

A novel approach to Neurorehabilitation for persisting Post Concussion Syndrome with occupational reintegration in 2 males aged 34 & 43: A Case Series of 2

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Grok prompt

Summarise this paper by David Richardson into 3 paragraphs using clinical language appropriate for a Chiropractor, and provide 5 multi-choice quiz questions with answers

Grok response

Post-concussion syndrome (PPCS) represents a multi-system neural disruption that persists beyond three months after mTBI, with substantial occupational disability in working-age adults. This report presents two cases of PPCS extending beyond one year, each managed with a patient-specific, multimodal neurorehabilitation program designed to drive neuroplastic changes and functional recovery. The assessment framework integrated objective measures across autonomic, oculomotor, vestibular, postural, cervical, and cognitive domains, with saccadometry and instrumented posturography providing quantitative biomarkers of impairment and treatment response. The study underscores the heterogeneity of PPCS and the limitation of unimodal therapies, advocating for an approach that targets distributed neural networks rather than isolated symptoms.

In Patient 1 (34-year-old electrician) and Patient 2 (43-year-old spray painter), baseline evaluations revealed cervicogenic dysfunction, oculomotor/vestibular impairments, autonomic dysregulation, postural instability, and convergence insufficiency in at least one case. Both received an individualized, progressive treatment package comprising clinic-based interventions (vestibular stimulation with an orbital rotational chair, saccade/oculomotor training with head-mounted laser tasks, sensorimotor integration tasks including backward treadmill walking with cognitive load, rapid visuomotor tapping, rhythmic entrainment therapy, and cervical-SPINAL adjustments) plus a structured home program (vergence exercises, breathing and breath-hold training, VOR/ocular motor drills, balance training, and functional movement tasks). The interventions were dosed and progressed according to objective capabilities, with no adverse events reported over 10-16 months of care.

Outcomes demonstrated continuous, objective improvement in neurophysiological measures and meaningful occupational reintegration: both patients achieved improvements in saccadometry and force-plate posturography, with convergence function and autonomic regulation showing clinically relevant gains. P1 returned to full-time, skilled trade work as an electrician; P2 transitioned to a new vocational path (distillery entrepreneurship) reflecting functional recovery beyond prior occupation. The cases support the proposition that multimodal, assessment-driven rehabilitation can yield neurophysiological normalisation trends

and substantive real-world outcomes in chronic PPCS, and they highlight the importance of framing return-to-work and vocational reintegration as primary outcomes rather than secondary metrics.

Clinical implications and considerations for practice include the value of objective, multi-domain assessment to guide rehabilitation, the role of orthostatic/ autonomic targets, and the integration of oculomotor-vestibular therapies with cervical care in chiropractors' scope. Limitations include the small sample, absence of imaging or standardised symptom scales, and inability to isolate the contribution of individual components. Nonetheless, the report reinforces a diagnostic- and problem-focused, multimodal approach as a clinically feasible strategy for chronic PPCS and occupational reintegration, with saccadometry and posturography serving as practical biomarkers of treatment response when available.

Five multiple-choice questions (with answers)

1. What is the primary diagnostic rationale used for PPCS in these cases?

- A) Unimodal vestibular diagnosis
- B) Clinical history alone
- C) Multi-domain objective abnormalities plus persistent symptoms
- D) Neuroimaging-confirmed lesions

Correct answer: C

2. Which objective measures were used to document treatment response in these cases?

- A) Self-reported symptoms only
- B) Saccadometry and instrumented force plate posturography
- C) MRI and CT imaging
- D) Traditional balance tests alone

Correct answer: B

3. What occupational outcome did Patient 1 achieve after treatment?

- A) No change in employment status
- B) Return to full-time employment in his prior trade
- C) Transition to a different occupation but no full-time work
- D) Retirement due to persistent symptoms

