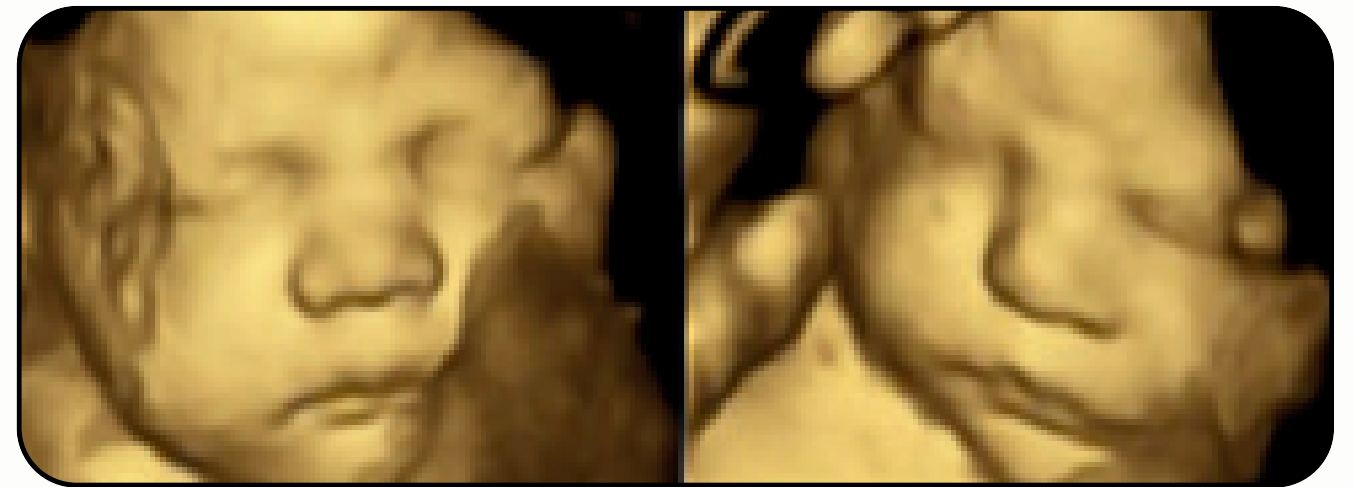


Investigation Into The Effect Of Cigarette And E-Cigarette Exposure On Prenatal Facial Movement With Comparison To No Exposure.

INTRODUCTION

Whilst smoking cessation during pregnancy is recommended, e-cigarette use remains prevalent due to its nicotine content and perceived safety. The neurobehavioral consequences of prenatal nicotine exposure, particularly in humans, is not well understood. This pilot study investigates the effects of prenatal cigarette and e-cigarette exposure on fetal facial movements compared to no exposure.

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METHODOLOGY

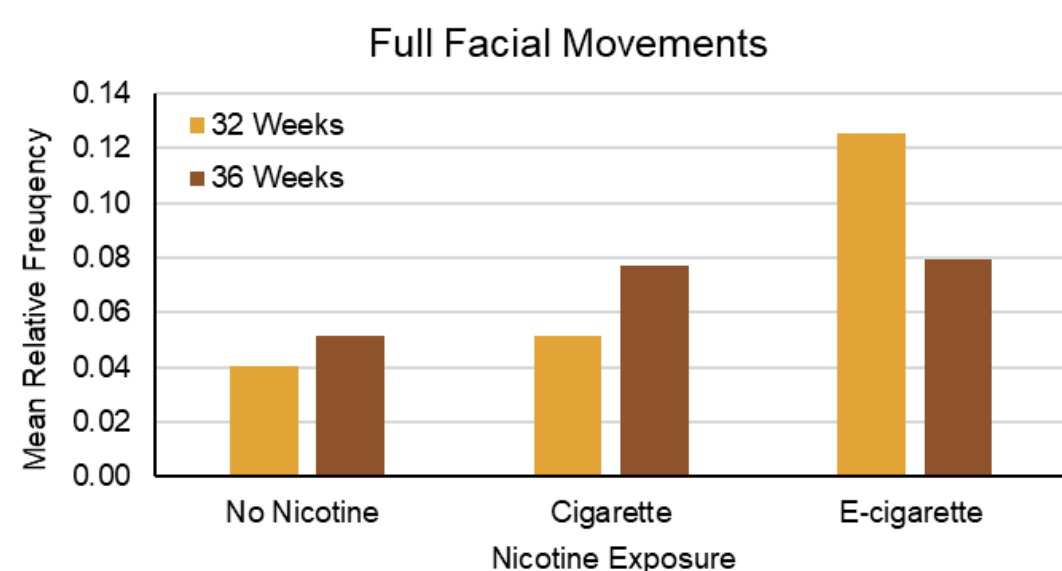
Participants: 15 mother-infant pairs were selected (Cigarette users=5, E-cigarette users=5, Non-smokers=5) from participants of the Froggatt et al. (2021) study.

