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Influence of food consistency on the mandibular temporal patterns during chewing and babbling

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Faculté de médecine



THEORETICAL BACKGROUND

Relationships between feeding and speech

- **Anatomical findings:** shared anatomical effectors (MacNeilage, 1998; Hiiemae, 2002).
- **Clinical findings:** high prevalence of feeding and swallowing difficulties in infants with language impairments (Malas et al., 2015, 2017).
- **Genetic findings:** the role of FOXP2 on feeding and speech development (Zimmerman & Maron, 2017).
- **Phylogenetic findings:** changes in diet impacted human language sounds inventory (Blasi et al., 2019).
- **Ontogenetic findings:** parallel development of speech and feeding (Thibault, 2007).

Food consistency exposure

- Food consistency (i.e. hard food, soft food) influences the development of jaw muscles' function in rats (Liu et al., 1998) and the development of jaws' size in young children (Larsson, 1998).
- Mice fed with solid consistencies are able to adapt their chewing movement according to the nature of the consistency administered unlike those that are fed only with soft textures (Fujishita et al., 2015).
- Food consistency influences the temporal characteristics of chewing in adults (Anderson et al., 2002) and in typically developing children (Gisel, 1988; Wilson et al., 2012).

Babbling (6-12 months) and complementary feeding

- **Emergence of lowering and raising jaw gestures (MacNeilage, 1998):**
 - First syllables
 - First chewing gestures
- **10 months a period of change for oro-motor development ?**
 - 80% of french children consume semi solids (Lemarchand, 2019).
 - \searrow syllabic duration (Canault et al., 2018; Canault et al., under review).
 - \searrow chewing cycle duration (Lemarchand et al. 2017, 2018; Lemarchand, 2019).

RESEARCH QUESTIONS

- Is there a link between speech and feeding development ?
- Does the exposure to different consistency types impact oro-motor development?
- Are syllable duration and chewing cycle duration correlated to feeding practices at 10 months ?

CONCLUSIONS

- The syllables duration and the chewing cycles duration seem to be correlated to the frequency of semi-solids and solids exposure.
- >> A regular exposure to semi-solid and solid textures could contribute to the improvement of masticatory skills (Green et al., 2017), as well as that of articulatory skills.
- The development of articulatory skills is part of a complex and integrated system (Iverson, 2010). This study tends to show a link between speech and chewing development.
- Including more participants and testing other developmental stages would be helpful for the validation of these preliminary results.

METHODS

Population

- 14 French-speaking children (7 females and 7 males).
- 10 months old.
- Typical development: born at term, no neurological, physical or oro-motor impairments and no clinical history of eating disorders.

Material and procedure

- Audio and video recordings.
- Parental questionnaire on child feeding behaviors (Lemarchand, 2019).

Corpus

930 CV syllables and 1927 chewing cycles (semi-solid (e.g. green peas, banana, cheddar) and crackers textures).

Analysis

- **Syllable duration** (Praat software)
- **Chewing cycle duration** (i.e. one down-and-up movement of the mandible (Gisel, 1988) (Datavyu software)
- **Complementary feeding score between (0 and 21 points):** based on the type (ie, mixed (1pt), semi-solid (2pts), solid (4pts)) and exposure frequency (ie, sometimes (1pt), often (2pts), very often (3pts)) of introduced consistencies.

RESULTS

The **chewing cycle duration** ($M = 1092,4$ ms; $SD = 243,7$) tends to be **shorter** when the **complementary feeding score** is **higher**.

The **syllabic duration** ($M = 364,8$ ms; $SD = 57,6$) tends to be **shorter** when the **complementary feeding score** is **higher**.

