

# Relative Delivery Efficiency and Convenience of Spray and Ointment Formulations of Papain/Urea/Chlorophyllin Enzymatic Wound Therapies

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## INTRODUCTION

Wound therapies containing papain and urea have a long history of safe and effective use in wound care.<sup>1-5</sup> The addition of chlorophyllin copper complex (CCC) sodium to papain/urea formulations improves tolerability and provides a host of other benefits, including bacteriostatic,<sup>6</sup> anti-inflammatory,<sup>7,8</sup> cytoprotective,<sup>7,8</sup> antihemagglutinating,<sup>9</sup> and deodorizing properties.

Currently, papain/urea/CCC is available in several different ointment formulations and a unique spray delivery system. Ointments can be messy to use and care must be taken during their application to avoid contaminating the wound or the remaining ointment in the tube with potentially harmful pathogens. The process of applying an ointment across a wound is often painful, can disturb the wound bed, and may disrupt the healing process. The first spray formulation of papain/urea/CCC (Panafi<sup>®</sup> Spray, Healthpoint Ltd.) became available in 2004. The greatest advantage offered by a spray is that it allows for a "no touch" application. A "no touch technique" is recommended in a position statement by the Association of Professionals in Infection Control and Epidemiology and the Wound Ostomy Continence Nurses Society as a strategy for reducing infection risk in chronic wounds.<sup>10</sup>

The present study enlisted a large number of attendees at the 2005 annual meeting of the Wound, Ostomy, and Continence Nurses Society to help evaluate the relative product delivery efficiency and convenience of spray and ointment formulations of papain/urea/CCC and urea. The spray formulation (Panafi<sup>®</sup> Spray) was compared to all three papain/urea/CCC ointment formulations currently available in the US (Panafi<sup>®</sup> Ointment, Healthpoint Ltd.; Gladase<sup>™</sup>-C, Smith and Nephew, Inc.; and Ziox<sup>®</sup>, Stratus Pharmaceuticals, Inc).

## METHODS

### Study Design

- Open-label, non-clinical, product usage study conducted in a designated section of the Healthpoint booth in the Technical Exhibit Hall at the 2005 WOCN annual meeting.
- Participants were given a primed, pre-weighed bottle of the spray (Panafi<sup>®</sup> Spray) and asked to apply it to a wound model (dimensions: 4.5 cm wide, 6.0 cm long, and 1.0 cm deep).
  - All participants first received a tutorial to familiarize them with the spray.
- Participants were then given a masked, pre-weighed tube of comparative ointment (either Panafi<sup>®</sup> Ointment, Gladase<sup>™</sup>-C, or Ziox<sup>®</sup>) and asked to apply it to the wound model.
- All applications by all clinicians used the same identical wound model.
- Participants were then asked to complete a self-administered survey.

### Data Analysis

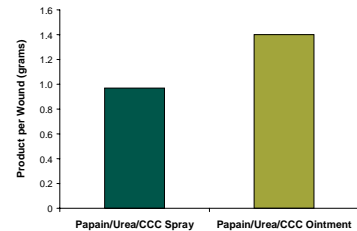
- Average amount of product used per wound was calculated by dividing the total amount of product used by the number of wound applications.
- The number of wound applications available in each ointment tube or spray bottle was calculated by dividing the estimated amount of "available" product in the container by the amount of product used in each wound application.

- The average amount of "available" product in each ointment tube or spray bottle was estimated by subtracting the amount of residual product left in "emptied" ointment tubes or spray bottles from the labeled product volume.
- Spray bottles were considered "empty" when they would no longer dispense product. Ointment tubes were considered "empty" when clinicians determined that they could no longer dispense product from them.

## RESULTS

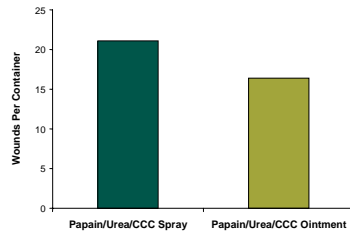
### Product Delivery Efficiency

#### A. Average product amount needed to cover wound model



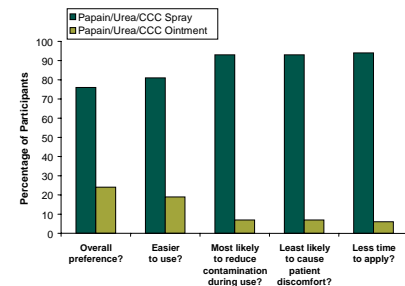
- A total of 416.16 g of spray from 17 bottles was used to complete 429 wound applications; 598.6 g of ointment from 17 tubes (4 Ziox, 6 Panafi, and 7 Gladase) was used to complete the same number of applications.
- The average amount of product used per wound was 0.97 g for the spray formulation and 1.4 g for the ointment formulations. This indicates that approximately 30% less product was used per application of the spray formulation.

#### B. Estimated number of wounds treated per container



- Estimate based on the estimated amount of available product and the average amount of product needed to cover the wound model.
  - For spray: 33 g starting weight minus 12.53 residual gives 20.47 g usable product
  - For ointment: 30 g starting weight minus 7.03 residual gives 22.97 g usable product
- A 33 mL bottle of spray will treat approximately 29% more wounds than will one 30 g tube of ointment.

### Participant Preference



- Nearly all participants considered the spray to be quicker (94%) and easier (81%) to use than the ointments.
- Over 90% of participants considered the spray to be most likely to reduce contamination during use and less likely to cause patient discomfort, as compared with the ointment formulations.
- Seventy-six percent of participants expressed an overall preference for the spray over the ointments.

