Policy Number	**DME101.044**
Policy Effective Date	**04/01/2025**

Noncontact Ultrasound Treatment for Wounds

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Related Policies (if applicable)
None

Disclaimer

Carefully check state regulations and/or the member contract.
Each benefit plan, summary plan description or contract defines which services are covered, which services are excluded, and which services are subject to dollar caps or other limitations, conditions or exclusions. Members and their providers have the responsibility for consulting the member's benefit plan, summary plan description or contract to determine if there are any exclusions or other benefit limitations applicable to this service or supply. **If there is a discrepancy between a Medical Policy and a member's benefit plan, summary plan description or contract, the benefit plan, summary plan description or contract will govern.**

Legislative Mandates

EXCEPTION: For Illinois only: Illinois Public Act 103-0458 [Insurance Code 215 ILCS 5/356z.61] (HB3809 Impaired Children) states all group or individual fully insured PPO, HMO, POS plans amended, delivered, issued, or renewed on or after January 1, 2025 shall provide coverage for therapy, diagnostic testing, and equipment necessary to increase quality of life for children who have been clinically or genetically diagnosed with any disease, syndrome, or disorder that includes low tone neuromuscular impairment, neurological impairment, or cognitive impairment.

Coverage

Noncontact ultrasound treatment for wounds is **considered experimental, investigational, and/or unproven.**

Policy Guidelines

None.

Description

Ultrasound (US) delivers mechanical vibration above the upper threshold of human hearing (>20 kHz). US in the megahertz range (1-3 MHz) has been used to treat musculoskeletal disorders, often by physical therapists. Although the exact mechanism underlying its clinical effects is not known, therapeutic US has been shown to have a variety of effects at a cellular level, including angiogenesis, leukocyte adhesion, growth factor, collagen production, and increases in macrophage responsiveness, fibrinolysis, and nitric oxide levels. The therapeutic effects of US energy in the kilohertz range have also been examined. Although the precise effects are not known, the low-frequency US in this range may improve wound healing via the production, vibration, and movement of micron-sized bubbles in the coupling medium and tissue.

The mechanical energy from the US is typically transmitted to the tissue through a coupling gel. Several high-intensity US devices with contact probes are currently available for wound débridement. Low intensity US devices have been developed that do not require coupling gel or other direct contact. The MIST Therapy® System delivers a saline mist to the wound with low-frequency US (40 KHz). A second device, the Qoustic Wound Therapy System™, also uses sterile saline to deliver US energy (35 KHz) for wound débridement and irrigation.

US is intended as an adjunct to standard wound care. Therefore, the evidence is needed that demonstrates US plus standard wound care provides superior wound closure outcomes compared with standard wound care alone.

The primary end points of interest for trials of wound closure are as follows, consistent with 2006 guidance from the U.S. Food and Drug Administration (FDA) for the industry in developing products for the treatment of chronic cutaneous ulcer and burn wounds (1):

- Incidence of complete wound closure.
- Time to complete wound closure (reflecting accelerated wound closure).
- Incidence of complete wound closure following surgical wound closure.
- Pain control.

Regulatory Status

In 2005, the MIST Therapy® device (Celleration) was cleared for marketing by the FDA through the 510(k) process "to promote wound healing through wound cleansing and maintenance débridement by the removal of yellow slough, fibrin, tissue exudates and bacteria." (2) In February 2015, Celleration was acquired by Alliqua Biomedical (Langhorne, PA). In August 2020, Sanuwave acquired related UltraMIST System assets.

In 2007, the AR1000 Ultrasonic Wound Therapy System (Arobella Medical, Minnetonka, MN) was cleared for marketing by the FDA through the 510(k) process, listing the MIST Therapy® system and several other ultrasonic wound débridement and hydrosurgery systems as predicate devices. The AR1000 system probe uses "contact or noncontact techniques to

achieve intended wound therapy modalities to promote wound healing." (3) Indications in the 510(k) summary are listed as "Selective and non-selective dissection and fragmentation of soft and/or hard tissue" and "Surgical, excisional or sharp-edge wound débridement (acute and chronic wounds, burns) for the removal of nonviable tissue including but not limited to diseased tissue, necrotic tissue, slough and eschar, fibrin, tissue exudates, bacteria, and other matter." (3) This device is now known as the Qoustic Wound Therapy System™ (K131096).

