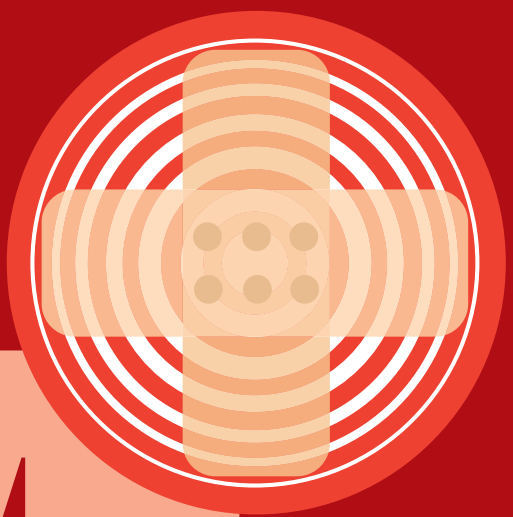
HOLISTIC MANAGEMENT OF WOUND-RELATED PAIN

AN OVERVIEW OF THE EVIDENCE AND RECOMMENDATIONS FOR CLINICAL PRACTICE



APPENDICES

AAWC Association for the Advancement of Wound Care
WoundsAustralia
The European Wound Management Association EWMA

Appendices

Appendix 1: Pain Assessment Tools

Numerous representations

There are numerous representations of the NRS, VRS and VAS rating scale are available in the public domain. Below are examples of these.[76]

Numerical rating scale

Ask the patient on a scale of 0-10, where 0=no pain and 10=worst pain, to choose a number that best places his/her current level of pain

Verbal rating scale

Ask the patient which word best desribes his/her current level of pain

Visual analogue scale

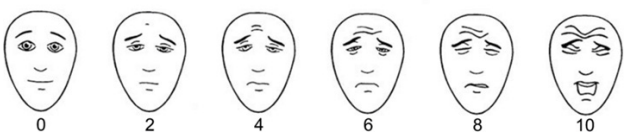
Ask the patient to pick up a point on the continuum that best reflects how she/he is feeling

Faces Pain Scales

Wong-Baker FACES Scale[198]

Ask the patient to choose a face that best describes how he/she is feeling

Faces Pain Scale – Revised[103]



Brief Pain Inventory[199]

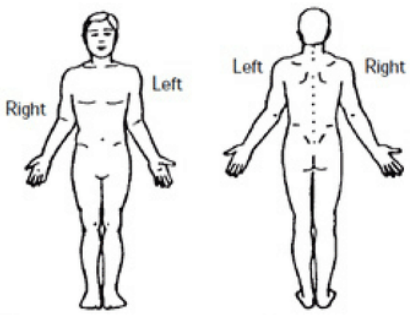
Date: _____ /_____ /_____ Time: _____

Name: _____ _____ _____
Last First Middle intial

1) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?

   1. Yes 2. No

2) On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



3) Please rate your pain by circling the one number that best describes your pain at its **worst** in the past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

4) Please rate your pain by circling the one number that best describes your pain at its **least** in the past 24 hours.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

5) Please rate your pain by circling the one number that best describes your pain on **average**.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

6) Please rate your pain by circling the one number that tells how much pain you have **right now**.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

7) What treatments or medications are you receiving for your pain?

   _____

   _____

8) In the past 24 hours, how much **relief** have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

0%	10	20	30	40	50	60	70	80	90	100%
No relief										Complete relief

9) Circle the one number that describes how, during the past 24 hours, pain has **interfered** with your:

   A. General activity

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   B. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   C. Walking ability

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   D. Normal work (includes both work outside the home and housework)

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   E. Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   F. Sleep

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

   G. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

SHORT-FORM McGILL PAIN QUESTIONNAIRE

PATIENT'S NAME: _____ **DATE:** _____

	NONE	MILD	MODERATE	SEVERE
THROBBING	0) _____	1) _____	2) _____	3) _____
SHOOTING	0) _____	1) _____	2) _____	3) _____
STABBING	0) _____	1) _____	2) _____	3) _____
SHARP	0) _____	1) _____	2) _____	3) _____
CRAMPING	0) _____	1) _____	2) _____	3) _____
GNAWING	0) _____	1) _____	2) _____	3) _____
HOT-BURNING	0) _____	1) _____	2) _____	3) _____
ACHING	0) _____	1) _____	2) _____	3) _____
HEAVY	0) _____	1) _____	2) _____	3) _____
TENDER	0) _____	1) _____	2) _____	3) _____
SPLITTING	0) _____	1) _____	2) _____	3) _____
TIRING-EXHAUSTING	0) _____	1) _____	2) _____	3) _____
SICKENING	0) _____	1) _____	2) _____	3) _____
FEARFUL	0) _____	1) _____	2) _____	3) _____
PUNISHING-CRUEL	0) _____	1) _____	2) _____	3) _____

P P I

0	NO PAIN	_____
1	MILD	_____
2	DISCOMFORTING	_____
3	DISTRESSING	_____
4	HORRIBLE	_____
5	EXCRUCIATING	_____

The short-form McGill Pain Questionnaire (SF-MPQ). Descriptors 1-11 represent the sensory dimension of pain experience and 12-15 represent the affective dimension. Each descriptor is ranked on an intensity scale of 0 = none, 1 = mild, 2 = moderate, 3 = severe. The Present Pain Intensity (PPI) of the standard long-form McGill Pain Questionnaire (LF-MPQ) and the visual analogue scale (VAS) are also included to provide overall intensity scores.

Coping Strategies Questionnaire[201]

ONE- AND TWO-ITEM VERSIONS OF THE COPING STRATEGIES QUESTIONNAIRE (CSQ)

Instructions: Individuals who experience pain have developed a number of ways to cope, or deal with, their pain. These include saying things to themselves when they experience pain, or engaging in different activities. Below is a list of things that people have reported doing when they feel pain. For each activity, please indicate, using the scale below, how much you engage in that activity when you feel pain, where a 0 indicates you never do that when you are experiencing pain, a 3 indicates you sometimes do that when you are experiencing pain, and a 6 indicates you always do it when you are experiencing pain. Remember, you can use any point along the scale.

---

0 1 2 3 4 5 6

Never do — Sometimes do that — Always do that

When I feel pain...

Single-item CSQ:

1. I think of things I enjoy doing.....0 1 2 3 4 5 6
2. I just think of it as some other sensation, such as numbness 0 1 2 3 4 5 6
3. It is terrible and I feel it is never going to get any better 0 1 2 3 4 5 6
4. I don't pay any attention to it 0 1 2 3 4 5 6
5. I pray for the pain to stop 0 1 2 3 4 5 6
6. I tell myself I can't let the pain stand in the way of what I have to do 0 1 2 3 4 5 6
7. I do something active, like household chores or projects 0 1 2 3 4 5 6

Two-item CSQ scales consist of the above plus the following:

8. I replay in my mind pleasant experiences in the past 0 1 2 3 4 5 6
9. I pretend it is not a part of me 0 1 2 3 4 5 6
10. I feel I can't stand it anymore 0 1 2 3 4 5 6
11. I ignore it 0 1 2 3 4 5 6
12. I try to think years ahead, what everything will be like after I've gotten rid of the pain 0 1 2 3 4 5 6
13. I see it as a challenge and don't let it bother me 0 1 2 3 4 5 6
14. I do something I enjoy, such as watching TV or listening to music 0 1 2 3 4 5 6

Scoring instructions: Items 1, 2, 3, 4, 5, 6, and 7 represent the CSQ Diverting Attention, Reinterpreting Pain Sensations, Catastrophizing, Ignoring Sensations, Praying or Hoping, Coping Self-Statements, and Increased Behavioral Activities scales, respectively. The respondent's rating for each of these items is the score for that scale. Items 8, 9, 10, 11, 12, 13, and 14 are the second items in each of the CSQ scales, respectively. Scores for the two-item CSQ scales are the averages of the two items on each scale.

Abbey Pain Scale

For measurement of pain in people with dementia who cannot verbalise

How to use scale: While observing the resident, score questions 1 to 6

Name of resident:

Name and designation of person completing the scale:

Date: Time:

Latest pain releif given was: at hours

Q1. Vocalisation
eg. whipering, groaning, crying

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q1** ☐

Q2. Facial Expression
eg. looking tense, frowning, grimacing, looking frightened

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q2** ☐

Q3. Change in Body Language
eg. fidgeting, rocking, guarding part of body, withdrawn

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q3** ☐

Q4. Behavioural Change
eg. increased confusion, refusing to eat, alteration in usual patterns

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q4** ☐

Q5. Physiological Change
eg. temperature, pulse or blood pressure outside normal limits, perspiring, flushing or pallor

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q5** ☐

Q6. Physical Changes
eg. skin tears, pressure areas, arthritis, contractures, previous injuries

Absent - 0 Mild - 1 Moderate - 2 Severe - 3 **Q6** ☐

- **Add scores for 1 - 6 and record here:** **Total pain score** ☐
- **Now tick the box that matches the Total**

☐ **0-2 - No Pain** ☐ **3-7 - Mild** ☐ **8-13 - Moderate** ☐ **14+ - Severe**

- **Finally tick the box which matches the type of pain**

☐ **Chronic** ☐ **Acute** ☐ **Acute on Chronic**

The Pain Assessment in Advanced Dementia (PAINAD) scale[58]

Items	0	1	2	SCORE
Breathing (Independent of vocalization)	Normal	Occasional labored breathing. Short period of hyperventilation.	Noisy labored breathing. Long period of hyperventilation. Cheyne-stokes respirastions.	
Negative vocalization	None	Occasional moan or groan. Low level of speeech with a negative or disapproving quality.	Repeated troubled calling out. Loud moaning or groaning. Crying.	
Facial expression	Smiling or inexpressive	Sad, frightened, frown.	Facial grimacing.	
Body language	Relaxed	Tense. Distressed pacing. Fidgeting.	Rigid. Fists clenched. Knees pulled up. Pulling or pushing away. Striking out.	
Consolability	No need to console	Distracted or reassured by voice or touch.	Unable to console, distract or reassure.	
TOTAL				

Douleur Neuropathique 4. Screening tool for neuropathic pain[202]

DN4© QUESTIONNAIRE

Please complete this questionnaire by ticking one answer for each item in the 4 questions below.

Patient Name:

Date:

	yes = 1 point	no = 0 points
INTERVIEW OF THE PATIENT	yes	no
QUESTION 1		
Does the pain have one or more of the following characteristics?		
1. Burning	☐	☐
2. Painful cold	☐	☐
3. Electric shocks	☐	☐
QUESTION 2		
Is the pain associated with one or more of the following symptoms in the same area?		
4. Tingling	☐	☐
5. Pins and needles	☐	☐
6. Numbness	☐	☐
7. Itching	☐	☐
EXAMINATION OF THE PATIENT		
QUESTION 3		
Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?		
8. Hypoesthesia to touch	☐	☐
9. Hypoesthesia to pinprick	☐	☐
QUESTION 4		
In the painful area, can the pain be caused or increased by:		
10. Brushing	☐	☐

If the patients score is greater than or equal to 4, the test indicates that your patient is likely to be suffering from neuropathic pain (sensitivity: 83%; specificity: 90%), and further assessment is recommended.[1]

Patient's Score: / 10

1. Bouhassira D et al Pain. 2005; 114(1-2):29-36.

The LANSS Pain Scale[82,83]

THE LANSS PAIN SCALE
Leeds Assessment of Neuropathic Symptoms and Signs

NAME_____ **DATE** _____

This pain scale can help to determine whether the nerves that are carrying your pain signals are working normally or not. It is important to find this out in case different treatments are needed to control your pain.

A. PAIN QUESTIONNAIRE

- Think about how your pain has felt over the last week.
- Please say whether any of the descriptions match your pain exactly.

1) Does your pain feel like strange, unpleasant sensations in your skin? Words like pricking, tingling, pins and needles might describe these sensations.

a) NO - My pain doesn't really feel like this ..... (0)

b) YES - I get these sensations quite a lot ..... (5)

2) Does your pain make the skin in the painful area look different from normal? Words like mottled or looking more red or pink might describe the appearance.

a) NO - My pain doesn't affect the colour of my skin ..... (0)

b) YES - I've noticed that the pain does make my skin look different from normal ..... (5)

3) Does your pain make the affected skin abnormally sensitive to touch? Getting unpleasant sensations when lightly stroking the skin, or getting pain when wearing tight clothes might describe the abnormal sensitivity.

a) NO - My pain doesn't make my skin abnormally sensitive in that area ..... (0)

b) YES - My skin seems abnormally sensitive to touch in that area ..... (3)

4) Does your pain come on suddenly and in bursts for no apparent reason when you're still. Words like electric shocks, jumping, and bursting describe these sensations.

a) NO - My pain doesn't really feel like this ..... (0)

b) YES - I get these sensations quite a lot ..... (2)

5) Does your pain feel as if the skin temperature in the painful area has changed abnormally? Words like hot and burning describe these sensations

a) NO - I don't really get these sensations ..... (0)

b) YES - I get these sensations quite a lot ..... (1)

B. SENSORY TESTING

Skin sensitivity can be examined by comparing the painful area with a contralateral or adjacent non-painful area for the presence of allodynia and an altered pin-prick threshold (PPT).

