

MANAGEMENT OF PRESSURE SORES

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Learning Objectives

1. Definitions
2. Epidemiology
3. Pathophysiology
4. Risk factors
5. Grades/ Clinical manifestations
6. Treatment options
7. Take home
8. References

Definition

- localized soft-tissue injury resulting from unrelieved pressure,
- usually over a bony prominence.
- Also commonly referred to as pressure injury, bedsore or decubitus ulcer.
- Commonest sites include; sacrum, ischial tuberosities, greater trochanters and the calcaneum

Epidemiology

- Incidence is variable among different regions.
- Studies been focused on acute care settings, nursing home patients, and paraplegic
- Data from National Pressure Ulcer Advisory Panel (NPUAP)
 - ✓ Approximately 9% of all hospitalized patients
 - ✓ Affects 2.5 million people annually
 - ✓ Overall prevalence 3.5% and 29.5% for acute and long-term care respectively
 - ✓ over 60,000 deaths per year

Epidemiology cont...

- ▣ Studies at CHUK Intensive care unit, Rwanda (Gideon Mutabazi , Jessie Silver: 2015)
 - ✓ 41 patients enrolled, 3 months.
 - ✓ 27% arrived with preexisting ulcers
 - ✓ 15% developed new ulcers during their ICU stay
 - ✓ No pre-existing ulcers notably worsened in severity in the ICU
 - ✓ new onset ulcers showed a maximum severity of Stage 2

Epidemiology cont...

- ▣ Other studies have also indicated:
 - ✓ 20% incidence in paraplegic patients
 - ✓ 26% incidence in patients who were quadriplegic.
 - ✓ Up to 75% of all pressure sores are located around the pelvic girdle.

Pathophysiology

Compression of local tissues



(external pressure exceeds the capillary pressure)

Ischemia



(If pressure not relieved)

Necrosis and ulceration

Pressure highest on the bone surface.

Necrosis: Muscle



subcutaneous



Skin

Risk factors

INTRINSIC FACTORS

- Age >65 years
- Male gender
- Cacaasian
- Diabetes
- Metastatic carcinoma
- Malnutrition
- Anemia
- Smoking

EXTRINSIC FACTORS

- Urinary incontinence
- Fecal incontinence
- Uncontrolled fistulae
- Perspiration
- Shear and friction forces

Grading of pressure sores

- I : Intact skin with non-blanchable redness of a localized area
- II: Partial-thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed
- III: Full-thickness tissue loss. Subcutaneous fat may be visible but bone, tendon, and muscle are not exposed
- IV: Full-thickness tissue loss with exposed bone, tendon, or muscle

Stage: I



Intact skin with non-blanchable redness of a localized area usually over a bony. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

Stage: II



Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

Stage: III



Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscles are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

Stage: IV



Full thickness tissue loss with exposed tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often includes undermining tunneling.

Suspected Deep Tissue Injury^a

Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft from pressure and/or shear. The area may be preceded tissue that is painful, firm, ushy, boggy, warmer or cooler as compared to adjacent tissue.

Unstageable^a

Full thickness tissue loss in which the base of the ulcer is covered by (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.



Treatment of pressure sores

- ▣ Management goals:
 - ✓ Prevention of complications (invasive infection from existing sore)
 - ✓ preventing the existing sore from getting larger
 - ✓ preventing sores in other locations
 - ✓ closure of the wound (If possible).

