Infant massage and brain maturation measured by EEG

**Background:**
Very preterm (VPT) infants develop adverse neurological sequelae due to early exposure of the immature brain to the extrauterine environment. It is hypothesized that infant massage improves neurodevelopmental outcomes through stimulation of the tactile system. The effects of massage on brain maturation in low risk VPT infants was measured using EEG.

**Methods:**
60 VPT infants born between 28 and 32+6 weeks’ gestational age were randomised to receive standard care (SC) or massage therapy (30 in each group). Massage was administered by the infant’s mother from 34 to 40 weeks’ postmenstrual age. At term equivalent age (TEA), a 64 channel EEG was recorded to capture active sleep and calculate global relative power (GRP) (Figure 1), across beta (0.5-2Hz), alpha (2-6Hz), theta (6-13Hz) and delta (13-30Hz) band frequencies, using power spectral analysis (PSA). Relative power was defined as the ratio of absolute band power to total absolute power summed across all bands. Global relative power was the sum of relative band powers for all included electrodes, divided by the number of included electrodes. As babies’ brains mature, power in the faster frequencies (beta, alpha) increase, whilst power in the slower frequencies (delta) decrease.

**Results:**
At TEA, 25 massage and 20 SC EEGs were analysable. A moderate negative correlation existed between beta GRP and birthweight (BW) (r = -0.405, p=0.006), that is, the lower the BW, the higher the beta GRP. A moderate negative correlation existed between delta GRP and chronological days of age at EEG (r=-0.373, p=0.014), that is, the older in chronological days of age at EEG (more preterm), the lower the delta GRP. Comparing intervention groups, the massage group had smaller and more preterm infants, compared to the SC group, so massage group infants measured higher GRP in the faster frequencies and lower GRP in the slower frequencies, than SC group infants. However, this difference between intervention groups did not reach statistical significance (p > 0.2 across all bands). A variable massage dose was administered by the mothers over the 6 week intervention period. There was a moderate, positive correlation between beta, alpha and theta GRP and massage dose (r=0.413, p=0.005; r=0.445, p=0.002; r=0.388, p=0.008 respectively) and a moderate, negative correlation between delta GRP and massage dose (r=-0.413, p=0.005) (Figure 2), suggesting that more massage was associated with higher power in the faster frequencies and lower power in the slower frequencies, suggestive of more favourable brain maturation.

**Conclusions:**
Increasing massage dose demonstrated a favourable association with VPT infant brain maturation. Important clinical confounders suggests further research with a larger cohort, to confirm these positive EEG findings is warranted.