

To whom it may concern,

*The Concussion Fix* is an evidence-based online program for patients with Persistent Concussion Symptoms (PCS). As part of the Concussion Fix program, we encourage each participant to work closely with their primary care provider to assess all aspect of the health that may be contributing to their ongoing symptoms.

Persistent Concussion Symptoms do not necessarily reflect ongoing brain injury, but rather a constellation of other, more systemic, and treatable dysregulations, including:

1. Blood flow impairment & autonomic nervous system dysregulation
2. Inflammation and Endocrine dysfunction
3. Visual and/or Vestibular Dysfunction
4. Concomitant Neck Injury/Dysfunction
5. Psychosomatic or mental health issues

As part of addressing the above factors, specifically point #2, testing the following markers may help determine if there are some underlying metabolic, inflammatory, and hormonal imbalances that are contributing to PCS symptoms. This list and supporting documentation is meant to serve as a reference guide.

**Morning cortisol, DHEAs, TSH, Free T4, Prolactin, FSH, LH, Progesterone (females), Estradiol (females), total testosterone (males) vitamin D, B12, CRP, HA1C, fasting glucose, ferritin, CBC, IGF-1**

See attached **Appendix 1** to see our rationale for requesting each test and selected references.

Sincerely,

The Concussion Fix Medical Advisory Group  
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## Appendix 1: Key Screening Laboratory Tests in PCS

Test	Rationale in PCS/concussion
CBC	Assess anemia, possible cause of fatigue
Ferritin	Assess iron status, anemia is associated with poor outcomes following TBI. Common cause of fatigue in female PCS patients
B12	Key in neurological recovery and energy levels
Fasting glucose	Assess blood sugar control – this can be omitted if risk factors for type 2 diabetes are not present
HA1C	Assess blood sugar control – this can be omitted if risk factors for type 2 diabetes are not present
TSH	Pituitary hormone that may become dysfunctional after TBI. May be out of range in absence of overt hypothyroid symptoms
Free T4	Assess thyroid function along with TSH
Cortisol (AM)	Assess adrenal hormonal production.
DHEA-S	Levels may decrease post-concussion. Lower levels of DHEA-S may be related to increased symptom burden and longer recovery times.
Prolactin	Pituitary hormone that may become dysfunctional after TBI. Levels may increase post-concussion. Especially relevant in cases of menstrual irregularity Post-TBI.
Estradiol (females)	Levels may change post-concussion.
Progesterone (females)	Levels may decrease post-concussion. Lower levels of progesterone may be related to increased symptom burden and longer recovery times
LH	Pituitary hormone that may become dysfunctional after TBI. Especially relevant in cases of menstrual irregularity Post-TBI and suspected cases of PCOS.
FSH	Pituitary hormone that may become dysfunctional after TBI. Especially relevant in cases of menstrual irregularity Post-TBI and suspected cases of PCOS.
IGF-1	Indirect test for growth hormone (GH). One of the most common and overlooked pituitary hormone affected after concussion. More accurate serum marker than growth hormone.
Testosterone, total (males)	Linked to poor muscle recovery and mood disturbances.
CRP	Linked to increased psychological outcomes involving PTSD and/or depression in the chronic mTBI population.
Vitamin D	Common deficiency – related to mood, immune function and pain levels. Levels will inform ideal dosing strategy for repletion.

## **Select References**

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