BACKGROUND: Breathing pattern disorders (BPD) and hyperventilation syndrome (HVS) are patterns of dysfunctional breathing, or over-breathing, where "the depth and rate are in excess of the metabolic needs of the body at the time". BPD and HVS are an affliction that affects around 10% of the general population. Temporary patterns of over-breathing are in survival situations, as part of the bodies fight or flight response. Individuals with BPDs have prolonged patterns of over-breathing. The drawbacks of this include disrupted oxygen supply to the brain, respiratory alkalosis, overuse of respiratory muscles, and a weakening of the diaphragm.

"Re-establishment of normal function requires a therapeutic input which addresses both the number of changes that have occurred, and the need for re-education as to how to use one's body and breathe in a more efficient way." 3

AIM: To investigate the effectiveness of a massage therapy treatment protocol for treating individuals with breathing pattern disorders.

METHODS: Case Series Design
- 3 subjects with BPDs
- Baseline measures taken:
  - Nijmegen Questionnaire
  - Breathing pattern assessments
  - Postural analysis
  - Muscle testing and ROMs

Massage therapy intervention
- 4 week massage therapy protocol (NMT) intervention
- Breathing exercises and stretches
- Reassessment of measures taken in initial assessment
- Results compared and contrasted

Post-intervention reassessment
- Pre & Post intervention breath pattern assessments

RESULTS:

Subject A: 21 F Student
Age: 21 Sex: F Occupation: Student BPD Duration: ≥ 2 yrs

Subject B: 47 F Self-employed
Age: 47 Sex: F Occupation: Self-employed BPD Duration: ≥ 4 yrs

Subject C: 35 M Student
Age: 35 Sex: M Occupation: Student BPD Duration: ≤ 1 month

Key Findings:
- The most significant findings came from the analysis of the Nijmegen Questionnaire. All subjects dropped below the threshold of 23/64; a score greater than or equal to this is indicative of a BPD.
- Emotional states such as anxiety maintain dysfunctional breathing patterns indefinitely. Post-intervention feedback showed the following key factor: the subjects were able to recognize situations when dysfunctional patterns were dominant, and engage correct diaphragmatic breathing to compensate for this.
- The results of this study would suggest that the treatment of the musculature involved in respiratory mechanics will aid breathing retraining and vice versa.
- Breathing pattern assessment results differed in relation to the modifications made to treatment. For example, the exclusion of the treatment of intercostals led to limited improvements in rib expansion during post-intervention reassessment.
- All three subjects had a forward head posture (FHP) and although testing for this in not indicative of breathing dysfunction, the muscles that are commonly short and over used with a FHP are common with those that are short and overused in individuals with breathing pattern disorders.

Conclusions: The link between massage therapy and breathing pattern disorders has not been widely explored and the existing literature on the topic is limited. This study expands on the current research by reporting on the musculoskeletal influences on breathing pattern disorders. The results would suggest that a massage therapy treatment intervention using a NMT approach is feasible in the treatment of breathing pattern disorders.