Using the dehisced surgical wounds aetiology-specific T.I.M.E. clinical decision support tool to promote consistent holistic wound management and eliminate variation in practice

Authors:

Stacy Phelps, Wanda Smith, Tesha Smith, Beth Benton, Mallory Rybolt, Taylor White and Melanie Edwards The T.I.M.E. clinical decision support tool (CDST; Moore et al, 2019; World Union of Wound Healing Societies, 2020) is based on the well-established T.I.M.E. wound bed preparation framework (Schultz et al, 2003). The tool has been further developed to help support clinicians to assess different wound types – namely venous leg ulcers, pressure ulcers/injuries, diabetic foot ulcers and dehisced surgical wounds. In this article, a team of non-wound care specialist staff (homecare nurses) used the dehisced surgical wounds aetiology-specific T.I.M.E. CDST to help guide wound bed preparation, dressing selection and ongoing management of patients with a dehisced surgical wound in a homecare setting in the USA. Four case studies are presented here.

ound care involves several techniques to assess, treat, and care for patients with a wound; however, many inconsistencies have been highlighted in clinical practice. Suboptimal wound care is common and can contribute to delayed healing and misuse of resources, and subsequently expose patients to unnecessary risk (Johnson, 2015). Delayed healing occurs in a variety of wound types and can lead to a failure to recognise deterioration and/or seek timely advice, increasing the likelihood of poor treatment choices (Dowsett and Hall, 2019).

Tools that incorporate evidence-based wound management and provide a structured approach to wound care can assist accurate and comprehensive wound assessment and could be beneficial to promote consistent holistic wound management and eliminate variation in practice (World Union of Wound Healing Societies [WUWHS], 2020).

T.I.M.E. clinical decision support tool

The T.I.M.E. clinical decision support tool (CDST) was developed with input from an international group of experts to provide support to health care professionals making clinical decisions,

while reducing variation in practice and helping to improve wound outcomes (Moore et al, 2019; *Box 1*). Holistic wound care and the involvement of a multidisciplinary team are central features of the T.I.M.E. CDST.

In 2019, a multi-centre clinical evaluation of the T.I.M.E. CDST was conducted at four different centres: two in Australia (Carville et al, 2019; Swanson et al, 2019), one in Canada (Woo, 2019), and one in Denmark (Jelnes et al, 2019). The wound care specialist at each centre supported non-specialists to use and evaluate the tool on five different patients over a 4-week period and report how the T.I.M.E. CDST influenced practice. The tool provided a structured wound management approach supporting nonspecialists and encouraging consistency of care and better patient outcomes (Blackburn et al, 2019).

Development of aetiology-specific T.I.M.E. CDSTs

The T.I.M.E. CDST has since been evolved into aetiology-specific tools, which retain the essence of the original T.I.M.E. CDST, but with specific management prompts for four different wound aetiologies – venous leg ulcers (VLUs), pressure

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Box 1. Timeline of the T.I.M.E. clinical decision support tool.

- T.I.M.E. concept developed to provide a structured approach to wound bed preparation Tissue (non-viable or deficient), Infection/Inflammation, Moisture balance and Edges of wound nonadvancing (Schultz et al, 2003).
- A survey of delegates at the 2018 European Wound Management Association conference identified that although T.I.M.E. is universally the most widely used assessment tool, 40% of respondents reported that they did not use any formal framework to guide wound bed preparation in practice (Ousey et al, 2018).
- The T.I.M.E. clinical decision support tool (CDST) evolved from the T.I.M.E. wound bed preparation concept with the aim to help guide an holistic patient–wound approach. The tool addresses the elements of holistic assessment and management and the importance of patient involvement to help eliminate variation in practice (Moore et al, 2019; WUWHS, 2020). The tool was developed and endorsed by an international group of experts.
- The aetiology-specific T.I.M.E. CDSTs for venous leg ulcers, pressure ulcers/injuries, diabetic foot ulcers and dehisced surgical wounds were developed in conjunction with input from tissue viability nurses from the United Kingdom and wound, ostomy and continence nurses in the United States of America.

ulcers/injuries, diabetic foot ulcers (DFUs) and dehisced surgical wounds. All aetiology-specific tools follow the same principles of the original T.I.M.E. CDST tool by using an 'ABCD and E' approach to facilitate clinical decision-making:

- A Assessment of the patient, wellbeing and wound
- **B** Bringing in a multidisciplinary team and informal carers to promote holistic patient care
- C Controlling and treating the underlying causes and barriers to wound healing
- Deciding on the most appropriate wound treatment to implement and the desired wound management outcome
- E Evaluation and reassessment of how the wound is progressing and if the wound management goals have been achieved.

