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# Temporal evolution of quantitative EEG within 3 days of birth in early preterm infants

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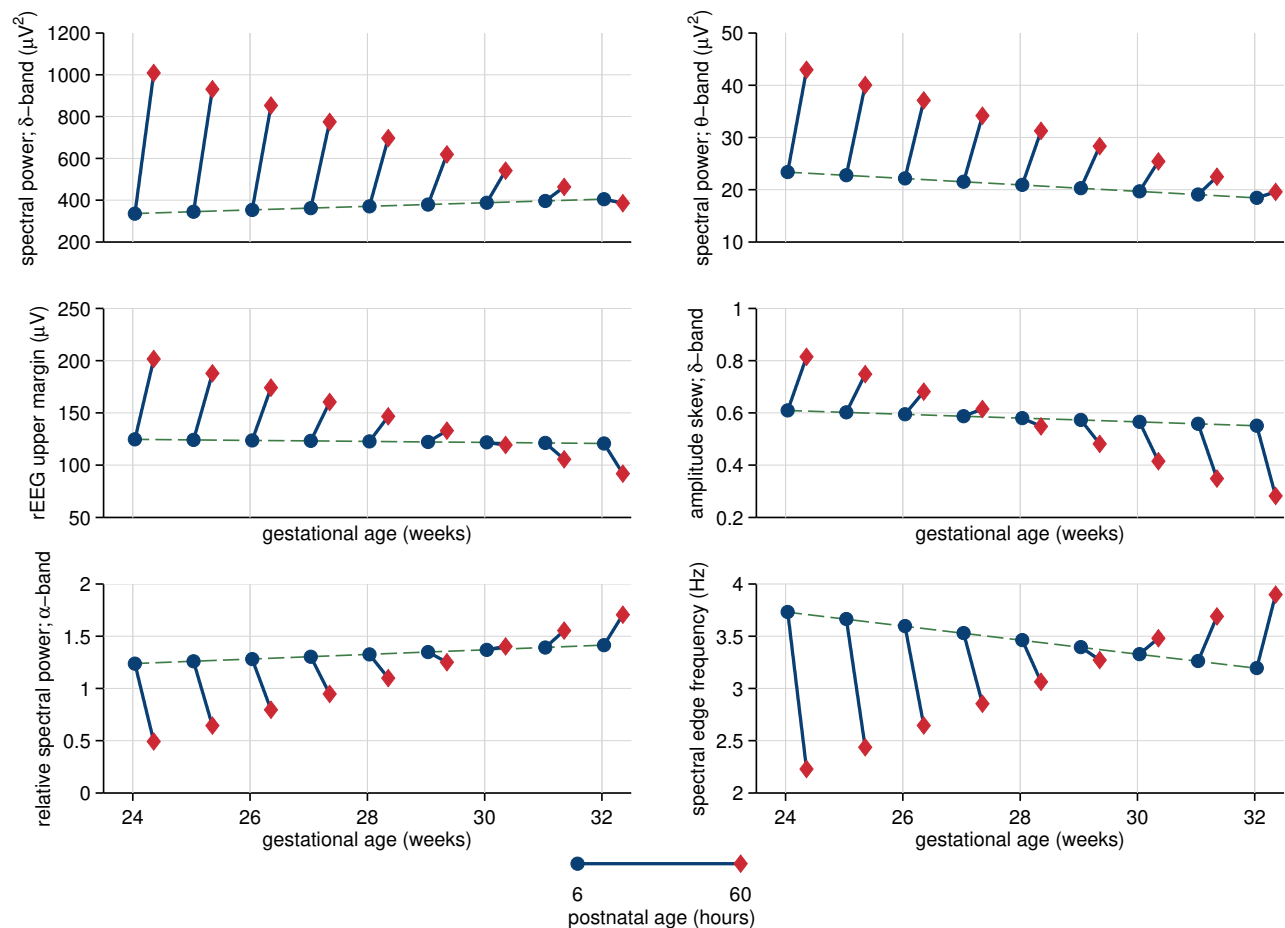
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## Temporal evolution with gestational age dependencies

Figure S1 presents a visualisation of the changing temporal trajectories with increasing GA specific to these 6 features. For example, for infants born at 24 weeks of gestation, there is a large increase in  $\delta$ -band spectral power (approximately  $700 \mu V^2$ ) over the first 60 hours of life. For infants born at 32 weeks of gestation however, there is a small decrease in the spectral power (approximately  $50 \mu V^2$ ) over the same time period.



**Figure S1.** Trajectories of the time fixed-effect (postnatal age, as solid lines) plotted at selected gestational ages. The dashed line represents a baseline at 6 hours PNA.

## Medication and qEEG: multiple linear regression

Estimates of the independent variable representing medication therapies: surfactant in Table S1 and fentanyl in Table S2. GA is also included as an independent variable with the time-averaged qEEG feature as the dependent variable.

