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Definition and Characteristics of Chronic Tissue Injury

A Unique Form of Skin Damage

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ABSTRACT

BACKGROUND: The purpose of this article is to examine the evidence related to a unique phenomenon of purple-maroon discoloration of the buttocks found in homecare patients and to recommend a label for this phenomenon.

CASES: Initially, we searched the literature to identify and retrieve any evidence related to this unique form of purple-maroon discoloration of the buttocks. No evidence was found. To illustrate the condition, we compared 4 cases of what we have labeled chronic tissue injury to 6 patients with purple-maroon discoloration of the buttocks from different causes.

CONCLUSION: Chronic tissue injury is characterized by a persistent purple-maroon discoloration located on the fleshy portion of the buttocks that does not improve or deteriorate. Unlike other causes of purple discoloration such as deep tissue pressure injury, there is minimal change in the discoloration over time. Additional research is needed to further our understanding of the histopathology of this phenomenon.

KEY WORDS: Chronic tissue injury, Chronic wound, Deep tissue pressure injury, Moisture-associated skin damage, Skin failure, Venous ulcers.

INTRODUCTION

Understanding the etiology of various forms of skin damage is necessary for accurate assessment and classification. For example, pressure injury categories have clinically relevant regulatory and cost implications.[1,2] Misidentification can lead to inconsistent and inaccurate benchmarking, ineffective treatment, and inaccurate use of resources.

Through our combined 35 years of homecare nursing experience, we have reviewed thousands of homecare patients' medical records with a form of skin injury of the buttocks that did not resemble any known skin injury category. The injury was noted to be a purple-maroon discoloration of the fleshy buttocks present for a long period. The area of damaged skin sometimes included superficial abraded skin or small open lesions. Anecdotal conversations with expert WOC nurses practicing in the homecare setting corroborated our observations. Given the absence of a recognized label for this phenomenon, WOC nurses must arbitrarily choose a wound type, resulting in inconsistent classification, even among wound care experts. In addition, acute care and homecare clinicians, who are required to classify wounds due to regulatory requirements, are also confused as to how to categorize this tissue injury.[3]

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All clinicians must accurately identify wound type to guide management, comply with federal regulations, and achieve reimbursement.[2] Choosing the wound type may be limited by the terminology available in the organization's electronic medical record system. For example, home health clinicians must classify wounds using the Outcomes and Assessment Information Set (OASIS). We have found that clinicians typically label these unique purple-maroon lesions as Stage 1 or Stage 2 pressure injury (PI), deep tissue pressure injury (DTPI), skin failure, moisture-associated skin damage, trauma, or inflammatory lesions. The purpose of this article is to examine evidence related to chronic tissue injury, present a case series of individuals with chronic tissue injury compared to patients with similar characteristics of the buttocks, and recommend a new label for this unique phenomenon.

LITERATURE REVIEW

We completed a focused literature review using the CINAHL and MEDLINE databases with no language, time, or date of publication limiters. The key search words included suspected deep tissue pressure injury, pressure, moisture-associated skin damage, skin failure, friction injury, purple, venous, venous pooling, venous engorgement, recliner butt, and chronic tissue injury. We limited our search to articles published in the English language. Based on these inclusion/exclusion criteria, we retrieved and reviewed 41 abstracts and selected 9 articles that were read in full. We also reviewed current wound textbooks, National Pressure Ulcer Advisory Panel clinical resources, and the Federal Guidance Manual for homecare.

In addition to the literature search, 2 expert WOC nurses (M.F.M. and B.J.R.) reviewed medical records of patients from our home healthcare agency with evidence of this phenomenon. This review was approved by UnityPoint at Home nursing

administration, UnityPoint at Home compliance officers, and UnityPoint Health Director of Ethics; study procedures were determined to be exempt from individual informed consent.

Our literature review identified no evidence of a unique form of skin damage presenting as chronic purple-maroon discoloration of the buttocks. Although this discoloration frequently coexists with other skin injuries, we assert this injury is unique and requires further investigation.

