People with tetraplegia have poor respiratory function leading to limited tidal volume and reduced cough peak flow. These problems may cause respiratory failure during the initial admission or subsequent intercurrent illness. Electrical stimulation of the abdominal muscles during expiration can improve respiratory function by increasing tidal volume and cough capacity. A novel control system will be presented which automatically triggers muscle stimulation, synchronised with the subject's voluntary respiratory activity. Results of the evaluation of the system in tetraplegic subjects will be shown which suggest that the technique may have potential use in both acute and established tetraplegia to increase minute ventilation and to improve cough clearance of secretions. Possibilities for the combination of this technique with advanced sensor systems to detect respiratory activity will be discussed. In a recent study we have shown that BCI based on SSVEP can be used to control electrical stimulation, and the potential of this technique as an interface for abdominal stimulation will be explored.