1) ALLODYNIA (Pain caused by something that normally would not cause pain)

Examine the response to lightly stroking cotton wool across the non-painful area and then the painful area. If normal sensations are experienced in the non-painful site, but pain or unpleasant sensations (e.g., tingling, nausea) are experienced in the painful area when stroking, allodynia is present.

a) NO, normal sensation in both areas ..... (0)

b) YES, allodynia in painful area only ..... (5)

2) ALTERED PIN-PRICK THRESHOLD

Determine the pin-prick threshold by comparing the response to a 23 gauge (blue) needle mounted inside a 2 ml syringe barrel placed gently on to the skin in a non-painful and then painful areas.

If a sharp pin prick is felt in the non-painful area, but a different sensation is experienced in the painful area (e.g., none/blunt only [raised PPT] or a very painful sensation [lowered PPT]), an altered PPT is present.

If a pinprick is not felt in either area, mount the syringe onto the needle to increase the weight and repeat.

a) NO, equal sensation in both areas ..... (0)

b) YES, altered PPT in painful area ..... (3)

SCORING:

Add values in parentheses for sensory description and examination findings to obtain overall score.

TOTAL SCORE (maximum 24) .....

If score <12, neuropathic mechanisms are **unlikely** to be contribution to the patient's pain.

If score ≥12, neuropathic mechanisms are **likely** to be contribution to the patient's pain.

Appendix 2: Summary Table of Evidence for Pain Assessment (Rayyan Project)

Authors, Year	Aim / Purpose of Systematic Review/ Outcomes	Interventions / phenomena of interest	Databases sourced and searched	Types of Studies Included	Participant details	No. of studies included	Date range of database searching	Pain assessment tools used	Summary of results / findings	Context / Setting / Geographical location of studies included
De Laat E, Scholte op Reimer W, Van Achterberg T [53]	Literature search on pressure ulcers and the treatment of pain, malodour and exudate	The diagnosis of pain, malodour and exudate in patients with pressure ulcers	Medline, CINAHL, and Cochrane	Descriptive studies, cross-sectional, randomised double-blind, placebo controlled crossover trial for PU pain. RCTs for PU exudate	Pressure Ulcers	13	1991-2004	VAS, Faces Rating Scale (FRS), McGill Pain Questionnaire (MPQ)	The MPQ the VAS and FRS are useful instruments to assess pressure ulcer related pain. Wound malodour is subjectively assessed. Pressure Sore Status Tool is a valid and reliable instrument for assessing the wound healing process	Not indicated
Herber O, Schnepp W, Rieger M [54]	To describe or measure the impact of leg ulceration on patients' QoL	Assessment of Quality of life	MEDLINE via PubMed, and CINAHL	11x quantitative studies 11x qualitative studies and 2x mixed methods studies	Patients with venous leg ulcers or mixed aetiology	24	1990 -2006	Short-Form Health Survey (SF-36), Nottingham Health Profile (NHP); Life Satisfaction Index; Hospital Anxiety & Depression Scale; Health Locus of Control Scale, NPRS; SF-MPQ	Pain was considered the worst individual item that affects QoL. Leg ulcer patients suffered pain more often than controls. Aetiology of the wounds had an effect on pain experience. Patients with arterial ulcers had more often severe pain than patients with VLU´s whereas males experienced more pain than females. In terms of QoL wound related pain influenced physical activities and caused sleeping problems.	UK, Germany, New Zealand, USA, Brazil

Authors, Year	Aim / Purpose of Systematic Review/ Outcomes	Interventions / phenomena of interest	Databases sourced and searched	Types of Studies Included	Participant details	No. of studies included	Date range of database searching	Pain assessment tools used	Summary of results / findings	Context / Setting / Geographical location of studies included
									Coping strategies were employed to reduce pain and wound prevention. The level of pain prevented physical activities. Activities of daily living such as preparing meals or carrying out housework were impeded for the majority of patients This study revealed psycho-social, mobility, economical problems of having chronic ulcerations and the treatment of the wounds	UK, Germany, New Zealand, US, Brazil
Purcell A, Buckley T, King J, Moyle W, Marshall A [55]	To examine the effectiveness of topical analgesic and topical local anaesthetic for reducing pain in chronic leg ulcers	Topical local anaesthetics lidocaine or prilocaine and topical analgesic agents such as ketamine, nonsteroidal anti-inflammatory drugs, opioids, tricyclic antidepressants (amitriptyline), or capsaicin on participants with chronic leg ulcers	MEDLINE, EMBASE, CINAHL, Joanna Briggs Institute, PubMed, and the Cochrane Library, and hand searched international consensus documents and position statements	19x RCTs, 1x quasi-experimental study, 2x crossover studies and 1x retrospective observational medical record review	Patients with chronic leg ulcers with wound related pain	23	January 1990 to August 2019	NRS, VAS, VRS, and numeric box scale. For topical anaesthetic agents studies - the visual analogue scale was the predominant pain assessment tool	The findings related to topical analgesic and topical local anaesthetic agents for the relief of chronic leg ulcer pain indicate that topical agents (except for morphine gel) are effective. The only topical formulations used as primary dressings for chronic leg ulcer pain have been ibuprofen foam and morphine gel, and rarely, lidocaine/prilocaine cream.	The majority of studies (n = 20) were conducted in Europe, most commonly in Sweden (n=5)

Authors, Year	Aim / Purpose of Systematic Review/ Outcomes	Interventions / phenomena of interest	Databases sourced and searched	Types of Studies Included	Participant details	No. of studies included	Date range of database searching	Pain assessment tools used	Summary of results / findings	Context / Setting / Geographical location of studies included
Gutierrez Y, Pourali S, Kohn A, Jones M, Rajkumar J, Armstrong A [57]	To synthesize and interpret the evidence on topical opioid use for skin diseases and to discuss their practical use in dermatology. Systematic review	Topical opioids included in this review were topical morphine and diamorphine. Common formulations consisted of 0.2–10 mg of opioid compounded with hydrogel or IntraSite gel. Investigated the frequency of application for pain management in skin diseases	PubMed, Embase, and Cochrane	11x RCT, 2x non randomised interventional studies, 1x retrospective cohort study Specifically studies on chronic ulcers: 6x RCT, 2x non-RCT, 1x retrospective cohort study	n=263 chronic ulcerative lesions (pressure ulcers n = 4 studies, venous and/or arterial ulcers n = 3 studies, or ulcers of various aetiologies (n=2 studies) which included traumatic, malignant, cellulitis, and necrotic angiodermatitis. Burns (n=2 studies) oral lichen planus (n=1 study), photodynamic therapy associated pain (n=1 study), Split-thickness skin grafts n=1 study	14	1980–2021	Pain intensity scores measured by the VAS, or the NRS were the primary outcome measures in 10 of 12 included studies. Other assessment tools included the Brief Pain Inventory-Pain Scale (BPI-PS) and the Likert scale from 1–4 (none, mild, moderate, severe, overwhelming)	Topical opioid use in individuals with pressure ulcers has the potential of minimizing the use of systemic opioids. However no statistical improvement in pain was found for venous or arterial ulcers nor in the various aetiologies ulcer category when topical opioid was used. Literature is mixed regarding the efficacy of topical opioid use in non-pressure ulcers, oral lichen planus, PDT, and STSG,	Inpatient palliative care, India. Outpatient dermatology and primary care clinics, Sweden, Department of Dermatology, Germany Outpatient dermatology clinic, Netherlands, Inpatient oncology department, Italy. Inpatient dermatology department, France. Hospice Care, UK. Inpatient Hospice, UK, Outpatient university hospital, Germany, University Hospital Burn Center, Sweden. Outpatient Dermatology Department, Denmark, Emergency department, United Kingdom. Inpatient Burn Center, US

Authors, Year	Aim / Purpose of Systematic Review/ Outcomes	Interventions / phenomena of interest	Databases sourced and searched	Types of Studies Included	Participant details	No. of studies included	Date range of database searching	Pain assessment tools used	Summary of results / findings	Context / Setting / Geographical location of studies included
Da Costa Ferreira S, Sena González C, Thum M, Da Costa Faresin A, Woo, De Gouveia Santos V[56]	To map and synthesise the existing literature on topical therapies for Malignant fungating wound (MFW) pain management and identify the existing gaps. This was a scoping review.	Topical therapies identified included analgesic drugs, antimicrobial substances, dressings, negative pressure therapy and cryotherapy	CINAHL (EBSCO), LILACS (VHL Regional Portal), Embase, Scopus, Web of Science, Medline (PubMed), Cochrane, NICE, JBISRIR, as well as unpublished studies on the Open Access Scientific Repository (Canada), Canadian Dissertation and Thesis Portal, Thesis Doctorales Database - Teseo (Spain), CAPES Thesis Bank (Brazil), Google Scholar (including Textbooks and Congress Proceedings), and the European Thesis and Dissertation Database-Dart-E	Non systematic reviews, RCT, case studies, survey, control trials, systematic reviews, guidelines, cohorts	Cancer patients	70	No time limit was applied	Visual Analogue Scale, Numerical Verbal Scale, McGill's Questionnaire and the assessment by categories (no pain, weak, moderate and severe)	The topical therapies with positive results were lidocaine/ prilocaine 2.5%, morphine gel 0.2% as analgesics, metronidazole 0.8% solution and polyhexamethylene biguanide (PHMB) with betaine 0.1% solution, octenidine solution, honey and silver as antimicrobials. The combination of topical therapies on the wound bed, periwound skin and the application of techniques of dressing change aiming at pain prevention can potentially improve the painful experience in people with MFWs	England, US, Portugal, Spain, Poland, Switzerland, Canada, France, Scotland, Australia, New Zealand, China, Brazil

Appendix 3: Detailed Search Strategy for the Narrative Review for Pain Assessment Tools

Search Strategy (Medline)

#	Searches	Results
1	Pain Measurement/	94085
2	"Surveys and Questionnaires"/	550039
3	Nursing Assessment/	29092
4	(pain adj2 assessment*).mp.	11160
5	(pain adj2 tool*).mp.	1644
6	(pain adj2 score*).mp.	43975
7	(pain adj2 questionnaire*).mp.	6955
8	(pain adj2 survey*).mp.	1028
9	(pain adj2 measure*).mp.	102333
10	(pain adj2 scale*).mp.	20941
11	(pain adj2 instrument*).mp.	618
12	(pain adj2 chart*).mp.	188
13	(pain adj2 appraisal*).mp.	152
14	(pain adj2 indicat*).mp.	3628
15	(pain adj2 self report*).mp.	3860
16	(pain adj2 check list*).mp.	11
17	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	708670
18	Pain/	148584
19	Chronic Pain/	21136
20	Nociceptive Pain/	957
21	Pain Perception/	3127
22	pain*.mp.	917889
23	18 or 19 or 20 or 21 or 22	917889
24	"Wounds and Injuries"/	81078
25	Wound Healing/	104199
26	Ulcer/	15184
27	wound*.mp.	439094
28	ulcer*.mp.	283841
29	coloni?* wound*.mp.	177
30	contamin* wound*.mp.	762
31	infect* wound*.mp.	3805
32	coloni?* ulcer*.mp.	426
33	contamin* ulcer*.mp.	4
34	infect* ulcer*.mp.	423
35	24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	698112
36	23 and 35	45935
37	17 and 36	7193
38	validate*.mp.	475899
39	validation.mp.	348866
40	validating.mp.	23246
41	38 or 39 or 40	738100
42	37 and 41	246
43	from 42 keep 3, 7, 16, 19-20, 29-31, 35...	30
44	limit 37 to (clinical trial, all or guideline or meta analysis or observational study or randomized controlled trial or "systematic review" or validation study)	2856
45	limit 44 to humans	2807
46	limit 45 to english language	2691
47	46 not 42	2591
48	exp Lower Extremity/	182887
49	lower limb*.mp.	61081
50	lower extremit*.mp.	79492
51	48 or 49 or 50	264009
52	47 not 51	2474
53	from 52 keep 19, 31, 89, 155, 210, 299...	19
54	43 or 53	49

Search Strategy (Embase)

#	Searches	Results
1	Pain Measurement/	10882
2	"Surveys and Questionnaires"/	848888
3	Nursing Assessment/	27433
4	(pain adj2 assessment*).mp.	102131
5	(pain adj2 tool*).mp.	2425
6	(pain adj2 score*).mp.	67675
7	(pain adj2 questionnaire*).mp.	11621
8	(pain adj2 survey*).mp.	1572
9	(pain adj2 measure*).mp.	30466
10	(pain adj2 scale*).mp.	32511
11	(pain adj2 instrument*).mp.	826
12	(pain adj2 chart*).mp.	302
13	(pain adj2 appraisal*).mp.	215
14	(pain adj2 indicat*).mp.	5432
15	(pain adj2 self report*).mp.	5347
16	(pain adj2 check list*).mp.	14
17	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	1038350
18	Pain/	350156
19	Chronic Pain/	73251
20	Nociceptive Pain/	2158
21	Pain Perception/	44477
22	pain*.mp.	1607118
23	18 or 19 or 20 or 21 or 22	1615978
24	"Wounds and Injuries"/	175818
25	Wound Healing/	136028
26	Ulcer/	44390
27	wound*.mp.	436113
28	ulcer*.mp.	403196
29	coloni?* wound*.mp.	227
30	contamin* wound*.mp.	893
31	infect* wound*.mp.	4902
32	coloni?* ulcer*.mp.	668
33	contamin* ulcer*.mp.	10
34	infect* ulcer*.mp.	662
35	24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	963441
36	23 and 35	113505
37	17 and 36	13377
38	validate*.mp.	696526
39	validation.mp.	526596
40	validating.mp.	32176
41	38 or 39 or 40	1065484
42	37 and 41	654
43	limit 37 to (clinical trial, all or guideline or meta analysis or observational study or randomized controlled trial or "systematic review" or validation study) [Limit not valid in Embase; records were retained]	3496
44	limit 43 to humans	3436
45	limit 44 to english language	3320
46	45 not 42	3219
47	exp Lower Extremity/	458284
48	lower limb*.mp.	109390
49	lower extremit*.mp.	92100
50	47 or 48 or 49	545956
51	46 not 50	3040
52	limit 1 to ("remove medline records" and embase database only)	489
53	limit 2 to ("remove medline records" and embase database only)	132652
54	limit 3 to ("remove medline records" and embase database only)	146
55	limit 4 to ("remove medline records" and embase database only)	21037

