

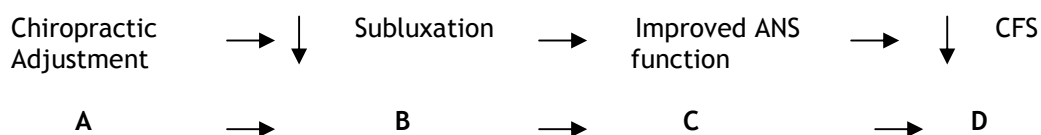
## Update 34

### Conceptualising paradigm relevant hypotheses - Chronic Fatigue Syndrome (CFS)

Chronic fatigue syndrome (CFS) is characterized by a complex of unexplained symptoms including fatigue of more than 6 months duration associated with a marked decrease in daily activity. Despite extensive research, no definitive aetiology has been discovered for CFS.

Although many chiropractors contend that chiropractic is not focused towards treating any specific disease, or ameliorating what have been termed Medically Unexplained Syndromes, like CFS, many chiropractors do posit that by correcting vertebral subluxations they help to minimise nerve interference and thereby optimise the body's potential to heal and be healthy.

We might hypothesise about a relationship between the chiropractic adjustment and CFS as follows - Chiropractic adjustments decrease the extent to which the spine is subluxated, which in turn decreases the extent to which the function of the autonomic nervous system is compromised, which in turn, decreases the symptoms associated with CFS. Our concepts can be linked diagrammatically with the following causal chain -



In order to be able to better explore the relationship between each of the above 4 concepts, the following steps need to be fulfilled -

First, each of our concepts needs to be operationally defined. Before attempting to operationally define each concept it is important to review the literature and know what research has already taken place around the concept, or concepts of interest, and whether there is information and or definitions that might serve our purposes so we don't go reinventing the wheel. Having said that, it might be argued that there is some value in re-inventing the wheel because the more operational definitions we have regarding a particular concept, and the more hypothesis testing that takes place, the more we are likely to know the extent to which a concept accurately maps reality.

In the above example the terms that need to be operationally defined are - Chiropractic adjustment; Vertebral subluxation; ANS function; CFS.

Next, we need to decide which aspects of our causal chain we are going to focus on in terms of hypothesis testing. There are a number of options -

- A → B
- A → C
- A → D
- B → C
- C → D

Or, we might choose to look at more than just two concepts at the same time, by measuring a number of outcome measures at the same time, for example -

A → B → C

A → B → D

A → C → D

A → B → C → D

Interestingly the relationship between C and D of the above causal chain have already received considerable attention from biomedical researchers. For example, the following summary mentions some of the studies that have been published which explore the relationship between the ANS (C) and CFS (D) through the use of Power Spectral Analysis of Heart Rate Variability.

A number of years ago, several groups of clinical researchers reported that patients with postural orthostatic tachycardia (increased heart rate when going from lying to standing) or delayed orthostatic hypotension (decreased blood pressure when going from lying to standing) frequently reported severe chronic fatigue (1,2). Subsequently, these symptoms were found to co-exist in at least some patients with CFS (3,4). The realization that patients with CFS had a cardiovascular system that responded abnormally to postural challenge led one group to do tilt testing in CFS and to report a very high rate of orthostatic hypotension in patients with CFS compared with controls (5,6). Subsequent studies have confirmed that patients with CFS develop increased symptoms during orthostatic challenge (5).

Because other research focused on the pathogenesis of chronic orthostatic intolerance suggests the existence of autonomic dysfunction (9,10), one major hypothesis to explain the symptom worsening seen in CFS after orthostatic challenge is autonomic dysfunction. A number of researchers have now reported data showing autonomic abnormalities during postural challenge in patients with CFS (11-14).

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