Medical Coverage Policy

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Coverage Policy Number..... 0525

Peripheral Nerve Destruction for Pain Conditions

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INSTRUCTIONS FOR USE

The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgment where appropriate and have discretion in making individual coverage determinations. Where coverage for care or services does not depend on specific circumstances, reimbursement will only be provided if a requested service(s) is submitted in accordance with the relevant criteria outlined in the applicable Coverage Policy, including covered diagnosis and/or procedure code(s). Reimbursement is not allowed for services when billed for conditions or diagnoses that are not covered under this Coverage Policy (see "Coding Information" below). When billing, providers

must use the most appropriate codes as of the effective date of the submission. Claims submitted for services that are not accompanied by covered code(s) under the applicable Coverage Policy will be denied as not covered. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.

Overview

This Coverage Policy addresses peripheral nerve destruction for pain management using percutaneous cryoablation or other ablation techniques including electrical, laser, chemical, or radiofrequency. These procedures may be performed alone or in combination for treatment of pain conditions such as headache, occipital neuralgia, joint pain, and neuropathic or nerve entrapment syndromes.

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The following ablative treatments of peripheral or truncal nerves are considered not medically necessary for the treatment of pain conditions:

- Percutaneous cryoablation
- Pulsed radiofrequency ablation

Peripheral nerve destruction using cryoablation or laser, electrical, chemical or radiofrequency ablation is not covered or reimbursable for treatment of ANY of the following conditions:

- sacroiliac joint pain
- knee pain
- hip pain
- shoulder pain
- foot/heel pain
- headache
- occipital neuralgia
- intercostal neuralgia
- extremity pain resulting from any of the following:
  - complex regional pain syndrome
  - peripheral nerve entrapment/compression (e.g., carpal or tarsal tunnel syndrome, sciatica)
  - peripheral neuropathy

Coding Information

Notes:

1. This list of codes may not be all-inclusive since the American Medical Association (AMA) and Centers for Medicare & Medicaid Services (CMS) code updates may occur more frequently than policy updates.
2. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

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Considered Not Medically Necessary when used for the treatment of pain conditions as outlined in the above coverage policy statement:

CPT®* Codes	Description
64999	Unlisted procedure, nervous system
0440T	Ablation, percutaneous, cryoablation, includes imaging guidance; upper extremity distal/peripheral nerve
0441T	Ablation, percutaneous, cryoablation, includes imaging guidance; lower extremity distal/peripheral nerve
0442T	Ablation, percutaneous, cryoablation, includes imaging guidance; nerve plexus or other truncal nerve (eg, brachial plexus, pudendal nerve)

HCPCS Codes	Description
C9808	Nerve cryoablation probe (e.g., cryoICE, cryoSPHERE, cryoSPHERE MAX, cryoICE cryosphere, cryoICE cryo2), including probe and all disposable system components, non-opioid medical device (must be a qualifying Medicare non-opioid medical device for post-surgical pain relief in accordance with Section 4135 of the CAA, 2023)
C9809	Cryoablation needle (e.g., iovera system), including needle/tip and all disposable system components, non-opioid medical device (must be a qualifying Medicare non-opioid medical device for post-surgical pain relief in accordance with Section 4135 of the CAA, 2023)

Not Covered or Reimbursable when used for the treatment of pain conditions as outlined in the above coverage policy statement:

CPT®* Codes	Description
64620	Destruction by neurolytic agent, intercostal nerve
64624	Destruction by neurolytic agent, genicular nerve branches including imaging guidance, when performed
64632	Destruction by neurolytic agent; plantar common digital nerve
64640	Destruction by neurolytic agent; other peripheral nerve or branch

ICD-10-CM Diagnosis Codes	Description
G43.001	Migraine without aura, not intractable, with status migrainosus
G43.009	Migraine without aura, not intractable, without status migrainosus
G43.011	Migraine without aura, intractable, with status migrainosus
G43.019	Migraine without aura, intractable, without status migrainosus
G43.101	Migraine with aura, not intractable, with status migrainosus
G43.109	Migraine with aura, not intractable, without status migrainosus
G43.111	Migraine with aura, intractable, with status migrainosus
G43.119	Migraine with aura, intractable, without status migrainosus
G43.401	Hemiplegic migraine, not intractable, with status migrainosus
G43.409	Hemiplegic migraine, not intractable, without status migrainosus
G43.411	Hemiplegic migraine, intractable, with status migrainosus
G43.419	Hemiplegic migraine, intractable, without status migrainosus