#	Searches	Results
56	limit 5 to ("remove medline records" and embase database only)	339
57	limit 6 to ("remove medline records" and embase database only)	9725
58	limit 7 to ("remove medline records" and embase database only)	1809
59	limit 8 to ("remove medline records" and embase database only)	195
60	limit 9 to ("remove medline records" and embase database only)	3270
61	limit 10 to ("remove medline records" and embase database only)	5261
62	limit 11 to ("remove medline records" and embase database only)	98
63	limit 12 to ("remove medline records" and embase database only)	34
64	limit 13 to ("remove medline records" and embase database only)	23
65	limit 14 to ("remove medline records" and embase database only)	754
66	limit 15 to ("remove medline records" and embase database only)	497
67	limit 16 to ("remove medline records" and embase database only)	3
68	limit 17 to ("remove medline records" and embase database only)	161237
69	limit 18 to ("remove medline records" and embase database only)	54401
70	limit 19 to ("remove medline records" and embase database only)	15690
71	limit 20 to ("remove medline records" and embase database only)	559
72	limit 21 to ("remove medline records" and embase database only)	7909
73	limit 22 to ("remove medline records" and embase database only)	329099
74	limit 23 to ("remove medline records" and embase database only)	330554

#	Searches	Results
75	limit 24 to ("remove medline records" and embase database only)	32163
76	limit 25 to ("remove medline records" and embase database only)	25319
77	limit 26 to ("remove medline records" and embase database only)	7300
78	limit 27 to ("remove medline records" and embase database only)	79555
79	limit 28 to ("remove medline records" and embase database only)	82004
80	limit 29 to ("remove medline records" and embase database only)	33
81	limit 30 to ("remove medline records" and embase database only)	121
82	limit 31 to ("remove medline records" and embase database only)	892
83	limit 32 to ("remove medline records" and embase database only)	81
84	limit 33 to ("remove medline records" and embase database only)	2
85	limit 34 to ("remove medline records" and embase database only)	127
86	limit 35 to ("remove medline records" and embase database only)	183816
87	limit 36 to ("remove medline records" and embase database only)	25235
88	limit 37 to ("remove medline records" and embase database only)	2505
89	limit 38 to ("remove medline records" and embase database only)	95441
90	limit 39 to ("remove medline records" and embase database only)	92606
91	limit 40 to ("remove medline records" and embase database only)	4067
92	limit 41 to ("remove medline records" and embase database only)	158491
93	limit 42 to ("remove medline records" and embase database only)	88

#	Searches	Results
94	limit 43 to ("remove medline records" and embase database only)	635
95	limit 44 to ("remove medline records" and embase database only)	627
96	limit 45 to ("remove medline records" and embase database only)	573
97	limit 46 to ("remove medline records" and embase database only)	564
98	limit 47 to ("remove medline records" and embase database only)	58585
99	limit 48 to ("remove medline records" and embase database only)	19675
100	limit 49 to ("remove medline records" and embase database only)	14107
101	limit 50 to ("remove medline records" and embase database only)	78132
102	limit 51 to ("remove medline records" and embase database only)	537
103	from 93 keep 21, 28, 43, 50-51, 62, 65...	9
104	from 102 keep 104, 337	2
105	103 or 104	11

Search Strategy (PsycINFO)

#	Searches	Results
1	Pain Measurement/	2509
2	Surveys/	13228
3	exp Questionnaires/	24776
4	exp Measurement/	506765
5	(pain adj2 assessment*).mp.	3528
6	(pain adj2 tool*).mp.	610
7	(pain adj2 score*).mp.	3059
8	(pain adj2 questionnaire*).mp.	5067
9	(pain adj2 survey*).mp.	596
10	(pain adj2 measure*).mp.	18969
11	(pain adj2 scale*).mp.	6645
12	(pain adj2 instrument*).mp.	219
13	(pain adj2 chart*).mp.	30
14	(pain adj2 appraisal*).mp.	151
15	(pain adj2 indicat*).mp.	1176
16	(pain adj2 self report*).mp.	1372
17	(pain adj2 check list*).mp.	9
18	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	529426
19	Pain/	30348
20	Chronic Pain/	15452
21	Pain Perception/	11330
22	pain*.mp.	134458
23	19 or 20 or 21 or 22	134458
24	exp Wounds/	1408
25	wound*.mp.	12840
26	ulcer*.mp.	4461
27	coloni?* wound*.mp.	9
28	contamin* wound*.mp.	2
29	infect* wound*.mp.	22
30	infect* ulcer*.mp.	1
31	24 or 25 or 26 or 27 or 28 or 29 or 30	17017
32	23 and 31	1885
33	18 and 32	378
34	validate*.mp.	70539
35	validation.mp.	59780
36	validating.mp.	7612
37	34 or 35 or 36	121327
38	33 and 37	29
39	from 38 keep 4-5, 10	3
40	from 33 keep 2, 29, 75, 89, 107, 119...	11
41	39 or 40	13

Search Strategy (CINAHL)

#	Query	Limiters/Expanders	Results
S17	S15 AND S16	Search modes - Boolean/ Phrase	407 *(16 Results Identified)*
S16	validate* OR validation OR validating	Search modes - Boolean/ Phrase	493,631
S15	S11 AND S12 AND S13	Limiters - English Language; Human Search modes - Boolean/ Phrase	2,810
S14	S11 AND S12 AND S13	Search modes - Boolean/ Phrase	3,908
S13	S9 OR S10	Search modes - Boolean/ Phrase	166,340
S12	S7 OR S8	Search modes - Boolean/ Phrase	379,050
S11	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Search modes - Boolean/ Phrase	777,963
S10	wound* OR ulcer*	Search modes - Boolean/ Phrase	166,340
S9	(MH “Wounds and Injuries”) OR (MH “Wounds, Chronic”) OR (MH “Fungating Wounds”) OR (MH “Wounds, Penetrating”) OR (MH “Surgical Wound Dehiscence”)	Search modes - Boolean/ Phrase	36,209
S8	pain*	Search modes - Boolean/ Phrase	379,050
S7	(MH “Pain”)	Search modes - Boolean/ Phrase	81,507
S6	(MH “Questionnaires”)	Search modes - Boolean/ Phrase	466,005
S5	(MH “Surveys”)	Search modes - Boolean/ Phrase	161,656
S4	pain assessment tool* OR pain scale* OR pain measue* or pain assessment* OR pain rating scale* OR pain questionnaire* OR pain survey*	Search modes - Boolean/ Phrase	38,581
S3	(MH “McGill Pain Questionnaire”)	Search modes - Boolean/ Phrase	2,156
S2	(MH “Clinical Assessment Tools”)	Search modes - Boolean/ Phrase	194,500
S1	(MH “Pain Measurement”)	Search modes - Boolean/ Phrase	52,194

Appendix 4: Summary Table of Evidence for pain assessment tools (Narrative Review)

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Dallam L, Smyth C, Jackson BS, Krinsky R, O'Dell C, Rooney J, Badillo C, Amella E, Ferrara L, Freeman K[104]	US	To determine the perceived intensity and patterns of pressure ulcer pain in hospitalised patients.	Cross sectional study	N = 132 59% female Mean age 71.4 (SD 16.4)	Pressure ulcer stage 1–4		VAS (0 –10) Faces Pain Rating scale.	VAS Pain scores significantly and inversely correlated with age (r+-0.36, P<0.02) and positively correlated with maximum pain intensity assessment FRS (r= 0.92, p<0.01). The localised VAS to pressure ulcer sites significantly correlated with Max pressure ulcer stage (r=0.37, p<0.01)	Patients with pressure ulcers have wound related pain, and that this condition is frequently ignored untreated or not treated at all. Evaluation of pain by means of the VAS or FRS reveals that even cognitively impaired patients will express pressure ulcer related or generalised pain
Noonan L & Burge S[71]	UK	To employ validated techniques to measure and characterise the pain associated with leg ulceration of defined causes		n=51 Females 57% VLU duration mean 5.7 yrs (median 1.5yrs) Arterial mean 2.3yrs (median 1.0yrs) Arterial/Venous (AV) ulcers mean 2.8yrs (median 1.0yr) Microvascular ulcers (MV)mean 0.6 years (median 0.5yr)	Leg ulcers: VLU n=38 arterial ulcers n=6 AV n=3 MV n=4	Structured questionnaire. Administered by research nurse at leg ulcer clinic	VRS VAS SF-McGill Questionnaire COOP Chart System	Pain mean score: VLU = 5.88 Arterial/MV/AV 7.23 QoL: VLU 2.89/5, arterial 3.50/5, AV/MV 3.14/5 VLUs are painful. Although pain scores are greater in arterial ulcers, most patients with VLUs suffer at least moderate pain. Night pain disturbed sleep in 73% and pain affected mood in more than 50%. Dressing changes exacerbated pain.	Unidimensional rating scales fail to reflect the complexity of pain.

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Walters SJ, Morrell CJ, Dixon S [91]	UK	To compare the performance of four Health related Quality of Life instruments in measuring HRQoL in patients with venous leg ulcers, in terms of their discriminative and evaluative properties	Survey	There was a good 86% response rate (200/233) at three months to the postal questionnaire There was a 67% response rate (156/233) at 12 months to the postal questionnaire. Median age 75 yrs Females 66.5% Median ulcer duration seven years	VLU below the knee including the foot	Baseline: self-completed questionnaire Demographics completed by interview Postal questionnaires containing the four HRQoL instruments were issued to all patients at 12 weeks, and to all surviving patients one year after recruitment	MOS 36-Item Short-Form Health Survey (SF-36); EuroQol (EQ); Short Form McGill Pain Questionnaire (SF-MPQ) Frenchay Activities Index (FAI).	The SF-MPQ had poorer discriminative properties than the other three instruments and was not able to distinguish between the different patient groups in relation to age and ulcer duration Or between the different patient groups (at initial assessment) in relation to age, mobility and ulcer size For the short term (3-month follow-up), the SF-MPQ appears to have good evaluative properties None of the other tools were sensitive enough (all having small SRMs) to detect the condition-specific changes in health experienced by the patients and could not differentiate between healed and not healed groups of patients Over the longer 12-month period of follow-up more dimensions (on the SF-36 and EQ) were shown to be responsive to the ulcer healing. The FAI had poorer evaluative properties than the other three instruments and did not appear to be very sensitive at detecting differences in changes in HRQoL over time between patients whose ulcer had healed or not	The development and validation of a condition-specific tool for measuring improvement in patients' health, as defined by the patients themselves, would better serve the purpose of discriminating between positive changes attributable to the provision of leg ulcer care and co-existing poor general health The Chronic Venous Insufficiency Questionnaire (CIVIQ) was found to have good discriminative and evaluative properties in patients with venous insufficiency and may prove suitable for measuring changes in quality of life in patients with venous leg ulcers

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Freeman K [105]	US	To better understand the statistical properties of the Faces Rating Scale (FRS) so it can be used appropriately in clinical settings To describe the mathematical relationship between the VAS and the FRS when they are used to quantify pressure ulcer pain in hospitalized elderly patient	Secondary data analyses were performed as part of a cross-sectional study		Pressure ulcer		The VAS used was a 0 to 100 mm horizontal line demonstrated to have ratio scale properties with high validity and reproducibility, and the FRS used was six faces ordered horizontally from smiling to crying, labelled 0 to 5 beneath each face, respectively	The nonlinear relationship indicated high reliability between VAS and FRS for pain assessment in populations with diminished verbal and abstract thinking abilities.	A Faces Rating Scale is a simple measure of assessing pain before and after wound care. The Faces Rating Scale is especially helpful in patients who cannot verbalize their distress
Nemeth KA, Graham ID, Harrison MB [65]	Canada	To identify and compare the psychometric, clinical sensibility, and pain-specific properties of leg ulcer pain assessment tools for use as a guide for clinicians and researchers	Review and appraisal of the literature	Not applicable	Leg ulcers	Databases used: (CINAHL), Psychology/ Sociology (SOCFILE), and Medical Literature Analysis and Retrieval System Online (MEDLINE)	The 54 pain assessment tools identified Five tools met all the inclusion criteria and were subjected to the appraisal process: Pain ruler Numerical Rating Scale Visual Analog Scale Verbal Rating Scale Short Form -McGill Pain Questionnaire	The most commonly unmet criteria were “tool used in different diseases/pain-inducing interventions in adults” (n=41) and “measures quality and/or intensity of pain only”(n=28)	The appraisal revealed that each tool met the psychometric, clinical sensibility, and pain-specific criteria to varying degrees; however, use with individuals with leg ulcers has been limited. No evidence indicates that any of the five tools have been specifically evaluated psychometrically with the leg ulcer population. However, they show promise because they have demonstrated reliability and validity with other populations, despite limited use in individuals with leg ulcers.

