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**Title:** 24-HOUR PAD TEST NORMAL VALUES IN OLDER CONTINENT WOMEN

### Aims of Study

The 24-hour pad test is becoming more widely used, as the reproducibility of the 1-hour pad test has been questioned(1). Previous reports of continent women have mainly studied small sample sizes (up to 25 women)(2-4), who were younger than most incontinent women (3-4), Relatively inaccurate weighing scales (2-4) were often used. These studies showed normal values of 5-8ml pad loss for continent women. We aimed to provide reference data using a larger sample, with more elderly women, using highly accurate weighing equipment. We also studied the relation between pad weight and menopausal status, use of HRT, oral contraception, the timing of the menstrual cycle and exercise.

### Methods

Continent women were recruited as follows:1) 35 from an osteoporosis aerobics group, 2) 30 elderly hospital volunteer workers, 3) 80 attendees from a menopause seminar and 4) 155 hospital staff. Each was given a stamped addressed parcel containing 3 pads in a plastic snaplock bag, information sheet and anonymous questionnaire. This asked if the patient leaked any urine, age, menopause status, duration since first day of menstrual period, and whether HRT or hormonal contraception used.

We used Carefree Pantyliners®\* in preference to thicker continence pads because they were less bulky and therefore likely to optimise compliance. Also, their smaller size facilitated the return of parcels by mail, to maintain anonymity. Pads were pre-weighed in the snaplock bag using a beam balance accurate to 0.1g and reweighed accurately upon return.

The study was performed in 2 phases (both in winter). Initially, women were asked not to exercise, to minimise perspiration. Secondly, exercise was encouraged, and recorded on the questionnaire. Data was non-parametric, given as median (interquartile range), compared via Mann-Whitney U test.

After analysing the data, we questioned whether the variation between our results and prior studies might be due to the type of pad used, as prior authors had not described the size or weight of pads. Therefore, further women wore a pantyliner for 24 h, then repeated the study for another 24 h using "Tena mini®" pads which were of greater surface area and are normally used for pad testing of incontinent women. The Tena mini pads were returned in person as they were too bulky to post.

Two males also wore both types of pads for 24 hours in order to exclude contribution from vaginal secretions. Finally, to measure the effect of evaporative loss upon pad weight, one male wore the pantyliner instilled with 5mls of normal saline for 8 hours overnight, and repeated the procedure using the Tena mini® the following night, to assess degree of evaporation with each type of pad.

### Results

Of 320 test parcels distributed, 124 were returned. Four were ineligible: 2 incontinent, 2 used vaginal creams. The median age of the 120 continent women was 48 (IQR 32-60). Their median pad test weight was 0.3g (IQR 0.2-0.7; 95% Upper Confidence Limit 0.5g).

Subgroup analysis showed no significant differences in pad weight with respect to menopausal status, hormonal use, or exercise. Premenopausal women not on hormonal contraception (n=46), were analysed with respect to ovulatory(day 10-18) and non-ovulatory pad loss, but the ovulatory pad weights (0.2g) were actually less than non-ovulatory pad weights (0.4g, p = 0.004).

The normal loss for Carefree pantyliners® and Tena mini® pads has so far been compared in 5 women (1 premenopausal and 4 postmenopausal, one excluded because she did leak urine). Median Carefree pantyliner weight gains were 0.6g and Tena pad weight gains 1.6g (recruitment ongoing).

Male pantyliner weight gain in 2 cases was 0g, while for the Tena pad gain was 2g, suggesting that the larger surface area of the Tena pad encouraged collection of perspiration. In the male who wore pads instilled with 5ml of saline overnight, the change in weight (presumed evaporation) was -2.5g for the Carefree pantyliner®, compared to only -0.5g for the larger Tena mini® pad.

### **Conclusions**

In this study, the median 24 h pad weight gain for continent women was just 0.3g (95% upper CL 0.5g). This result is substantially lower than prior studies (2-4) (median pad weights between 2.6-7g.) Despite our larger numbers and accurate weighing scales, we wondered if prior studies had used thicker pads, these thicker pads might have resulted in larger pad weight gains. Our early comparison between pantyliner and Tena pad results suggests that the larger thicker pads do weigh more in the same woman, perhaps because they collect more perspiration.

Male pad tests (that were similar to female pad weights) suggest that the majority of pad weight gain in continent females is due to perspiration, not vaginal secretions. Saline instillation to each type of pad revealed that thinner pads allow more evaporation of moisture. Thus, whatever moisture was deposited on the pantyliners in the female controls may have evaporated. This could explain why the carefree pantyliners in our control subjects were almost dry. We conclude that the pads used in future 24 h studies of incontinent women should be carefully described, and perhaps standardised.

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Footnote- \* makers = Johnson and Johnson