The aetiology-specific T.I.M.E. CDSTs were developed in conjunction with input from tissue viability nurses from the United Kingdom and wound, ostomy and continence nurses in the United States of America.

The purpose of the aetiology-specific T.I.M.E. CDSTs is to provide aetiology-specific content in sections A, B, C, to provide images of associated wound types and to include treatments that may be specific to wound aetiology in section D. The DFU T.I.M.E. CDST and the VLU T.I.M.E. CDST have been evaluated previously (Nair and Kaur, 2021; Post et al, 2021).

There are two versions of the dehisced surgical wounds aetiology-specific T.I.M.E. CDST to help clinicians manage wounds appropriately when problems such as dehiscence occur. The grading system used in the SWD T.I.M.E. CDST is based on the WUWHS grading system (Sandy-Hodgetts, 2017; WUWHS, 2018). One includes Smith + Nephew products [*Figure 1*]. The other does not specify a particular product and can be adapted to local formularies [*Figure 2*].

Evaluating the dehisced surgical wounds aetiology-specific T.I.M.E. CDST Setting: Home setting, care provided by Sta-Home Health & Hospice, Mississippi, USA This article focuses on the experiences of staff

at Sta-Home Health & Hospice, a provider of home care services that serves approximately 6,200 patients a day throughout the state of Mississippi over a 1-year period. Sta-Home Health & Hospice provide services which include nursing, physical and occupational therapy, and home health aide care.

Executive directors/supervisors were contacted to identify eligible patients prior to evaluation of the tool. After patient selection, nurses were contacted and briefed on components of the project. Nurses then discussed this further with the patients and consent for participation was obtained. Thereafter, meetings were held to explain use of the T.I.M.E. CDST and how to complete the data collection forms.

Overall, nurses were happy to be involved in the project and felt that use of the clinical decision-making tool would help to guide appropriate treatment and instil confidence, leading to better patient outcomes.

Case 1: Grade 3 (muscle) dehisced surgical wound

Assess patient, wellbeing and wound A 54-year-old male presented with a Grade 3 (muscle) dehisced surgical wound on

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Figure 1: Dehisced surgical wounds aetiology-specific T.I.M.E. clinical decision support tool (Smith + Nephew products included).



Figure 2: Dehisced surgical wounds aetiology-specific T.I.M.E. clinical decision support tool (generic version).

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Case 1: Grade 3 (muscle) dehisced surgical wound.



Figure 3: Initial assessment.



Figure 4: Week 4.

his cervical spine. The patient had had surgery for cervical spinal fusion/shoulder replacement and the incision site had dehisced 29 days later. The wound had been present for 19 days at initial presentation and measured 9.5cm (length) x 4cm (width) x 1.7cm (depth) [*Figure 3*].

After 2 days, treatment commenced with negative pressure wound therapy (NPWT) twice weekly and was increased to three times a week. The wound was not painful but was affecting the patient's movement and he was concerned about developing an infection.

Bring in multidisciplinary team and informal carers to promote holistic patient care

No referrals were required during the evaluation period. The patient had weekly/biweekly followup visits with the surgeon and support from a spouse at home to assist with care.

Control or treat underlying causes and barriers to wound healing

No other treatments were prescribed during the evaluation period. However, the clinician reassured the patient and offered gentle exercise/movement advice as he was concerned about developing an infection and movements were restricted.

Decide appropriate treatment

Using the dehisced surgical wounds aetiologyspecific T.I.M.E. CDST, the main barriers to healing that needed to be addressed were the presence of the non-viable tissue and the non-advancing edges.

- T= The wound bed comprised 80% granulation tissue and 20% slough
- I= The wound was not infected
- M= Moderate levels of serosanguinous drainage/ exudate were present
- E= There were two areas of undermining around the wound edge.

The aim of wound care was to continue with NPWT to promote advancing of the wound edges and prepare the wound for closure with a split thickness skin graft.

The wound was cleansed with saline and gauze to remove the sloughy tissue, patted dry, and a black foam (roll) dressing was used to fill the wound before NPWT was applied at a continuous pressure setting of 125mmHg.

Evaluate

Over the 4-week period, the wound had progressed well *[Figure 4]* and no infection developed. The wound now measured 6.1cm (length) x 3.5cm (width) x 1cm (depth). A split thickness skin graft was expected to be applied in 2 weeks. The patient reported no pain prior to each dressing change, but the wound was still affecting his ability to work and socialise.

For this wound in a challenging location, the T.I.M.E. CDST helped to guide appropriate treatment and determine if a change in treatment was required. The clinician noted that the tool may be particularly beneficial for nurses new to wound care to guide clinical decision-making and selection of the most appropriate treatment.

