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The effect of carpal tunnel syndrome pain on sleep architecture

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THE EFFECT OF CARPAL TUNNEL SYNDROME PAIN ON SLEEP ARCHITECTURE

by

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A dissertation submitted to the Faculty of Science, University of the Witwatersrand, in fulfilment of the requirement for the degree of Master of Science.

Johannesburg, 2012

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the Degree of Master of Science in the faculty of Science at the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination in any other University.

_____

Dalingcebo Christopher Mdluli

Signed in Johannesburg on this____ day of _____2012

ABSTRACT

Carpal tunnel syndrome (CTS) is a neuropathic condition commonly caused by the entrapment of the median nerve. The most common complaint presented by the CTS patients is pricking sensation, numbness, pins and needles, burning sensation as well as in the hand and sometimes the arm/s distribution of the affected side. The patients with CTS usually complain of nocturnal periodic sleep disruption caused by the pain discomfort. In my dissertation, I explore the extent to which the CTS pain influences sleep architecture using neurophysiological measurements like an overnight electroencephalogram (EEG), conduction tests as well as subjective questionnaires. I initially conducted a pilot research study on 33 patients with CTS using subjective questionnaires. The CTS patients reported sleep disturbance. I also demonstrated that they (patients) had a minimal mood and psychological disturbance. I was prompted therefore to investigate the influence of the CTS pain on the sleep architecture using more objective empirical instruments like the polysomnogram as well as subjective measurements such as Beck Depression Inventory, Profile of mood states, Visual analogue scales as well as the McGill pain questionnaire to further investigate changes. The patients were required to spend four nights in the sleep laboratory divided into two nights before surgery and two nights at least two to six weeks following the CTS surgery. The CTS surgery is commonly used to release the compression of the median nerve at the wrist. The changes in subjective and objective variables were compared before and after CTS surgery. The age and gender-matched control group was introduced into the research study. The control group was required to spend the same number of nights in the sleep laboratory as the CTS group. The control group was also going to have a non-painful procedure of the same magnitude as the experimental subjects. The conclusion I reached on this study was that the CTS patients reported poor sleep quality. I also demonstrated that there were not many changes in the polysomnogram and that there were minimum changes shown on the nerve conduction studies variables as might have been expected based on the severity of the carpal tunnel syndrome. Another important finding was that there was a relationship between pain and depressive mood in CTS patients. The removal of pain in CTS patients showed that there was a subsequent subjective improvement in mood and psychological status and no significant improvement in subjective measurements. There were no significant changes noted on the control subjects who were pain-free.

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Subjective sleep quality and psychological status in patients with carpal tunnel syndrome

CONFERENCE PROCEEDINGS

The following presentations were offered in support of the dissertation

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DEFINITIONS

BDI	Beck Depression Inventory
CNS	central nervous system
CTS	carpal tunnel syndrome
EEG	electroencephalogram
ESS	Epworth Sleepiness Scale
EMG	Electromyography
EOG	Elelctro-oculography
FMS	fibromyalgia syndrome
GHQ	General Health Questionnaire
MPQ	McGill Pain Questionnaire
NREM	non-rapid eye movement
POMS	Profile of mood states
PSG	Polysomnogram
PRI	Pain Rating Index
PSQI	Pittsburgh Sleep Quality Index
REM	rapid eye movement
SWS	slow wave sleep
VAS	Visual Analogue Scale