INTRODUCTION

Although the effects of motion sickness on the autonomic nervous system have been studied extensively, Electroencephalogram (EEG) dynamics have received relatively little attention. This study investigated the effects of motion sickness induced by optokinetic stimuli on the EEG.

METHODS

EEG was recorded before, during and after exposure to a stimulus to provoke motion sickness. Nausea was induced by watching a computerised scene, as might be seen by a pilot at moderate altitude rotating at 0.2 Hz a tilt of 18 degrees. Previous findings have shown that this is a validated provocative stimulus for motion sickness (Golding et al, 2009). As a method of inducing motion sickness it also has the advantage of minimising movement artefacts on EEG, by comparison with whole body motion or cross-coupled motion. Participants were exposed for ten minutes or until moderate nausea, whichever the sooner.

EEG was recorded over electrode sites Fz, Cz, Oz, Pz, P3, P4 for eight participants (6 F & 2 M, mean age 23.7 years). EEG data were analysed offline using a Fast Fourier Transform. Average spectra for selected bands Delta, Theta, Alpha, Beta1 and Beta2 were subjected to a 3 x 4 two-way within subjects ANOVA, where the data for parietal locations were combined. Successive epochs of one minute were analysed.

RESULTS

The ANOVA factor for Condition (Baseline, Motion, Post) showed a significant effect for Beta2 (p< .05). Inspection of Figure 4 reveals that this was mainly due to a small decrease in EEG Beta2 bandpower during Motion, followed by a large increase in Beta2 Post motion. This effect was similar across electrode positions. Other effects on other EEG bands were non significant or marginal.

CONCLUSIONS

Most changes in EEG bands were not significant. However, the increased activity in the high Beta2 band would indicate increased cortical arousal following motion sickness recovery. Given that motion sickness is sometimes associated with drowsiness (so-called “sopite” syndrome), this finding in the higher frequency Beta band post motion sickness could represent a rebound effect towards an overshoot of increased “cortical alertness” on recovery from motion sickness.

Reference