Several other devices have been approved as being substantially equivalent to the earlier devices. FDA product code: NRB

Rationale

Medical policies assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function -- including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

This literature review focuses on evidence evaluating whether the addition of noncontact low-frequency ultrasound (NLFU) improves wound healing compared with standard treatment alone. Observational studies may be considered if they provide additional information on adverse events or durability.

Noncontact Low-Frequency Ultrasound

Clinical Context and Therapy Purpose

The purpose of noncontact low-frequency ultrasound therapy in individuals who have any wound type (acute or nonhealing) is to improve wound healing.

The question addressed in this Medical Policy is: Does the use of noncontact low-frequency ultrasound therapy improve the net health outcome in individuals with any wound type (acute or nonhealing)?

The following PICO was used to select literature to inform this policy.

Populations
The relevant population(s) of interest are individuals with any wound type (acute or nonhealing).

Interventions
The therapy being considered is noncontact low-frequency ultrasound therapy.

Comparators
The following therapies/tools/rules/practices are currently being used to make decisions about wound care: Standard wound care.

Outcomes
The general outcomes of interest are symptoms, change in disease status, morbid events, quality of life, and treatment-related morbidity.

Study Selection Criteria
Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Consistent with a 'best available evidence approach,' within each category of study design, studies with larger sample sizes and longer durations were sought.
- Studies with duplicative or overlapping populations were excluded.

Systematic Reviews
Tricco et al. (2015) published an overview of systematic reviews on treatments for complex wounds, which reviewed multiple therapies including ultrasound. (4) The review by Voigt et al. (2011) was included. Conclusions related to ultrasound therapy are summarized in Table 1.

Table 1. Overview and Summary Conclusions of Systematic Reviews

Disorder	Intervention	Outcomes	Type of Review	QOE	Conclusion
Venous ulcer	US	Time to healing/ rate of healing	SR w/o MA	Low/moderate	No difference

Venous ulcer	HFUS, LFUS, US	Proportion of patients with healed wounds	SR with MA	High	No difference
Mixed arterial/venous ulcer	US	Wound area/size reduction	SR with MA	Low/moderate	Effective
Diabetic ulcer	US	Ulcer healing	SR w/o MA	Low/moderate	No difference
Pressure ulcer	US	Wound area/size reduction, time to healing/rate of healing	SR w/o MA	Low/moderate	No difference
Pressure ulcer	US	Proportion of patients with healed wounds	SR with MA	High and low/moderate	No difference
Pressure ulcer	US	Proportion of patients with healed wounds	SR w/o MA	Low/moderate	Uncertain (conflicting evidence or indeterminate)

Adapted from Trico et al. (2015). (4)
HFUS: high-frequency ultrasound; LFUS: low-frequency ultrasound; MA: meta-analysis; QOE: quality of evidence; SR: systematic review; US: ultrasound; w/o: without.

Tables 2 and 3 summarize systematic reviews that compare results from noncontact low-frequency ultrasound (NLFU) with standard care. The Voigt et al. (2011) systematic review only included RCTs; studies used contact or noncontact US for treating lower-limb wounds. (5) Five RCTs on NLFU were identified, 1 of which was unpublished. A pooled analysis of 2 sham-controlled trials found a significantly smaller proportion of non-healed wounds at 3 months in the NLFU group than in the control group (relative risk, 0.74; 95% confidence interval, 0.58 to 0.95; p=0.02). The two NLFU studies were those by Ennis et al. (2005; described in the following section), (6) and by Peschen et al. (1997), (7) which delivered US therapy with a dated device during foot bathing. A systematic review by Chang et al. (2017) (8) included all study types; however, only 2 of the RCTs (Ennis et al. [2005] [6] and Kavros et al. [2007] [9]) were included. Chang et al. (2017) did not include meta-analyses, and the narrative synthesis did not provide complete information on the range of comparative effects; therefore, it is not included in the tables below.

Table 2. Systematic Review Characteristics

Study (Year)	Dates	Studies	Participants	N (Range)	Design	Duration, months

Voight et al. (2011) (5)	Up to Mar 2011	2	Patients with chronic lower-limb wounds	22-55	RCTs	2-3

RCT: randomized controlled trial.