The Waterlow score

WATERLOW PRESSURE ULCER PREVENTION/TREATMENT POLICY

RING SCORES IN TABLE, ADD TOTAL. MORE THAN 1 SCORE/CATEGORY CAN BE USED

BUILD/WEIGHT FOR HEIGHT	◆	SKIN TYPE VISUAL RISK AREAS	◆	SEX AGE	◆	MALNUTRITION SCREENING TOOL (MST) (Nutrition Vol. 15, No. 6 1999 – Australia)		
AVERAGE BMI = 20–24.9	0	HEALTHY	0	MALE	1	A – HAS PATIENT LOST WEIGHT RECENTLY YES – GO TO B NO – GO TO C UNSURE – GO TO C AND SCORE 2	B – WEIGHT LOSS SCORE	
ABOVE AVERAGE BMI = 25–29.9	1	TISSUE PAPER DRY	1	FEMALE	2		0.5–5kg = 1 5–10 kg = 2 10–15 kg = 3 >15kg = 4 unsure = 2	
OBESSE BMI >30	2	OEDEMATOUS	1	14–49	1	C – PATIENT EATING POORLY OR LACK OF APPETITE ‘NO’ = 0; ‘YES’ SCORE = 1	NUTRITION SCORE	
BELOW AVERAGE BMI <20	3	CLAMMY, PYREXIA	1	50–64	2		If > 2 refer for nutrition assessment / intervention	
BMI = Wt(kg)/Ht(m) ²		DISCOLOURED GRADE 1	2	65–74	3			
		BROKEN/SPOTS GRADE 2–4	3	75–80	4			
				81+	5			
CONTINENCE		MOBILITY		SPECIAL RISKS				
COMPLETE/CATHETERISED URINE INCONT. FAECAL INCONT. URINARY + FAECAL INCONTINENCE	0 1 2 3	FULLY RESTLESS/FIDGETY	0	TISSUE MALNUTRITION	◆	NEUROLOGICAL DEFICIT		◆
		APATHETIC	1	TERMINAL CACHEXIA	8	DIABETES, MS, CVA		4–6
		RESTRICTED	2	MULTIPLE ORGAN FAILURE	8	MOTOR/SENSORY PARAPLEGIA (MAX OF 6)		4–6
		BEDBOUND	3	SINGLE ORGAN FAILURE (RESP, RENAL, CARDIAC)	5	MAJOR SURGERY or TRAUMA		4–6
		e.g. TRACTION	4	PERIPHERAL VASCULAR DISEASE	5	ORTHOPAEDIC/SPINAL		5
		e.g. WHEELCHAIR	5	ANAEMIA (Hb < 8)	2	ON TABLE > 2 HR#		5
				SMOKING	1	ON TABLE > 6 HR#		8
SCORE				MEDICATION – CYTOTOXICS, LONG TERM/HIGH DOSE STEROIDS, ANTI-INFLAMMATORY MAX OF 4				
10+ AT RISK								
15+ HIGH RISK								
20+ VERY HIGH RISK								

#Scores can be discounted after 48 hours provided patient is recovering normally

Figure 2 The Waterlow score. (Copyright | Waterlow 2005. With kind permission.)

Pre-operative management

- Nutrition
 - ✓ Evaluate nutritional status of patient.
 - ✓ serum albumin maintained above 2.0 g/dL.
 - ✓ adequate supply of micronutrients (zinc, calcium, iron, copper) , and vitamins A and C.
 - ✓ Daily requirement of 1.5 to 3.0 g/kg/d of protein to restore lost lean body mass, and 25 to 35 cal/kg of non-protein

Pre-operative management

- Infection
- ✓ Bacterial counts increase in compressed areas
- ✓ Possible sources of infection include pulmonary, urinary tract bacterial seeding.
- ✓ In-dwelling catheters and self catheterization cause sepsis in 1/3 of paraplegics.
- ✓ removal of all nonviable tissue is the essential first step.
- ✓ Specimen should be sent to the microbiology (c&s, quantitative culture)

Pre-operative management

- ✓ Delay closure if presence of β haemolytic streptococci or bacterial counts of more than 10^5 CFU/g of tissue
- ✓ Associated osteomyelitis: eradication of bone infection through resection of devitalized bone
- ✓ Appropriate intravenous antibiotics for cellulitis or osteomyelitis
- ✓ topical antimicrobials such as silver sulfadiazine, mafenide acetate, and buffered Dakin's solution used as adjuncts to surgery in the process of clearing infection.