Scans: 4D ultrasound scans were conducted by the same sonography team at both 32 and 36 weeks gestational age, at either The James Cook University Hospital or The Friarage Hospital within South Tees Hospitals NHS Foundation Trust.

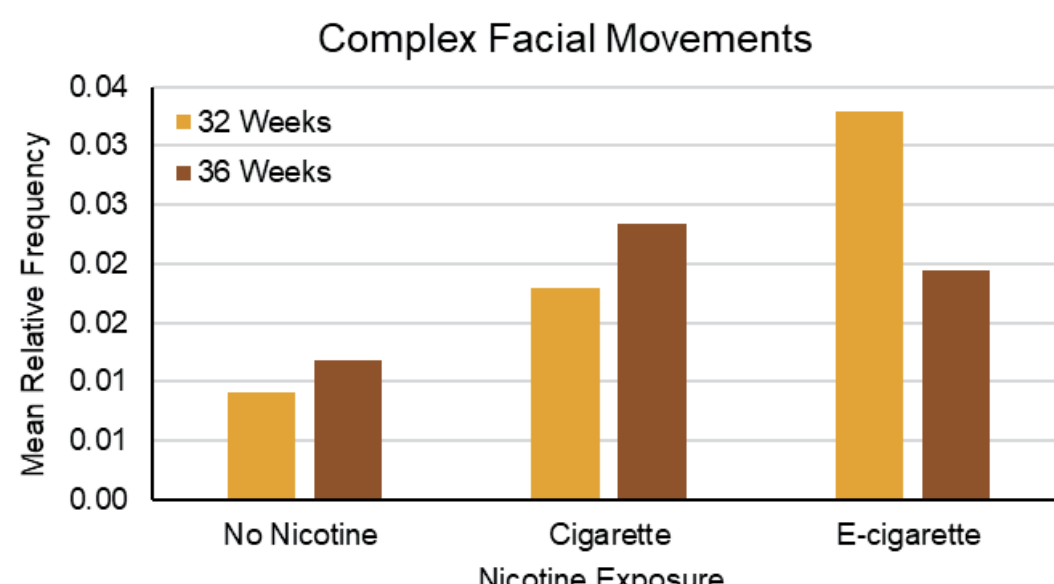
Study: Upper and lower facial movements were anonymously coded frame-by-frame for each scan using the Fetal Observable Movement System (Reissland et al., 2016). Code was peer-reviewed by Dr. Suzanne Froggatt-Gray and combined with mouth movements coded by Froggatt-Gray for analysis.

Analysis: Mean relative frequency of single movements (occurrence of one movement at a given point in time), all facial movements, and complex movements (three or more movements co-occurring or occurring within one second of each other) were calculated for each exposure group at both 32 and 36 weeks gestational age. Non-parametric Kruskal-Wallis tests were applied.

RESULTS



No significant difference between exposure groups for full facial movements. At 32 weeks, $X^2(2, N=15) = 2.720, p = .257$. At 36 weeks, $X^2(2, N=15) = .666, p = .717$.



No significant difference between exposure groups for complex facial movements. At 32 weeks, $X^2(2, N=15) = 2.660, p = .264$. At 36 weeks, $X^2(2, N=15) = 1.040, p = .595$.

RESULTS

No statistically significant differences in the mean relative frequency of single, full, or complex facial movements were observed between the three exposure groups at either 32 or 36 weeks gestational age.

An apparent increase in the level of facial movement was observed among fetuses exposed to nicotine compared to those with no exposure.

DISCUSSION & CONCLUSION

The observed increase in level of fetal movement among nicotine-exposed groups aligns with findings from postnatal studies and warrants further investigation.

High variability within both nicotine-exposed groups may be influenced by factors such as actual individual nicotine exposure, maternal mental health, fetal sex, and caffeine intake.

A sample of 15 mother-infant pairs is insufficient to assess the effect of nicotine exposure due to the high level of variability observed. Further research using a larger cohort is recommended.

REFERENCES

- Froggatt, S., Reissland, N., Covey, J., & Kumarendran, K. (2021). Foetal mouth movements: Effects of nicotine. *Acta Paediatrica*, 110(11). <https://doi.org/10.1111/apa.16042>.
- Reissland, N., Francis, B., & Buttanshaw, L. (2016). The Fetal Observable Movement System (FOMS). In *Fetal Development* (pp. 153–176). Springer. https://doi.org/10.1007/978-3-319-22023-9_9.