Sensation Event Metrics and Descriptors During Non-Invasive Oral Hydration

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AIMS OF STUDY

Bladder diaries, urge scales, bladder questionnaires, and focus groups have all been utilized to better understand bladder sensation. However, aside from ICS-defined verbal sensory thresholds, there is currently no standardized method of characterizing changes in bladder sensation during filling. The purpose of this investigation was to utilize an updated model of a previously developed sensation meter to more objectively characterize real-time bladder sensation events during oral hydration in healthy volunteers.[1]

METHODS

Investigators executed an accelerated hydration protocol where participants drank 2L Gatorade-G2® and used the sensation meter device to record real-time bladder sensation (0-100%), verbal sensory thresholds, and novel sensation descriptors of "tense," "pressure," "tingling," "painful," and "other" for two consecutive fill-void cycles. Data from previously trained participants has been analyzed in order to characterize bladder sensations. Average age and BMI of the participants (n=21, 12 F/9 M) were 24.5±1.1 years and 24.5±1.1 kg/m2, respectively.

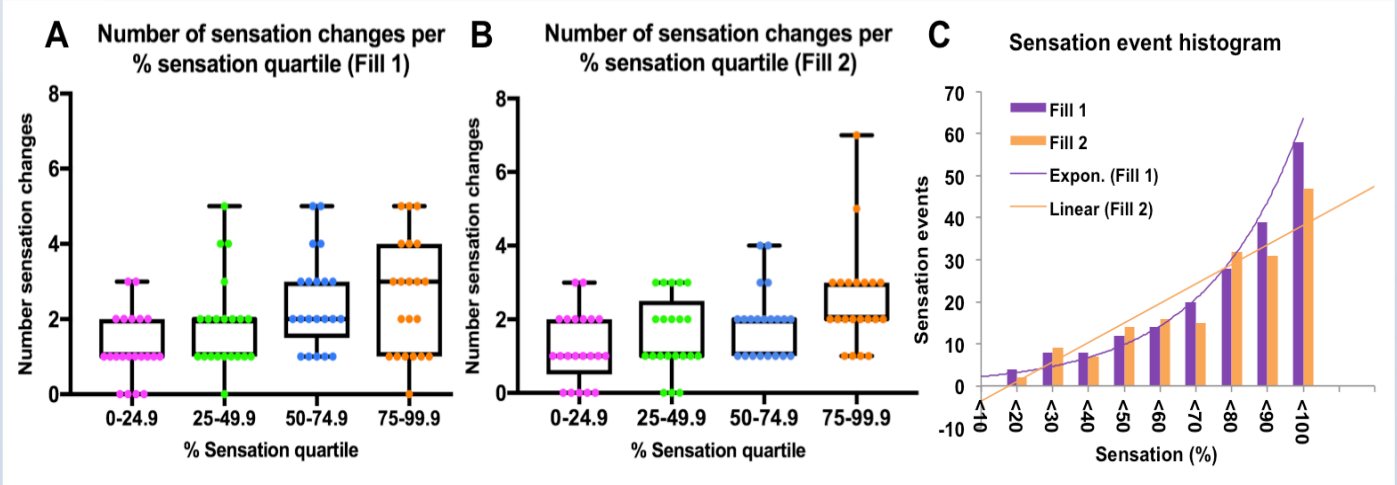

Figure 1. Changes in sensation events throughout the course of filling. Number of sensation events per quartile (A. fill 1 and B. fill 2). Each dot represents one participant, n=21. Sensation quartiles are marked pink (0-24.9), green (>25-49.9), blue (>50-74.9), and orange (>75-99.9). Histograms of sensation event frequency as a function of % sensation (C). An exponential function fits fill 1 histogram data better than a line, while the opposite was true for fill (2).

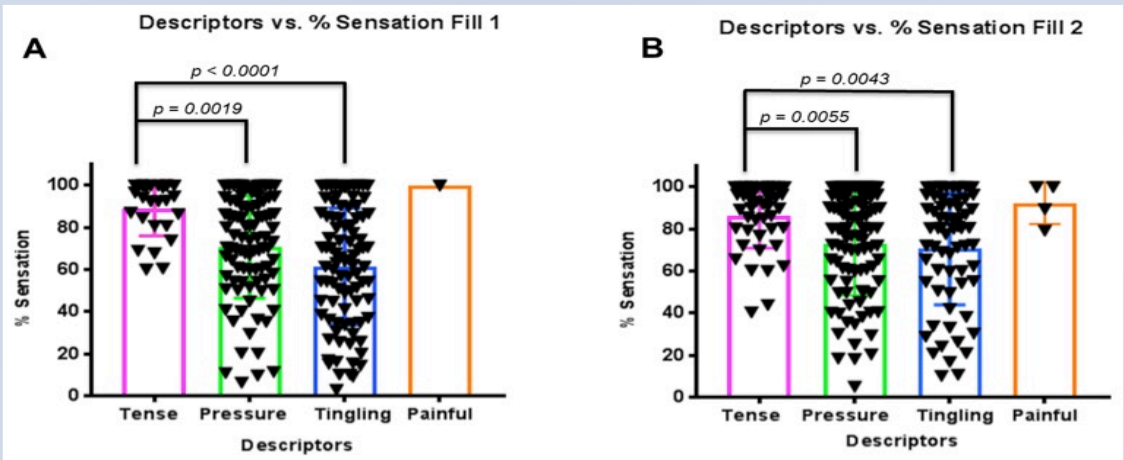

Figure 2. Descriptors and the % sensation at which they were selected (A. fill 1 and B. fill 2, n=18). Each mark (black triangle) represents one event where a descriptor was selected. Descriptors are classified pink (tense), green (pressure), blue (tingling), and orange (pain). Both fills had a significant difference in the frequency of descriptor selection between tense and pressure (A. p=0.0019 and B. p=0.0055) and tense and tingling (A. p<0.0001 and B. p=0.0043).

RESULTS

On average, participants recorded 8-9 sensation events in both fills, with no differences in the total number of sensation events and volume between sensation events (fill1 vs. fill 2). An increased number of sensation events occurred at higher sensation quartiles, with the majority of bladder sensation events, regardless of fill rate or end volume, being perceived at >50% sensation (Fig.1a,b). Histograms of sensation events (Fig.1c) demonstrated that an exponential and linear function better fit fill 1 and fill 2, respectively. Event descriptors of "pressure" and "tingling" were the most commonly chosen descriptors in both fills (Fig.2).

CONCLUSIONS

This study demonstrates increased events per fill compared to ICS standards, acceleration of sensation during filling, and unique sensation event descriptor patterns. Sensation event descriptors of tense, tingling, pressure, and painful enable a more comprehensive understanding of bladder sensation as well as real-time identification, quantification, and characterization of sensation events. Applicable to variable fill rate protocols, the sensation meter may be implemented in various settings for the purpose of identifying novel sensation patterns associated with OAB and aging.

REFERENCES

1. Nagle AS, Speich JE, De Wachter SG, et al: Non-invasive characterization of real-time bladder sensation using accelerated hydration and a novel sensation meter: An initial experience. Neurourol Urodyn. 2017;36:1417-1426.