Treatment of Combat Wounds in War Zones Using a Prolonged Wear Transforming Powder Dressing: A Clinical Case Series

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INTRODUCTION

Challenge:

- War-related injuries, including blast injuries, burns and penetrating gunshot or shrapnel wounds, result in severe pain, prolonged recovery and return to duty (RTD)[1]
- Combat hospitals are resource constrained, underscoring the need for more efficient wound management solutions[2]
- Conventional wound care requires frequent dressing changes, increasing patient discomfort and draining medical resources

Potential Solution:

- Transforming powder dressing (TPD*) offers an innovative solution that can stay in place for extended periods (up to 30 days)

This case series examines TPD's effectiveness in treating acute traumatic combat wounds and its impact on dressing change frequency and associated pain.

METHODS

Seven cases were analyzed, covering acute traumatic combat injuries from various causes, including burn, gunshot, shrapnel and blast injuries. All cases were treated with TPD in place of traditional dressings.

- TPD is a commercially available novel wound dressing with an extended wear time (up to 30-days)
- TPD is comprised primarily of methacrylate-based polymers similar to those used in contact lenses
- Upon hydration, TPD aggregates to form a moist oxygen-permeable barrier that protects the wound from exogenous bacteria while allowing excess exudate to flow through via vapor transpiration
- Simple secondary dressings may be used to cover the wounds in areas of high-exudation or friction
- TPD can be topped off by sprinkling more powder without removal of the existing TPD matrix for up to 30 days
- As healing progresses, the TPD matrix dries and flakes off
- If removal is necessary, the moistened matrix can be peeled off atraumatically

Altrazeal Transforming Powder Dressing

RESULTS

All wounds healed completely without complications.

A significant reduction in dressing change frequency, pain and expected RTD was observed

- **Mean Healing Time:** 29.3 days (range: 10-42)
- **Mean No. of Applications:** 3.6 (range: 2-6)
- **Reduction in Dressing Changes:** ~88.4%
  - 7 changes / week with SOC on average versus once every 8.6 days with TPD (range: 5-15)
- **Mean Return to Duty Time:** 10.3 days (range: 7-11)
- **Patient Reported Pain:** All patients reported a reduction in pain associated with dressing changes

Wound Type	Wound Location	Wound Size	Time to Heal (days)	No. of Dressing Changes*	Dressing Change Frequency (days)	RTD
Burn	Back, neck, arms	6% TBSA	30	3	10	13
MET	Thigh	NA	35	5	7	-
MET	Popliteal	NA	42	6	7	-
Gunshot	Gluteal muscle	NA	10	2	5	-
Shrapnel w/ hematoma	Thigh	5 x 2 x 2 cm	24	3	8	7
Shrapnel	Buttock	1.2 x 1.5 x 3 cm	30	2	15	10
Shrapnel	Arm	1.2 x 1.5 x 5 cm	34	4	9	11
		Mean	**29.2**	**3.7**	**8.4**	**9.3**

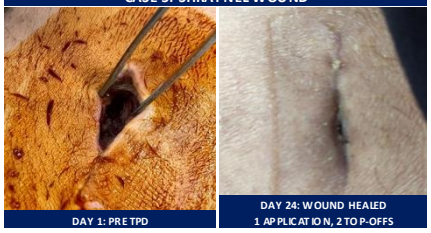
CASE1: BURN WOUND | 6% TBSA

CASE 2: MET

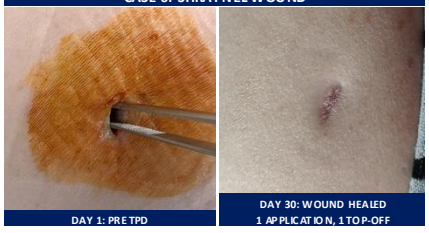
CASE 3: MET

CASE 4: GUNSHOT WOUND

CASE 5: SHRAPNEL WOUND



CASE 6: SHRAPNEL WOUND



CASE 7: SHRAPNEL WOUND

CONCLUSION

By reducing the need for frequent and painful dressing changes and enabling faster than expected patient discharge, TPD helped conserve medical resources while enhancing patient outcomes in combat care settings. This case series highlights TPD as a valuable treatment option for acute traumatic wounds, not only in combat environments but also in resource-limited civilian settings.

REFERENCES: (1) D'Souza EW, MacGregor AJ, Dougherty AL, Olson AS, Champion HR, Galarneau MR. Combat injury profiles among U.S. military personnel who survived serious wounds in Iraq and Afghanistan: A latent class analysis. PLoS One. 2022 Apr 6;17(4):e0266588. doi: 10.1371/journal.pone.0266588. PMID: 35385552; PMCID: PMC8985965. (2) https://abcnews.go.com/International/hospital-sees-30-rise-wounded-ukrainian-soldiers-doctor/story?id=106197525

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