



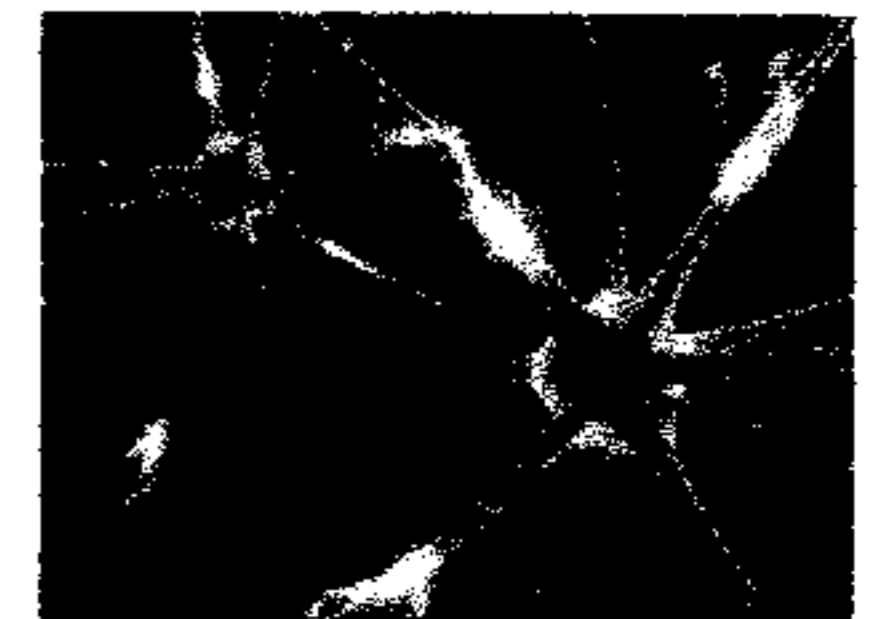
Chronic pain, pain and heart rate variability in a cross-sectional occupational sample

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Background

Pain is one of the sensations that is transmitted via the vagus nerve. Furthermore, inflammation, which is inversely associated with heart rate variability (HRV), a proxy measure for vagal activity, is a component of pain. We examined associations between HRV and pain stratified by self-reported chronic pain (CP).

Methods

Cross-sectional data (n=580) with 24h HRV recordings were used. Participants reported to what extent they suffered from chronic pain and a number of complaints including pain in various specific locations (e.g. hip; knee; feet) throughout the previous year. These pain locations were examined as a summary measure of pain by combining the individual items in relation to HRV. Pearson correlation coefficients and multivariate-adjusted partial correlation coefficients (PCCs) were calculated.

Results

Pearson correlations suggested inverse associations between HRV and pain summary measure ($r=-0.18$, $p<0.001$). After multivariate adjustment, these associations remained significant (PCC=-0.09, $p=0.032$). After stratification by chronic pain, the associations between pain and HRV remained in the group without chronic pain (PCC=-0.09, $p<0.05$) but were attenuated in the chronic pain group (PCC=-0.04 $p=0.76$). The model explained 73% of the variation in pain summary measure. Additionally, associations between pain and indices of inflammation were larger in the CP-group compared to those that did not report chronic pain.

Table 1 Partial correlation coefficients for Pain summary Score for overall model and stratified by self reported chronic pain (CP)

Model	Overall	Without CP	With CP
Age	0.121	0.108	0.242
Female	0.009	0.006	0.067
HRV*	-0.090	-0.088	-0.041
SleepQuality**	0.833	0.818	0.722
Work Status [‡]			
Division Manager	-0.139	-0.136	-0.152
Process Owner	-0.074	-0.070	-0.187
Semiskilled Worker	0.032	0.035	-0.050
Trainee	0.020	0.022	(dropped)
Physical activity [§]	-0.034	-0.036	0.092
cigarettes smoked	-0.009	-0.020	0.118
Alcohol [¶]	-0.056	-0.045	-0.188

* RMSSD ** Jenkins Score [‡] Skilled Worker [§] Estimated physical activity per kg [¶] Alcohol in gr/day (self report)

Conclusion

Self-reported chronic pain attenuated the inverse pain and HRV association. These results suggest that the descending inhibitory pathway is disrupted in chronic pain and can be indexed by the association between HRV and reports of pain. Additionally, inflammation is more highly associated with pain in those persons having chronic pain.