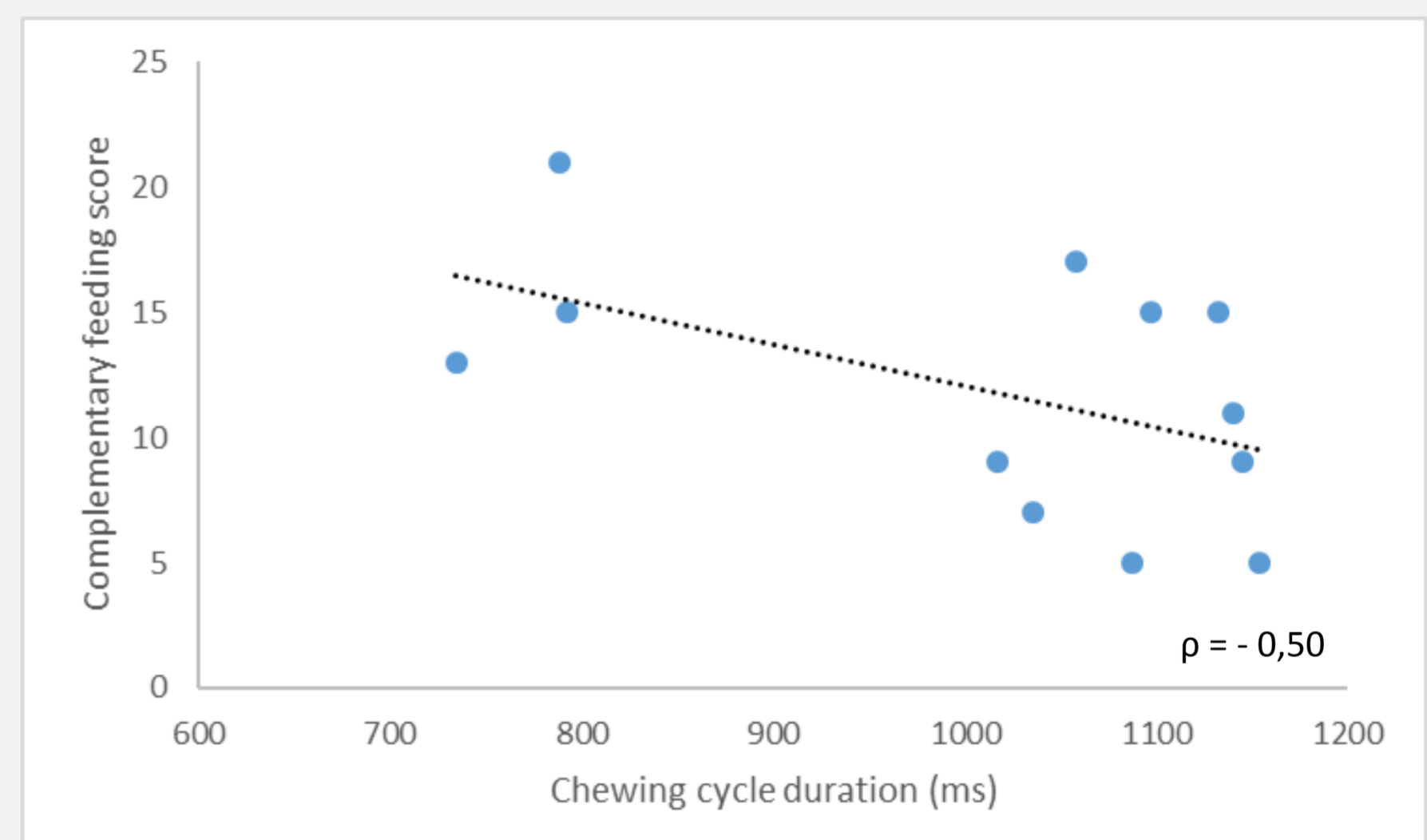


Fig.1. Chewing cycle duration (ms) according to complementary feeding score

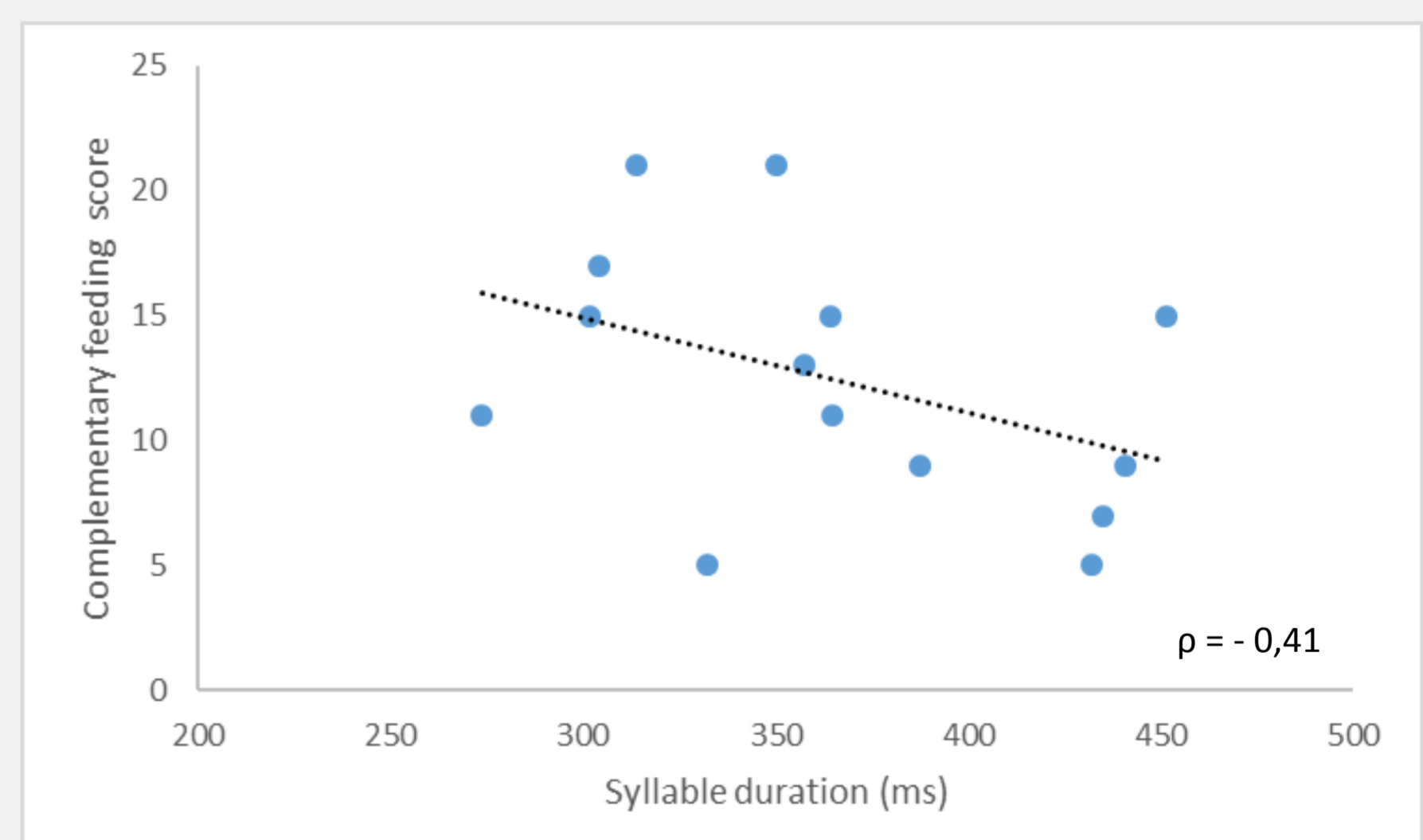


Fig.2. Syllable duration (ms) according to complementary feeding score

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