**Table S1.** Coefficient estimates for surfactant replacement therapy.

Feature type				Regression coefficient			
group	feature	FB	C <sub>th</sub>	coefficient	(95% CI)	P-value	
power	SP ( $\mu V^2$ )	$\delta$		8.2	(-174.5, 193.9)	0.939	
		$\theta$		2.6	(-6.9, 11.0)	0.622	
		$\alpha$		0.58	(-1.33, 3.14)	0.624	
		$\beta$		0.13	(-0.93, 1.1)	0.792	
	rEEG ( $\mu V$ )		50th	0.25	(-7.30, 8.34)	0.945	
			5th	0.48	(-2.51, 3.07)	0.717	
			95th	0.56	(-30.17, 28.07)	0.973	
discontinuity	r-AS skew			0.039	(-0.047, 0.117)	0.251	
		$\delta$		0.078	(-0.033, 0.192)	0.134	
		$\theta$		0.011	(-0.020, 0.049)	0.438	
		$\alpha$		0.0045	(-0.0007, 0.0119)	0.108	
		$\beta$		0.018	(-0.017, 0.058)	0.361	
	kurtosis	$\delta$		0.45	(-0.75, 1.71)	0.387	
		$\theta$		2.8	(-2.5, 8.4)	0.214	
		$\alpha$		2.6	(-1.0, 6.8)	0.176	
		$\beta$		0.71	(-2.39, 3.85)	0.702	
	IBI (s)		95th	-0.45	(-2.57, 1.56)	0.764	
			50th	-0.22	(-0.62, 0.27)	0.452	
	burst% (%)		0.03	(-8.66, 6.99)	0.995		
	burst#		9.2	(-29.0, 72.0)	0.686		
spectral distribution	RSP (%)	$\delta$		-0.41	(-2.00, 1.46)	0.650	
		$\theta$		0.59	(-0.46, 2.19)	0.367	
		$\alpha$		0.075	(-0.318, 0.39)	0.696	
		$\beta$		-0.045	(-0.274, 0.101)	0.645	
	SF	$\delta$		-0.0077	(-0.0336, 0.0179)	0.569	
		$\theta$		0.007	(-0.029, 0.039)	0.671	
		$\alpha$		-0.014	(-0.033, 0.004)	0.073	
		$\beta$		-0.0051	(-0.0368, 0.0167)	0.698	
	SEF (Hz)		0.13	(-0.81, 0.98)	0.764		
	FD		0.00064	(-0.03717, 0.03142)	0.972		
	connectivity	coherence	$\delta$		-0.0010	(-0.0322, 0.0303)	0.949
			$\theta$		0.0070	(-0.0138, 0.0345)	0.559
			$\alpha$		-0.0025	(-0.0178, 0.0179)	0.792
$\beta$				-0.0091	(-0.0253, 0.0091)	0.279	

Frequency bands (FB): 0.5–3 Hz ( $\delta$ ), 3–8 Hz ( $\theta$ ), 8–15 Hz ( $\alpha$ ), and 15–30 Hz ( $\beta$ ); C<sub>th</sub>: centile; CI: confidence intervals; SP: spectral power; rEEG: range EEG; r-AS: rEEG asymmetry; IBI: inter-burst interval; burst%: burst ratio; burst#: number of bursts. Statistical significance: \* for  $P < 0.05$ .

**Table S2.** Coefficient estimates of fentanyl (with suxamethonium) therapy.

Feature type				Regression coefficient			
group	feature	FB	C <sub>th</sub>	coefficient	(95% CI)	P-value	
power	SP ( $\mu V^2$ )	$\delta$		28	(-187, 244)	0.786	
		$\theta$		4.7	(-5.7, 15.0)	0.353	
		$\alpha$		1.3	(-1.0, 3.7)	0.240	
		$\beta$		0.22	(-0.80, 1.24)	0.655	
	rEEG ( $\mu V$ )			50th	-0.11	(-7.37, 7.16)	0.976
				5th	0.16	(-2.53, 2.85)	0.903
				95th	14	(-19, 47)	0.394
discontinuity	r-AS skew	$\delta$		0.046	(-0.022, 0.114)	0.164	
		$\theta$		0.11	(0.01, 0.21)	0.019*	
		$\alpha$		0.014	(-0.015, 0.043)	0.324	
		$\beta$		0.00093	(-0.00497, 0.00682)	0.746	
	kurtosis	$\delta$		0.0025	(-0.0384, 0.0433)	0.901	
		$\theta$		0.41	(-0.65, 1.46)	0.427	
		$\alpha$		3.8	(-0.6, 8.2)	0.075	
		$\beta$		2.0	(-2.0, 6.0)	0.305	
	IBI (s)			95th	-0.18	(-3.92, 3.56)	0.922
				50th	-0.89	(-3.92, 2.14)	0.546
	burst% (%)				-0.23	(-0.81, 0.35)	0.413
					0.12	(-9.10, 9.34)	0.978
	burst#				7.2	(-38.7, 53.2)	0.746
spectral distribution	RSP (%)	$\delta$		-0.65	(-2.47, 1.17)	0.464	
		$\theta$		0.71	(-0.59, 2.00)	0.263	
		$\alpha$		0.17	(-0.21, 0.55)	0.365	
		$\beta$		-0.064	(-0.259, 0.131)	0.498	
	SF	$\delta$		-0.0052	(-0.0326, 0.0222)	0.698	
		$\theta$		0.011	(-0.022, 0.044)	0.502	
		$\alpha$		-0.011	(-0.026, 0.005)	0.154	
		$\beta$		-0.0041	(-0.0304, 0.0222)	0.749	
	SEF (Hz)			0.15	(-0.73, 1.04)	0.722	
	FD			0.0032	(-0.0330, 0.0394)	0.857	
	connectivity coherence	$\delta$		0.011	(-0.019, 0.041)	0.458	
		$\theta$		0.018	(-0.005, 0.041)	0.107	
		$\alpha$		0.0064	(-0.0128, 0.0255)	0.494	
$\beta$			0.00035	(-0.01696, 0.01766)	0.967		

Frequency bands (FB): 0.5–3 Hz ( $\delta$ ), 3–8 Hz ( $\theta$ ), 8–15 Hz ( $\alpha$ ), and 15–30 Hz ( $\beta$ ); C<sub>th</sub>: centile; CI: confidence intervals; SP: spectral power; rEEG: range EEG; r-AS: rEEG asymmetry; IBI: inter-burst interval; burst%: burst ratio; burst#: number of bursts. Statistical significance: \* for  $P < 0.05$ .