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Roth RS, Lowery JC, Hamill JB[34]	US	To examine pain experience among patients with chronic wounds, and determine the relation of wound -related pain to wound stage, affective distress, depressive symptoms, and pain catastrophizing.	Cross-sectional study.	n=69 with spinal cord injuries. All participants were men n=19 who experienced pain associated with their wounds Average age: 59 Average duration of wounds 4.1 months (SD = 4.3 months).	Mixed chronic wounds.	Participants were examined by both a physician and the nurse coordinator as part of the assessment protocol for monitoring wound status. Subjects were seen for a maximum of six visits to monitor changes in their wound status. Pain data were obtained during their first visit .	Numerical Pain Rating Scale, McGill Pain Questionnaire Mood assessment: Brief Symptom Inventory, Center for Epidemiologic Studies Depression Scale Pain catastrophising: catastrophizing scale of the Coping Strategies Questionnaire.	Relative insensitivity of the single pain intensity measure NPRS compared with the MPQ for assessing chronic wound pain. NPRS did correlate significantly with pain catastrophizing, but it did not relate to any of the other pain rating measures. The NPRS was unrelated to measures of depression and distress, an anticipated association that has been commonly observed for patients with chronic pain. The NPRS did not discriminate changes in pain severity across stages of wound severity. A pattern of association was found of pain catastrophizing with pain experience, affective distress, and depressive symptoms. Data suggest that examining for the presence of catastrophizing and providing intervention strategies for its modification may be particularly beneficial for patients being treated for chronic wound pain.	The McGill Pain Questionnaire was more sensitive to pain experience than a single rating of pain intensity. Wound stage was positively related to severity of pain. Pain catastrophizing was positively related to pain intensity and higher levels of affective distress and depressive symptoms. Patients with chronic wound pain present a profile of emotional distress and its relation to maladaptive pain coping that is consistent with the available literature drawn from other populations with pain.

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Barrett S[95]	UK	To evaluate Heal Not Hurt pain assessment and management tool for during dressing changes	Narrative evaluation	Not specified. Evaluation implemented by district nursing team.	Not specified	Not specified No data collection or analysis provided	Heal Not Hurt wound pain assessment and recording tool Included: Faces Rating Scale, Verbal Scale (none, very mild, mild, moderate, severe, very severe) VAS NRS	The tool improved the district nurses level of understanding of both the patients' needs and the way that they had managed pain.	Overall the tools Improved skill in pain management and improved documentation
White RJ[98]	UK	Considers interventions and procedures for managing pain in patients with chronic wounds.	Narrative	Not applicable	Chronic wounds	Not applicable	Key elements of pain assessment include: pain type, nociceptive, neuropathic or mixed; duration; severity; impact of pain on the patient; relief rating: assessment of post-analgesia scores; and identification of treatment-related adverse effects to reduce their impact.	Not applicable	No single pain measuring scale is suitable for all patients; choice is dependent on an individual's need. Once chosen the same scale should be used for subsequent assessments.

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Maida V & Ennis Mand Kuziemsky C[96]	Canada	To formulate a patient-rated assessment tool that facilitates the measurement of pain and polysymptom distress directly related to all classes of wounds	A prospective observational study derived from a sequential case series of patients with advanced illness was carried out to determine the most common symptoms associated with wounds. to develop and pilot a patient -scored assessment tool	Phase 1: n=531 Phase 2 n = 83	Pressure ulcers, traumatic wounds, malignant wounds ostomies, DFU arterial ulcers, iatrogenic wounds, infected wounds	Phase 1: patients were given a list of 9 symptoms and were asked to rank their 3 most severe symptoms. Phase 2: TSAS-W was created by applying 11-point NRSs to the most common wound-related symptoms reported by patients in the initial phase of the study	Toronto Symptom Assessment System for Wounds (TSAS-W) 11 point NRS for all symptoms	Pain with dressing and/or debridement (mean baselined 3.88) mean score 7 days later 3.00) Pain between dressing and/or debridement (3.44 and 2.78)	There is a significant need for assessment tools that measure wound-related pain and symptom issues as reflected by their paucity in the peer-reviewed literature. The availability of these tools, instruments, or questionnaires may serve to promote improvements in clinical assessment and result in improved outcomes, especially when they are completed by the patient. Furthermore, symptom measurement must be carried out regularly and serially. In addition, such tools will also facilitate clinical audit, as well as research into wound-related pain and symptom management
Woo K & Sibbald RG[97]	Canada	To validate an organized pain management approach using the Wound Associated Pain model in subjects with chronic leg and foot ulcers	A prospective cohort study that documented pain in chronic wound subjects over a 4-week period	A total of 111 subjects with chronic leg and foot ulcers were recruited from the community and ambulatory wound care clinics male (60.4%) and their average age was 66 years (range, 33 –95 years)	Leg ulcers and foot ulcers		NRS is a comparatively simple instrument that is easy to administer and score. It has been used in a variety of patient populations including geriatric subjects The NRS scores are significantly related to the pain thermometer (r 0.91), the vertical visual analogue scale (r 0.92), and the verbal descriptor scale (r 0.91) in elderly patients The NRS has been shown to be more reliable than visual analogue scales, particularly among subjects with a lower educational level	More than 60% of our subjects reported pain associated with their lower extremity wounds and almost half (45.6%) experienced severe pain (NRS pain scores 7) Significant reductions in pain intensity were achieved by correcting the wound cause, addressing patient-centred concerns, using pharmacological agents to relieve pain, and applying atraumatic dressings	The WAP model was developed to integrate principles of wound pain assessment and management into principles of wound bed preparation. A comprehensive patient assessment can improve chronic leg and foot ulcer wound-related pain and healing rates

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Woo K[92]	Canada	To explore the relationship of attachment style and pain during dressing change in an older population In particular the study focussed on the role that anxiety, anticipatory self- reported pain, and behavioural expression of pain play in these relationships	Cross-sectional study	n = 96 Males n= 38 Wound duration Mean 8.38 months (SD14.08m)	Leg ulcers: Venous 78.1%, Pressure ulcer 8.3% Mixed arterio-venous 7.3%	Questionnaire Pain was evaluated before dressing change (T1), at dressing removal (T2), at cleansing (T3), with dressing reapplication (T4) and after dressing change (T5)	NRS, SF-MPQ, Pain Assessment in Advanced Dementia scale (PAINAID) Relationship Scales Questionnaire (RSQ) Shortened Anxiety Scale (SAS) Pressure Ulcer Scale for Healing (PUSH)	Elderly subjects experienced more pain during dressing change than at baseline Attachment needs (anxiety over self-worth and closeness to others) continue to exert a tremendous influence on older people living with chronic pain Patients who expressed high levels of attachment anxiety and avoidance reported heightened anxiety, increased anticipation of pain, and more intense pain during dressing change in comparison to secure individuals	This study of older adults has provided empirical evidence to support the influence of attachment on anticipatory pain, anxiety and experienced pain at dressing change Attachment anxiety and avoidance were critical to understanding how one reacts to threat, regulates negative emotions, and interprets a physiological symptom (pain)
Frescos N[51]	Australia	To determine if a validated and holistic pain assessment instrument is available for use in the primary care setting to assess wound pain in chronic lower limb wounds	A scoping review of the literature	N/A	Chronic lower limb wounds	MEDLINE, CINAHL, EMBASE and PsycINFO	Common tools: Pain ruler, NRS VAS VRS SF-MGQ Numeric Pain Scale Faces Scales Other tools: Diabetes Foot Ulcer Scale Short SF-12 Brief Pain Inventory	Four common generic pain assessment tools used by health care practitioners were found: the NRS, VAS, VRS and SF-MPQ. These tools were appraised and justified to offer pain assessment tools that could be useful for leg ulcer	Although four common pain measurement tools were identified to be suitable for wound pain, current evidence is insufficient to recommend one pain assessment tool that is suitable for chronic lower limb wounds

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Rutherford C, Nixon JE, Brown JM, Briggs M, Horton M [79]	Australia/ UK	To investigate whether the Leeds Assessment of Neuropathic Symptoms and Signs scale (LANSS) is suitable for use as an outcome measure in people with PUs	Psychometric and Rasch analyses	n=709, Age mean = 76 (15.3) Female 59.1%	Pressure Ulcers	Hospital in patients and Community outpatient services: Patient was assessed by asking 2 pain screening questions. Those reporting pain then were assessed with VAS and LANSS	VAS of 0–10 LANSS Pain Scale The LANSS contains five patient-reported symptom items and two clinical sensory testing items associated with neuropathic pain	Findings support unidimensional scale But not supported for internal construct validity For LANSS, there was low to moderate item correlations Chi Square (df = 28) 55.546, p = 0.002, inter – item correlations (mean 0.117 and range from 0.063 to 0.415) and low Cronbach's alpha (0.549) and Person Separation Index (0.334)	The LANSS is not suitable as an outcome measure of pressure ulcer-related neuropathic pain as it did not meet requirements for reliable and valid measurement in this population
Kogure T, Sumitani M, Abe H, Hozumi J, Inoue R, Mietani K, et al [73]	Japan	Examined the discriminant validity of the classification by providing a list of distinct pain quality descriptors in the MPQ to dichotomize pain into nociceptive or neuropathic	Cross sectional study	N =489. Divided into neuropathic pain group and nociceptive pain group based on diagnoses. Post revascularisation (n=18)			Categorized ischemic ulcer pain into nociceptive/ inflammatory pain (NocP) or neuropathic pain (NeP), on the basis of patients' descriptions of their pain using the MPQ Post revascularisation Approximately half of the patients with ischemic ulcer pain were classified as NeP before revascularization, and 70% who had residual pain after revascularization were classified as NeP	Among these patients complaining of NeP after revascularization, the NocP complaints by more than a half of the patients before revascularization turned into complaints of NeP after revascularization	Confirmed that ischemic ulcer pain has both components of NocP and NeP

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Newbern S [66]	Alaska	To describe the experience and perceptions of pain and pain management for patients with chronic wounds related to lower extremity vascular disease. The goals of this study are to clinically appraise the evidence for efficacy of existing assessment practices, identify barriers to providing holistic patient care with pain management, and acknowledge pain impact on QoL	An integrative literature review using CINAHL, Google Scholar, PubMed, written journals, and scholarly textbooks was performed		Lower extremity wounds		Medical outcome study pain measures, Modified EQ-5D Questionnaire, Brief Pain inventory, The Neuropathic Pain Scale, Neuropathic Pain symptom inventory, The Diabetic Peripheral Neuropathic Pain Impact Measure, The Short-Form McGill Pain Questionnaire, Numeric Pain Scale, SF-36 Health Status Questionnaire, Brockopp-Warden Pain Knowledge/Bias Questionnaire, Hospital Depression and Anxiety Scale		Lack of a validated pain and QOL assessment tool for patients experiencing diabetic foot ulcers or chronic lower-extremity wounds is a barrier to appropriate pain management There is a need for wound pain validation and further studies related to holistic pain identification including the psychosocial aspects of pain Single-question pain assessment instruments may not be appropriate for evaluating neuropathic pain and may lead the clinical provider to undertreat pain and associated QOL symptoms

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Frescos N[99]	Australia	To determine how practitioners assess wound related pain, including the types of assessment tools used and frequency of assessment	Survey Descriptive study that used convenience sampling	N = 1189 Health care professionals involved win wound care. Nurses (89%), podiatrist (7%) and others (4%)	Chronic wounds	Self-administered questionnaire mailed out to health practitioners' who were members of a wound association	Numerical analogue scale (NAS) VRS VAS Faces Rating Scale Abbey Scale	A total of 63% (n = 738) of practitioners indicated that they used a validated pain assessment tool. The most common validated pain assessment tool used by all 3 categories of professions was the numerical analogue scale (n = 524, 46%), followed by the verbal rating scale (n = 328, 28%). When comparing the use of validated tools between the professions, nurses were more likely to use the visual analogue scale (χ 2 = 7.82, df = 2, P = .020), faces scale (χ 2 = 7.99, df = 2, P = .018), and numerical analogue scale (χ 2 = 12.46, df = 2, P = .002) compared with the other	A variety of assessment methods were used to gather information about the patients' pain, and the process used to identify pain was not uniform among practitioners. The most common approach in identifying and assessing pain by all categories of health professionals was talking to the patient and asking the patient to give a self-report rating of their pain. This study suggests that health care practitioners use various methods of identifying or assessing wound pain
Ren Y, Luo X, Xie C, Zhang P, Meng M, Song H[106]	China	To determine the gap between evidence-based criteria and current clinical practice regarding assessment and management of dressing-related pain To standardize strategies for assessment and management of dressing-related pain by developing an education program To improve diabetic foot nurses' compliance with evidence-based criteria regarding dressing related pain assessment and management	Clinical audit	n= 50 patients n = 15 nursing staff	Diabetic foot ulcer	Audit tool with six criteria to measure the compliance rates with best practice Before and after implementation of training of nurses on how to assess and when to assess pain Implemented pain management survey and intervention strategy	VAS C-PAINAID scale for patients with dementia	Barriers identified: Lack of standardised pain assessment tools Nurses do not have enough time to assess pain; Absence of education materials for patients No formal education regarding pain assessment and management for nurses Improvements were observed after training.	Improved compliance with strategies to implement best practice was the key to success to improving pain assessment and management by nurses

