

Abstract T1P90

Gum chewing while walking affects physical and physiological functions

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Introduction: Gum chewing stimulates sympathetic nervous activity, and increases heart rate and energy expenditure (N Engl J Med. 1999;341:2100, Eur J Oral Sci. 2009;117:470–473). Although these studies have examined the effects of gum chewing while at rest on physiological functions, to date, no studies have focused specifically on the effects of gum chewing while walking. Therefore, the present study examined the effects of gum chewing while walking on physical and physiological functions.

Methods: 46 male and female participants aged 21–69 were completed two trials in a random order. In the gum trial, participants walked at a natural pace for 15 minutes while chewing 2 pellets of gum (1.5 g and 3 kcal per pellet) after a 1-hour rest period. In the control trial, participants rested for an hour before walking, and then they walked at a natural pace for 15 minutes after ingesting powder containing the same ingredient as the chewing gum. Resting heart rate and heart rate (i.e., during walking), walking distance and cadence were measured. The mean walking speed was calculated based on walking distance and time (15 minutes). The mean step counts were calculated based on the cadence value. Stride was calculated based on the mean walking speed and mean step counts. Energy expenditure during a 15-min walk was estimated based on the mean walking speed and body mass.

Results: In the all participants, the mean heart rate and changes in heart rate (i.e., from the rest to during walking) were significantly higher in the gum trial than in the control trial. The stratified analysis by sex showed that the walking distance, mean walking speed, mean heart rate and changes in heart rate among male participants, and mean heart rate and changes in heart rate among female participants were significantly higher in the gum trial than in the control trial. The stratified analysis by generation showed that the changes in heart rate among young participants (age: 39 years and younger), and mean heart rate and changes in heart rate among middle-aged and elderly participants (age: 40 years and older) were significantly higher in the gum trial than in the control trial. The stratified analysis by sex and generation showed that the walking distance, mean walking speed, mean step counts, mean heart rate, changes in heart rate and energy expenditure among middle-aged and elderly male participants were significantly higher in the gum trial than in the control trial (**Table-see next page**)

Conclusion: The present study demonstrates that gum chewing while walking affected on physical and physiological functions. The findings of the present study also indicate that gum chewing while walking increased the walking distance and energy expenditure of middle-aged and elderly male participants in particular.

Conflicts of Interest: This study was supported by a research grant from Lotte Co., Ltd. S.K. and T.A. were not involved in data acquisition, statistical analysis, and interpretation of results. M.M. has no professional relationships with the company involved in this study.

Table. Physical and physiological data, stratified by sex and generation, in the control and gum trials

	Young participants (n=20)				Middle-aged and elderly participants (n=26)			
	Male (n=10)		Female (n=10)		Male (n=12)		Female (n=14)	
	Control	Gum	Control	Gum	Control	Gum	Control	Gum
Walking distance (m/15min)	1,448±166	1,460±161	1,384±200	1,376±185	1,438±135	1,488±135*	1,373±82	1,369±113
Walking speed (m/min)	97±11	97±11	92±13	92±12	96±9	99±9*	92±5	91±8
Step counts (steps/min)	122±10	121±9	125±7	127±9	123±5	125±6*	126±8	127±6
Stride (cm/step)	79±5	80±5	73±7	72±6	78±7	79±6	73±6	72±7
Heart rate (bpm/min)								
Resting	70±4	69±5	75±6	74±6	76±12	74±11*	74±10	76±12
Walking	107±8	107±8	115±12	118±14	107±17	111±18*	114±15	119±12*
Changes in heart rate	37±7	38±5	39±13	44±16*	30±9	37±10*	40±8	43±8
Energy expenditure (kcal/15min)	69±9	70±9	59±10	58±10	70±11	71±12*	59±8	58±8

All values are given as the mean ± SD. *p<0.05, control trial vs. gum trial. Young participants: aged ≤39 years (20s–30s), middle-aged and elderly participants: aged ≥40 years (40s–60s).