Pre-operative management

- Relief of pressure.
- ✓ healing will not occur in the presence of ischemia
- ✓ Relieving the pressure over a bony prominence for 5 minutes every 2 hours
- ✓ Adjuncts include dynamic and static pressure-reducing support surfaces, such as foam, wheelchair cushions, specialized mattresses, cushions, and mattress overlays.
- ✓ During surgery- Heel floating, intermittent scalp massages by anaesthesia staff

Pre-operative management

- Spasms
- ✓ common in patients with spinal cord injuries
- ✓ The more proximal the lesion, the higher the incidence of spasm
- ✓ Treatment of muscle spasticity implemented prior to surgery
- ✓ Rx include baclofen, diazepam, and dantrolene.
- ✓ Botulinum toxin found to reduce localized spasticity in limbs
- ✓ Surgical treatment- peripheral nerve blocks, epidural stimulators, baclofen pumps, Rhizotomy

Pre-operative management

- Contractures
- ✓ common in bedridden patients
- ✓ Commonly affects hip flexors
- ✓ contribute to the formation of trochanteric, knee, ankle ulcers
- ✓ Treatment prior to surgery reduces recurrence
- ✓ Rx- physical therapy, tenotomies

Pre-operative management

- Managing any Comorbidities
 - ✓ Diabetes
 - ✓ Smoking
 - ✓ peripheral vascular disease, and cardiovascular disease
 - ✓ Hb A1c greater than 6% associated with both dehiscence and recurrence
 - ✓ Fecal soilage of the wound- alteration of bowel routine, diverting colostomy

Operative Management

- Goals
- ✓ To provide soft-tissue coverage of the pressure sore defect
- ✓ maintaining as many options as possible for future use (Recurrence rates up to 91%)
- ✓ Primary closure should be avoided
- ✓ Skin grafting has been attempted with limited success- indicated in acute illnesses
- ✓ Coverage with a musculocutaneous or fasciocutaneous flaps give the best results

Operative Management

- Debridement
- ✓ removes necrotic tissue
- ✓ decreases the bacterial count
- ✓ cavity can be painted with a dilute solution of methylene blue and hydrogen peroxide to help define the cavity and leave a visual guide for excision.
- ✓ specimens of viable tissue sent for quantitative culture, c&s
- ✓ wound packed and dressings changed every 6 to 8 hours

Operative Management

- Closure

Choice of surgery will depend on:

- ✓ Location
- ✓ Size and depth of the ulcer
- ✓ Previous surgeries performed
- ✓ Ambulatory status of patient

Name:

Surname:

Pressure Sore Assessment Form

Demographics : Gender and Age

Male	+ 1	14 – 49 Years	+ 1
		49 – 65 Years OR 5 – 14 Years	0
Female	0	65 – 80 Years OR < 5 Years	- 1
		> 80 Years	- 2

Score :

Score :

Nutrition : Albumin and Haemoglobin
Note : Investigations not done automatically score - 2

Albumin > 35	+1	Hb > 10 g/dl	+ 1
Albumin 30 – 35	0	Hb 7 – 10 g/dl	0
Albumin 20 – 30	- 1	Hb 5 – 7 g/dl	- 1
Albumin < 20	- 2	Hb < 5 g/dl	- 2

Score :

Score :

Mobility : Arm Strength and Activity Level

Unassisted Lift and Turn	+1	Caliper or Chair mobile	+ 1
Single Assistant	0	Bed Bound	0
Team Assist	- 1	GCS 9 – 14	- 5
No Effort from Patient	- 2	GCS < 9	- 10

Score :

Score :

Mobility : Contractures and Spasms

No Contractures	+1	No Spasms	+ 1
Upper Limb Contractures	- 2	Occasional Spasms	0
Lower Limb Contractures	- 5	Frequent Spasms	- 1
Upper and Lower Limbs	- 10	Fasciculation	- 2

Score :

Score :

Psychology and Support Structures

Motivated, Educated and Compliant	+1	Educated caregivers available full time	+ 1
Poor Education	- 1	Part time caregivers	0
Poor Motivation	- 1	Institutionalized	- 1
Previous Poor Compliance	- 2	No home	- 2

Score :

Score :