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Jenkins S[67]	UK	Review of what is required in the assessment of pain in individuals with chronic wounds.	Review of the literature	Not applicable	Chronic wounds, aetiologies not specified	Not applicable	Pain Quantity: NPRS, VAS, VRS Physical functioning: Brief Pain Inventory Emotional Functioning: Beck Depression Inventory (BDI), Centre for Epidemiologic Studies Depression Scale (CESD), Hospital Anxiety and Depression Scale (HADS), Short Form MOS-36 (SF036) Profile of Mood states (POMS), Pain Catastrophising Scale Patient Health Questionnaire – 2, Pain Self Efficacy Questionnaire (PSEQ) Quality of Life: EuroQol 5D Patient reported global rating: Patient Global Impression of Change		A biopsychosocial assessment is required through discussion and use of assessment tools. Validated tools are available for the assessment of pain quantity, physical functioning, emotional functioning and a person's global rating. Due to the lack of validated pain assessment tools for those with chronic wounds, these validated chronic pain tools should be considered. Working with a local pain service can help identify appropriate tools and those that are used locally

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Leren L, JohansenE, Eide H, Falk R, Juvet L, Ljoså T[88]	Norway	To describe the prevalence of wound related a background pain in CVLUs, describe characteristic of the wound related background pain	SR and meta-analysis	Mean age of patients 50.3–74.6years	CVLUs	Databases	NRS (0–10) 12 studies VAS 10 studies VRS 6 studies SF-MPQ 3 studies DN4 1 study Medical Outcome Scale 1 study BPI 1 study (pain interference) Non validated tool 2 studies		The majority of persons with CVLU experience wound-related background pain, reporting mild to moderate pain intensity. Because of the poor quality of the assessment and reporting of pain, it is likely that the research available underestimates the severity of wound pain and provides an inaccurate and simplified clinical picture Encourage future studies to adhere to standardised methods for collecting and presenting data on wound and pain characteristics

Authors (year)	Country	Study purpose	Design	Sample characteristics (sample size, age, gender wound duration)	Wound type	Data collection	Type of pain measurement/report	Results	Main finding
Leren L, Eide H, Johansen EA, Jelnes R, Ljoså TM (100)	Norway	To explore and describe characteristics of ulcer related background pain and pain management as reported by persons with CLUs	A descriptive analysis of cross-sectional data	Study sample was selected from a larger sample of persons with CLUs. (n=121) The mean age of participants was 74.4 years (SD 12.75), and 53.7% were female. A total of 39.7% were living alone, and 87.5% were not working	Chronic leg ulcer ankle or foot venous, DFU, traumatic arterial and other	Data were gathered with an initial screening interview, and a clinical examination at the wound outpatient clinic, as well as a self-report questionnaire filled in at home within 24 hours after the hospital visit persons who reported presence of ulcer related background pain in the screening interviews	SF-MPQ was used to assess qualities of present ulcer related background pain BPI was used to provide information about the location, intensity, treatment, and interference of ulcer related pain on function in the last 24 hours	Ulcer pain intensity: The mean average pain intensity was 4.5 (SD 2.56) (CI 95% 4.0-5.0), and the mean worst pain intensity was 4.9 (SD 2.88) (CI 95% 4.4-5.5) (0-10 NRS). Mean present pain intensity was 38.65 mm (SD 27.23) (0-100 VAS) Pain interfered mostly with general activity (mean 4.3), sleep (mean 4.1), and walking ability (mean 4.0) (0-10 NRS). The average activity pain interference (WAW) was 4.1 (SD 2.8), and the average affective pain interference (REM) was 3.1 (SD 2.7) Ulcer pain qualities: The mean score on the sensory sub-scale of SF-MPQ was 6.95 (SD 6.66). The most frequently reported sensory descriptors were 'tender' (50.4%), 'stabbing' (49.6%), 'aching' (46.3%), and 'hot burning' (45.5%). On the affective sub-scale, the mean score was 1.36 (SD 2.19). The most frequently reported affective descriptor was 'tiring-exhausting' (32.2%) The majority stated that the ulcer related pain was intermittent (71.1%). None reported that the pain was stable	Ulcer related background pain is a significant and interfering problem. Over 60% of the participants reported moderate to severe pain intensity and that pain interfered with daily function It is important to conduct a thorough pain assessment in all persons presenting with CLUs, and especially in all persons reporting ulcer related background pain, to provide effective pain management

Appendix 5: Summary of characteristics of the systematic reviews of physical therapies

Authors (year)	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Yim E, Kirsner RS, Gailey RS, Mandel DW, Chen SC, Tomic-Canic M[118]	To evaluate the effect of physical therapy on healing and QOL outcomes in patients with VLUs	Walking, standing heel-raises, tip-toe exercise, use of a treadmill, cycling, use of elastic resistance bands Supervision consisted of a physical therapist, a physical therapy assistant, a nurse or an exercise physiologist	PubMed (MEDLINE), CINAHL, and Cochrane databases	RCTs Single-arm cohort studies	Patients with open or healed VLUs	10	Searched in April 2014	Only two studies measured QoL and found no change in QoL after physical exercise They discussed that physical exercise has an effect on QoL and that pain was the most frequently identified factor affecting QoL In one study pain was reduced	Not indicated
Dymarek R, Halski T, Ptaszkowski K, Slupska L, Rosinczuk J, Taradaj J[136]	To evaluate the effectiveness of ESWT in wound healing	Extracorporeal shock wave (ESWT) using used low or medium energy, focused or defocused generator heads (energy range 0.03 to 0.25 mJ/mm^2; usually 0.1 mJ/mm^2), and electrohydraulic or electromagnetic sources	MEDLINE, PubMed, Scopus, EBSCOhost, and PEDro databases	RCTs 7 studies Clinical controlled study 1 study Prospective clinical trials 3 studies Clinical case reports 2 studies	Patients with DFU, PU, chronic DFU, PU, VLU, and AIU (arterial insufficiency ulcer) wounds as well as acute wounds involving BW (Burn wound) , TW (trauma wound), and SW (post surgical wound) resulting from CABG or STSG procedures	13 primary studies 2 systematic reviews	2000 –2013	The results of this study show ESWT can be characterized as a non invasive, painless, and safe physical treatment modality that seems beneficial in healing soft tissue wounds It was found that ESWT as an anti-inflammatory treatment has effect on reepithelialisation, enhancing tissue granulation, improving blood flow perfusion and angiogenesis, reducing necrotic tissue and reducing time of total wound treatment	Not indicated

Authors (year)	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Ramundo J & Gray M[124]	To determine whether ultrasonic mist therapy effectively removes necrotic debris from the bed of chronic wounds and promotes wound healing	Ultrasonic mist therapy, compared to other debridement	MEDLINE and CINAHL and Cochrane Database for Systematic Reviews	Prospective studies that compared ultrasonic mist debridement to any other debridement technique, to a sham device, or to no debridement were included	One study: adults with diabetes mellitus and Wagner grade 1 or 2 diabetic foot ulcers located on the plantar surface	No studies were identified that evaluated the efficacy of the direct contact of the ultrasonic mist therapy 2 RCTs found for necrotic tissue (1single site, parallel group RCT, 1 double blind RCT)	January 1996 to February 2008	According to the study this is a debridement method that reduces the necrotic tissue Procedural pain, when reported, has been successfully addressed with topical analgesia Clinical experience suggests that the need for pain management tends to diminish with subsequent treatments	Mentions one study that was conducted in the US and Canada
Chang YR, Perry J, Cross K [126]	To review clinical evidence on the use of low frequency ultrasound debridement as adjunctive therapy in chronic wounds	Comparison of low frequency ultrasound debridement with other debridement modalities	Ovid MEDLINE, Ovid EMBASE, the Cochrane Central Register of Controlled Trials, Agency for Healthcare Research & Quality, and Google Scholar	Retrospective case study, Single arm prospective study	Participants wound aetiology included burn wounds, surgical/ trauma wounds, diabetic foot ulcers, pressure ulcers, arterial/venous insufficiency	25 studies, RCT 8 studies	2000 to 2017	In relation to pain, ultrasound therapy is generally considered painless in contrary to sharp and mechanical debridement techniques. Treatment with MIST Therapy was found to reduce patients' pain in a study of 15 ulcers of vascular ischemia, sickle cell anaemia and venous stasis origin. One study found on average rection of 79% in subjective pain score in patients receiving u/s therapy. Another study reported decrease of almost 3 points on the subjective pain score following u/s treatment	Not indicated

Authors (year)	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Smith D, Lane R, McGinnes R, O'Brien J, Johnston R, Bugeja L, Team V, Weller C [119]	To examine the effects of exercise in addition to standard compression therapy on VLU characteristics, including time to heal, size and recurrence, pain, quality of life, adverse events, and economic outcomes	Compression only or compression and care as usual versus: Various- nurse l ed self-management counselling program, including physical therapy and adherence to compression therapy Home based 12 week progressive resistance exercise program including compression Nine week exercise programme, intervention group included training bikes under nurse supervision	Ovid Medline, Ovid EMBASE, Ovid CINAHL, The Cochrane Library, PsycINFO, Web of Science, and PEDRO	RCTs	Adults with VLU	6 studies	1946 to 2018	The visual analogue scale ranging between 0 and 10, whereby a score of 0 indicates no pain and a score of 10 indicates severe pain, was used to assess the participants' pain levels. Means and measures of variance were not reported nor provided upon request; thus, we could not analyse this outcome, One study reported Pain not associated with increasing the number of daily steps ($P = 0.45$) Relationship between pain and healing time not statistically significant ($P = .88$) Another study reported No association b/w pain and range of ankle mobility	Outpatient centres, home based or university hospital

Appendix 6: Summary of characteristics of the hand search of systematic reviews for physical therapies

Authors (year)	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Purcell A, Buckley T, King J, Moyle W, Marshall A [55]	Chronic leg ulcers are painful and if oral medication is not sufficient or compulsory, is there evidence for effectiveness of local treatment methods in pain treatment for wound-related pain	Topical analgesics were investigated in 10 studies, ibuprofen as intervention in 7 studies and morphine gel in 3 articles. Local anaesthetics were in 13 studies	MEDLINE, EMBASE, CINAHL, Joanna Briggs Institute, PubMed, Cochrane Library	19 RCT´s, 1 quasi-experimental study, 2 crossover studies and 1 retrospective observational medical record review.	3783	23	1990 to 2019	Lidocaine /prilocaine cream and ibuprofen foam significantly decreased wound-related pain during debridement and maybe promising in treating pain daily basis Morphine gel was ineffective according this review	20 studies in Europe, five in Sweden
Costa Ferreira SA, Serna Gonzalez CV, Thum M, Costa Faresin AA, Woo K, Gouveia Santos VLC [56]	Malignant fungating wounds (MFW) are painful, this article was investigating if pain relief is possible by topical therapy and which topical therapies are being used	20 different therapies as intervention were identified, wound dressings (58%), analgesic drugs (55.5%), topical antimicrobials (25.7%), skin barriers (15.7%), cryotherapy (5.7%), negative pressure wound therapy (4.3%)	CINAHL, LILACS, Embase, Web of Science, PubMed, Cochrane library, NICE, Scopus, JBISRIR, grey literature	non-systematic reviews, 6 clinical trials	not assessed	70	No time limit, 22 studies were conducted 2015 to 2022	This review categorized topical therapies used into groups of anti-adherent, antimicrobial, anti-inflammatory, absorbent dressing and analgesic drugs, negative pressure wound therapy, cryotherapy, and careful irrigation and removal of dressings 11 studies recommended the applying topical therapy to the periwound skin	England, Poland, US, Switzerland, Canada, Spain, Scotland, Australia, New Zealand, Brazil, China, Denmark, France
Upton D & Andrews A [130]	This review investigated pain and skin trauma that may be experienced during negative pressure wound therapy (NPWT)	Pain levels measured during NPWT treatment and dressing changes, factors affecting pain during dressing change, and if different types of dressings/fillers or different NWPT systems (were affecting pain	CINAHL MEDLINE PsycINFO Academic Search Complete PsyARTICLES	Not categorized systematically; systematic review, RCT´s, multicenter clinical study, several case studies	Not reported systematically. Mentioned number of participants in 19/30 articles (variety1-208), total of 906 participants counted from these 19 articles.	30	2001 to 2012	Pain and trauma should be minimized during NPWT. Using atraumatic dressings/fillers may affect on pain during NPWT, but it remains unclear how different factors during NPWT cause pain and therefore it remains resolved how to treat properly NMWT-related pain	Not mentioned

Appendix 7: Summary of evidence related to dressings for wound-related pain (supplementary Evidence from Companies)