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ICD-10-CM Diagnosis Codes	Description
G43.501	Persistent migraine aura without cerebral infarction, not intractable, with status migrainosus
G43.509	Persistent migraine aura without cerebral infarction, not intractable, without status migrainosus
G43.511	Persistent migraine aura without cerebral infarction, intractable, with status migrainosus
G43.519	Persistent migraine aura without cerebral infarction, intractable, without status migrainosus
G43.601	Persistent migraine aura with cerebral infarction, not intractable, with status migrainosus
G43.609	Persistent migraine aura with cerebral infarction, not intractable, without status migrainosus
G43.611	Persistent migraine aura with cerebral infarction, intractable, with status migrainosus
G43.619	Persistent migraine aura with cerebral infarction, intractable, without status migrainosus
G43.701	Chronic migraine without aura, not intractable, with status migrainosus
G43.709	Chronic migraine without aura, not intractable, without status migrainosus
G43.711	Chronic migraine without aura, intractable, with status migrainosus
G43.719	Chronic migraine without aura, intractable, without status migrainosus
G43.801	Other migraine, not intractable, with status migrainosus
G43.809	Other migraine, not intractable, without status migrainosus
G43.811	Other migraine, intractable, with status migrainosus
G43.819	Other migraine, intractable, without status migrainosus
G43.821	Menstrual migraine, not intractable, with status migrainosus
G43.829	Menstrual migraine, not intractable, without status migrainosus
G43.831	Menstrual migraine, intractable, with status migrainosus
G43.839	Menstrual migraine, intractable, without status migrainosus
G43.901	Migraine, unspecified, not intractable, with status migrainosus
G43.909	Migraine, unspecified, not intractable, without status migrainosus
G43.911	Migraine, unspecified, intractable, with status migrainosus
G43.919	Migraine, unspecified, intractable, without status migrainosus
G43.E01	Chronic migraine with aura, not intractable, with status migrainosus
G43.E09	Chronic migraine with aura, not intractable, without status migrainosus
G43.E11	Chronic migraine with aura, intractable, with status migrainosus
G43.E19	Chronic migraine with aura, intractable, without status migrainosus
G44.001-G44.89	Other headache syndromes
G54.0	Brachial plexus disorders
G54.1	Lumbosacral plexus disorders
G54.2	Cervical root disorders, not elsewhere classified
G54.4	Lumbosacral root disorders, not elsewhere classified
G56.00-G56.93	Mononeuropathies of upper limb
G57.00	Lesion of sciatic nerve, unspecified lower limb
G57.01	Lesion of sciatic nerve, right lower limb
G57.02	Lesion of sciatic nerve, left lower limb

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ICD-10-CM Diagnosis Codes	Description
G57.03	Lesion of sciatic nerve, bilateral lower limbs
G57.10	Meralgia paresthetica, unspecified lower limb
G57.11	Meralgia paresthetica, right lower limb
G57.12	Meralgia paresthetica, left lower limb
G57.13	Meralgia paresthetica, bilateral lower limbs
G57.30	Lesion of lateral popliteal nerve, unspecified lower limb
G57.31	Lesion of lateral popliteal nerve, right lower limb
G57.32	Lesion of lateral popliteal nerve, left lower limb
G57.33	Lesion of lateral popliteal nerve, bilateral lower limbs
G57.40	Lesion of medial popliteal nerve, unspecified lower limb
G57.41	Lesion of medial popliteal nerve, right lower limb
G57.42	Lesion of medial popliteal nerve, left lower limb
G57.43	Lesion of medial popliteal nerve, bilateral lower limbs
G57.50	Tarsal tunnel syndrome, unspecified lower limb
G57.51	Tarsal tunnel syndrome, right lower limb
G57.52	Tarsal tunnel syndrome, left lower limb
G57.53	Tarsal tunnel syndrome, bilateral lower limbs
G57.60	Lesion of plantar nerve, unspecified lower limb
G57.61	Lesion of plantar nerve, right lower limb
G57.62	Lesion of plantar nerve, left lower limb
G57.63	Lesion of plantar nerve, bilateral lower limbs
G57.70	Causalgia of unspecified lower limb
G57.71	Causalgia of right lower limb
G57.72	Causalgia of left lower limb
G57.73	Causalgia of bilateral lower limbs
G57.80	Other specified mononeuropathies of unspecified lower limb
G57.81	Other specified mononeuropathies of right lower limb
G57.82	Other specified mononeuropathies of left lower limb
G57.83	Other specified mononeuropathies of bilateral lower limbs
G57.90	Unspecified mononeuropathy of unspecified lower limb
G57.91	Unspecified mononeuropathy of right lower limb
G57.92	Unspecified mononeuropathy of left lower limb
G57.93	Unspecified mononeuropathy of bilateral lower limbs
G58.0	Intercostal neuropathy
G89.29	Other chronic pain
G89.4	Chronic pain syndrome
G90.50-G90.59	Complex regional pain syndrome I (CRPS II)
M00.011	Staphylococcal arthritis, right shoulder
M00.012	Staphylococcal arthritis, left shoulder
M00.019	Staphylococcal arthritis, unspecified shoulder
M00.111	Pneumococcal arthritis, right shoulder
M00.112	Pneumococcal arthritis, left shoulder
M00.119	Pneumococcal arthritis, unspecified shoulder
M02.811	Other reactive arthropathies, right shoulder
M02.812	Other reactive arthropathies, left shoulder
M02.819	Other reactive arthropathies, unspecified shoulder