CASE SELECTION

Based on the lack of published evidence, we monitored our practice for patients who presented with purple-maroon discoloration of the buttocks that was inconsistent with other typical skin injuries located in this area of the body. The skin damage is characterized by a typically bilateral, purple-maroon discoloration of the fleshy buttocks that does not improve or deteriorate over time. We selected 4 cases that exemplify this unique phenomenon and compared them to other skin injuries (Table 1). Cases were typically chair-bound adults whose prime seating choice was a recliner chair. Our experience indicates that many homecare patients sit and sleep in a favored recliner chair for long periods. Thus, the term "recliner butt" is often used by homecare WOC nurses to describe this form of skin damage. We acknowledge that we need a term that better characterizes the cause of this unique skin damage.

Chronic Tissue Injury

Chronic tissue injury (CTI) is a distinct form of skin damage affecting the buttocks. It presents as purple-maroon discoloration with thinning of the epidermis, with or without open skin injury. Chronic tissue injury is located on the fleshy portion of the buttocks and not necessarily over a bony prominence. The distinguishing factor is that CTIs do not innately improve or deteriorate into partial or full-thickness injury.

The etiology of CTI is unknown, rendering differential diagnosis difficult. It may occur with other skin injuries. Table 2 summarizes 4 patients with CTI, and Table 3 describes 7 cases of patients with other forms of unique skin damage that may be confused with CTI.

Chronic Tissue Injury Versus Friction Skin Injury

Our understanding of friction and pressure injuries has advanced in recent years.[4-7] Friction is defined as the force that resists the motion created when surfaces (such as the skin and recliner surface) slide against each other.[7] In contrast, the term "pressure" is a measure of force that exists when the skin is compressed between a bony prominence and a surface such as a chair or bed, whereas shear is the force created when layers of skin are laterally shifted against one another.[6] Berke[4] observed that friction skin injuries (FSIs) are located on the rounded portion of the buttocks but not over a bony prominence. She postulated that because aging skin is thinner and may have less sensation, it may be more susceptible to friction injury.[4] Friction skin injuries are characterized by lichenification and skin ridging; they may be full thickness, and are amenable to treatment. Descriptions of FSI do not include skin discoloration.[4,6]

In summary, while both CTI and FSI occur on the fleshy buttocks, CTI has a distinct purple-maroon discoloration visible over time. In addition, while the thinned epidermal tissue of the CTI is easily damaged with friction forces, CTI lacks the lichenification and ridging of FSI (Table 3, Case 5).

Chronic Tissue Injury Versus Moisture-Associated Skin Damage

Moisture-associated skin damage (MASD) is characterized by inflammation and erosion of the epidermis resulting from prolonged exposure to various sources of bodily secretions or effluent.[8-12] As its name implies, MASD is characterized by excessive exposure to moisture such as perspiration, incontinence, or wound exudate that may not be present with CTI. In addition, CTI has a characteristic purple-maroon discoloration whereas the inflammation of MASD tends to be bright red or a subtler red in persons with darker skin tones. Unlike MASD, CTI is not frequently associated with secondary cutaneous infections (Table 3, Case 6).

Chronic Tissue Injury Versus Venous Discoloration

Venous pooling or venous engorgement has been suggested as a possible etiologic factor in the development of CTI.[13] Nevertheless, the pathophysiology and clinical relevance of venous pooling and engorgement are not well understood. Given this gap in evidence, it is not possible to conclusively link the purple-maroon discoloration of CTI to venous pooling. Similarly, hemosiderosis, defined as a reddish-brown black pigmentation discoloration of the skin as a result of extravasated red blood cells and subsequent release of iron into the tissue in patients with venous disease, has also been suggested as a possible contributor to the discoloration of CTI (Table 3, Cases 7 and 8).[14,15]

Both CTI and venous engorgement are characterized by a purplish discoloration of the skin. Patients with CTI are typically chair-bound, possibly creating venous pooling in the trunk owing to prolonged time in a seated position with the

