



Charge Density Pulse (CDP) device as an objective indicator of pain - a preliminary report



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Aim of Investigation

There is a growing recognition at the clinical level of the need for a new and more reliable measure of pain, preferably using a new technology of some type.¹ Our aim is to determine whether measurements of human and animal bioelectric output, in the form of skin potential, displayed as a linear trace on the CDP device reflecting the asymmetry between the left and right sides of the body, can be an objective indicator of pain.

Methods

IRB approval was obtained for a study on human subjects undergoing serial conventional acupuncture therapy for various pain conditions. Standard silver/silver chloride electrodes are applied to the palmar skin on each side of the subject's body. A CDP trace is displayed for 60 seconds before and after acupuncture treatment on a CDP recorder (Biographs Inc., Bayville, NY). The CDP device was also used on several animals suffering painful conditions before and after pain relieving treatments. In the animals, similar recording methods were employed with electrodes on either side of the neck.

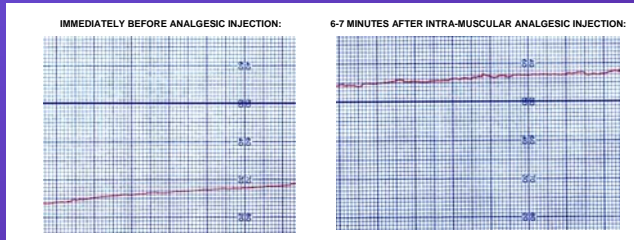
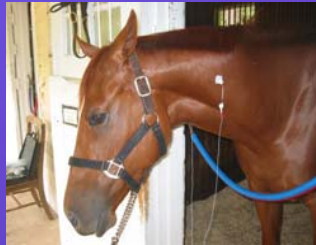


Typical trace recording of human subject in moderate pain (left figure) obtained with silver/silver chloride electrodes on the palms (right figure). If skin potential (SP) were identical on both sides of the body, then the trace shown on the strip chart recorder would run down the middle of the page on the 50/50 line, which we consider to be a neutral baseline. Lower SP on the right side of the body produces a trace like that shown.

Results

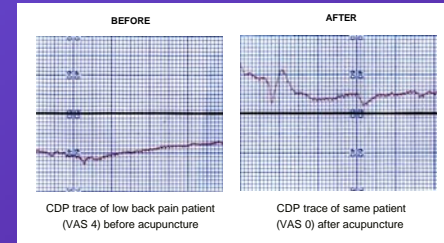
CDP monitored in humans before and after pain therapy, and in animals before and after pain relieving therapy or surgery, produced chart recorder tracings that accurately reflected their self-reported and observed pain states respectively. In some instances, the amplitude of the linear traces also corresponded with the magnitude of pain sensation reported by the human subjects. In every case, return to a pain free state produced a linear trace that was closer to, or on the opposite side of the neutral baseline compared to the trace obtained during the painful state.

Injured Thoroughbred Racehorse

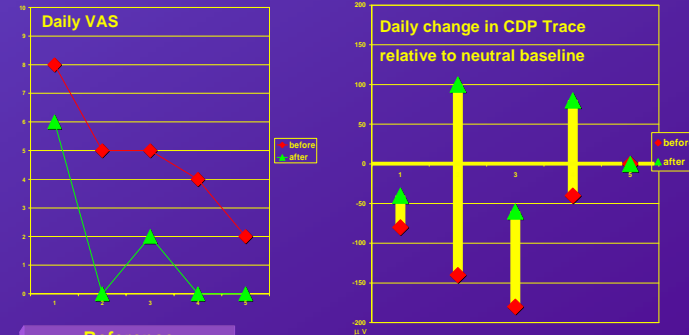


Conclusions

CDP display is a simple, non-invasive measurement that can be a potentially useful tool to objectively detect a painful state and its resolution. CDP display deserves further study to establish its reliability and consistency in clinical practice.



VAS and CDP trace from one patient before and after acupuncture treatment in subsequent days



Reference

Backonja, Misha-Miroslav, Chairman's Opening Statement, Special Interest Group for Measurement of Pain and It's Impact, Annual Congress of the American Pain Society, (2005)

Acknowledgements

John Burke, Biographs Inc., Bayville, NY 11709