Author/s	Article tttle	Type of study	Results	Pain assessment tool/ score
Beitz AJ, Newman A, Kahn AR, Ruggles T, Eikmeier[139]	A polymeric membrane dressing with antinociceptive properties: analysis with a rodent model of stab wound secondary hyperalgesia	Experimental study	Significant reduction in the development of both mechanical and thermal hyperalgesia. Analysis of spinal cord Fos expression demonstrated that the polymeric membrane dressing significantly decreased stab wound–induced Fos expression in laminae I to VI of the ipsilateral L3-L5 cord segments. Application of the polymeric membrane elicited Fos expression in laminae III and IV of the lumbar spinal cord. Demonstrated that the polymeric membrane dressing is capable of significantly reducing secondary hyperalgesia	C-Fos expression in the spinal laminae & activity
Klode J, Schöttler L, Stoffels I, Körber A, Schadendorf D, Dissemond J[137]	Investigation of adhesion of modern wound dressings: a comparative analysis of 56 different wound dressings	Experimental study – adhesion of wound dressings	The energy required to remove the wound dressings from human skin, was measured in Newton (N) and the following median values were obtained: hydrocolloid (2.25 N) > acrylate (1.14 N) > polyurethane (0.9 N) > silicone (0.7 N). The subjective pain intensity during the removal of the wound dressings was recorded using the visual analogue scale (VAS) with values ranging from 0 to 10. For hydrocolloid, it was 6.8, for acrylate 4.9, for polyurethane 3.1 and for silicone 2.5 points VAS. In comparison with human skin, the adhesion of wound dressings was significantly higher on steel ($P < 0.0001$), but was different for the different groups of wound dressings. Moreover, there was a statistically significant correlation between the adhesion and pain intensity (correlation coefficient 0.806; $P = 0.01$)	VAS 1-10 used to measure pain intensity
Davies SL & White RJ [140]	Defining a holistic pain-relieving approach to wound care via a drug free polymeric membrane dressing	Literature review / theoretical review of how polymeric membrane dressings impact on the modulation of nociception in chronic wounds, wound-related pain and clinical outcomes.	Polymeric membrane dressings could impact on inflammation, its dissemination beyond a site of injury, nociceptor activation and the neuromodulation that is linked to tissue damage	Suggestion that polymeric membrane dressings could have a direct effect on pain associated with inflammation
Derbyshire A[138]	Using a silicone-based dressing as a primary wound contact layer	Case studies (n=2)	Cases related to a burn injury and weeping eczema	Role of silicone dressings in reducing pain related to dressing change
Hegarty F & Wong M [114]	Polymeric membrane dressing for radiotherapy-induced skin reactions	An evaluation of the use of a polymeric membrane dressing (PolyMem®, Aspen Medical) in 23 patients with skin reactions following radiotherapy	A purpose-designed evaluation form was completed over a period of 4 weeks or until healed. Patients were asked to complete both qualitative descriptions and numerical scores of pain for symptoms and procedural pain. Skin healing, pain and sleep patterns were all evaluated, with additional qualitative input on the patient experience. Successful symptom management regarding pain, exudate control and patient comfort was documented in both clinical observations and patient diaries	Numerical scale Wong-Baker Faces Rating Scale (1988)
Tickle J[143]	Positive clinical and patient outcomes with a next generation foam dressing	Two clinical evaluations of AQUACEL® Foam dressing 40 locations across the UK	75 patients Majority with leg ulcers, pressure ulcers patient pain rating (using a VAS of 0 [no pain] to 10 [worst pain]) At the final dressing change, the majority of patients experienced no pain whilst the dressing was in situ (Figure 6a) or at dressing removal (Figure 6b) (83% and 84%, respectively) (five non-responders)	VAS

Author/s	Article tttle	Type of study	Results	Pain assessment tool/ score
Gefen A [141]	Managing inflammation by means of polymeric membrane dressings in pressure ulcer prevention	Literature Review/Discussion	Inflammation is the immediate normal response of the immune system to localised microscopic cell damage that precedes macroscopic tissue damage. Inflammation is triggered by secretion of chemokines that attract immune system cells to the sites of cell damage and facilitate their extravasation through increase in capillary permeability. The increased permeability of capillary walls in the inflammatory state consequently causes fluid leakage from the vasculature and, hence, oedema and associated pain. Polymeric membrane dressings (PolyMem®, Ferris Mfg. Corp.) are multifunctional dressings that focus and control the inflammation and oedema, and reduce pain. The literature reviewed in this article suggests that by having these effects on the inflammatory response, especially in fragile patients, the PolyMem dressing technology may facilitate repair of micro-damage in cell groups, which counteracts the evolution of damage to a macroscopic (tissue) level. Reducing the spread of inflammation and oedema in tissues appears to be a unique feature of PolyMem dressings, which supports repair of cell-scale damage under intact skin and tilts the delicate balance between the counteracting damage build-up and tissue repair mechanisms, thus promoting reversibility and self-healing	Extends the discussion of the role of polymeric membrane dressings in the control of inflammation, oedema and pain
King B and Barrett S [113]	A clinical evaluation of 20 patients when using a new absorbent silicone foam wound dressing: Cutimed Siltec B	Clinical/Product evaluation 20 wounds (3 dressing changes)	There was an overall improvement in pain scores with only one patient scoring above 2 (pain score 3) at week three, whereas 4 patients had scored above 2 at the previous dressing change. This would support the claim that the silicone adhesive was atraumatic to remove	Pain Assessment Tool used: VAS 0-10
Seckam A [115]	A multicentre, observational evaluation of the product characteristics of two absorbent foam dressings	Clinical evaluations	Cutimed Siltec and Cutimed Siltec B There was a statistically significant improvement (chi=15.28, p=0.009) in patients' general pain levels and during the initial and final dressing changes There was a significant decrease in reported pain from the initial visit to the final visit (Figure 3). Patients often suffer psychosocial implications (Wounds International, 2012) because of the various wound elements mentioned previously, thus the results presented here highlight the importance of pain management during dressing changes. A decrease in wound pain during dressing changes may be linked to atraumatic removal. Further investigation into the decrease in general pain is required. Wounds International. Optimising wellbeing in people living with a wound. An expert working group review. (International consensus document). 2012. http://tinyurl.com/y3n86zon (accessed 18 June 2019)	Descriptive categories: No pain Mild pain Moderate pain Severe pain Very severe pain
Seckam AM, Twardowska-Saucha K, Heggemann J, Süß-Burghart A, Augustin M [144]	Clinical performance and quality of life impact of an absorbent bacteria-binding foam dressing	Prospective multicentre observational study (5 study sites) was to assess the clinical performance and safety of Cutimed® Siltec® Sorbact® absorbent bacteria-binding foam dressing in wound healing and its impact on patients' quality of life	There was a statistically significant difference in the perception of wound pain over time (chi-square=25.60, P value <0.0001). At visit 5, more patients reported no pain (40% versus 31%) and a little pain (35% versus 26%). At visit 1, 31% of patients reported their pain was experienced as 'quite a lot' and 'very much'. In contrast, at visit 5, 6% of patients reported 'quite a lot' or 'very much' pain	'my wound hurt': Not at all A little Moderately Quite a lot Very much

Summary of evidence related to topical medications for wound-related pain

Pearson WA, Prentice DA, Sinclair DL, Lim LY, Carville KJ [145]	A novel topical therapy for resistant and early peristomal pyoderma gangrenosum	Case series	Crushed oral prednisolone tablet mixed with Stomahesive Protective Powder (ConvaTec) was applied topically to seven patients with PPG and resulted in pain relief and wound healing in six of seven patients	Findings relate to individuals with PPG, however may have some relevance for PG in other anatomical locations.

Appendix 8: Summary Table of Systematic Reviews for Patient Education and Wound-Related Pain

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Van Hecke A, Grypdonck M, Defloor T [147]	Reasons for non-adherence to prescribed compression therapy, leg exercises and leg elevation from patients' and nurses' perspectives Determinants of non-adherence to leg ulcer treatment	Reasons or determinants of non-adherence	Medline, CINAHL and the Cochrane database	Qualitative – Phenomenological, Ground Theory, Focus Group, Heideggerian Hermeneutics, Questionnaire, discourse analysis	Patients with leg ulcers based on venous insufficiency or a combination of venous and arterial insufficiency	31 (n=6513 patients, n=108 health/ social care professionals)	1995 to December 2007	Pain, discomfort and lack of valid lifestyle advice by healthcare professionals (e.g., conflicting advice, no specific advice, impossibility of instructions) were identified as primary reasons for non-adherence from patient's perspective A pain management programme is recommended. Effective cooperation with general practitioners for analgesia might be paramount in helping the patient to adhere to compression and leg exercise instructions. While pain improved with compression therapy, during the first week's pain levels may increase (Briggs & Closs 2006, Morison et al.2007). Therefore, nurses should warn the patient and provide coping instructions as this might reduce distress (Johnson1973). Also, advice on taking regular analgesia when starting compression is important as this might influence whether patients will persevere	
Liberato SMD, Souza AJG, Costa IKF, Torres GdV, Fortes AF, Lira ALBdC [146]	Nursing interventions used for the management of pain in people with venous ulcer	Any nursing intervention for pain management as per the Nursing Interventions Classification	PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ISI Web of Knowledge, SCOPUS, The Cochrane Library and Latin American Literature and Caribbean Health Sciences (LILACS)	RCT (n=4), double-blind crossover clinical trial, prospective case series, clinical trial (not randomised)	Leg ulcers, venous, chronic	7 (Number of participants not stated)	Search undertaken in June 2013	Consider the referral of the patient, the family, and the persons significant to support groups and other resources when appropriate Social Interactions based on Leg Club model	Canada, Denmark, Australia, UK

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Weller CD, Buchbinder R, Johnston RV [148]	To assess the benefits and harms of interventions designed to help people adhere to venous leg ulcer compression therapy, to improve healing and prevent recurrence after healing	Interventions that aim to help people with venous leg ulcers adhere to compression treatments compared with usual care, or no intervention, or another active intervention Outcomes were ulcer healing, ulcer recurrence, quality of life, pain, adherence to compression therapy and number of people with adverse events Education with video versus education in written format	The Cochrane Wounds Specialised Register; The Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library); Ovid MEDLINE; Ovid MEDLINE (In-Process & Other Non-Indexed Citations); Ovid EMBASE and EBSCO CINAHL. We also searched trial registries, and reference lists of relevant publications for published and ongoing trials	RCTs	Venous ulcers Majority aged > 60 Male preponderance in 2 studies	3 (n=371 participants)	June 2015 No date restrictions	Edwards et al (2009) study assessed pain using the RAND instrument and SF-36 at 12 weeks, at 24 weeks they used the Medical Outcomes Study pain measure – 100 point continuous scale 24-week data, and found there may be a small decrease in pain intensity in the participants attending the Leg Club compared with home visit care (MD -12.75 points on 100 point scale, 95% CI -24.79 to -0.71	Miami Australia Netherlands

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Gethin G, Probst S, Stryja J, Christiansen N, Price P [149]	Evidence on the use of person-centred care (PCC) in chronic wound care management	Chronic wounds or chronic wound prevention Person-centred intervention	PubMed, Embase, Cochrane Library, CINAHL, Web of Science and Scopus	Seven randomised controlled trials (RCTs) four pre-test post-test design, Quasi-experimental studies Study within an RCT, Retrospective study Outcomes monitoring	Diabetic foot ulcers, venous leg ulcer, pressure ulcers	17 studies (3149 patients, 36 Healthcare professionals)	2009 to 2019	Impact of Leg Club on pain reduction Kelechi et al. described in their comparative 8-week study, a nurse-directed and patient-centred educational programme among 21 patients.[63] The educational intervention included a 6-week motivational enhancement programme and conditioning activity for leg function plus two additional visits in weeks 6–8 without active motivational enhancement. The control group completed conditioning activities along with a handout at baseline and weekly visits. The results showed an overall pain reduction on a 10-point scale of 0.5±2.0, versus 2.4±2.0 (p=0.046); a motivation difference of 3.8±3.1, versus 4.4±2.9; and a self-efficacy difference of 1.2±3.6, versus 0.6±6.0. Tulleners et al. studied the impact of a new transdisciplinary specialist service supplemented with telehealth consultations offered to 29 patients with VLUs. After detailed diagnostics and causal treatment, all participants received a tailored dressing plan upon completion of their appointment, with directions on dressing type, application and exercises if appropriate. The average quality of life score based on a 0–1 scale with 1 representing the ‘best health you can imagine’, increased from 0.69 to 0.84.	Australia (n=5) USA (n=3) UK (n=2) Iran (n=2) N=1 Morocco Germany Brazil Switzerland China

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Thomas DC, Chui PL, Yahya A, Yap JW[150]	The effectiveness of structured patient education on their knowledge, participation, wound healing, and QoL	Structured patient education efficacy on improving knowledge or participation or wound healing progress or quality of life among patient with a pressure injury were included. Any patient education-related interventions (e.g., structured or condition-specific interventions) were included in this review.	PubMed, MEDLINE, CINAHL, ProQuest, and Cochrane Library	Four RCTs One quasi-experimental and three interventional studies	Adult patients with PI stage I to stage IV or at risk of developing PI	8 studies 466 participants	2009 to 2021	improved patient knowledge, participation, and QoL with structured patient education QoL measured in five studies, two reported that patient education significantly affected QoL. EQ-5D-5L includes pain/discomfort SF-36 includes measurement of pain	Ireland Australia France Sweden India South Korea US