TABLE 1.
Differential Assessment of Various Forms of Skin Damage

Type of Injury	Distinguishing Differences
Friction skin injury	No purple or purple-maroon discoloration, presents with lichenification and ridges
Moisture-associated skin damage	Presents with erythema and not purple-maroon discoloration
Stage 1 pressure injury	Nonblanchable erythema, no purple-maroon discoloration
Stage 2 pressure injury	No purple-maroon discoloration, partial-thickness skin loss over bony prominence
Deep tissue pressure injury	Similar skin discoloration, occurs over a bony prominence; variable trajectory of deterioration or healing
Venous pooling/engorgement	Purple-maroon discoloration of chronic tissue injury is located on fleshy buttocks
Venous disease/hemosiderin	Reddish brown discoloration of skin over lower extremities
Skin failure	Tissue necrosis associated with multisystem organ failure seen at end of life
Trauma	Variable discoloration of skin due to blunt force trauma

TABLE 2.
Chronic Tissue Injury: Cases 1 to 4

Case 1
A 72-y-old man with chronic kidney disease, diabetes, and back pain, and urinary incontinence. He had an unsteady gait and used a walker but sits and sleeps in a recliner chair. Assessment revealed deep purple-maroon discoloration and thinned epidermal tissue of bilateral fleshy buttocks with small open lesions. These small lesions were scattered, and intermittently opened. The purple-maroon discoloration did not worsen or improve during his 6 months in homecare.

Case 2
An 88-y-old woman with heart failure and osteoarthritis. She was occasionally incontinent of urine. She spent the majority of her day sitting in a recliner with her legs elevated to decrease lower extremity edema. Assessment revealed a purple-maroon discoloration on bilateral inner and fleshy buttocks with thinned epithelium. The discoloration was originally thought to a cutaneous candida infection and friction injury.

Case 3
A 75-y-old man with obesity, diabetes mellitus, and dual urinary and fecal incontinence. He spent the majority of waking hours in a recliner chair due to generalized weakness limiting his mobility. Skin assessment revealed a deep purple-maroon discoloration of the bilateral fleshy buttocks with thinned epidermal tissue. The buttocks had similar appearance 6 months later.

Case 4
A 79-y-old man with chronic pain, obesity, and diabetes mellitus. He was frequently incontinent of urine and occasionally experienced fecal incontinence. He spent the majority of his waking hours in a recliner chair. Skin assessment revealed a purple-maroon discoloration with thin, fragile epidermal tissue initially noted on admission to our homecare service. A similar area of skin damage was noted during several readmissions to homecare. The small partial-thickness lesions intermittently open and heal. This area of skin damage retained a similar appearance over a period of 2 y.

extremities elevated. However, there is insufficient evidence to conclude that the purple discoloration of CTI is similar to the pathophysiologic mechanisms seen in patients with chronic venous disease of the lower extremities.[14,15]

Chronic Tissue Injury Versus Pressure Injury

Pressure injury occurs as a result of "intense and/or prolonged pressure or pressure in combination with shear."[1(p586)] These forces create an ischemia/reperfusion injury that may or may not result in an open wound. Stage 1 PI is a localized area of nonblanchable erythema.[1] The National Pressure Ulcer Advisory Panel states that the color change seen with a stage 1 PI does not include purple or maroon. Stage 2 PIs are characterized by partial-thickness skin loss with exposed dermis.[1] In contrast, CTI is characterized by small areas of skin loss that does not occur over bony prominences. In addition, Stage 2 pressure does not have the purple-maroon discoloration of CTI.

Unlike Stage 1 or 2 pressure injuries, DTPIs are characterized by purple discoloration of affected skin. However, the discoloration of DTPI appears as deeper violet hue, which may reflect the intense the tissue load posited to cause DTPI (Table 3, Case 9).[16,17] In addition, DTPI follows a variable course of deterioration or healing whereas the severity of CTI persists over time.[18] Deep tissue pressure injury is often associated with pain not seen in our patients with CTI.

Chronic Tissue Injury and Skin Failure

Skin failure is defined as death of the skin and underlying tissues due to poor blood circulation occurring in a context of multisystem organ failure (Table 3, Case 10).[19-21] In contrast, CTI persists over time, is not characterized by tissue necrosis, and occurs in patients with stable chronic health conditions who are not at end of life.

