

Structured Light Plethysmography as an Assessment Tool for Dysfunctional Breathing in Children

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Background

Dysfunctional breathing (DB) is a respiratory disorder characterised by abnormal breathing patterns. Currently there is no comprehensive method available for objectively measuring these patterns.

Aim

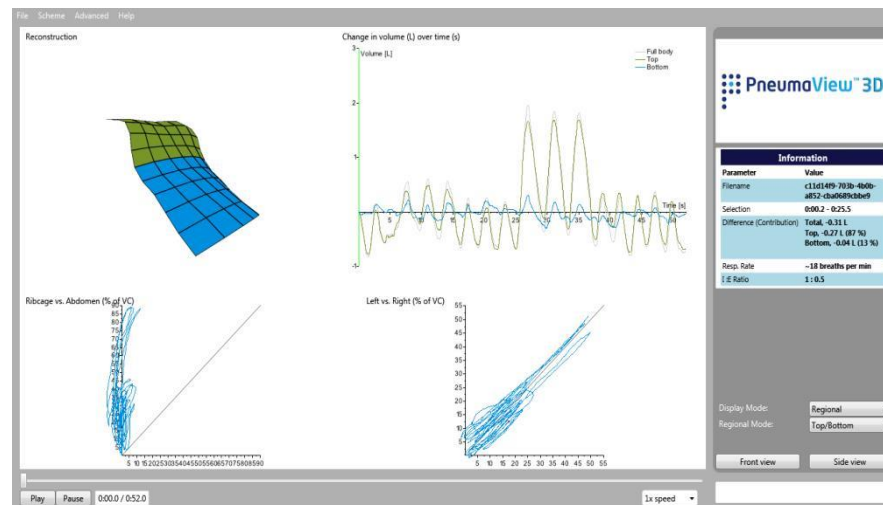
To investigate if structured light plethysmography (SLP) can be used for the objective measurement of breathing patterns in children with DB.

Method

Tidal breathing was recorded, using the Thora3Di™ SLP device, in 41 children (20 with DB and 21 healthy controls). Measured parameters included overall phase, principle angle, breath phase, inspiratory time and expiratory time.

Results

- No significant difference was found between healthy children and those with DB, when comparing periods of settled tidal breathing ($p > 0.19$)
- However, when comparing all tidal breaths recorded for each child, a significant difference ($p = 0.03$) in breath phase* was found
- Results indicate that those with DB have a more synchronous breathing pattern than the control group



Example SLP device output

Conclusion

SLP can be used to objectively measure breathing patterns in children with DB, but longer captures may be required to achieve more reliable data.



Key references/notes:

* Breath phase is the difference in phase angle between the thorax and abdomen signals

1. Barker N, Everard M. Getting to grips with 'dysfunctional breathing'. Pediatric Respiratory Reviews. 2014; In Press
2. Konno K, Mead J. Measurement of the separate volume changes of rib cage and abdomen during breathing. Journal of Applied Physiology. 1967 March 1, 1967;22(3):407-22
3. Hammer J, Newth C. Assessment of thoraco-abdominal asynchrony. Paediatric respiratory reviews. 2009;10(2):75-80