The impact of automated milk delivery on infant feeding performance

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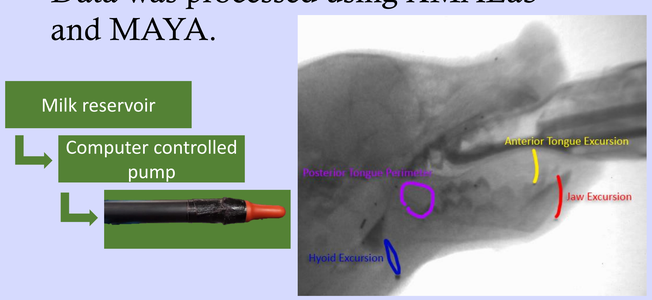
Background

- One of the main challenges of infant feeding is generating enough suction to acquire milk[1].
- Sensory stimulation during milk acquisition impacts feeding physiology during transport and swallowing[2].
- How does automated milk delivery impact infant sucking and swallowing kinematics?

Methods

- Surgically implanted radiopaque markers into the tongue and hyoid.
- Filmed infant pigs using biplanar videofluoroscopy when feeding on a bottle and with automated milk delivery[2].
- Data was processed using XMALab and MAYA.



Results

Automated delivery resulted in decreased jaw and tongue excursion (Fig. 1).

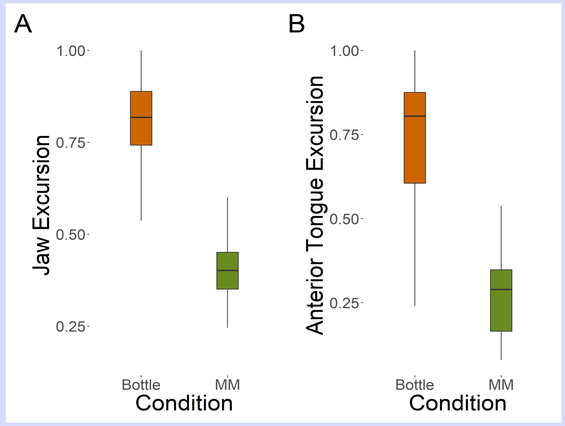


Figure 1. Boxplots showing differences in scaled jaw (A) and anterior tongue (B) total translation. Automated delivery resulted in drastically decreased total translation of both.

Automated delivery increased anteroposterior translation of the anterior tongue (Fig. 2).

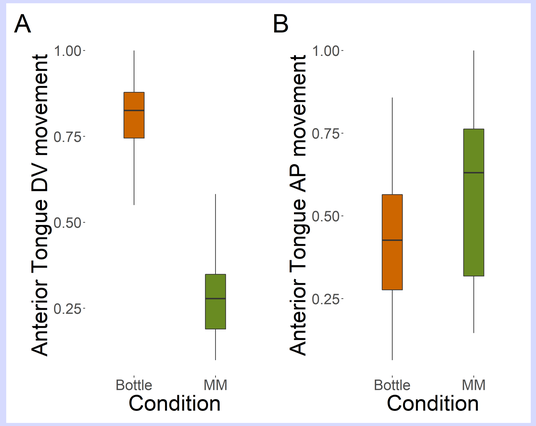


Figure 2. Boxplots displaying differences in scaled anterior tongue dorsal ventral (A) and anteroposterior movement (B). Automated milk delivery resulted in less DV movement and more AP movement.

Bolus size was larger when pigs fed on automated milk delivery system than when bottle feeding (Fig. 3).

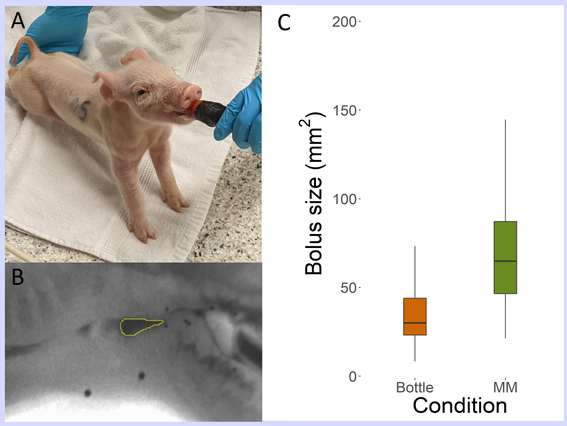


Figure 3. Automated delivery during infant pig feeding (A). The outline of a bolus in the valleculae used in measuring bolus size (B). Boxplot (C) showing automated delivery resulted in increased boluses.

Hyoid excursion was no different between conditions (Fig. 4A), but posterior tongue perimeter was larger when bottle feeding (Fig. 4B).

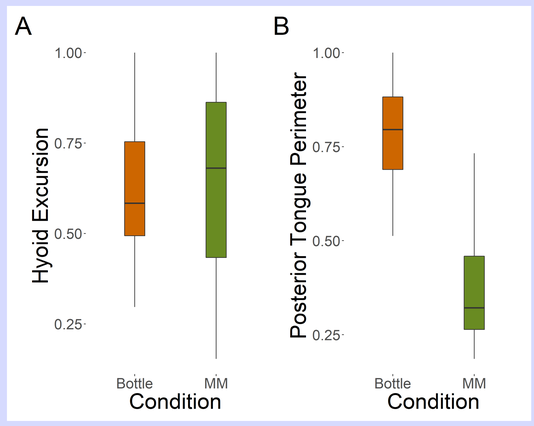


Figure 4. Boxplots showing differences in scaled hyoid excursion (A) and posterior tongue perimeter during swallowing (B). Automated feeding did not alter hyoid excursion, but did result in decreased posterior tongue perimeter.

Conclusions

- Use of an automated milk delivery system reduced sucking kinematics, which has downstream effects on feeding performance.
- Understanding the sensorimotor integration with infant feeding will improve our understanding of the physiology of infant feeding[3].
- A better understanding of the physiology of feeding will improve infant health for compromised populations.

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