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ICD-10-CM Diagnosis Codes	Description
M05.111	Rheumatoid lung disease with rheumatoid arthritis of right shoulder
M05.112	Rheumatoid lung disease with rheumatoid arthritis of left shoulder
M05.119	Rheumatoid lung disease with rheumatoid arthritis of unspecified shoulder
M05.151	Rheumatoid lung disease with rheumatoid arthritis of right hip
M05.152	Rheumatoid lung disease with rheumatoid arthritis of left hip
M05.159	Rheumatoid lung disease with rheumatoid arthritis of unspecified hip
M05.161	Rheumatoid lung disease with rheumatoid arthritis of right knee
M05.162	Rheumatoid lung disease with rheumatoid arthritis of left knee
M05.169	Rheumatoid lung disease with rheumatoid arthritis of unspecified knee
M05.171	Rheumatoid lung disease with rheumatoid arthritis of right ankle and foot
M05.172	Rheumatoid lung disease with rheumatoid arthritis of left ankle and foot
M05.179	Rheumatoid lung disease with rheumatoid arthritis of unspecified ankle and foot
M05.211	Rheumatoid vasculitis with rheumatoid arthritis of right shoulder
M05.212	Rheumatoid vasculitis with rheumatoid arthritis of left shoulder
M05.219	Rheumatoid vasculitis with rheumatoid arthritis of unspecified shoulder
M05.251	Rheumatoid vasculitis with rheumatoid arthritis of right hip
M05.252	Rheumatoid vasculitis with rheumatoid arthritis of left hip
M05.259	Rheumatoid vasculitis with rheumatoid arthritis of unspecified hip
M05.261	Rheumatoid vasculitis with rheumatoid arthritis of right knee
M05.262	Rheumatoid vasculitis with rheumatoid arthritis of left knee
M05.269	Rheumatoid vasculitis with rheumatoid arthritis of unspecified knee
M05.271	Rheumatoid vasculitis with rheumatoid arthritis of right ankle and foot
M05.272	Rheumatoid vasculitis with rheumatoid arthritis of left ankle and foot
M05.279	Rheumatoid vasculitis with rheumatoid arthritis of unspecified ankle and foot
M05.311	Rheumatoid heart disease with rheumatoid arthritis of right shoulder
M05.312	Rheumatoid heart disease with rheumatoid arthritis of left shoulder
M05.319	Rheumatoid heart disease with rheumatoid arthritis of unspecified shoulder
M05.351	Rheumatoid heart disease with rheumatoid arthritis of right hip
M05.352	Rheumatoid heart disease with rheumatoid arthritis of left hip
M05.359	Rheumatoid heart disease with rheumatoid arthritis of unspecified hip
M05.361	Rheumatoid heart disease with rheumatoid arthritis of right knee
M05.362	Rheumatoid heart disease with rheumatoid arthritis of left knee
M05.369	Rheumatoid heart disease with rheumatoid arthritis of unspecified knee
M05.371	Rheumatoid heart disease with rheumatoid arthritis of right ankle and foot
M05.372	Rheumatoid heart disease with rheumatoid arthritis of left ankle and foot
M05.379	Rheumatoid heart disease with rheumatoid arthritis of unspecified ankle and foot
M05.411	Rheumatoid myopathy with rheumatoid arthritis of right shoulder
M05.412	Rheumatoid myopathy with rheumatoid arthritis of left shoulder
M05.419	Rheumatoid myopathy with rheumatoid arthritis of unspecified shoulder
M05.451	Rheumatoid myopathy with rheumatoid arthritis of right hip
M05.452	Rheumatoid myopathy with rheumatoid arthritis of left hip
M05.459	Rheumatoid myopathy with rheumatoid arthritis of unspecified hip
M05.461	Rheumatoid myopathy with rheumatoid arthritis of right knee
M05.462	Rheumatoid myopathy with rheumatoid arthritis of left knee
M05.469	Rheumatoid myopathy with rheumatoid arthritis of unspecified knee
M05.471	Rheumatoid myopathy with rheumatoid arthritis of right ankle and foot
M05.472	Rheumatoid myopathy with rheumatoid arthritis of left ankle and foot

