptoms on standing or upright; pre-syncope; tachycardia. Action: lying/standing BP+HR (1, 3, 10 min), salt + fluids, compression, graded exercise.
6. Persistent Postural-Perceptual Dizziness (PPPD)	Daily non-vertiginous unsteadiness over 3 months; worse upright, with motion or visual stimuli. Action: vestibular rehab, SSRI / SNRI, CBT.

♦ **Three commonly missed mechanisms: traumatic BPPV (do positional testing), post-traumatic vestibular migraine (ask about headache pattern), and PPPD (consider after 3 months of non-specific dizziness). Most patients have more than one mechanism.**

HISTORY - KEY QUESTIONS

Question	Why it matters / what it differentiates
Timing and duration of dizzy episodes	Seconds -> BPPV; minutes-hours -> vestibular migraine; constant -> PPPD or labyrinthine concussion.
Triggers - positional, visual, neck, standing	Maps to mechanism: position -> BPPV; visual -> PPPD or VM; standing -> OH / POTS; neck -> cervicogenic.
Hearing change, tinnitus, aural fullness	Suggests labyrinthine concussion, perilymph fistula, post-traumatic Meniere's; warrants audiometry.
Headache pattern, photo/phonophobia, motion sensitivity	Suggests post-traumatic vestibular migraine - commonest under-recognised mechanism after mTBI.
Mechanism, LOC, post-traumatic amnesia, GCS at presentation	Stratifies mTBI severity; flags need for imaging, longer follow-up, or neurology referral.
Prior concussions, migraine, anxiety / depression	Risk factors for protracted recovery and chronic post-concussive symptoms; informs prognosis.

BEDSIDE EXAM - SEVEN-STEP CHECKLIST

Step	What to do / what it tells you
1. Oculomotor screen	Smooth pursuit, saccades, gaze-evoked nystagmus, convergence - catches central pathology and post-concussive oculomotor dysfunction.
2. HINTS (head impulse, nystagmus, skew)	In any acute vestibular pattern: normal HI + direction-changing nystagmus + skew -> central until proven otherwise.
3. Dix-Hallpike L and R	Mandatory in every post-concussive patient. Posterior canal BPPV is the commonest peripheral cause after trauma.
4. Supine roll test	Catches lateral / horizontal canal BPPV - over-represented after head injury and missed by Dix-Hallpike alone.
5. Orthostatic BP + HR (lying, 1, 3, 10 min)	Identifies initial OH, classical OH, and POTS (HR rise >=30 sustained beyond 3 min).
6. Cervical ROM + suboccipital / trap palpation	Reproducible cervical pain and restricted ROM support a cervicogenic contribution - common comorbidity.
7. Focused neuro: cranial nerves, gait, tandem, Romberg	Screens for central red flags warranting same-day imaging or neurology / vestibular physician escalation.

♦ **Document Dix-Hallpike and supine roll results explicitly - not buried under "neuro exam normal." The next clinician needs to know whether positional testing was done, and whether truly negative.**

CHRONIC RISK FACTORS - WHO IS LIKELY TO STAY DIZZY

Risk factor	Why it matters / what to do
Pre-existing migraine or family history of migraine	Strongly predicts post-traumatic vestibular migraine; consider preventive Rx earlier
Female sex, especially adolescent	Higher rate of prolonged recovery; lower threshold for vestibular rehab
Prior concussion(s)	Cumulative risk; consider neurology / vestibular physician referral
High initial symptom burden (vertigo, photophobia, vomiting) within first 48 h	Predicts protracted course; arrange early follow-up
Pre-existing anxiety, depression, or PPPD	Elevated risk of post-concussive PPPD; screen with PHQ-9 / GAD-7
Litigation, workers' compensation, or driving / sport stakes	Influences symptom reporting; address openly, document

♦ **Most post-concussive dizziness improves in 1-2 weeks. If symptoms are not trending down by day 7-10, refer to vestibular physiotherapy at that point - do not wait the conventional 4 weeks. Early referral is the single highest-yield intervention for preventing chronicity.**

RED FLAGS - ESCALATE THE SAME DAY

Red flag	Action
New focal neurological deficit; GCS deterioration; seizure	Same-day ED -> CT brain; neurosurgical / neurology review.
Direction-changing or vertical / torsional nystagmus; skew	Central pattern - urgent MRI-DWI; consider posterior-circulation stroke.
Worsening headache, vomiting, decreasing GCS, anticoagulation	Same-day CT brain to exclude expanding intracranial haemorrhage.
Acute hearing loss with vertigo (post-trauma)	Audiometry within 72 h; consider perilymph fistula, temporal bone fracture, or AICA infarction.
Symptoms persisting beyond 3 months despite rehab	Vestibular physician for mechanism reappraisal; consider PPPD, post-traumatic VM, or layered diagnosis.