Appendix 9: Summary Table of Primary Research Identified from Systematic Reviews

Reference	Design	Population (n)	Aim	Setting	Intervention/s	Outcome measures	Results	Conclusion
Arora M, Harvey LA, Glinsky JV, Chhabra HS, Hossain S, Arumugam N, et al. (See Thomas et al.[150])	Multicentre, prospective, assessor-blinded, parallel randomised controlled trial	Spinal cord injury, with pressure ulcers N=120: n=60 in the intervention n=60 in the control	To determine the effectiveness of telephone-based management of pressure ulcers in people with spinal cord injury (SCI) in low- and middle-income countries	India Bangladesh	Weekly advice by telephone for 12 weeks about the management of their pressure ulcers from a trained health-care professional vs no intervention	The size of the pressure ulcer and 13 secondary outcomes including pain as measured by the Utility score: EQ-5D-5L	The mean between-group difference for the size of the pressure ulcer at 12 weeks was 2.3 cm2 (95% confidence interval of 0.3 to 4.9; favouring the intervention group). Eight of the 13 secondary outcomes were statistically significant	There was a statistically significant difference in the mean utility score between the groups 0.1 (0.02 to 0.2; P=0.01) in favour of the intervention Of note, the results reflect a younger age group (35 vs 36) and were mainly male (n=106)
Carlson, M, Vigen CLP, Rubayi S, Blanche EI, Blanchard J, Atkins M, et al. (See Thomas et al.[150])	RCT	Adults with SCI, with history of one or more MSPrIs over the past 5 years. (N=232) n=166 intervention n=66 in control group	To test the efficacy of a lifestyle-based intervention designed to reduce incidence of medically serious pressure injuries in adults with SCI PUPP program, six modules	USA National Rehabilitation Centre, ethnically diverse, low income	The Pressure Ulcer Prevention Program, a 12-month lifestyle-based treatment administered by healthcare professionals, largely via in-home visits and phone contacts Module 5 of the program - Happiness and Personal Well-Being - examined managing pain	Blinded assessments of annualized MSPrI incidence rates at 12 and 24 months, based on: skin checks, quarterly phone interviews with participants, and review of medical charts and billing records. Secondary outcomes included number of surgeries and various quality-of-life measures	Annualized MSPrI rates did not differ significantly between study groups. At 12 months, rates were .56for intervention recipients, .48 for randomized controls, and .65 for nonrandomized controls. At follow-up, rates were .44 and .39 respectively for randomized intervention and control participants	Evidence for intervention efficacy was inconclusive Intervention and control groups improved with no statistically significant difference in many measures, including pain Predominantly male population
Edwards H, Courtney M, Finlayson K, Lindsay E, Lewis C, Shuter P, Chang A (See Liberato et al.[146])	RCT	Clients with chronic leg ulcer N=56 n=28 Intervention n=28 control	To investigate the effectiveness of a new community nursing model of care for clients with chronic leg ulcers in terms of levels of pain and ulcer healing	Australia	Leg Club model of care	Healing rates, levels of pain, mood, sleep, functional ability	Unable to access full text	Decreased levels of pain were experienced by Leg Club patients, which may be directly associated with improved sleep, mood and normal working habits

Reference	Design	Population (n)	Aim	Setting	Intervention/s	Outcome measures	Results	Conclusion
Edwards H, Courtney M, Finlayson K, Shuter P, Lindsay E (See Gethin et al. [149])	RCT	Venous leg ulcers N=67 n=34 Intervention n=33 standard care	To determine the effectiveness of a new community nursing model of care on quality of life, morale, depression, self-esteem, social support, healing, pain and functional ability of clients with chronic venous leg ulcers	Queensland, Australia	Lindsay Leg Club model (emphasising socialisation and peer support) vs traditional community nursing model (Home visits by a Registered Nurse) Participants in both groups were treated by a core team of nurses using identical research protocols based on short-stretch compression bandage treatment. Data were collected at baseline, 12 and 24 weeks from commencement	QoL, morale, depression, self-esteem, social support, healing, pain and functional ability Pain was measured using the Medical Outcomes Study (MOS) Pain Measures (Sherbourne 1992)	Participants who received care under the Leg Club model demonstrated significantly improved outcomes in quality of life (p=0·014), morale (p<0·001), self-esteem (p=0·006), healing (p=0·004), pain (p=0·003) and functional ability (p=0·044) Sequential analysis revealed that the intervention group mean scores had significantly greater decreases in the Severity of Pain subscale (Z=3·02, p=0·001), the Effect of Pain subscale, (Z=2·65, p=0·004) and the overall total pain score (Z=2·71, p=0·003) when compared with the control	The Leg Club model of care shows potential to improve the health and well-being of clients who have chronic leg ulcers

Reference	Design	Population (n)	Aim	Setting	Intervention/s	Outcome measures	Results	Conclusion
Green J, Jester R, McKinley R, Pooler A [153]	Qualitative, unstructured interviews and non participant observation Phase 1 and 2 of a 4 Phase Study	Patients with leg ulcers 9 patients	Phase 1: to explore the lived experiences of patients Phase 2: to determine the extent to which the themes that were disclosed in phase 1 were explored by the nurse during a routine consultation.	UK	N/A	N/A	Themes included; pain, issues relating to exudate and odour, social isolation and psychological effects Pain was reported by all nine participants and formed the very core of each interview. Pain dominated the patients' lives and limited their functioning. Across the participants, there were similarities in the description of their pain, including its unceasing nature, severity and timing; pain was reported to be especially problematic throughout the night. Many spoke of long nights, of being awakened by pain in the early hours of the morning and being unable to get comfortable and to go back to sleep again. All spoke of their reluctance to take analgesia, often because they were already taking a cocktail of medications for their comorbidities. Where analgesia was taken, respondents reflected that this was generally ineffective for the type and intensity of pain that their leg ulcers caused Phase 2: pain, a concern that had been readily raised during the interviews, was not explored on 42% of occasions and a solution was offered on only 23% of all occasions	The phase 1 and 2 study data demonstrate a mismatch between the impact of a concern for the patient and their likelihood of disclosure to their nurse, albeit for a small sample. The study highlights that nurses need to explore issues with patients during clinical consultations more effectively

Reference	Design	Population (n)	Aim	Setting	Intervention/s	Outcome measures	Results	Conclusion
Kelechi TJ, Mueller M, Spencer C, Rinard B, Loftis G (see Gethin et al. [149])	Comparative study	Painful lower legs and critically colonised / infected wounds N=21 n=12 MECALF site A n=9 CALF site B	WOC nurse-directed, patient-centered intervention called MECALF (motivational enhancement and conditioning activity for leg function) compared to conditioning activities for lower leg function (CALF) alone	US	All patients received usual wound care per center protocol. The MECALF intervention was delivered by WOC nurses for 6 weeks at site A and a handout of CALF depicting the conditioning activities was provided by site staff (not WOC nurses) to patients at site B	Pre- and post-intervention outcome data were collected by study staff using pain, motivation, and self-efficacy scales, functional measures of physical activity, and physical measures of strength and range of motion	Patients reported that they were able to perform CALF. Overall pain was statistically significantly reduced (P=0.046) in both groups of patients with painful critically colonized/infected leg ulcers measured at week 8, two weeks after the study period. The CALF group experienced a slightly greater reduction in pain intensity than did the MECALF group. No statistically significant differences between the groups were observed in behavioural outcomes for motivation (P=0.641) and self-efficacy (P = .643), or for physical outcomes including overall ankle strength (P=0.609) and ankle range of motion (P=0.498). Functional and physical activity scores revealed no statistically significant differences in 3 measures, including Timed Up and Go test (P=0.624), Timed Chair Standing Test (P=0.686), or the Community Health Activities Model for Seniors (P=0.803)	No improvement in outcomes was observed with the addition of the WOC nurse-directed intervention. However, pain in the lower legs of patients with critically colonized/infected wounds in both groups improved after a 6-week behavioural/physical activity intervention

Appendix 10: Summary Table of Systematic Reviews for Psychological Aspects

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ gkeographical location of studies included
Liberato SMD, Souza AJG, Costa IKF, Torres GdV, Fortes AF, Lira ALBdC [146]	Nursing interventions used for the management of pain in people with venous ulcer	Any nursing intervention for pain management as per the Nursing Interventions Classification	PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ISI Web of Knowledge, SCOPUS, The Cochrane Library and Latin American Literature and Caribbean Health Sciences (LILACS)	RCT (n=4), double-blind crossover clinical trial, prospective case series, clinical trial (not randomised)	Leg ulcers, venous, chronic	7 (No. of participants not stated)	Search undertaken in June 2013	Consider the referral of the patient, the family, and the persons significant to support groups and other resources when appropriate Social Interactions based on Leg Club model	Canada, Denmark, Australia, UK
Gethin G, Probst S, Stryja J, Christiansen N, Price P [149]	Evidence on the use of person-centred care (PCC) in chronic wound care management	Chronic wounds or chronic wound prevention Person-centred intervention	PubMed, Embase, Cochrane Library, CINAHL, Web of Science and Scopus	Seven randomised controlled trials (RCTs) four pre-test post-test design Quasi-experimental studies Study within an RCT Retrospective study Outcomes monitoring	Diabetic foot ulcers, venous leg ulcer, pressure ulcers	17 (3149 patients, 36 healthcare professionals)	2009-2019	Impact of Leg Club on pain reduction Kelechi et al. described in their comparative 8-week study, a nurse-directed and patient-centred educational programme among 21 patients.[63] The educational intervention included a 6-week motivational enhancement programme and conditioning activity for leg function plus two additional visits in weeks 6–8 without active motivational enhancement. The control group completed conditioning activities along with a handout at baseline and weekly visits. The results showed an overall pain reduction on a 10-point scale of 0.5±2.0, versus 2.4±2.0 (p=0.046); a motivation difference of 3.8±3.1, versus 4.4±2.9; and a self-efficacy difference of 1.2±3.6, versus 0.6±6.0 Tulleners et al. studied the impact of a new transdisciplinary specialist service supplemented with telehealth consultations offered to 29 patients with VLUs. After detailed diagnostics and causal treatment, all participants received a tailored dressing plan upon completion of their appointment, with directions on dressing type, application and exercises if appropriate. The average quality of life score based on a 0–1 scale with 1 representing the 'best health you can imagine', increased from 0.69 to 0.84.	Australia (n=5) USA (n=3) UK (n=2) Iran (n=2) n=1 in Morocco Germany Brazil Switzerland China

Appendix 11: Summary Table of Evidence for complementary and alternative medicine

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Fox C [158]	To identify whether in adults with chronic wounds, the use of honey as a wound dressing improves wound management outcomes.	Honey	Cochrane Library Medline Cumulative Index to Nursing and Allied Health Literature Embase Amed	Individual or multiple case studies	Recalcitrant surgical wound Chronic Wounds Ulceration Chronic infected wounds Leg Ulceration Recalcitrant wounds and ulcers	6 (n=66 patients)	(1966–present) (CINAHL, 1984–present) (1980–present) (1985–March 2002).	Five of the studies examined the effect of honey on pain. Three reported a decrease in pain. Case studies were of limited quality. No measure of pain assessment was discussed.	Not discussed
Mwipatayi BP, Angel D, Norrish J, Hamilton MJ, Scott A, Sieunarine K [159]	To investigate the clinical effects of topical honey on chronic leg ulcers Outcomes – healing time and antimicrobial effect Pain was discussed as part of the properties of honey background section but not evident in the review of studies	Topical Honey	PubMed, MEDLINE, EMBASE, CINAHL database and the Cochrane Library	Clinical Trials (not randomised)	Chronic Leg Ulcer (n=50) 3 groups: honey, phenytoin / honey and phenytoin. Honey-medicated dressing Chronic wounds (n=21), complicated surgical wounds (n=23), acute traumatic (n=16)	2	1980 to 2004	The studies analysed were influenced by different sources of bias, especially lack of blinding, poor reporting quality and poor sample size. None of those studies was an RCT. In order to elucidate the evidence for the use of honey as a first-line treatment in chronic leg ulcers, RCTs and laboratory studies on cellular effects are urgently needed	Africa Netherlands

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Bardy J, Slevin NJ, Mais KL, Molassiotis A [160]	To synthesise the evidence regarding honey's role in health care and to identify whether this evidence applies more specifically to cancer care	Honey	EMBASE, CINAHL, AMED, MEDLINE, COCHRANE and PUBMED	RCTs (n=20)	Wounds (n=19) burns (n=11) skin (n=3) cancer (n= 5) others (n=5)	43 patients 2 examined pain in patients with leg ulcers Dunford and Hanano (2004) – multi-centre, -non-randomised (n=40) Pain reduced from 1.6 ± 1.22 to 1.08 ± 1.54 p <0.001 Oluwatosin et al. (2000) n=38, non-randomised comparative. Pain at end of treatment p=0.21 NS	EMBASE 1974 to date; CINAHL 1982 to date; AMED 1985 to date; BNI 1994 to date and MEDLINE 1951 to date	Honey was found to be a suitable alternative for wound healing, burns and various skin conditions and to potentially have a role within cancer care In the cancer setting, honey may be used for radiation-induced mucositis, radiotherapy-induced skin reactions, hand and foot skin reactions in chemotherapy patients and for oral cavity and external surgical wounds	UK Nigeria 1

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Vandamme L, Heyneman A, Hoeksema H, Verbelen J, Monstrey S [162]	To evaluate the available evidence and the role of honey in contemporary wound care	Honey and wound healing: Antibacterial effect Healing stimulating properties Anti-inflammatory effect Odour reducing capacity Wound Pain	PubMed and ISI Web of Science	RCT (n=25) CCT (n=2) CT (n=5) CR (n=23)	Human burns, ulcers and other wounds	55 studies 19 related to 'ulcers' including VLU, DFU, PU/PI,	Up to July 15, 2012	Ulcers According to only one RCT, honey significantly reduces wound pain (Tables 4 and 5). The available evidence for these qualities is therefore weak. Overall, it can be concluded that the evidence for the antibacterial, anti-inflammatory, deodorising, debridement and wound pain-reducing properties of honey in ulcers is less conclusive. Most evidence had been found for the wound size-reducing effect of honey, which was statistically significant in favour of honey in 50% of the trials Other wounds Five RCTs report the parameter wound pain, but only two of them found a positive result in favour of honey; however not significant (Tables 4 and 5). Evidence for its deodorising, debridement, anti-inflammatory, and wound pain reducing properties is rather limited.	Not specified
Yaghoobi R, Kazerouni A, Kazerouni O[163]	Antioxidant, antibacterial and anti-inflammatory properties of honey.	Honey	CINAHL, BioMed Central, Cochrane Library, Medline and Embase	RCTs Reviews	Animal Human	Not stated	Last 30 years up to December 2012	Honey has antioxidant, antibacterial and anti-inflammatory properties. It can be used as a wound dressing to promote rapid and improved healing. These effects are due to honey's antibacterial action, secondary to its high acidity, osmotic effect, antioxidant, and hydrogen peroxide content. Using honey leads to improved wound healing in acute cases, pain relief in burn patients and decreased inflammatory response in such patients. However, it has proven to be ineffective in chronic leg ulcers Anti-Inflammatory action: The anti-inflammatory action of honey reduces oedema and exudates, which can subsequently improve wound healing. This effect also reduces pain caused by pressure on nerve endings and reduces the amount of prostaglandin produced in the inflammatory process	Not reported

