

## Effects of Prematurity on Pituitary Gland Volume in Adolescents

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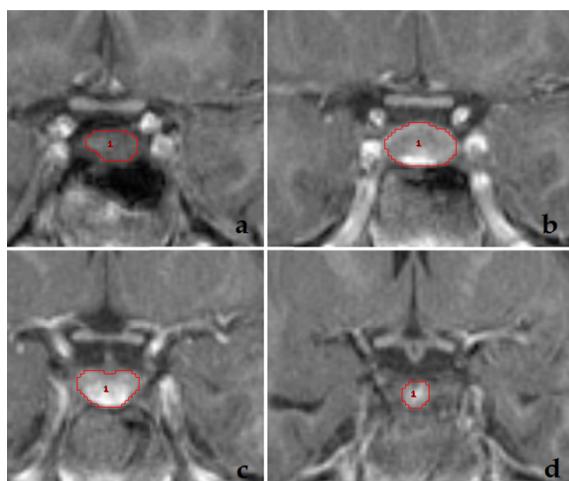
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**Background:** Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis has been implicated in prematurity, which renders the adolescent population increasingly susceptible to stress and depressive disorders (1). Reduced pituitary gland volume (PGV) may reflect chronic HPA axis hyperactivity (2). The aims of this study were to compare pituitary volumes between extremely preterm adolescents and term controls, and to investigate associations with gender and perinatal factors.

**Method:** 186 adolescents born extremely preterm (79 male) and 139 adolescents born full term (58 male) underwent 1.2 mm-thick T1-weighted coronal 3T MRI scans at 18 years of age. The pituitary gland was manually traced using the software, ANALYZE (Mayo Clinic), by an investigator unaware of group status (Fig 1). Pituitary volume was related to gender and other perinatal variables including gestational age at birth, postnatal corticosteroid therapy, assisted ventilation and perinatal brain injury diagnosed by cranial ultrasound in the newborn period.

**Results:** Preterm subjects had significantly smaller pituitary volumes than full term subjects [mean difference (95% CI): 52 (21, 82) mm<sup>3</sup>], independent of gender and age at scan  $p<0.0005$ . Females had significantly larger pituitary volumes than males [81 (50, 111) mm<sup>3</sup>,  $p<0.0005$ ], but there was no significant gender by group interaction ( $p=0.9$ ) (Fig 2). Within preterm subjects, PGV was not associated with gestational age at birth, postnatal corticosteroid therapy, assisted ventilation or perinatal brain injury.

**Conclusions:** Smaller pituitary volumes in the preterm adolescents may reflect chronic HPA-axis hyperactivity. This serves as a potential pathophysiological mechanism for the higher rate of internalising disorders like anxiety and depression, for which preterm adolescents are at greater risk.

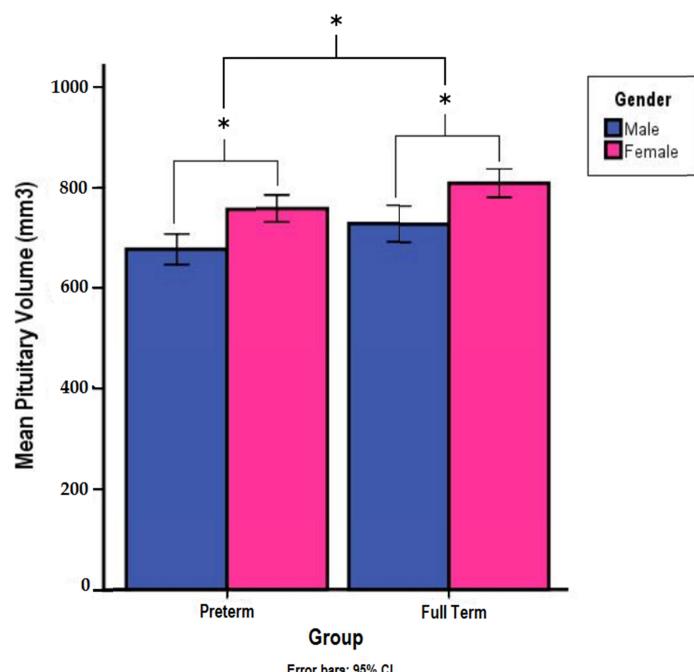


**Figure 1. Pituitary gland on MRI**

T1-weighted images (a-d) show the pituitary gland as featured in every second coronal slice on MRI, where (a) is the most anterior part of the pituitary and (d) is the

### REFERENCES

1. Burnett AC, et al. Prevalence of psychiatric diagnoses in preterm and full-term children, adolescents and young adults: a meta-analysis. *Psychol Med*. 2011 May; 20:1-12.
2. Pariante CM, et al. Pituitary volume in psychosis. *Br J Psychiatry*. 2004 Jul; 185:5-10



**Figure 2. Pituitary volumes of preterm and full term adolescents, data split by gender**

Independent-samples t-test within each group showed a significant difference in pituitary volume means between males and females (\* $p < 0.0005$ ). Univariate analysis, controlling for gender, revealed preterm adolescents had 7% smaller mean pituitary volume than full term adolescents (\* $p < 0.0005$ ).