Table 3. Systematic Review Results

Study (Year)	Time to Complete Wound Healing	% Nonhealed Wounds at 3 Months	Pain Outcomes	Safety Outcomes
Voight et al. (2011) (5)				
Total Number	NR	77	NR	NR
Pooled effect (95% CI)		RR=0.74 (0.58 to 0.95), p=0.02		
I^2, %		0		

CI: confidence interval; I^2: heterogeneity measure; NR: not reported; RR: relative risk.

Randomized Controlled Trials

One double-blind, multicenter, sham-controlled trial and a number of unblinded RCTs comparing NLFU with standard wound care alone have been performed. Trials including at least 25 patients are described in the Tables 4-7 and the following text. All RCTs used MIST therapy and, other than Beheshti et al. (2014) (10) and Olyaie et al. (2013) (11) that did not report a funding source, all were industry funded. One study addressed diabetic foot ulcers. Four RCTs included patients with venous leg ulcers and another evaluated treatment of split-thickness graft donor sites. All studies except that on split-thickness graft donor sites included patients with nonhealing wounds; eligibility criteria included wounds that had not healed after at least 4 weeks. Standard care interventions varied, but generally consisted of wound cleaning, noncontact dressings, compression and, if deemed necessary by providers, débridement. In 2 studies (White et al. [2016] [12], Gibbons et al. [2015] [13]), authors mentioned following national guidelines for the standard of care intervention. Prather et al. (2015) (14) did not describe the standard care intervention and Beheshti et al. reported only that compression was used.

Table 4. Summary of RCT Characteristics[a]

					Interventions	
Author (Year)	**Countries**	**Sites**	**Dates**	**Participants**	**Active**	**Comparator**
White et al. (2016) (12)	UK	1	Aug 2012-Nov 2013	Patients with venous leg ulcers (≥6 wk)	• n=17 • NLFU: 3x/wk for 8 wk (after 2-wk run-in) + SOC	• n=19 • SOC: >1 visit per week for 8 wk

Gibbons et al. (2015) (13)	US	22	Apr 2012-Mar 2014	Patients with venous leg ulcers (≥30 d)	• n=40 • NLFU: 3x/wk for 4 wk + SOC	• n=41 • SOC: 3x/wk for 4 wk
Prather et al. (2015) (14)	US	1	Feb 2012- Jul 2013	Patients with split-thickness graft donor sites	• n=16 • NLFU: 1x/wk for 5 consecutive days (after 2-wk run-in) + SOC	• n=15 • SOC: 1x/wk for 5 consecutive days (after 2-wk run-in)
Olyaie et al. (2013) (11)	Iran	1	Apr 2011-Apr 2012	Patients with venous leg ulcers (≥4 wk)	• n=30 • NLFU: 3x/wk for 3 mo or until healed + SOC • n=30 • HFU: 3x/wk for 3 mo or until healed + SOC	• n=30 • SOC: 3x/wk for 3 mo or until healed
Beheshti et al. (2014) (10)	Iran	1	Apr 2011-Aug 2012	Patients with venous leg ulcers (≥4 wk)	• n=30 • NLFU: 3x/wk until healed + SOC • n=30 • HFU: 3x/wk until healed + SOC	• n=30 • SOC: Compression therapy (visit frequency NR)
Kavros et al. (2007) (9)	US	1	2004-2006	Patients with nonhealing foot, ankle, or leg wounds (≥8 wk)	• n=35 • NLFU: 3x/wk for 12 wk + SOC	• n=35 • SOC: daily visits
Ennis et al. (2005) (6)	US, Canada	26	NR	Patients with diabetic foot ulcers	• n=70 • NLFU: 3x/wk for 12 wk + SOC	• n=63 • SOC: x3/wk for 12 wk

NLFU: noncontact low-frequency ultrasound; n: number; NR: not reported; RCT: randomized controlled trial; SOC: standard of care; wk: week.

[a] Includes trials with ≥25 participants.