Case 2: Grade 1 (skin) dehisced surgical wound

Assess patient, wellbeing and wound

This case describes a 62-year-old male with hypertension, insomnia and acid reflux. The patient presented with a Grade 1 (skin) dehisced surgical wound under intact staples on his lower back of approximately 2cm *[Figure 5]*. The wound had dehisced roughly 2 weeks after hardware removal surgery and measured 11cm in length, width and depth could not be determined by the clinician.

Wound pain was rated at 3 out of 10 on a visual analogue scale (VAS; 1 = no pain and 10 = unbearable pain) and varied from constant to intermittent. Activities of daily living were limited.

Bring in multidisciplinary team and informal carers to promote holistic patient care

No referrals were required during the evaluation period. The patient had weekly/biweekly followup visits with the surgeon; physical therapy was not provided during the evaluation period as this was not covered by insurance. The patient had attended outpatient therapy prior to surgery and returned to outpatient therapy upon discharge from Home Health services.

Control or treat underlying causes and barriers to wound healing

The patient experienced chronic back pain daily but always wore a brace, which provided back support and helped to minimise pain when conducting activities of daily living. The back brace was not reported to have any interference with the wound.

He was prescribed a combination medication of hydrocodone and acetaminophen as needed, and according to local pain management policy.

Decide appropriate treatment

Using the dehisced surgical wounds aetiologyspecific T.I.M.E. CDST, the main barrier to healing that needed to be addressed was

Case 2: Grade 1 (skin) dehisced surgical wound.



Figure 5: Initial assessment.



Figure 6: Week 4.

Case 3: Grade 2 (subcutaneous tissues) dehisced surgical wound.



Figure 7: Initial assessment.



Figure 8: Week 4.

moisture imbalance.

- T= The wound bed comprised 75% granulation tissue and 25% epithelialising tissue
- I= The wound was not overtly infected,
- M= Low levels of serosanguinous drainage/ exudate
- E = Dermal layer had slightly dehisced.

The aim of wound care was to achieve the optimal moisture balance for wound healing. The wound was cleansed with an antimicrobial solution and covered with a low adherent dressing. After two weeks of treatment, the wound had healed.

Evaluate

Over the 2-week period, this grade 1 small dehiscence had progressed to healing. The wound closed quickly after the surgical staples were removed at week 2 and stayed approximated [*Figure 6*] with no drainage observed.

The dehisced surgical wounds T.I.M.E. CDST enhanced confidence in decisionmaking, reduced the need to seek assistance from specialist nurses and may enable more consistent use of the formulary.

Case 3: Grade 2 (subcutaneous tissues) dehisced surgical wound

Assess patient, wellbeing and wound This case describes a 63-year-old male with a Grade 2 (subcutaneous tissues) dehisced surgical wound on his abdomen [*Figure 7*], measuring 12cm (length) x 2.5cm (width) x 6cm (depth).

The patient had type 2 diabetes, hypertension and coronary artery disease and was morbidly obese. The patient had had his appendix removed and the wound had dehisced 4 days after surgery.

The wound had been present for 12 days at initial presentation. The wound was painful (4 out of 10 on a VAS scale) and the patient was no longer able to conduct activities of daily living. He was prescribed a tablet containing hydrocodone 10mg and acetaminophen 325mg as needed, and according to local pain management policy.

Bring in multidisciplinary team and informal carers to promote holistic patient care The surgical team consulted with a medical doctor weekly and the patient visited the wound care centre twice a week during the evaluation period.

The patient continued to visit the diabetes team to support his glycaemic management and support from Home Health nursing services was

available during post-op recovery. Control or treat underlying causes and barriers to wound healing

No other treatments were prescribed during the evaluation period. The patient did not require diabetes medication, but the home health nurse monitored and provided continuous education on diabetes management and nutrition.

If a change in treatment was required, the home health nurse was advised to speak to the primary care physician.

Decide appropriate treatment

Using the dehisced surgical wounds aetiologyspecific T.I.M.E. CDST, the main barriers to healing was identified as non-viable tissue and moisture imbalance.

- T= The wound bed comprised 75% granulation tissue and 25% epithelialising tissue. Exposed subcutaneous tissue was visible
- I= The wound was not initially infected
- M= Moderate levels of exudate were observed, serosanguinous at week 2
- E= The wound edges were healing well, and increased epithelialisation was noted as treatment progressed.

The aims of wound care were to optimise moisture balance, by absorbing drainage and minimising moisture, and to promote healing. The wound was cleansed with saline, loosely filled according to local protocol and covered with a sterile abdominal pad.

At week 2, the decision was made to pack the wound with a silver gelling fibre dressing, due to the increase in serosanguinous exudate.

At week 3, the medical doctor requested a change in treatment and the wound was packed with a 2cm x 3cm absorbent gauze dressing, cut into strips and soaked in an antiseptic solution to loosely fill the wound.

