



Designing a Remote Intervention to Investigate Chewing Efficiency

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WORK IN PROGRESS

Background:

- Chewing difficulties can negatively impact mental and physical health.
- The current methodological landscape for chewing assessment:

	Testing format	Key limitations
Objective measures <ul style="list-style-type: none"> • Food particle sieving • Gum mixing 	<ul style="list-style-type: none"> • Lab-based assessment • Clinical assessment 	<ul style="list-style-type: none"> • Explores isolated facets of chewing (e.g., comminution or manipulation) • Requires specialist equipment and/or expertise.
Subjective measures <ul style="list-style-type: none"> • Food consumption scales • Eating behaviour scales 	<ul style="list-style-type: none"> • Non-lab based • Self-report scales 	<ul style="list-style-type: none"> • Relies on recall of eating behaviour and perceived ability • Lacks objective measurement

- A more useful, holistic approach would combine objective and subjective measures that are contextually linked to each other, *and* factors indirectly related to chewing ability (e.g., pain and fatigue).
- Remote techniques for optical assessment of manipulation ability (gum mixing) are already established, however, equivalent techniques for comminution (particle size) require development.
- We introduce a feasibility study of a remote digital system, facilitating a more complete integrated measure of chewing without the need for specialist equipment. This will allow for self-assessment, targeted interventions and treatment.



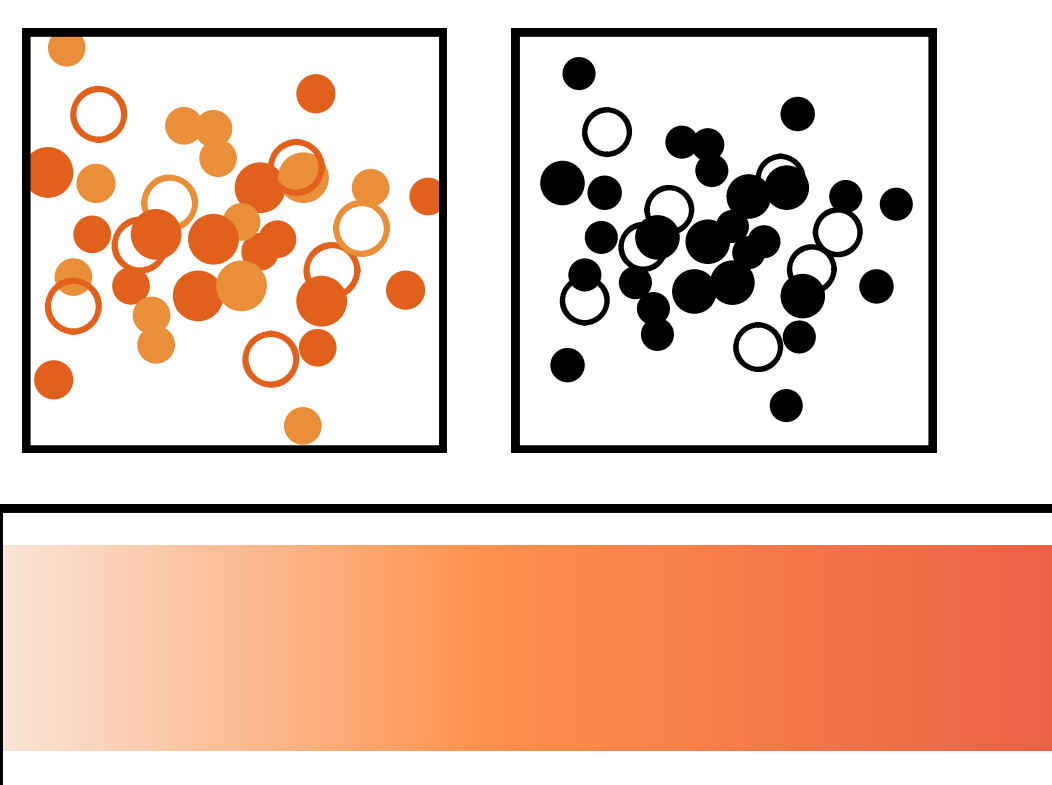
Aims:

1. Design and build an algorithm for remote assessment of food particle size.
2. Design a remote system to holistically assess chewing & test within a feasibility trial.

