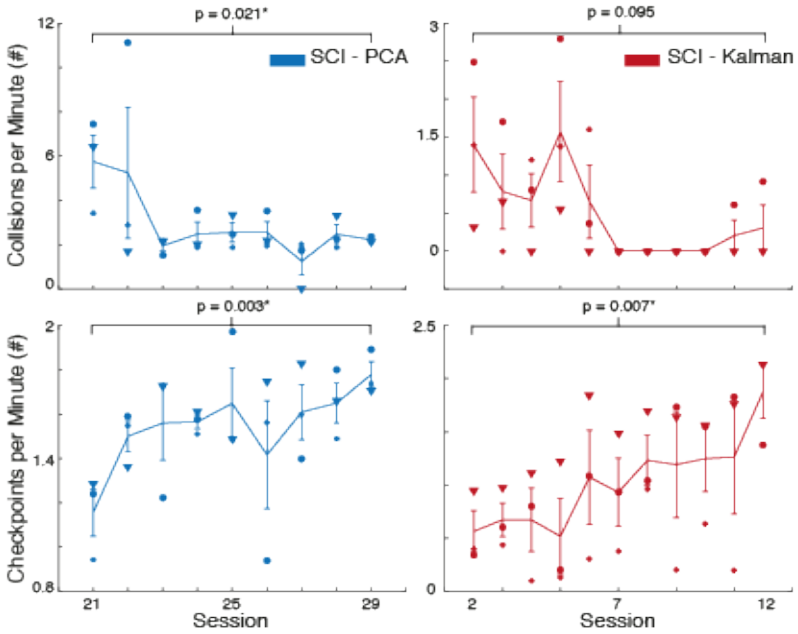
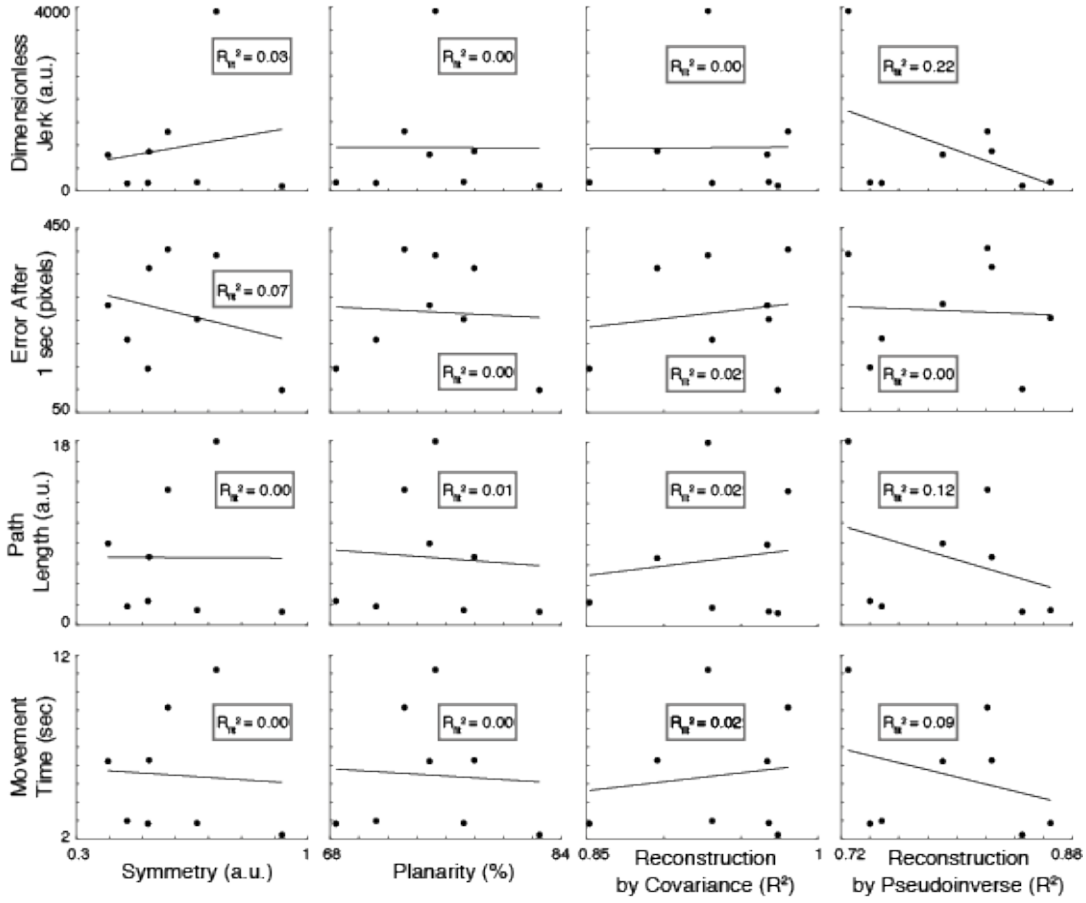


Supplementary Fig. 1. Virtual wheelchair driving using a body-machine interface based on inertial sensors for people with spinal cord injury. SCI participants performed the VR driving tasks using two different protocols and 3D game engine, so performance between SCI-PCA and SCI-Kalman is not directly comparable. PCA participants began the VR driving on their 21st session in a VR environment developed in Unreal Engine 3 (Epic Games, Inc. Cary, NC, USA), whereas Kalman participants began the VR driving on their 2nd session using the same VR environment as control subjects (Unity®). Individual SCI subject's performance at each VR driving session is shown by a unique marker type. The lines represent the group averages (n = 3) ± SEM (bars). Horizontal lines on top of each graph represent the results for the one-sided paired t-test comparing the first to the last session. Both PCA and Kalman SCI

subjects improved their VR driving performance with practice as measured by *collisions per minute*. However, improvement in *checkpoints per minute* was significant for the PCA group only.



Supplementary Fig. 2. Initial performance dependency on PCA training data. In order to determine whether we could predict task performance based on PCA calibration data, we tested the correlation between the symmetry, planarity, and reconstruction of the training data for the PCA map, and the performance at the first block. The symmetry of the PCA map was computed as the ratio between the two first principal components PC2/PC1. Planarity was computed as the sum of the two first principal components. We reconstructed the *dance* data from the *cursor* data using either the covariance matrix or the pseudoinverse of the PCA map. We then calculated a correlation coefficient between the *reconstructed dance* and the actual *dance*. We averaged the reconstruction correlation coefficients for the eight two dimensions of the *dance*. For each participant, we plotted their *reconstruction correlation* against each of the performance measures at the first block. Each circle represents an individual unimpaired participant. The black line illustrates the linear regression on the map data. The regressions' r-square values (R^2_{fitt}) are enclosed in the gray box.