Correct answer: B

4. Which component was specifically used to address convergence insufficiency in Patient 2?

- A) Cervical adjustments only
- B) Vergence/oculomotor rehabilitation and head-mounted laser tasks
- C) Pure vestibular rehabilitation with rotation chair alone
- D) Pharmacologic therapy

Correct answer: B

5. What is a key limitation acknowledged by the authors of these cases?

- A) Large randomized controlled trial design
- B) Absence of objective measures
- C) No control condition and small sample size
- D) Excessive use of neuroimaging

Correct answer: C

Specific Chiropractic implications

Perspectives for chiropractic management of chronic PPCS: This case series reinforces the concept that PPCS is a multi-system neurofunctional disorder rather than a single-organ pathology. For chiropractors, the clearest clinical implication is that cervicogenic contributions to dizziness, headache, and cognitive symptoms are not incidental but integral to the patient's overall functional profile. Both patients demonstrated cervical segmental dysfunction contributing to headache and vertigo, supporting the rationale for cervical spine assessment and targeted spinal manipulative therapy (SMT) as part of a multimodal program. Systematic reviews cited in the report support modest but meaningful short-term reductions in cervicogenic headache frequency and intensity with SMT, suggesting a role for carefully dosed cervical adjustments within a broader rehabilitation plan rather than as a stand-alone treatment.

Vestibulo-oculomotor integration and sensorimotor rehabilitation align with chiropractic scope and interdisciplinary care: The interventions included vestibular stimulation, oculomotor training, and convergence rehabilitation, which directly address the oculomotor-vestibular networks implicated in PPCS. Chiropractors can coordinate with optometric or neuro-ophthalmologic colleagues to integrate vergence and VOR-based therapies into the adjustment-focused care plan. The use of a weight-bearing, multi-domain approach (e.g., sensorimotor tasks with cognitive load, backward treadmill walking, and rhythmic entrainment) aligns with progressive loading principles—an area where chiropractors can contribute by pacing rehabilitation, monitoring tolerance, and adjusting manual therapy and functional training to the patient's neuromotor capacity. Importantly, the outcomes showed not only symptomatic improvement but objective neurophysiological changes, underscoring the potential for chiropractic-driven multimodal programs to facilitate meaningful occupational reintegration.

Occupational reintegration and autonomic considerations in chiropractic practice: The report highlights that return-to-work outcomes are a primary measure of rehabilitation success in PPCS and can be enhanced by addressing autonomic dysregulation (e.g., orthostatic tachycardia) alongside musculoskeletal and neurosensory targets. Chiropractors are well positioned to implement autonomic-tuning strategies within a multimodal framework, such as controlled breathing, postural rehabilitation, and proprioceptive training, while ensuring cervical and vestibular components are congruent with the patient's daily work demands. The cases also illustrate the potential for vocational reorientation when the post-injury functional profile supports alternative lines of work, emphasising the need for flexible, patient-centred goal setting within Chiropractic care.

True/False quiz (8 items)

1. True or False: The study supports using cervical SMT as a sole treatment for PPCS without integrating vestibular or oculomotor rehabilitation.

• Answer: False

2. True or False: Objective measures such as saccadometry and instrumented force plate posturography were used to document treatment response in these cases.

• Answer: True

3. True or False: Convergence insufficiency was addressed in Patient 2 exclusively with pharmacologic therapy.

• Answer: False

4. True or False: The occupational outcomes included one patient returning to his prior skilled trade and the other achieving vocational reorientation to a new occupation.

• Answer: True

5. True or False: The rehabilitation program was delivered as a fixed 6-week protocol with no progression in task difficulty.

• Answer: False

6. True or False: Orthostatic tachycardia was identified as a confounding factor in one patient and required autonomic-targeted rehabilitation.

- Answer: True

7. True or False: Neuroimaging (MRI/CT) was routinely performed at presentation to correlate with objective neurophysiological findings.

- Answer: False

8. True or False: The authors advocate treating occupational reintegration as a secondary outcome rather than a primary goal.

- Answer: False