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Higher chewing rates reduce food intake – a pilot study building towards a clear public-health message

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Horace Fletcher (1849–1919) evangelised his doctrine to chew each mouthful 50–100 times until it turned to liquid, claiming this prevented weight gain and saved money⁽¹⁾. Surprisingly, the literature lacks reports investigating the role of the number of chews per mouthful (cpm) on food intake. However, slower ‘eating rate’ (grams/minute) has been shown to reduce energy intake⁽²⁾, but a health message prescribing ‘eat slower’ may lack conceptual clarity. Testing Mr Fletcher’s (subjective) observations, participants (n 11: 6 ‘normal weight’: BMI = 20.7–25.2; 5 ‘overweight’: BMI = 30.7–35.6) consumed a pasta-based lunch on three separate testing sessions while keeping pre-test circumstances identical between testing days. Using surface electrode electromyography (EMG) and standardised eating procedures, session 1 served as a practice session recording habitual chewing frequencies per mouthful, while sessions 2 and 3 investigated differences in food intake between prescribed 10 and 35 cpm (random order). It was hypothesised that 35 cpm result in lower food intake compared to 10 cpm, and that habitually (session1), overweight participants would eat more and chew fewer times per mouthful. Analyses employed were paired samples and independent samples t -tests and GLM repeated measures using SPSS. Means are reported (SE).

The mean 35 cpm food intake was lower compared to 10 cpm (mean 291 (SD 33) g *v.* mean 358 (SD 19); $P = 0.006$) despite a substantially longer meal duration (35 cpm: mean 28.6 (SD 1.8) min *v.* 10 cpm: mean 15.1 (SD 0.6); $P < 0.001$). Interestingly, instructing participants to chew 35 cpm resulted in faster chewing (35 cpm: mean 1.10 (SD 0.03) chews/s *v.* 10 cpm: mean 0.78 (SD 0.03); $P < 0.001$), which, combined with participant feedback, suggests that participants increased chewing speed in the 35 cpm condition to ‘get to the next mouthful’. Post-meal fullness (100 mm line scale) levels were not significantly different between conditions. This was confirmed by post-study questionnaire feedback, suggesting that despite de-motivating efforts required for 35 cpm (as perceived by some participants), higher chewing counts reduce energy intake while reaching identical levels of satiety. Note that habitual cpm was not significantly different between the two groups (overweight: mean 15.4 (SD 2.1) *v.* normal weight: mean 14.8 (SD 8.8); $P = 0.893$), and that overweight participants ate less (overweight: mean 240 (SD 25) g *v.* normal weight: mean 355 (SD 29); $P = 0.018$). The latter was supported by marginally lower pre-meal ratings for hunger across conditions (overweight: mean 51.5 (SD 5.7) *v.* normal weight: mean 67.8 (SD 5.2); $P = 0.065$), a possible indicator for different eating/snacking patterns between the two groups.

In summary, although further work will be needed, our main hypothesis, i.e. chewing each mouthful more thoroughly reduces food intake, was confirmed, validating Mr Fletcher’s doctrine.

1. Christen AG & Christen JA (1997) Horace Fletcher (1849–1919): “The Great Masticator”. *J Hist Dent* **45**, 95–100.
2. Andrade AM, Greene GW & Melanson KJ (2008) Eating slowly led to decreases in energy intake within meals in healthy women. *J Am Diet Assoc* **108**, 1186–1191.