EARLY REHAB PRINCIPLES - START WITHIN DAYS, NOT WEEKS

► Avoid prolonged rest - 24-48 h relative rest is sufficient. Beyond that, prolonged inactivity worsens outcomes and increases risk of chronic symptoms (CISG 6th, ONF 3rd ed).

► Graded sub-symptom-threshold aerobic exercise - walking or stationary cycling at intensity that does not provoke symptom escalation. Buffalo Concussion Treadmill Test guides safe threshold.

► Specific vestibular exercises - VOR x1 gaze stabilisation, habituation, dynamic balance retraining. Prescribe early; titrate to symptoms; review at 2-4 weeks.

► Visual-motion habituation - staged exposure to busy or visually complex environments (supermarkets, screens, crowded streets). Counters avoidance and addresses PPPD trajectory.

► Stop vestibular suppressants beyond 72 h - prochlorperazine, promethazine, benzodiazepines block central compensation and prolong recovery.

TREATMENT BY MECHANISM

Mechanism	Targeted treatment
Traumatic BPPV	Epley (posterior) or Gufoni / barbecue log-roll (lateral); recheck at 1 week. Most resolve in 1-2 sessions.
Labyrinthine concussion	VOR x1 + habituation + balance programme; supervised vestibular physiotherapy 6-12 weeks; review at 4 weeks.
Post-traumatic vestibular migraine	Lifestyle measures. Prophylaxis if frequent: propranolol 20-80 mg bd or amitriptyline 10-25 mg nocte; topiramate 25 -> 100 mg as alternative.
Cervicogenic dizziness	Cervical physiotherapy, manual therapy, postural retraining; treat headache contribution; review at 4-6 weeks.
Autonomic (OH / POTS)	Salt 3-10 g/day, fluids 2-3 L/day, compression, graded exercise. Refractory POTS: cardiology / autonomic clinic; midodrine, fludrocortisone.
PPPD	Vestibular rehab (mainstay), sertraline 25 -> 50 mg or venlafaxine 37.5 -> 75 mg, plus CBT. Onset of benefit at 8-12 weeks.

STAGED RETURN TO ACTIVITY (CISG 6TH)

Stage	Activity - progress only when symptom-free for >=24 h at each stage
1. Symptom-limited activity	24-48 h relative rest. Daily activities of living that do not provoke symptoms; gradually reintroduce screens and reading.
2. Light aerobic exercise	Walking or stationary cycling at sub-symptom-threshold intensity; Buffalo treadmill protocol if available; no resistance training.
3. Sport- or work-specific exercise	Running drills, simulated work tasks, light cognitive load. No head-impact risk; no contact.
4. Non-contact training drills	More complex movement and coordination; resistance training added; integration of dual-task demands.
5. Full-contact / full-duty practice	After medical clearance only; full training load; restore confidence in normal activity.
6. Return to play / full duties	Unrestricted competition or work. Each stage requires >=24 h symptom-free progression; setback -> step back one stage.

REFERRAL, DOCUMENTATION & SAFETY-NETTING

Trigger / topic	Action
Central red flags (HINTS-positive, focal deficit)	Same-day ED for MRI-DWI +/- neurology / stroke service.
Persistent symptoms beyond 6-8 weeks despite first-line management	Vestibular physician for mechanism reappraisal and integrated rehab plan.
Documentation	Mechanism, GCS, LOC, post-traumatic amnesia, SCAT-6 / RPQ; mechanism(s) identified; treatment plan; follow-up interval.
Driving (Austroads)	Written advice not to drive while symptomatic; reassess fitness at each follow-up; notify regulator only if persistent concern.
Safety-net (written)	Return for worsening headache, new focal weakness, repeated vomiting, drowsiness, seizure, or any decrease in conscious level.

★ **The post-concussive patient who does well has three things: a named clinician coordinating care, a specific mechanism identified and addressed, and a graded return-to-activity programme started within days, not weeks, of injury.**

♦ **Outlook - 70-85% of dizziness following mTBI resolves by 3 months with mechanism-specific treatment. The 15-30% with persistent symptoms are usually under-treated, not under-investigated.**

Evidence: CISG 6th International Consensus on Concussion in Sport (Amsterdam 2022); Ontario Neurotrauma Foundation Guidelines 3rd ed (2018); Barany Society PPPD criteria (2017); Australian Institute of Sport Concussion Position Statement (2023).