Table 5. Summary of RCT Results[a]

Study (Year)	Time to Complete Wound Healing	% With Complete Wound Healing	Change in Wound Size	Pain Outcomes	Adverse Events
		At 8 Wk	**Mean % Change in Wound Area at 8 WK**	**Mean Reduction in VAS Pain Score at 8 Wk**	**No. of Events**
White et al. (2016) (12)					
N	NR	36	36	36	36
NLFU+SOC		3 (16%)	-46.6%	-14.35	24
SOC		1 (6%)	-39.2%	-5.27	36
TE (95% CI)		NR	Diff=-7.4 (-33.4 to 18.6); p=0.57	Diff=-9.08 (-19.23 to 1.06); p=0.08	NR
		At 7 Wk	**Mean % Change In Wound Area at 4 Wk**	**Mean % Reduction in VAS Pain Score at 4 Wk**	
Gibbons et al. (2015) (13)					
N	NR	81	81	81	NR
NLFU+SOC		11 (28%)	-61.6%	-80%	
SOC		6 (15%)	-45.0%	-20%	
TE (95% CI)		NR	Diff/CI NR; p=0.02	Diff/CI NR; p=0.01	
		At 14 Days		**Mean VAS Pain Score at 3 Wk**	
Prather et al. (2015) (14)					
N	NR	NR	NR	NR	NR
NLFU+SOC	12.1 d	92%		0.04	
SOC	21.3 d	64%		1.0	
TE (95% CI)	HR/CI NR; p=0.04	NR		NR	
			Mean Wound Size at 4 Mo	**Pain on 0-20 Scale at 4 Mo**	
Olyaie et al. (2013) (11)					

N	90	NR	90	90	NR
HFUS+SOC	6.86 mo		3.23 cm^2	3.96	
NLFU+SOC	6.65 mo		2.72 cm^2	3.26	
SOC	8.50 mo		4.28 cm^2	5.10	
TE (95% CI)	Diff/CI NR; between 3 groups p=0.001		Diff/CI NR; between 3 groups p=0.02	Diff/CI NR; between 3 groups p=0.02	
				Pain on 0-20 Scale at 4 Mo	
Beheshti et al. (2014) (10)					
N	90	NR	NR		NR
HFUS+SOC	6.10 mo			4.20	
NLFU+SOC	5.70 mo			4.20	
SOC	8.13 mo			6.56	
TE (95% CI)	Diff/CI NR; p<0.001[b]			Diff/CI NR; p<0.001[b]	
			% With 50% Reduction in Wound Volume at 12 Wk		
Kavros et al. (2007) (9)					
N	NR	NR		NR	NR
NLFU+SOC			63%		
SOC			29%		
TE (95% CI)			Ratio/CI NR; p<0.001		
		At 10 Wk		**No. With Pain During Treatment, Pain Scale Not Described**	**% of Patients With Event**
Ennis et al. (2005) (6)					
N	55[c]	133	NR	133	133
NLFU+SOC	9.2 wk	26%		1	Mild: 51% Moderate: 41% Severe: 7%
SOC	11.0 wk	22%		3	Mild: 46% Moderate: 39% Severe: 15%

TE (95% CI)	HR NR; p<0.014	Ratio/CI NR; p=0.69			Ratios/CIs NR; p=0.27

CI: confidence interval; Diff: difference; HFUS: high-frequency ultrasound; HR: hazard ratio; NLFU: noncontact low-frequency ultrasound; NR: not reported; RCT: randomized controlled trial; SOC: standard of care; TE: treatment effect; VAS: visual analog scale.

[a] Includes trials with ≥25 participants.

[b] The comparison for this p-value is unclear.

[c] Per-protocol analysis.

Limitations in the body of evidence are summarized in Tables 6 and 7 and the following paragraphs. Ennis et al. (2005) published findings of a double-blind, multicenter, sham-controlled trial of MIST therapy for recalcitrant diabetic foot ulcers in 133 patients. (6) Patients were treated with active or sham MIST therapy 3 times per week, with débridement as needed and a weekly evaluation by an independent investigator. Twenty-four patients were lost to follow-up, and data from 54 patients were excluded from analysis due to protocol violations (5 centers inverted the treatment distances for the active and sham devices), leaving 55 (41%) patients for the per-protocol analysis. Investigators reported significant improvement in the active treatment group (11/27 [41%] patients) compared with the control group (4/28 [14%] patients) in the proportion of wounds healed (defined as complete epithelialization without drainage). However, intention-to-treat analysis showed no difference in wound healing between the active (n=70 [26%]) and control (n= 63 [22%]) groups. In addition to the 59% loss to follow-up, there was a difference in the ulcer area at baseline (1.7 cm^2 vs 4.4 cm^2, respectively) and chronicity of wounds (35 weeks vs 67 weeks, respectively) that favored MIST therapy in the per-protocol groups. Due to the serious limitations of this trial, these results are considered inconclusive.

