

Peer Review File

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Review comments

This is a prospective study of non-nutritive sucking (NNS) dynamics in the frequency domain using Fourier transforms and power spectral density measures in extreme preterm infants during 30-34 weeks of gestational age. A fairly large sample size (n=117) of relatively healthy extremely premature infants were included in the study. Authors have observed 3 different classes of preterm infants based on the suck dynamics (Class A, B, C). Class A has higher suck frequency at baseline compared class B/C and continues to have better NNS measures throughout the studied GA 30-34 weeks. The characteristic that leads to class A suck dynamics is not known, but authors have proposed some possible etiologies. Overall well written manuscript and will help to improve our understanding of suck dynamics of preterm infants.

Reply: Special thanks to this reviewer for helpful comments.

Comments

Abstract background, line 29- 'NNS is routinely used to promote ororhythmic patterning'- avoid the word 'routinely'

Reply: Recommended edit completed.

Introduction, line 94 - split into two sentences. Ref 21 and 22 separated into two sentences.

Reply: Syntax modified

Introduction line 112 - add reference for NNS Spatiotemporal index

Reply: References added

Methods: line 155- severe IUGR (change to $< 3\%$), add exclusion criteria preterm born < 24 weeks. Reply: Completed edit

Methods line 167 - stick to PMA or PCA Reply: Sticking to PMA

Methods Figure 1- expand VCG Reply: Expanded

Results Table 1. Class A PMA at baseline measurement was 215.89(SD 7.15)=30.9 (SD 1 week), while class C it was 209.93 (SD 1.7)=30.00 weeks. So class C infants were appropriately 1 week younger compared to class A at baseline measurement, which may explain their lower NNS frequency at baseline. The real question is

whether at specific GA, say for e.g. at 30 weeks -preterm infants have different sucking dynamics. This may require adjusting the analysis for PMA at baseline.
Reply: Linear Mixed Modeling accounts for these differences in PMA at baseline across infant classes.

For class C, there was no growth in spectral measure over the 4 week intervention period. So can we conclude that the functional maturity of the sucking was not correlating with PMA for this group. So this group was lagging behind the functional maturity of NNS expected at a certain PMA.

BPD infants noted to have delayed oral feeding skills. So if RDS/BPD is not a significant factor for NNS suck dynamics, is it because NNS is not associated with/or leading to swallowing reflexes, thus not interfering with breathing? If that is the case, does the study finding suggest that NNS stimulation is not helping with the swallowing-breathing coordination development?

Reply: This study shows that the selected frequency domain measures (i.e., Fourier) of NNS burst development (pacifier nipple compression pressure dynamics) among RDS/BPD infants does not discriminate between NNS stimulation types. This is in sharp contrast to time domain measures of NNS dynamics (NNS STI) and oral feeding transition data analytics completed for this same cohort of preterm infants which demonstrates significant effects for NNS stimulation and respiratory status (RDS vs. BPD).