Method:

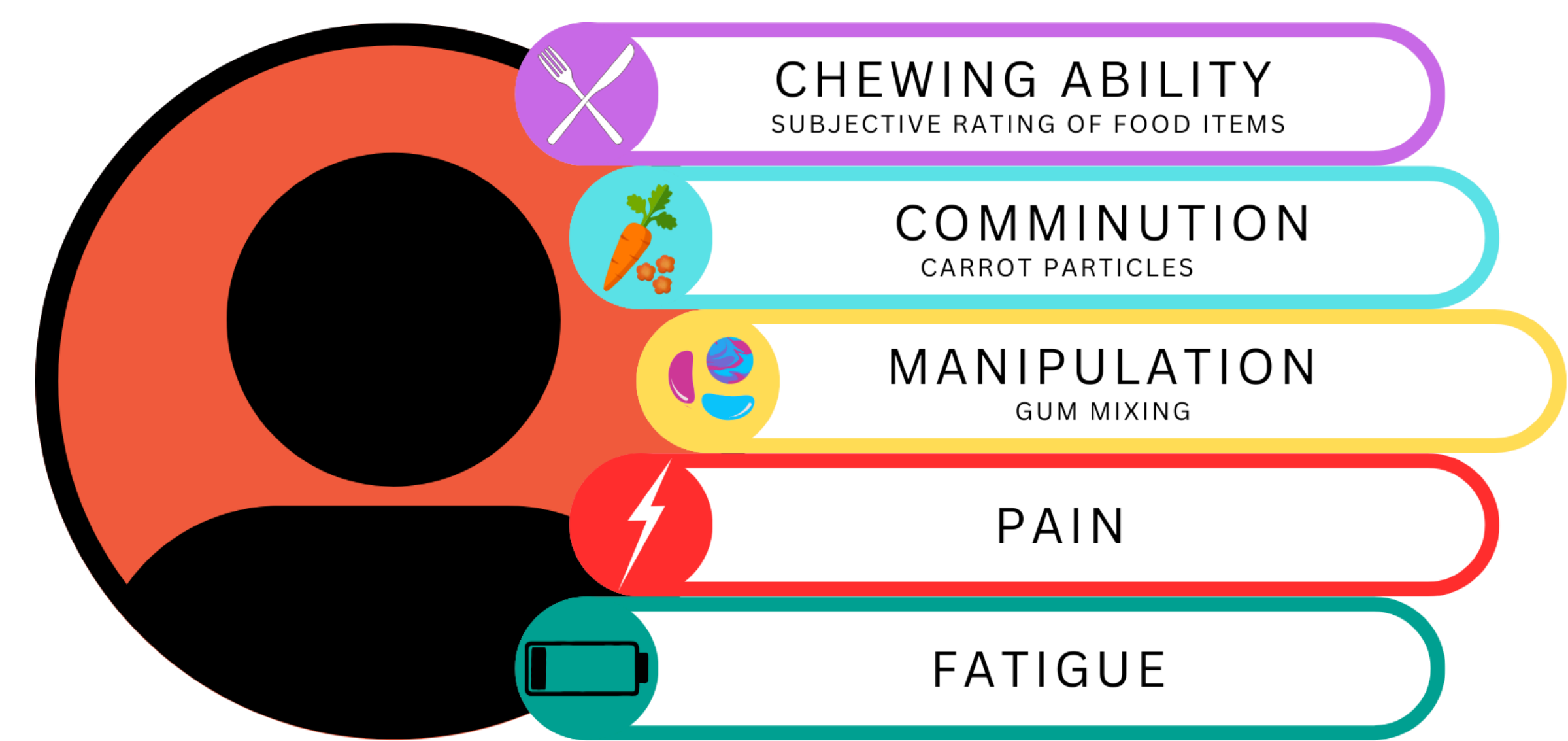
Algorithm development

- Developed using MatLab, the algorithm uses colour thresholds to identify particles.
- Particles are then masked and measured digitally.
- Particle area distribution, median and count.



Feasibility trial

- 84 healthy chewers (18yrs+) will complete an assessment via smartphone
- Objective tasks:
 - Carrot chewing - comminution
 - Gum mixing - manipulation
- Subjective measures:
 - Chewing ability rating scale, perceived ease of the chewing tasks
 - Pain and fatigue arising from chewing tasks
- System usability interview



Analysis:

- Correlations
 - Comminution and manipulation
 - Objective and subjective measures of chewing
- Qualitative analysis
 - User experience
 - Suggested refinements

Current work stage:

Collection of pilot data with healthy chewers for testing the designed system.



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Implications:

Findings will support the continued development of the remote chewing assessment system. It is anticipated that the system will have applications for research and healthcare settings.

Next steps:

Following initial testing with healthy chewers, the system will be refined and tested with populations with known chewing difficulty.

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