### Participant Background

#### A. Professional designation

Professional Designation	Percentage of Participants (n=439)
Nurse	65%
Physical Therapist	6%
Nurse Practitioner	6%
Podiatrist	-
Physician	-
Surgeon	-
Physician Assistant	1%
Other	4%
No Response	-
Total	100%

#### B. Professional title

Title	Percentage of Participants (n=416)
Wound Care/WOCN Nurse	64%
Other	32%
Wound Care Consultant	18%
Wound Center Manager/Director	3%
Medical/Clinical Director	1%
Department Manager	3%
Director/Assistant Director	2%
Nursing	0%
Total	100%

#### C. Care setting

Care Setting	Percentage of Participants (n=439)
Hospital In-patient	52%
Hospital Outpatient	11%
Private Office	2%
Home Care or Hospice	22%
Long-term Care Nursing Home	3%
Long-term Care Acute Care	6%
Other	2%
Free Standing Wound Clinic	3%
No Response	0%
Total	100%

### Participant Opinion of Performance

#### A. Spray formulation

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Agree & Strongly Agree
Spray requires less application time than ointment (n=384)	1%	3%	9%	38%	49%	87%
Spray is easy to apply (n=383)	1%	5%	11%	40%	43%	83%
Spray will minimize disruption to the wound during application (n=382)	1%	1%	7%	42%	49%	91%
Spray will be easier for patient or caregiver to apply at home than ointment (n=381)	2%	7%	12%	34%	45%	79%
Spray minimizes product waste (n=384)	2%	6%	17%	33%	42%	75%
Spray adheres well to the wound bed (n=380)	0%	1%	6%	45%	48%	93%
Spray is suitable for varying sizes of wounds (n=376)	0%	4%	7%	43%	46%	89%
Spray would reduce the potential for cross contamination during application (n=382)	1%	3%	4%	39%	53%	92%
Spray can be applied at various angles and patient positions (n=383)	2%	4%	9%	38%	47%	85%
Spray can be applied with one hand (n=380)	1%	1%	3%	42%	53%	98%
Spray has the ability to provide a cost savings for my facility (n=377)	2%	4%	29%	28%	37%	65%
Spray minimizes patient discomfort during application (n=382)	0%	1%	12%	39%	48%	87%

- Between 75% and 95% of participants agreed or strongly agreed that the spray formulation would provide a range of practical benefits related to ease of use and maintenance of the stent and integrity of the wound bed.
- Ninety-two percent of participants indicated that they would recommend the spray formulation to a colleague.

#### B. Ointment formulation

Statement	Good and Very Good Ratings*			Overall
	Panafi <sup>®</sup>	Ziox <sup>®</sup>	Gladase <sup>™</sup> -C	
Ointment adherence to the wound bed (ointment stays where applied; n=437)	82%	67%	68%	72%
Ease of spreading ointment onto the wound (n=438)	68%	61%	55%	61%
Ointment does not run or drip while dispensing or during application (n=436)	84%	73%	65%	74%
Ointment consistency (no lumps or clumps; n=438)	84%	70%	67%	74%
Overall ease of ointment application (n=438)	73%	60%	59%	64%
Time required to apply ointment (n=436)	58%	50%	53%	54%

\*Possible responses included very poor, poor, neutral, good, and very good.

- The percentage of participants who agreed or strongly agreed that the ointment formulations provided the same types of practical benefits was notably lower than that seen for the spray formulation.

### Cost Estimates

- In a post-hoc analysis, the cost per application of the spray formulation was estimated by dividing average wholesale price (AWP) by the estimated number of wounds treated per container. The cost per application of ointment was estimated by dividing the average of the AWP's for the 3 ointments used by the estimated number of applications for all ointment containers.
- At this time, the AWP for a 33 mL bottle of Panafi<sup>®</sup> Spray is \$88.00, which gives an estimated cost per wound application of \$4.17. The AWP for the different ointments ranges from \$60.95 to \$88.00 (average \$70.48) giving an estimated cost per application of \$3.72 to \$5.36 (average \$4.29).

## DISCUSSION

- The spray formulation of papain/urea/CCC allowed 30% less product to be used per wound application than did three different types of ointment formulations.
  - Resulting in 29% more wound applications per container.
- Experienced wound care clinicians in this study found the spray easier and quicker to use than the ointments.
- 92% of study participants agreed that the spray formulation could reduce the potential for cross contamination during application.
- In general, the overwhelming majority of study participants agreed that the spray formulation would provide a variety of practical benefits over ointments, including minimizing patient discomfort and wound bed disruption during application.
- A post hoc analysis found per application cost of the spray formulation to be comparable to the ointments.
- Study limited by the fact that it was conducted by the manufacturer of the spray formulation in the vicinity of a promotional display of their products.
  - Means that all of the survey results should be interpreted conservatively.
- The product use efficiency findings are much less likely to have been influenced by the study setting than were the survey results. Study participants covered the wound models according to product use directions and their usual clinical practice and had no incentive to use more or less of any particular product during each application.

## CONCLUSIONS

- A specific spray formulation of papain/urea/CCC (Panafi<sup>®</sup> Spray) resulted in less product use per application to a standard wound model than did three different ointment formulations of papain/urea/CCC.
- Participants expressed an overwhelmingly favorable impression of the practical benefits of the spray formulation.
  - These findings suggest that similar benefits may be seen in the clinical setting.

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