遷延性疼痛の高次運動機能への影響

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Pathologic Pain Relates with the Higher Brain Function-associated Motor Dysfunction

by

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ABSTRACT

Introduction: Following a traumatic noxious event, pathologic pain sometimes occurs. Pathologic pain sometimes impairs motor function of the affected limb, but the underlying

mechanisms of the motor dysfunction are still unclear. In this study, we focused on the relationship between pathologic pain and higher brain function-associated motor function.
Methods: Under the light or dark conditions, six patients with pathologic pain in their upper limb were asked to perform two-way pointing between three visual targets and their nose by their index finger of the affected and unaffected limb. We evaluated the response time during the respective pointing movements and inaccuracy of the pointing trajectories. To analyze these data statistically, we used 3-way ANOVA for three factors [laterality（affected or unaffected）× condition（light or dark）× two-way task（go-task from their nose to targets or back-task from targets to their nose].

Results: Regarding the response time, there was no significance among three factors. There was a significant interaction of the inaccuracy of pointing trajectories between two factors（laterality and condition）（$p<0.01$）. Other factors revealed no significance.
Discussion: In the dark condition, the patients performed the pointing task on the basis of proprio-motor reference frame. On the other hand, in the light condition, the patients performed the task on the basis of not only proprio-motor reference but also visuo-motor reference. Considering that the patients showed almost accurate pointing trajectories in the dark, the peripheral motor system（e.g., muscle, joint, and bone）would not be impaired. Further, the visuo-motor reference of the affected limb would interfere with the intact proprio-motor reference and thereby the eye-hand coordinative linkage of the affected limb is impaired.

Conclusions Our finding suggest that pathologic pain concerns with motor dysfunction of the affected limb, which is dependent on the higher brain function.

要　旨

緒　言

外傷後遷延する疼痛に伴う運動機能の障害は末梢運動器だけでなく中枢性の運動機能障害に起因する可能性がある．

方　法

上肢遷延性疼痛患者６人（右３，左３）を対象に，視覚刺激と鼻を往復するポインティング課題を明暗２条件で行わせ，その運動軌跡の不正確さと反応時間を評価した．得られた結果は３要因分散分析で解析した．

結　果

反応時間には有意差が無かった．運動の不正確さは患・健肢と明・暗条件の２要因間に相互作用（$p<0.01$）が見られた．

考　察

遷延性疼痛患者の運動機能障害は末梢運動器の障害によるものではない．視覚情報と体性感覚情報を統合して上肢運動が行われる明条件よりも，体性感覚情報のみで上肢運動が行われる暗条件の方が運動は正確に行える傾向にあったことから，患肢の視覚情報がポインティング動作の障害となっていることを示唆し遷延性疼痛は中枢神経系の高次運動機能（眼－手協調運動）を障害していると