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ICD-10-CM Diagnosis Codes	Description
M05.479	Rheumatoid myopathy with rheumatoid arthritis of unspecified ankle and foot
M05.50-M05.59	Rheumatoid polyneuropathy with rheumatoid arthritis
M05.611	Rheumatoid arthritis of right shoulder with involvement of other organs and systems
M05.612	Rheumatoid arthritis of left shoulder with involvement of other organs and systems
M05.619	Rheumatoid arthritis of unspecified shoulder with involvement of other organs and systems
M05.651	Rheumatoid arthritis of right hip with involvement of other organs and systems
M05.652	Rheumatoid arthritis of left hip with involvement of other organs and systems
M05.659	Rheumatoid arthritis of unspecified hip with involvement of other organs and systems
M05.661	Rheumatoid arthritis of right knee with involvement of other organs and systems
M05.662	Rheumatoid arthritis of left knee with involvement of other organs and systems
M05.669	Rheumatoid arthritis of unspecified knee with involvement of other organs and systems
M05.671	Rheumatoid arthritis of right ankle and foot with involvement of other organs and systems
M05.672	Rheumatoid arthritis of left ankle and foot with involvement of other organs and systems
M05.679	Rheumatoid arthritis of unspecified ankle and foot with involvement of other organs and systems
M05.711	Rheumatoid arthritis with rheumatoid factor of right shoulder without organ or systems involvement
M05.712	Rheumatoid arthritis with rheumatoid factor of left shoulder without organ or systems involvement
M05.719	Rheumatoid arthritis with rheumatoid factor of unspecified shoulder without organ or systems involvement
M05.751	Rheumatoid arthritis with rheumatoid factor of right hip without organ or systems involvement
M05.752	Rheumatoid arthritis with rheumatoid factor of left hip without organ or systems involvement
M05.759	Rheumatoid arthritis with rheumatoid factor of unspecified hip without organ or systems involvement
M05.761	Rheumatoid arthritis with rheumatoid factor of right knee without organ or systems involvement
M05.762	Rheumatoid arthritis with rheumatoid factor of left knee without organ or systems involvement
M05.769	Rheumatoid arthritis with rheumatoid factor of unspecified knee without organ or systems involvement
M05.771	Rheumatoid arthritis with rheumatoid factor of right ankle and foot without organ or systems involvement
M05.772	Rheumatoid arthritis with rheumatoid factor of left ankle and foot without organ or systems involvement
M05.779	Rheumatoid arthritis with rheumatoid factor of unspecified ankle and foot without organ or systems involvement
M05.811	Other rheumatoid arthritis with rheumatoid factor of right shoulder