In the White et al. (2016), (12) Gibbons et al. (2015), (13) and Prather et al. (2015) (14) studies, patients, and providers were not blinded, but outcome assessment was blinded. The other studies did not mention blinding. All but one RCT reported improved (statistically significant) results for the primary outcome with NLFU than with standard of care. However, these studies had methodologic limitations. Regarding outcome assessment, complete healing is considered the most clinically relevant outcome. (15) Complete healing was reported in a subset of the studies, and most were not powered for this outcome or the outcome used to power the study was unclear. Only Prather et al. (2015) (14) and Ennis et al. (2005) (6) conducted blinded outcome assessments and reported complete healing. Another limitation of the body of evidence is that some of the standard care interventions involved different visit schedules than the NLFU intervention, and the effects of this differential in face-to-face contact could partially explain the difference in findings between intervention and control groups.

Table 6. Study Relevance Limitations in RCTs

Study	Population[a]	Intervention[b]	Comparator[c]	Outcomes[d]	Follow-Up[e]
White et al. (2016) (12)		3. Follow-up schedule for SOC involved	3. Follow-up schedule for SOC involved		

		fewer visits than NLFU	fewer visits than NLFU		
Gibbons et al. (2015) (13)				3. Adverse events not reported	
Prather et al. (2015) (14)			1. Did not describe SOC	3. Adverse events not reported	
Olyaie et al. (2013) (11)				3. Adverse events not reported	
Behesti et al. (2014) (10)			2. Only compression used 3. Details about frequency of SOC administration not provided	3. Adverse events not reported	
Kavros et al. (2007) (9)		3. Follow-up more intensive in SOC	3. Follow-up more intensive in SOC	1. Complete wound healing not reported 3. Adverse events not reported	
Ennis et al. (2005) (6)	None noted	None noted	None noted	None noted	None noted

NLFU: noncontact low-frequency ultrasound; SOC: standard of care

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.

[a] Population key: 1. Intended use population unclear; 2. Clinical context is unclear; 3. Study population is unclear; 4. Study population not representative of intended use.

[b] Intervention key: 1. Not clearly defined; 2. Version used unclear; 3. Delivery not similar intensity as comparator; 4.Not the intervention of interest.

[c] Comparator key: 1. Not clearly defined; 2. Not standard or optimal; 3. Delivery not similar intensity as intervention; 4. Not delivered effectively.

[d] Outcomes key: 1. Key health outcomes not addressed; 2. Physiologic measures, not validated surrogates; 3. No CONSORT reporting of harms; 4. Not establish and validated measurements; 5. Clinical significant difference not prespecified; 6. Clinical significant difference not supported.

[e] Follow-Up key: 1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.

Table 7. Study Design and Conduct Limitations in RCTs

Study	Allocation	Blinding	Selective Reporting	Follow-Up	Power	Statistical
White et al. (2016) (12)		1. Not blinded assignment 2. Not blinded assessment				
Gibbons et al. (2015) (13)		1. Not blinded assignment 2. Not blinded assessment				
Prather et al. (2015) (14)		1. Not blinded assignment				
Olyaie et al. (2013) (11)		1. Not blinded assignment 2. Not blinded assessment	1. Registration not documented in publication		1. No power calculations	
Beheshti et al. (2014) (10)		1. Not blinded assignment 2. Not blinded assessment	1. Registration not documented in publication		1. No power calculations	
Kavros et al. (2007) (9)		1. Not blinded assignment 2. Not blinded assessment	1. Registration not documented in publication		1. No power calculations	
Ennis et al. (2005) (6)				1, 5. High number of protocol deviations and exclusions	1. No power calculations	

RCT: randomized controlled trials.

