

Fig. 5. Application units

The first four recordings are made between the one-week intervals, while the last recording is made one month after the fourth recording.

During the first four weeks, patient performed the training every day. The training consisted of the predefined set of exercises, designed by the physiatrist. After four weeks, the patient stopped the training and his performance is measured again after one month.

It can be seen that the movement speed has the similar values or slightly increases from one recording to another in the first four weeks during the training period. It reaches the maximum value in the fourth recording. However, in the last recording, the movement speed drops since the patient did not perform training during one month period. Such results strongly suggest the importance of the continuous training in stroke patients.

The results in the Fig. 6 are presented for the affected (right) arm and healthy (left) arm. Both parts of the shoulder abduction-adduction movement are taken into account – when arms go up and when arms go down. It can be seen that values of the movement speed are higher for the healthy arm in all four cases, as expected.

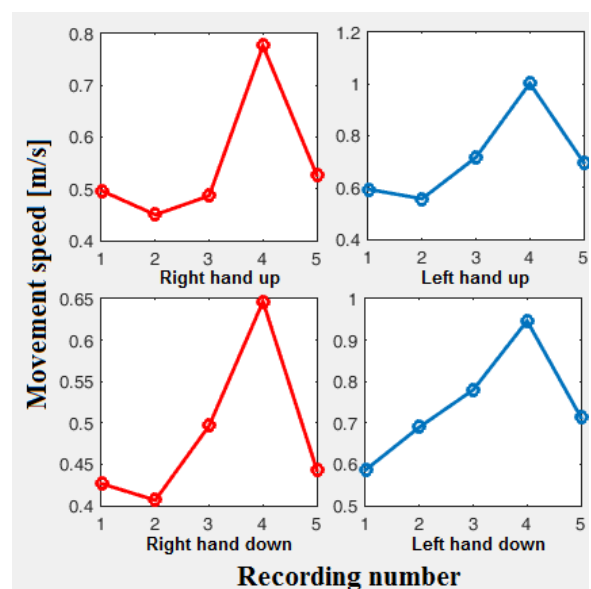


Fig. 6. Evolution of the movement speed across five rehabilitation sessions

VII. CONCLUSION

We have presented an approach for movement quantification, based on the measurements obtained from Kinect data. The focus is on the large range upper body movements, performed with both arms – affected and the healthy arm. We have designed an application for storing, visualization and interpretation of the collected data and quantitative movement measurements. The application is intended to support the clinical evaluations in the case of stroke patients.

Our results have demonstrated that our proposed measurements are relevant for the evaluation procedures in the case of stroke patients. The designed application is presented to one experienced physiatrist. From her point of view, the application is well organized, informative and equipped with meaningful content. She would use it to support clinical decisions about progress monitoring after stroke.

The following research will be primarily oriented to the extension of the data set. We plan to increase the number of subjects and the number of experimental movements towards the advancement and verification of the proposed approach. The future work will be focused on the extension of the approach in the sense of new sensor data and different groups of movements.

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