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Oryan A, Alemzadeh E, Moshiri A [164]	To review the mechanisms and therapeutic properties of honey on wound healing	Mechanisms and therapeutic properties of honey on wound healing	Not stated	Not stated	Not stated	Not stated	Not stated	In relation to the anti-inflammatory activity Reduced oedema and pain (6 studies) Debridement action contributes to the painless lifting off of the slough (3 studies)	
Vyhlídalová D, Kozáková R, Zeleníková R [166]	To identify the effectiveness of products containing honey in the management of nonhealing wounds	Honey	PubMed, Science Direct, EBSCO and Google Scholar	13 primary studies retrieved RCT, 8 studies Prospective, 5 studies	The number of participants in the assessed studies ranged from 10 to 375. Mostly, adults with diabetic and lower leg ulcers, or malignant fungating wounds (MFW)	20	2007-2017	Studies assessed in the review investigated the mean wound healing time, number (percentage) of completely or partly healed cases, pain intensity, odour and antibacterial activity of honey. The outcomes of most studies showed a shorter mean healing time, higher percentages of completely healed wounds and more effective eradication of wound infection. Only three studies reported no significant improvement in the treatment of lower leg and diabetic ulcers and malignant wounds with honey. CONCLUSION: Honey is an effective substance in the management of wounds and may be used at any phase of healing for any type of wounds, providing that the patient's allergies to some components of dressings are ruled out.	Belgium Egypt Germany Portugal Qatar New Zealand Malaysia Denmark Greece Saudi Arabia India Pakistan Hong Kong
Anastasiou IA, Eleftheriadou I, Tentolouris A, Samakidou G, Papanas N, Tentolouris N [165]	To summarise the therapeutic properties of honey and the data regarding its possible favourable effects on diabetic wound healing	Therapeutic effects of honey in vitro effect, and the efficacy and/or mechanism of action of several types of honey used for the treatment of diabetic animal wounds	MEDLINE, EMBASE, and the Cochrane Library	In vitro and in vivo	Animals	No PRISMA flow diagram included	1986 to April 2021	Evidence from 4 studies suggested that honey can reduce prostaglandin levels and thus decrease oedema, exudation and inflammation, and ultimately enhance wound healing and reduce topical pain Also, a suggestion that it provides painless debridement	

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Rojczyk E, Klama-Baryła A, Łabuś W, Wilemska-Kucharzewska K, Kucharzewski M [170]	To provide an overview of information on Polish research on propolis and its medical application with particular emphasis on studies concerning wound healing.	Propolis	PubMed, Web of Science, Google Scholar	All Polish research that has contributed to the topic	Animals Humans	Undisclosed	Undisclosed	Use of propolis for pain associated with mouth ulcers (recurrent aphthous stomatitis) and post-tonsillectomy Anti-inflammatory activities discussed Propolis-based dressings and pain not discussed per se	Polish Research
Yilmaz AC & Aygin D [167]	To evaluate the place of honey in wound treatment by investigating the randomised controlled studies	Difference of honey from other wound care materials in wound healing	MEDLINE, CINAHL, PUBMED, Google Scholar and Cochrane databases	RCTs	Human studies including burns, ulcers (Chronic Wounds), pressure sores, trauma, and post-operative wounds (n=17) Total number of patients – intervention and control 1716	30	2009 to 2019	Honey in acute and chronic wounds provided rapid epithelisation and wound contraction in wound healing, had anti-inflammatory and debridement effects, decreased the pain, ensured infection control, shortened the time of wound healing and was cost-effective Four studies mentioned pain as an outcome specifically. One study related to burn wounds. Three included chronic wounds (unspecified)	n=3 studies Pakistan Iran India n=2 studies Saudi Arabia n=1 study Denmark Indonesia Greece China Czech Republic UK

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Anyanwu, GO, Nisar-ur-Rehman N, Onyeneke CE, Rauf K [174]	To provide for the first time a repository of ethnopharmacological information while critically evaluating the relation between the traditional medicinal uses, chemical constituents and pharmacological activities of the Anthocleista species so as to unveil opportunities for future research.	Anthocleista species	PubMed, Google Scholar, SciFinder, Web of Science, Scopus, PubChem and other web sources	Unspecified Animal and human	Unspecified Where pain was mentioned this was for chest and abdominal pain Effect on pain also measured in animals: infliction of acute injuries	Unspecified	Unspecified	Anthocleista species showed antidiabetic, antiplasmodial, antimicrobial, hypotensive, spasmogenic, anti-obesity, antiulcerogeni, analgesic, anti-inflammatory, antioxidant, antitrypanosomal, anthelmintic, fertility, diuretic and laxative activities which supports most of their uses in traditional medicine.	For pain , wounds and inflammation studies: Nigeria Caneroun Guinea Cote d'Ivoire Kenya Tanzania Ghana Gabon Equatorial Guinea Congo

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Tsichlakidou A, Govina O, Vasilopoulos G, Kavga A, Vastardi M, Kalemikerakis I[171]	Symptom management of malignant fungating wounds	Any intervention in the management of MFW Managing the main symptoms, which are malodour, exudate, pain and bleeding MA(S)D Manuka Honey NPWT Foam vs Silver Foam Bleeding	Medline	Cross-sectional (n=20) Case Study (n=1) Patient Group Study (n=5) Qualitative Descriptive & Cross Sectional (n=24) RCT (n=26) Case Study (n=1) Case Study (n=1) RCT (n=69) Single-blind RCT (n=67) Case study (n=1) Case study (n=2)	Breast Oral SCC Melanoma, Sarcoma (2), Breast Breast Breast, head, neck and other locations SCC SCC Breast, head, neck and other locations Breast, head, neck and other locations SCC Torso	9	2008 to 2017	According to the results, odour and exudates were significantly decreased by the use of honey and silver dressings. Wound cleaning with saline or tap water and the use of metronidazole had also positive results. Pain management was performed by the systematic use of opioids and the administration of an additional dose prior to the dressing change	

Authors	Aim/purpose of systematic review/ outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and / or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context/setting/ geographical location of studies included
Peplow PV, Chung T, Baxter GD [177]	To provide evidence of the scientific bases by examining the effects in humans and animals of two clinical applications of low-level laser technologies	Effects in humans and common laboratory animals of laser acupuncture for pain relief and laser-stimulated wound healing	PubMed	15 human clinical trials 16 animals (rat) Case studies Observational	41 patients in total – not chronic wounds Modified VAS used for pain (self-evaluation) Or 'patients reporting of pain' – not specified	31 Laser-stimulated wound healing N=5 human studies Pain and inflammation	End of January 2010	Results consistently demonstrated the potential of laser irradiation to reduce pain and inflammation, improve blood flow, and stimulate wound repair The consensus from the included studies on laser acupuncture and laser-stimulated wound healing is positive in terms of supporting the rationale for the application of laser to decrease pain and inflammation, improve blood flow, and increase tissue regeneration	Not specified
Liberato SMD, Souza AJG, Costa IKF, Torres GdV, Fortes AF, Lira ALBdC[146]	Nursing interventions used for the management of pain in people with venous ulcer	Any nursing intervention for pain management as per the Nursing Interventions Classification	PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ISI Web of Knowledge, SCOPUS, The Cochrane Library and Latin American Literature and Caribbean Health Sciences (LILACS)	RCT (n=4), double-blind crossover clinical trial, prospective case series, clinical trial (not randomised)	Leg ulcers, venous, chronic	7 studies (No. of participants not stated)	Search undertaken in June 2013	Consider the referral of the patient, the family, and the persons significant to support groups and other resources when appropriate Teach the use of non pharmacological techniques before, after and, if possible, during painful activities; before the pain occurs or increase; and along with other measures of pain relief	Canada, Denmark, Australia, UK

Traditional Chinese Medicine

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context /setting/ geographical location of studies included
Ma X, Zheng C, Hu C, Rahman K, Qin L [172]	One section examined: Anti-inflammatory, antipyretic and analgesic activity Animal studies – not related to pain and wounds	Ethnopharmacological uses in Chinese medicine, phytochemistry, pharmacology and toxicology of *Desmodium* species	Chinese Herbal Classics PubMed, Scopus and Web of Science, SciFinder	Experimental Animal Human	Animals Humans	Unclear	Not reported		Not reported
Li X, Xiao QQ, Ze K, Li S, Wang YF, Zhou M, Yang QT, Li FL, Li B [173]	To evaluate the effectiveness of the external application of traditional Chinese medicine (EA-TCM) on venous ulcers.	The most common form of EA-TCM, used in nine trials, was ointment, including She, Xiang, Zhen, Zhu [20], Kui,Yang, Ping [9], Sheng, Ji [19], moist exposed burn [15], Sheng, Ji, Yu, Hong [11, 21], Hong, You [18, 22], and Fu, Fang, San, Huang ointments [23]. Other forms of EATCM used in clinical trials were powders in three trials [10, 14, 16], Chinese-herb external washing in three trials [17, 22, 24], paste in one trial [9], and oil in one trial [25]	MEDLINE), Excerpta Medica data BASE (EMBASE), Cochrane Central Register, China National Knowledge Infrastructure database, Chinese Scientific Journals Full Text Database, Wanfang Data Knowledge Service Platform, and the Chinese Biomedical Literature Service System	RCTs	Venous Ulcers A total of 1269 participants were included in these trials, with 660 and 609 in the experimental and control groups, respectively. The sample sizes of these trials ranged from 51 to 164	16	Earliest citation to April 2015	Sixteen of 193 potentially relevant trials met the inclusion criteria; however, their methodological qualities were low. Comparison of the same intervention strategies revealed significant differences in total effectiveness rates between EA-TCM and conventional therapy groups (RR = 1.22, 95% confidence interval [CI] = 1.16– 1.29, and $P < 0.00001$). Compared to conventional therapy, EA-TCM combined with conventional therapy had a superior total effectiveness rate (RR = 1.11, 95% CI = 1.04–1.19, and $P = 0.003$). There were no significant differences in recurrence rates during follow-up and final pain measurements between the experimental and those in the control groups (RR = 0.86, 95% CI = 0.31–2.39, and $P = 0.85$; MD −0.75, 95% CI = −2.15–0.65, and $P = 0.29$) The evidence that EA-TCM is an effective treatment for venous ulcers is encouraging, but not conclusive due to the low methodological quality of the RCTs.	China

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context /setting/ geographical location of studies included
Ashraf K, Haque MR, Amir M, Ahmad N, Ahmad W, Sultan S, et al. (157)	Pharmacognosy, phytochemistry, phytochemical, and pharmacological properties of Ficus and its important species	Ficus deltoidea Jack (Moraceae)	Web of Science, Science Direct, Springer, SciFinder, PubMed, Scopus, Medline, Embase, and Google Scholar	Mainly experimental	Undisclosed – appears to be mainly animal studies	No PRISMA diagram included	Not disclosed	Suggested effects include: Anticancer Antibacterial Anti-inflammatory and antinociceptive Antiulcerogenic (peptic ulcer) Wound Healing -suggestion that flavinoids protect tissue from oxidative stress Antioxidant Antidiabetic Uterotonic Little evidence to support the safety and efficacy	Not reported but appears to be Malaysia

Authors	Aim/purpose of systematic review/outcomes	Interventions/ phenomena of interest	Databases sourced and searched	Types of studies included and/or method	Participant details	Number of studies included	Date range of database searching	Summary of results/findings	Context /setting/ geographical location of studies included
Ongarora BG [175]	to explore the technological improvements in the management of chronic wounds	alleviating pain, promoting healing, or controlling wound infections.	PubMed, Scopus, Web of Science, Medline, and Clinical Trials	Articles in scientific journals	Not reported	119	Published after the year 2000	Low dosage of topical corticosteroid treatments is known to produce positive effects in chronic wounds. It accelerates healing, and reduces pain, besides suppressing hypergranulation tissue formation in 79% of the patients Ref- Hofman D, Moore K, Cooper R, Eagle M, Cooper S. Use of topical corticosteroids on chronic leg ulcers. J Wound Care. 2007;16(5): 227-230. 1 case study reporting on the use of ciprofloxacin (conventional drug) and Triphalā (ayurvedic medicine) An ayurvedic procedure involving the washing of the affected part with Triphalā (a formulation composed of Emblica officinalis, Terminalia chebula, and Terminalia bellirica) to reduce pain and infection was performed. The decoction was used daily together with the application of wound dressing with turmeric powder, neem bark powder, and Medi honey. Gauze and a two-layered compression wrap were also applied. Ayurvedic protocols continued daily for a period of 6 weeks. Marma therapeutic strokes to the legs were performed by a practitioner once per week for 6 weeks to improve blood circulation and increased the reabsorption of pooled lymph fluid.	Not reported

Note: References mentioned in Appendix 11 refer to the reviewed articles.