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.
[a] Allocation key: 1. Participants not randomly allocated; 2. Allocation not concealed; 3. Allocation concealment unclear; 4. Inadequate control for selection bias.
[b] Blinding key: 1. Not blinded to treatment assignment; 2. Not blinded outcome assessment; 3. Outcome assessed by treating physician.
[c] Selective Reporting key: 1. Not registered; 2. Evidence of selective reporting; 3. Evidence of selective publication.
[d] Data Completeness key: 1. High loss to follow-up or missing data; 2. Inadequate handling of missing data; 3. High number of crossovers; 4. Inadequate handling of crossovers; 5. Inappropriate exclusions; 6. Not intent to treat analysis (per protocol for noninferiority trials).
[e] Power key: 1. Power calculations not reported; 2. Power not calculated for primary outcome; 3. Power not based on clinically important difference.
[f] Statistical key: 1. Analysis is not appropriate for outcome type: (a) continuous; (b) binary; (c) time to event; 2. Analysis is not appropriate for multiple observations per patient; 3. Confidence intervals and/or p values not reported; 4.Comparative treatment effects not calculated.

Summary of Evidence

For individuals who have any wound type (acute or nonhealing) who receive noncontact ultrasound therapy plus standard wound care, the evidence includes randomized controlled trials (RCTs) and systematic reviews. Relevant outcomes are symptoms, change in disease status, morbid events, quality of life, and treatment-related morbidity. The single double-blinded, sham-controlled randomized trial, which included patients with nonhealing diabetic foot ulcers, had substantial methodologic flaws (e.g., high dropout rate, baseline differences between groups) that limit the validity of the findings. In the remaining studies comprising the evidence base, all but 1 RCT comparing noncontact low-frequency ultrasound (NLFU) with standard wound care reported improved (statistically significant) results on the primary outcome with NLFU. However, these studies also had several methodologic limitations. Complete healing is most clinically relevant outcome. None of the RCTs on venous leg ulcers reported complete healing as its primary outcome measure, and none had blinded outcome assessment. Only 1 RCT, which addressed split-thickness graft donor sites, reported on the proportion of patients with complete healing and had blinded outcome assessment. Another limitation of the body of evidence is that some standard of care interventions involved fewer visits than the NLFU intervention, and the differences in intensity of care resulting from this differential in face-to-face contact could partially explain the difference in findings between intervention and control groups. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Practice Guidelines and Position Statements

Association for the Advancement of Wound Care

In 2010, the Association for the Advancement of Wound Care (AAWC) published guidelines on the care of pressure ulcers. (16) Noncontact low-frequency ultrasound (NLFU) therapy was included as a potential second-line intervention if first-line treatments did not result in wound healing.

The AAWC guidelines on the treatment of venous ulcers, updated in 2015, stated that low-frequency US treatment requires additional evidence before it can be considered an appropriate treatment. (17)

National Institute for Health and Care Excellence

In 2011, the National Institute for Health and Care Excellence (NICE) published a medical technologies guidance on the MIST Therapy system for the promotion of wound healing. (18) The assessment concluded that "the amount and quality of published evidence on the relative effectiveness of the MIST Therapy System is not sufficient, at the time of writing, to support the case for routine adoption of the MIST Therapy System in the NHS." The guidance was last reviewed in 2016 with no changes to the recommendations. NICE states that the guidance will be reviewed in the future if there is new evidence that is likely to change the recommendations.

Society for Vascular Surgery, American Venous Forum, American Podiatric Medical Association

In 2014, the Society for Vascular Surgery in collaboration with the American Venous Forum published joint guidelines on the management of venous leg ulcers. (19) The guidelines recommended adjuvant wound therapy options for venous leg ulcers that fail to demonstrate improvement after 4 to 6 weeks of standard wound therapy (strength of recommendation: grade 1; quality of evidence: level B) but recommended against routine ultrasound therapy for venous leg ulcers (strength of recommendation: grade 2; quality of evidence: level B). This guideline is currently archived.