Evaluate

Over the 4-week period, the wound had reduced in size [Figure 8] and now measured 8cm (length) x 2.5cm (width) x 5cm (depth).

The wound comprised 90–100% healthy granulation tissue and the wound edges were epithelialising. The wound was still painful, but it did not affect his ability to conduct activities of daily living.

The dehisced surgical wounds T.I.M.E. CDST supported the clinician with appropriate dressing selection and in their ability to assess tissue type; however, the overriding decisions on treatment were made by the medical doctor, supporting the importance of bringing in the

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Case 4: Grade 4 (deep fascia and organ/implant) dehisced wound.



Figure 9: Initial assessment.



Figure 10: Week 4.

multidisciplinary team.

Case 4: Grade 4 (deep fascia and organ/implant) dehisced wound

Assess patient, wellbeing and wound This case describes a 61-year-old male with type 2 diabetes, venous insufficiency, hypertension and heart disease. The individual had had a left below-the-knee amputation but had fallen and the incision site had dehisced 24 days later.

The Grade 4 (deep fascia and organ/ implant) dehisced wound had been present for 3 months. At initial presentation, the dehiscence measured 2.3cm (length) x 1.2cm (width); bone was visible but not protruding [*Figure 9*].

The patient had no pain and was fairly independent when carrying out activities of daily living, but his ability to drive and walk steadily had been affected post-amputation.

Bring in multidisciplinary team and informal carers to promote holistic patient care

No new referrals were required during the evaluation period, but the patient continued to visit the diabetes team to support his glycaemic management.

Control or treat underlying causes and barriers to wound healing

No other treatments were prescribed during the evaluation period.

Decide appropriate treatment

Using the dehisced surgical wounds aetiologyspecific T.I.M.E. CDST, the main barriers to healing that needed to be addressed were the nonviable tissue, infection and moisture imbalance.

- T= The wound bed was composed of mostly healthy granulation tissue (70–75%) and the remaining tissue was necrotic/sloughy
- I= The wound was showing signs of overt infection and the patient was on systemic antibiotics (levofloxacin 500mg daily)
- M= Low levels of serosanguinous exudate were present

E= Edges were advancing.

The aims of wound care were to debride nonviable tissue, optimise moisture balance, resolve infection and promote wound healing.

The wound was cleansed with a wound cleanser spray, patted dry and SKIN PREP Skin Protectant (liquid film forming protective barrier wipe) was applied to protect the periwound skin. A silver gelling fibre dressing composed of sodium carboxymethylcellulose impregnated with 1.2% ionic silver and an absorbent secondary dressing were applied.

The patient moved to a different area after the first 2 weeks of treatment and was later followed up. Treatment commenced with a calcium alginate silver dressing and an absorbent secondary dressing, as per local protocol.

Evaluate

Over the 4-week period, signs of infection resolved, and the wound reduced in size (0.3cm [length] x 1.8cm [width] x 0.1cm [depth]). The wound bed comprised 100% healthy granulation tissue [*Figure 10*] and the patient reported no pain throughout the evaluation.

The dehisced surgical wounds T.I.M.E. CDST was easy and quick to use and helped the clinician identify the treatment plan based on the tissue type, the level of exudate and whether the wound was epithelialising.

Discussion

Dehisced surgical wounds are a significant issue that affect large numbers of patients and can cause increased mortality, delayed hospital discharge, readmission, further surgery, delayed adjuvant treatment, suboptimal aesthetic outcome and impaired psychosocial wellbeing (WUWHS, 2018). Management should involve a holistic approach that includes (WUWHS, 2018):

- Amelioration of impediments to healing
- Optimising conditions in the wound bed
- Using appropriate treatment modalities to close the wound.

Use of tools, such as the dehisced surgical wounds aetiology-specific T.I.M.E. CDST, have been designed to promote consistent holistic wound management and eliminate variation in practice.

The clinicians in this case series noted that use of the dehisced surgical wounds T.I.M.E. CDST eased decision-making, guided appropriate treatment and reduced the need to seek assistance from specialists. Challenges were faced during this project due to differing schedules between clinicians involved and a lack of regular face-to-face multidisciplinary meetings and reviews.

Conclusion

Tools, such as the T.I.M.E. CDST, can be used as part of a systematic and structured approach to wound management to promote consistent holistic wound management and eliminate variation in practice (WUWHS, 2020).

Declaration This case series has been supported

by Smith & Nephew.

The dehisced surgical wounds aetiologyspecific T.I.M.E. CDST aims to enhance the confidence of non-specialist staff members in decision-making, assessment of tissue type, and identifying infection and abnormal exudate levels.

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