Continence : Urine and Faeces

Continent or Self Intermittent Clean Catheterization	+1	Continent or Intermittent Constipation & Washout	+ 1
Condom Catheter	0	Stoma	0
Diversion or Indwelling	- 1	Incontinent	- 1
Incontinent	- 2	Doubly Incontinent EXTRA	- 1

Score :

Score :

General Condition : Health Modifiers and Wound Bed

Smoking	- 1	Clean and Healing	+ 1
Systemic Infection (UTI etc)	- 2	Clean but no change	0
Diabetes OR PVD	- 2	Slough or Eschar	- 1
Cytotoxics or Steroids	- 2	Active Infection	- 2

Score :

Score :

TOTAL SCORE : ___ / 13
FLAP CANDIDATES : 10 OR MORE
POSSIBLE CANDIDATES : 7 – 9
POOR CANDIDATES : < 7

Name:

Surname:

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Team Assist	- 1	GCS 9 – 14	- 5
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Upper Limb Contractures	- 2	Occasional Spasms	0
Lower Limb Contractures	- 5	Frequent Spasms	- 1
Upper and Lower Limbs	- 10	Fasciculation	- 2

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Poor Education	- 1	Part time caregivers	0
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Score :

Score :

TOTAL SCORE : ___ / 13**FLAP CANDIDATES : 10 OR MORE****POSSIBLE CANDIDATES : 7 – 9****POOR CANDIDATES : < 7**

Operative Management

MUSCULOCUTANEOUS FLAP

- Excellent blood supply and bulky padding
- effective in treating infected wounds

Disadv.

- Functional deformity in ambulatory patients
- lack of bulk in the elderly and in spinal cord patients.

FASCIOCUTANEOUS FLAP

- adequate blood supply
- durable coverage
- Minimal potential for a functional deformity

Disadv

- limited bulk for treatment of large ulcers.



Figure 3 Closure of a sacral grade IV pressure ulcer using a gluteal rotation flap. Cavity extent is marked with methylene blue prior to thorough