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ICD-10-CM Diagnosis Codes	Description
M05.812	Other rheumatoid arthritis with rheumatoid factor of left shoulder
M05.819	Other rheumatoid arthritis with rheumatoid factor of unspecified shoulder
M05.851	Other rheumatoid arthritis with rheumatoid factor of right hip
M05.852	Other rheumatoid arthritis with rheumatoid factor of left hip
M05.859	Other rheumatoid arthritis with rheumatoid factor of unspecified hip
M05.861	Other rheumatoid arthritis with rheumatoid factor of right knee
M05.862	Other rheumatoid arthritis with rheumatoid factor of left knee
M05.869	Other rheumatoid arthritis with rheumatoid factor of unspecified knee
M05.871	Other rheumatoid arthritis with rheumatoid factor of right ankle and foot
M05.872	Other rheumatoid arthritis with rheumatoid factor of left ankle and foot
M05.879	Other rheumatoid arthritis with rheumatoid factor of unspecified ankle and foot
M05.A	Abnormal rheumatoid factor and anti-citrullinated protein antibody with rheumatoid arthritis
M06.011	Rheumatoid arthritis without rheumatoid factor, right shoulder
M06.012	Rheumatoid arthritis without rheumatoid factor, left shoulder
M06.019	Rheumatoid arthritis without rheumatoid factor, unspecified shoulder
M06.051	Rheumatoid arthritis without rheumatoid factor, right hip
M06.052	Rheumatoid arthritis without rheumatoid factor, left hip
M06.059	Rheumatoid arthritis without rheumatoid factor, unspecified hip
M06.061	Rheumatoid arthritis without rheumatoid factor, right knee
M06.062	Rheumatoid arthritis without rheumatoid factor, left knee
M06.069	Rheumatoid arthritis without rheumatoid factor, unspecified knee
M06.071	Rheumatoid arthritis without rheumatoid factor, right ankle and foot
M06.072	Rheumatoid arthritis without rheumatoid factor, left ankle and foot
M06.079	Rheumatoid arthritis without rheumatoid factor, unspecified ankle and foot
M07.611	Enteropathic arthropathies, right shoulder
M07.612	Enteropathic arthropathies, left shoulder
M07.619	Enteropathic arthropathies, unspecified shoulder
M07.651	Enteropathic arthropathies, right hip
M07.652	Enteropathic arthropathies, left hip
M07.659	Enteropathic arthropathies, unspecified hip
M07.661	Enteropathic arthropathies, right knee
M07.662	Enteropathic arthropathies, left knee
M07.669	Enteropathic arthropathies, unspecified knee
M07.671	Enteropathic arthropathies, right ankle and foot
M07.672	Enteropathic arthropathies, left ankle and foot
M07.679	Enteropathic arthropathies, unspecified ankle and foot
M08.011	Unspecified juvenile rheumatoid arthritis, right shoulder
M08.012	Unspecified juvenile rheumatoid arthritis, left shoulder
M08.019	Unspecified juvenile rheumatoid arthritis, unspecified shoulder
M08.211	Juvenile rheumatoid arthritis with systemic onset, right shoulder
M08.212	Juvenile rheumatoid arthritis with systemic onset, left shoulder
M08.219	Juvenile rheumatoid arthritis with systemic onset, unspecified shoulder
M08.411	Pauciarticular juvenile rheumatoid arthritis, right shoulder
M08.412	Pauciarticular juvenile rheumatoid arthritis, left shoulder
M08.419	Pauciarticular juvenile rheumatoid arthritis, unspecified shoulder
M08.811	Other juvenile arthritis, right shoulder