In 2016, the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association published joint guidelines on the management of diabetic foot ulcers. (20) The guidelines recommended adjuvant therapy for diabetic foot ulcers that fail to demonstrate more than 50% wound area reduction after 4 weeks of standard wound therapy. The adjunctive wound therapy options listed in the guidelines included negative pressure therapy, biologics (platelet-derived growth factor, living cellular therapy, extracellular matrix products, amniotic membrane products), and hyperbaric oxygen therapy. Ultrasound therapy was not mentioned as a recommended adjuvant option.

Ongoing and Unpublished Clinical Trials

A search of ClinicalTrials.gov in December 2023 did not identify any ongoing or unpublished trials that would likely influence this policy.

Coding

Procedure codes on Medical Policy documents are included **only** as a general reference tool for each policy. **They may not be all-inclusive.**

The presence or absence of procedure, service, supply, or device codes in a Medical Policy document has no relevance for determination of benefit coverage for members or reimbursement for providers. **Only the written coverage position in a Medical Policy should be used for such determinations.**

Benefit coverage determinations based on written Medical Policy coverage positions must include review of the member's benefit contract or Summary Plan Description (SPD) for defined coverage vs. non-coverage, benefit exclusions, and benefit limitations such as dollar or duration caps.

CPT Codes	97610
HCPCS Codes	None

*Current Procedural Terminology (CPT®) ©2024 American Medical Association: Chicago, IL.

References

1. Center for Drug Evaluation and Research, Center for Biologics Evaluation and Research, Center for Devices and Radiological Health. Guidance for Industry: Chronic Cutaneous Ulcer and Burn Wounds - Developing Products for Treatment. Rockville, MD: Food and Drug Administration; 2006 June.
2. Food and Drug Administration. MIST[TM] Therapy System: 510(k) Premarket Notification: K050129. Available at: <https://www.accessdata.fda.gov> (accessed December 29, 2023).
3. Food and Drug Administration. 510(k) Summary: 510(k) -AR1000 Series K131096, Arobella Medical, LLC. 2014. Available at: <https://www.accessdata.fda.gov> (accessed December 29, 2023).
4. Tricco AC, Antony J, Vafaei A, et al. Seeking effective interventions to treat complex wounds: an overview of systematic reviews. BMC Med. Apr 22, 2015; 13:89. PMID 25899006
5. Voigt J, Wendelken M, Driver V, et al. Low-frequency ultrasound (20-40 kHz) as an adjunctive therapy for chronic wound healing: a systematic review of the literature and meta-analysis of eight randomized controlled trials. Int J Low Extrem Wounds. Dec 2011; 10(4):190-199. PMID 22184750
6. Ennis WJ, Foremann P, Mozen N, et al. Ultrasound therapy for recalcitrant diabetic foot ulcers: results of a randomized, double-blind, controlled, multicenter study. Ostomy Wound Manage. 2005; 51(8):24-39. PMID 16234574
7. Peschen M, Weichenthal M, Schopf E, et al. Low-frequency ultrasound treatment of chronic venous leg ulcers in an outpatient therapy. Acta Derm Venereol. Jul 1997; 77(4):311-314. PMID 9228227
8. Chang YR, Perry J, Cross K. Low-frequency ultrasound debridement in chronic wound healing: a systematic review of current evidence. Plast Surg (Oakv). Feb 2017; 25(1):21-26. PMID 29026808
9. Kavros SJ, Miller JL, Hanna SW. Treatment of ischemic wounds with noncontact, low-frequency ultrasound: the Mayo Clinic experience, 2004-2006. Adv Skin Wound Care. Apr 2007; 20(4):221-226. PMID 17415030
10. Beheshti A, Shafigh Y, Parsa H, et al. Comparison of high-frequency and MIST ultrasound therapy for the healing of venous leg ulcers. Adv Clin Exp Med. Nov-Dec 2014; 23(6):969-975. PMID 25618125
11. Olyaie M, Rad FS, Elahifar MA, et al. High-frequency and noncontact low-frequency ultrasound therapy for venous leg ulcer treatment: a randomized, controlled study. Ostomy Wound Manage. Aug 2013; 59(8):14-20. PMID 23934374