Chronic Tissue Injury and Trauma

Contusion, commonly referred to as bruising, is a common form of skin damage caused by blunt force trauma and leakage of blood leaking into local tissues. The discoloration of a contusion varies from deep purple to light red or even yellow that is located over the area of trauma. Case 11 (Table 3)

TABLE 3.
Other Forms of Skin Damage Affecting the Buttocks: Cases 5 to 11

Case 5: Friction skin injury
An 86-y-old woman with chronic obstructive pulmonary disease oxygen dependent. Urinary incontinence, fecal continence. She spent the majority of her waking and sleeping hours seated in a lift chair. Skin assessment revealed a mild purple-maroon discoloration of tissue, with abraded area typical of friction skin injury. The friction skin injury and discoloration resolved within several weeks following intervention.

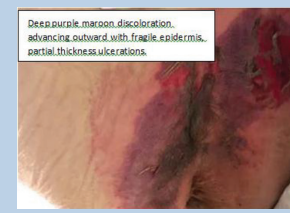
Case 6: Moisture-associated skin damage
A 65-y-old man was admitted to our homecare service following discharge from hospital for treatment for pneumonia. He was incontinent of urine and stool upon admission, had generalized weakness and limited mobility. He spent the majority of waking hours in a chair. Skin assessment revealed partial-thickness skin loss and tissue discoloration of bilateral buttocks and linear gluteal cleft upon admit to homecare. This area of skin damage resolved within a week of treatment for incontinence. Assessment showed no discoloration of tissue following resolution of skin injury.

Case 7: Chronic venous disease
A 75-y-old woman with chronic venous disease, diabetes mellitus, and coronary artery disease. Skin assessment revealed discoloration of the lower extremity typical of hemosiderin staining associated with venous disease.

Case 8: Possible venous pooling
A 78-y-old woman with obesity, diabetes mellitus, coronary artery disease, and dual urinary and fecal incontinence. She spent the majority of her waking hours seated in a recliner chair. Skin assessment revealed a deep purple discoloration of the inner thighs and labia present upon admission to our homecare service. This area did not involve the fleshy buttocks. The purple discoloration persisted during several homecare episodes that spanned 2 y.

Case 9: Deep tissue pressure injury
A 67-y-old woman with debilitating neurological disease rendering her bedbound. She was managed with an indwelling urinary catheter. She preferred a side-lying position and developed extensive reddened area with intact deep purple discoloration over the trochanter bony prominence. The area subsequently deteriorated into eschar and a full-thickness pressure injury.

Case 10: Skin failure
An 85-y-old woman admitted to hospice for end-of-life care occurring in a context of an advanced state malignancy. She was bedbound at this point in her care and had an indwelling urinary catheter. She was not incontinent of stool. She developed a sudden onset of erythema with central purple-maroon discoloration and skin loss encompassing large area of the buttocks and sacral area. She died within a week following the onset of this lesion.



Case 11: Blunt force trauma
A 78-year-old man with atrial fibrillation managed by anticoagulant therapy, generalized weakness with limited mobility, and urinary incontinence. He spent the majority of his waking hours in a chair. He fell at home and developed a subsequent purple discoloration of unilateral buttock. His skin remained intact and discoloration subsequently resolved over a period of approximately 2 wk.

summarizes a patient with a contusion of the buttocks. We have observed that many of our homecare patients are on anticoagulant drug therapy, which may create bruising even with minimal trauma. In contrast, we have found that patients with CTI do not have a history of trauma and CTI persists over time, while contusions normally heal within 2 weeks.[6]

CONCLUSION

Based on our clinical experience and observations, we recommend using the term chronic tissue injury for the purple-maroon discoloration located on the fleshy portion of the buttocks. These injuries are characterized by thinned epidermal tissue, with or without open skin injury, that persist over time. While CTIs share some similarities with a variety of other skin injuries, we assert that its etiology and pathophysiology are unique. Nevertheless, we further acknowledge that additional research is needed to increase our knowledge of this clinically relevant phenomenon.

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KEY POINTS

- Chronic tissue injury is a purple-maroon discoloration of the fleshy portion of the buttocks that persists over time, with or without open skin injuries.
- Chronic tissue injury is commonly misidentified as friction injury, moisture-associated skin damage, venous engorgement, pressure injury, skin failure, and trauma.
- Further consensus and research are needed to elucidate its etiology, histopathologic characteristics, assessment, prevention, and management.

