

DIFFERENT LEVELS OF PHYSICAL ACTIVITY AND 24-HOUR HEART RATE VARIABILITY IN PERSONS WITH NECK-SHOULDER PAIN

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INTRODUCTION

Musculoskeletal disorders such as neck-shoulder pain constitute a significant problem. Chronic muscle pain is related to a reduction in heart rate variability (HRV), indicating aberration in autonomic nervous system regulation (1). It is important to know how this aberration is related to physical activity (PA) and stress perception. The aim of the study was to investigate the influence of PA on 24-h HRV, self rated stress and pain intensity in subjects with chronic neck-shoulder pain (NSP) and healthy controls (CON) with different activity levels.

METHODS

Eighteen subjects with chronic neck-shoulder pain and 18 age and gender matched healthy controls took part in the present study. Subjects underwent 24-hours ambulatory monitoring of PA and HRV with IDEEA system. Perceived stress was rated during daily activities. Pain intensity was rated prior to ambulatory recordings. Based on total walking-distance a median split was performed for NSP (median = 3.97 km) and CON (median = 4.04 km) to investigate the impact of PA on HRV, stress and pain. HRV was analysed in time and frequency domains. Mean RR-intervals (IBI), pNN50 and normalized low frequency power (LFnorm) were used to assess ANS regulation during the evening, sleep, morning and day.

RESULTS

Shorter IBI (higher heart rate) was found in NSP compared to CON. A significant difference was found between active NSP compared to active and inactive CON ($p < 0.05$). No difference in IBI was seen within NSP (active vs inactive), nor within CON. NSP showed reduced pNN50 compared to CON, but no difference between groups with high/low PA. However, the largest increase in pNN50 from evening to sleep was observed in active CON. For LF-HRV, no significant difference was found between NSP and CON. A tendency towards a larger reduction in LF during sleep was seen in active CON ($p < 0.1$). Pain intensity was higher in inactive NSP (mean 4.2) compared to active NSP (mean 2.7). There was no difference between NSP and CON in stress level, irrespective of PA level.

DISCUSSION AND CONCLUSION

Elevated heart rate and reduced HRV may support the hypothesis of ANS imbalance in persons with chronic neck-shoulder pain. Although, comparable HRV were seen between active and inactive subjects with pain, the largest HRV was seen in active subjects without pain. More active subjects with NSP showed lower pain intensity. Increasing daily PA may be an effective intervention improving ANS regulation and pain among persons with chronic muscle pain.

REFERENCES

[1] Martinez-Lavin. Biology and therapy of fibromyalgia. Stress the stress response system, and fibromyalgia. *Arthritis Research & Therapy*, 2007;9:216.