12. White J, Ivins N, Wilkes A, et al. Non-contact low-frequency ultrasound therapy compared with UK standard of care for venous leg ulcers: a single-centre, assessor-blinded, randomised controlled trial. Int Wound J. Oct 2016; 13(5):833-842. PMID 25619411
13. Gibbons GW, Orgill DP, Serena TE, et al. A prospective, randomized, controlled trial comparing the effects of noncontact, low-frequency ultrasound to standard care in healing venous leg ulcers. Ostomy Wound Manage. Jan 2015; 61(1):16-29. PMID 25581604
14. Prather JL, Tummel EK, Patel AB, et al. Prospective randomized controlled trial comparing the effects of noncontact low-frequency ultrasound with standard care in healing split-thickness donor sites. J Am Coll Surg. Aug 2015; 221(2):309-318. PMID 25868409
15. Gottrup F, Apelqvist J, Price P, et al. Outcomes in controlled and comparative studies on non-healing wounds: recommendations to improve the quality of evidence in wound management. J Wound Care. Jun 2010; 19(6):237-268. PMID 20551864
16. Association for the Advancement of Wound Care (AAWC). Guideline of Pressure Ulcer Guidelines. (2010). Available at: <https://aawconline.memberclicks.net> (accessed December 29, 2023).
17. Association for the Advancement of Wound Care (AAWC). International Consolidated Venous Ulcer Guideline (ICVUG) (2015) (Update of AAWC Venous Ulcer Guideline, 2005 and 2010). 2015 Available at: <https://www.aawconline.memberclicks.net> (accessed December 28, 2023).
18. National Institute for Health and Care Excellence. Medical technologies guidance (MTG5): The MIST Therapy System for the promotion of wound healing. July 25, 2011. Available at: <https://www.nice.org> (accessed December 29, 2023).
19. O'Donnell TF, Passman MA, Marston WA, et al. Management of venous leg ulcers: clinical practice guidelines of the Society for Vascular Surgery (R) and the American Venous Forum. J Vasc Surg. Aug 2014; 60(2 Suppl):3S-59S. PMID 24974070
20. Hingorani A, LaMuraglia GM, Henke P, et al. The management of diabetic foot: A clinical practice guideline by the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine. J Vasc Surg. Feb 2016; 63(2 Suppl):3S-21S. PMID 26804367

Centers for Medicare and Medicaid Services (CMS)

The information contained in this section is for informational purposes only. HCSC makes no representation as to the accuracy of this information. It is not to be used for claims adjudication for HCSC Plans.

The Centers for Medicare and Medicaid Services (CMS) does not have a national Medicare coverage position. Coverage may be subject to local carrier discretion.

A national coverage position for Medicare may have been developed since this medical policy document was written. See Medicare's National Coverage at <https://www.cms.hhs.gov>.

Policy History/Revision

Date	Description of Change
04/01/2025	Reviewed. No changes.
05/15/2024	Document updated with literature review. The following editorial change was made to Coverage: Revised statement from "Ultrasound wound therapy is considered experimental, investigational and/or unproven" to "Noncontact ultrasound treatment for wounds is considered experimental, investigational and/or unproven." Reference 18 added; others revised. Title changed from Ultrasound Wound Therapy.
11/15/2023	Reviewed. No changes.
04/15/2022	Document updated with literature review. Coverage unchanged. No new references added; others updated.
06/15/2021	Reviewed. No changes.
05/01/2020	Document updated with literature review. Coverage unchanged. No new references added.
04/15/2019	Reviewed. No changes.
07/01/2018	Document updated with literature review. Coverage unchanged. References 1-4, 7-8, 17-19 added.
06/15/2017	Reviewed. No changes.
07/01/2016	Document updated with literature review. The following change(s) were made: Coverage for noncontact normothermic wound therapy was moved to policy DME101.050. Coverage unchanged for ultrasound wound therapy. Document title changed from Noncontact Wound Therapy.
07/01/2015	Policy updated with literature review. Coverage unchanged.
11/01/2014	Document updated with literature review. Coverage unchanged.
04/15/2012	Document updated with literature review. Coverage unchanged.
04/01/2010	Document updated with literature review. Coverage unchanged.
01/01/2008	Document updated with literature review. The following change was made: Noncontact, low frequency ultrasound wound therapy is considered experimental, investigational and unproven.
10/01/2006	Document updated with literature review
07/01/2004	New medical document.