REFERENCES

1. Edsberg LE, Black JM, Goldberg M, McNichol L, Moore L, Sieggreen M. Revised national pressure ulcer advisory panel pressure injury staging system: revised pressure injury staging system. *J Wound Ostomy Continence Nurs*. 2016;4(6):585-597.
2. Centers for Medicare & Medicaid Services. OASIS-C2 2018 Guidance Manual.https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/HHQIOASISUserManual.html. Accessed October 7, 2018.
3. Savage E, Lebovitz S, Delmore B. 50 Shades of Purple: A Reference Guide for Identifying Purple Discoloration. Paper presented at: WOCN® Society & CAET Joint Conference; June 4-8, 2016; Montreal, Quebec, Canada.
4. Berke CT. Pathology and clinical presentation of friction injuries. *J Wound Ostomy Continence Nurs*. 2015;42(1):47-61.
5. National Pressure Ulcer Advisory Panel. Terms and definitions related to support surfaces. http://www.npuap.org/wp-content/uploads/2012/03/NPUAP_S3I_TD.pdf. Published 2007. Accessed January 20, 2018.
6. Pieper B. Pressure ulcers: impact, etiology, and classification. In: Bryant RA, Nix DP, eds. *Acute & Chronic Wounds: Current Management Concepts.* 4th ed. St Louis, MO: Mosby Inc; 2012.
7. Brienza D, Antokal S, Herbe L, et al. Friction-induced skin injuries—are they pressure ulcers? *J Wound Ostomy Continence Nurs*. 2015;42(1):62-64.
8. Gray M, Black JM, Baharestani MM, et al. Moisture-associated skin damage: overview and pathology. *J Wound Ostomy Continence Nurs*. 2011;38(3):233-241.
9. Woo K, Beeckman D, Chakravarthy D. Management of moisture-associated skin damage: a scoping review. *Adv Skin Wound Care*. 2017;30(11):494-500.
10. Beeckman D. A decade of research on incontinence-associated dermatitis (IAD): evidence, knowledge gaps and next steps. *J Tissue Viability*. 2017;26:47-56.
11. Voegli D. Moisture-associated skin damage: aetiology, prevention and treatment. *B J Nurs*. 2012;21(9);517-521.
12. Gray M, McNichol LL, Nix DP. Incontinence-associated dermatitis: progress, promises, ongoing challenges. *J Wound Ostomy Continence Nurs*. 2016;43(2):188-192.
13. Black JM, Brindle CT, Honaker JS. Differential diagnosis of suspected deep tissue injury. *Intl Wound J*. 2016;13(4):531-539.
14. Johnson J, Yates SS, Burgess J. Venous insufficiency, venous ulcers and lymphedema. In: Doughty D, McNichol L, eds. *WOCN® Core Curriculum: Wound Management*. Philadelphia, PA: Wolters Kluwer; 2016:383-419.
15. Carmel JE, Bryant RA. Venous ulcers. In: Bryant RA, Nix DP, eds. *Acute & Chronic Wounds: Current Management Concepts*. 4th ed. St Louis, MO: Mosby Inc; 2012.
16. Gefen A, Farid K, Shaywitz I. A review of deep tissue injury development, detection, and prevention: shear savvy. *Ostomy Wound Manage*. 2013;59(2):26-35.
17. Wilson M, Simman R. Unusual presentation of deep tissue injuries: a case series. *Wounds*. 2018;30(10):306-309.
18. Zaratkiewicz S, Whitney JD, Baker MW, Lowe JR. Defining unstageable pressure ulcers as full-thickness wounds: are these wounds being misclassified? *J Wound Ostomy Continence Nurs*. 2015;42(6):583-588.
19. Levine JM. Skin failure: an emerging concept. *J Am Med Dir Assoc*. 2016;17(7):666-669.
20. Alvarez OM, Brindle CT, Langemo D, et al. The VCU Pressure Ulcer Summit: The Search for a Clearer Understanding and More Precise Clinical Definition of the Unavoidable Pressure Injury. *J Wound Ostomy Continence Nurs*. 2016;43(5):455-463.
21. Langemo D, Brown G. Skin fails too: acute, chronic, and end-stage skin failure. *Adv Skin Wound Care*. 2016;19(4):206-212.

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