

CHANGES OF LOCOMOTOR ACTIVITY IN ANIMAL MODELS OF NEUROPATHIC PAIN

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Introduction

The discovery and description of animal models of neuropathic pain that exhibit different elements of clinical pain syndromes have greatly advanced understanding of mechanisms involved in this type of pain. The main used models of peripheral neuropathic pain are well defined and described according to sensitivity to several types of painful and non-painful stimulus, animal behavior, anatomical and pathological changes of peripheral nervous system and changes of protein expression in affected areas. Our study focused on changes of spontaneous motor activity in two models, chronic constriction injury (CCI) of sciatic nerve and partial sciatic nerve injury (PSNI).

Spontaneous motor activity may play an important role in evaluation of peripheral neuropathy and pain. This activity can be increased or decreased depending on type and intensity of the neuropathic pain sensation. Thus, the level of spontaneous motor activity can be a valid marker of intensity of pain. Therefore, in this study we tried in this study to find possible correlations between pain threshold and motor activity in freely moving rats with peripheral neuropathy.

Methods

Chronic constriction injury (CCI, Bennett and Xie 1988)



Partial sciatic nerve injury (PSNI, Seltzer et al. 1990)



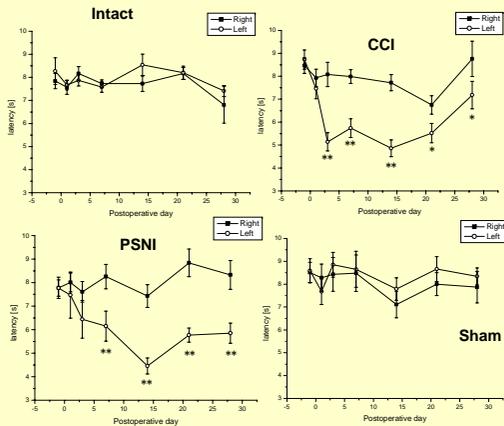
- 4 groups of adult male rats : Intact, CCI, PSNI, Sham
- Day -1: motor activity monitoring (1h) and thermal nociceptive tests
- Day 0: surgical procedures
- Postoperative days 1, 3, 7, 14, 21 and 28: motor activity monitoring (1h) and thermal nociceptive tests
- plantar test and tail flick

LABORAS

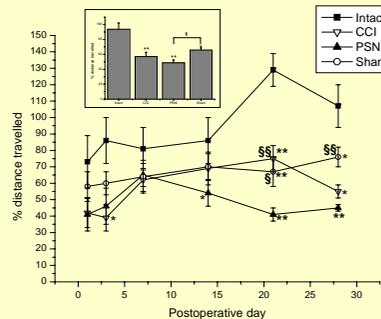


- Laboratory Animal Behaviour Observation, Registration and Analysis System, Metris, Netherlands)
- locomotion, distance travelled and velocity, grooming, immobility, drinking and eating
- movements were transformed via the sensing platform into electrical signals, each type of movement has its own unique frequency, amplitude and pattern,

Withdrawal threshold to thermal stimulation

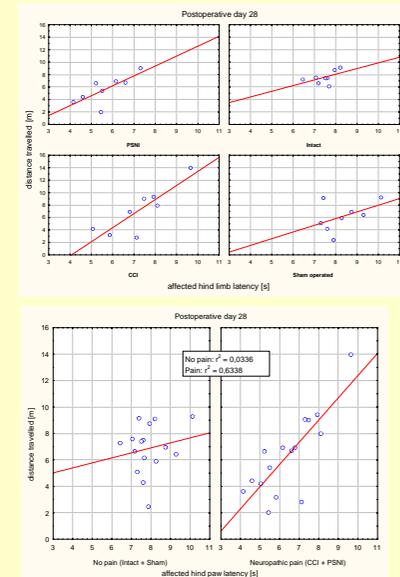


Spontaneous motor activity



- **difference Intact vs PSNI (*, **)**: POD 14, 21, 28
- **difference Intact vs. CCI (*, **)**: POD 3, 21, 28
- **difference PSNI vs. CCI (§)**: POD 21

Correlations between pain and locomotor activity



- lower pain threshold correlates with shorter distance
- in animals without pain there is no correlation between distance and pain threshold

Summary and conclusion

- different pain patterns in CCI and PSNI: in PSNI withdrawal thresholds are lower, the decrease onsets later and lasts longer
 - only in hind limbs pain threshold was changed: in fore limbs and in tail flick changes in pain threshold were not observed
 - there were no significant differences in body weight changes among groups
 - spontaneous motor activity was decreased in all operated animals, the shortest distance was measured in PSNI animals
 - compared to sham, there were no changes in distance travelled in CCI group
 - there is a correlation between pain threshold and travelled distance in CCI and PSNI group, this correlation was not observed in animals without neuropathic pain
- Both used models of neuropathic pain affect spontaneous motor activity (more in PSNI) and this affection correlates with pain threshold for thermal stimulation.**