

Robot-Assisted Upper Arm Training(RAT) in Subacute Hemiplegic Stroke Patients

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Introduction

This study was aimed to investigate the robot-assisted upper arm training was more effective on the motor recovery, upper limb function, the reach & grasp tasks than conventional occupational therapy in subacute hemiplegic stroke patients.

Method

60 subacute hemiplegic stroke patients were enrolled in this study. The subjects were randomly assigned into two groups. The RAT group were received the 30min robot-assisted upper arm training(RAT) with Armeopower (Hocoma AG, Switzerland) and 30min conventional occupational therapy per day, 5 times per week for 4weeks. The COT group did 60min conventional occupational therapy per day, 5 times per week for 4weeks. The clinical outcomes including Fugl-Meyer Assessment(FMA), Motricity Index(MI), Functional Independence Measure(FIM), Modified Ashworth Scale(MAS), Visual Analogue Scale(VAS) for pain, Trunk Control Test(TCT), Range of Motion(ROM), Maximal Voluntary Torques(MVT), Motor Function Test(MFT) and Wolf Motor Function Test(WMFT) were assessed in all patients before(T1), during treatment (T2), after treatment(T3) and 4 weeks after the treatment(T4). Also, the spatiotemporal and kinematic data were obtained during reach & grasp tasks through 3D motion analysis (MX-T10, Vicon Motion Systems Ltd UK). The reach & grasp tasks were composed of four sub-tasks: grasp the cup(P1), arrive at the mouth(P2), put the cup on the table(P3), and return to initial position(P4). Those were compared between two groups by repeated measures ANOVA(Analysis of variance).

Result

The all parameters measured at T1 did not differ between both group. All groups were improved the clinical outcomes after treatment ($P < 0.05$). However, the significant difference of all clinical outcomes (FMA, MI, FIM, MAS, VAS, TCT, ROM, MVT, MFT, WMFT) between RAT and COT group were not found. Also, the all temporospatial and kinematic parameters were not significantly different between both groups during reach & grasp tasks, except the shoulder rotation angle during P2 sub-task and the peak velocity during P1 sub-task ($p = 0.036$, $p = 0.042$).

Conclusion

This study did not agree that robot-assisted upper arm training combined with conventional occupational therapy in subacute post-stroke hemiplegic patients may be superior to the same intensity conventional occupational therapy.