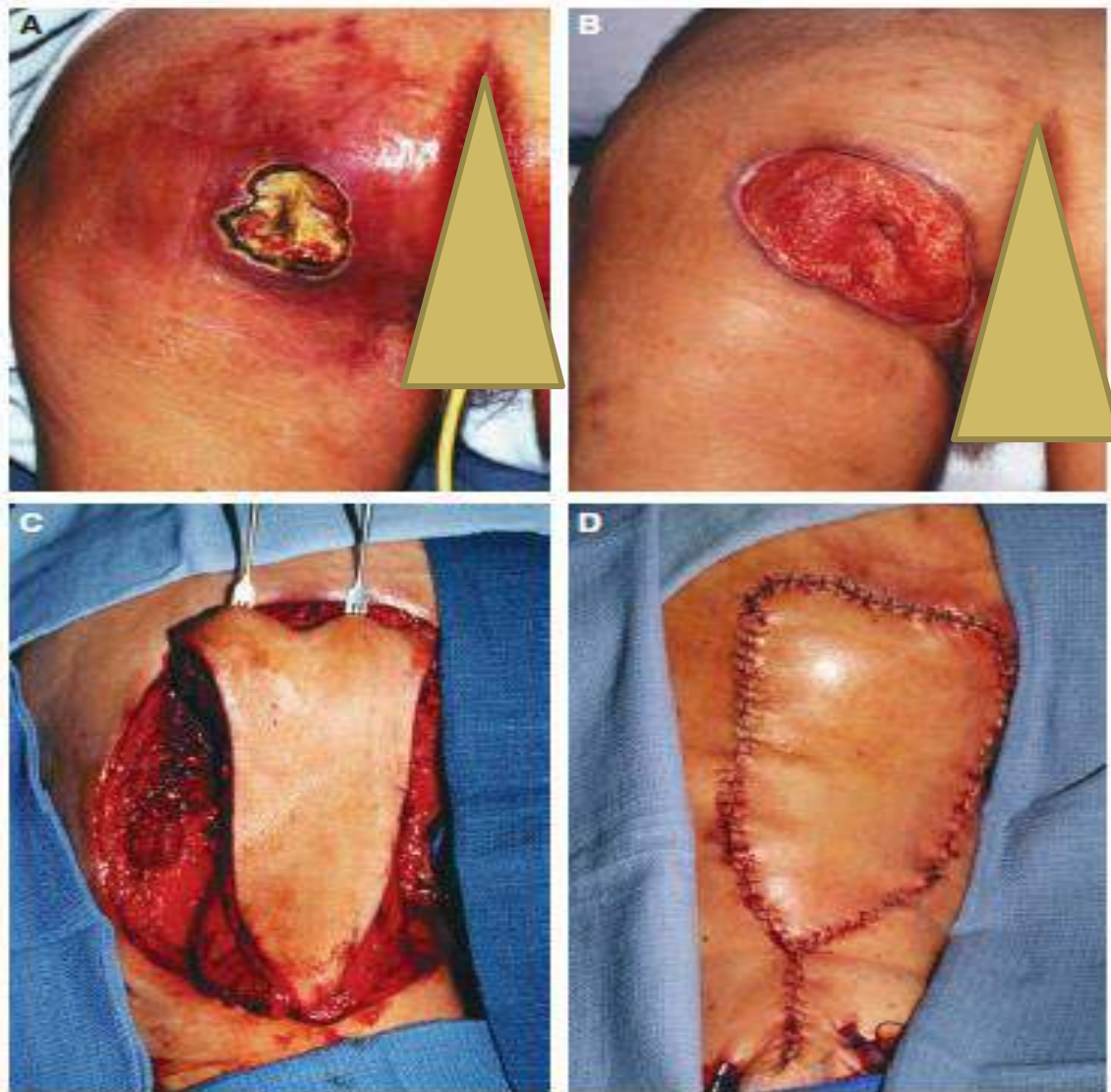


Fig. 12E-10 **A**, The wound had necrosis without granulation, and there was surrounding cellulitis. The first step was aggressive debridement and treatment of the cellulitis. **B**, After 2 weeks of dressing changes and preoperative optimization, a healthy, granulating wound could be seen without cellulitis. Note the true size of the defect as the thin overlying skin was resected and the bursa exposed. **C**, Reconstruction of the defect with a V-Y advancement. The flap is being advanced beyond the visible defect so some deepithelialization can be performed and the cavity filled with viable tissue, obliterating dead space. **D**, Flap inset. The V-Y closure has the advantage of supporting the flap in its new position, taking tension off the inset. (Case supplied by MRZ.)



Figure 4 Closure of an ischial pressure ulcer with a tens or fascia lata (TFL) fasciocutaneous flap. The pressure ulcer is debrided prior to raising the TFL flap which is then rotated into place. The resulting defect is closed with a split skin graft.

Post-operative management

- ✓ Many of pre-op considerations continue.
- ✓ control of urine and stool- colostomy in some cases
- ✓ Drains placed intra-operatively to remove serous fluid and to aid in apposition of the flaps to the wound bed
- ✓ Broad spectrum IV antibiotics continued peri-op
- ✓ Patients kept in the postoperative position,

Post-operative management

- ✓ No pressure allowed on the surgical site for 2 to 3 weeks.
- ✓ Turning every 2 hours
- ✓ Use of low-air-loss mattresses when available.
- ✓ Patient's wheelchair evaluation to ensure a proper fit and pressure distribution
- ✓ Gradual reseating
- ✓ 30 minutes the first day and then adds a 0.5-hour increment daily if tolerated without compromise of the surgical site

Nonsurgical Treatment

- ✓ Non-operative treatment if ulcer healing well
- ✓ Some patients may never be candidates for surgical correction because of significant medical problems
- ✓ Debridements, NPWTs

Take home

- ✓ Pressure sores is a preventable pathology.
- ✓ Recognition of 'at-risk' patients and the introduction of preventative measures is the mainstay of treatment.
- ✓ Prevention requires a lot of commitment from the patient, caretakers as well as the nursing and medical team.
- ✓ Once the pressure sores have formed, they are not usually very easy to treat and hence the need for proper preventive measures.

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Thank you all 😊