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ICD-10-CM Diagnosis Codes	Description
M08.812	Other juvenile arthritis, left shoulder
M08.819	Other juvenile arthritis, unspecified shoulder
M08.911	Juvenile arthritis, unspecified, right shoulder
M08.912	Juvenile arthritis, unspecified, left shoulder
M08.919	Juvenile arthritis, unspecified, unspecified shoulder
M12.511	Traumatic arthropathy, right shoulder
M12.512	Traumatic arthropathy, left shoulder
M12.519	Traumatic arthropathy, unspecified shoulder
M12.551	Traumatic arthropathy, right hip
M12.552	Traumatic arthropathy, left hip
M12.559	Traumatic arthropathy, unspecified hip
M12.561	Traumatic arthropathy, right knee
M12.562	Traumatic arthropathy, left knee
M12.569	Traumatic arthropathy, unspecified knee
M12.571	Traumatic arthropathy, right ankle and foot
M12.572	Traumatic arthropathy, left ankle and foot
M12.579	Traumatic arthropathy, unspecified ankle and foot
M12.811	Other specific arthropathies, not elsewhere classified, right shoulder
M12.812	Other specific arthropathies, not elsewhere classified, left shoulder
M12.819	Other specific arthropathies, not elsewhere classified, unspecified shoulder
M12.851	Other specific arthropathies, not elsewhere classified, right hip
M12.852	Other specific arthropathies, not elsewhere classified, left hip
M12.859	Other specific arthropathies, not elsewhere classified, unspecified hip
M12.861	Other specific arthropathies, not elsewhere classified, right knee
M12.862	Other specific arthropathies, not elsewhere classified, left knee
M12.869	Other specific arthropathies, not elsewhere classified, unspecified knee
M12.871	Other specific arthropathies, not elsewhere classified, right ankle and foot
M12.872	Other specific arthropathies, not elsewhere classified, left ankle and foot
M12.879	Other specific arthropathies, not elsewhere classified, unspecified ankle and foot
M13.111	Monoarthritis, not elsewhere classified, right shoulder
M13.112	Monoarthritis, not elsewhere classified, left shoulder
M13.119	Monoarthritis, not elsewhere classified, unspecified shoulder
M13.151	Monoarthritis, not elsewhere classified, right hip
M13.152	Monoarthritis, not elsewhere classified, left hip
M13.159	Monoarthritis, not elsewhere classified, unspecified hip
M13.161	Monoarthritis, not elsewhere classified, right knee
M13.162	Monoarthritis, not elsewhere classified, left knee
M13.169	Monoarthritis, not elsewhere classified, unspecified knee
M13.171	Monoarthritis, not elsewhere classified, right ankle and foot
M13.172	Monoarthritis, not elsewhere classified, left ankle and foot
M13.179	Monoarthritis, not elsewhere classified, unspecified ankle and foot
M13.811	Other specified arthritis, right shoulder
M13.812	Other specified arthritis, left shoulder
M13.819	Other specified arthritis, unspecified shoulder
M13.851	Other specified arthritis, right hip
M13.852	Other specified arthritis, left hip
M13.859	Other specified arthritis, unspecified hip

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ICD-10-CM Diagnosis Codes	Description
M13.861	Other specified arthritis, right knee
M13.862	Other specified arthritis, left knee
M13.869	Other specified arthritis, unspecified knee
M13.871	Other specified arthritis, right ankle and foot
M13.872	Other specified arthritis, left ankle and foot
M13.879	Other specified arthritis, unspecified ankle and foot
M14.611	Charcot's joint, right shoulder
M14.612	Charcot's joint, left shoulder
M14.619	Charcot's joint, unspecified shoulder
M14.651	Charcot's joint, right hip
M14.652	Charcot's joint, left hip
M14.659	Charcot's joint, unspecified hip
M14.661	Charcot's joint, right knee
M14.662	Charcot's joint, left knee
M14.669	Charcot's joint, unspecified knee
M14.671	Charcot's joint, right ankle and foot
M14.672	Charcot's joint, left ankle and foot
M14.679	Charcot's joint, unspecified ankle and foot
M14.811	Arthropathies in other specified diseases classified elsewhere, right shoulder
M14.812	Arthropathies in other specified diseases classified elsewhere, left shoulder
M14.819	Arthropathies in other specified diseases classified elsewhere, unspecified shoulder
M14.851	Arthropathies in other specified diseases classified elsewhere, right hip
M14.852	Arthropathies in other specified diseases classified elsewhere, left hip
M14.859	Arthropathies in other specified diseases classified elsewhere, unspecified hip
M14.861	Arthropathies in other specified diseases classified elsewhere, right knee
M14.862	Arthropathies in other specified diseases classified elsewhere, left knee
M14.869	Arthropathies in other specified diseases classified elsewhere, unspecified knee
M14.871	Arthropathies in other specified diseases classified elsewhere, right ankle and foot
M14.872	Arthropathies in other specified diseases classified elsewhere, left ankle and foot
M14.879	Arthropathies in other specified diseases classified elsewhere, unspecified ankle and foot
M16.0	Bilateral primary osteoarthritis of hip
M16.10	Unilateral primary osteoarthritis, unspecified hip
M16.11	Unilateral primary osteoarthritis, right hip
M16.12	Unilateral primary osteoarthritis, left hip
M16.2	Bilateral osteoarthritis resulting from hip dysplasia
M16.30	Unilateral osteoarthritis resulting from hip dysplasia, unspecified hip
M16.31	Unilateral osteoarthritis resulting from hip dysplasia, right hip
M16.32	Unilateral osteoarthritis resulting from hip dysplasia, left hip
M16.4	Bilateral post-traumatic osteoarthritis of hip
M16.50	Unilateral post-traumatic osteoarthritis, unspecified hip
M16.51	Unilateral post-traumatic osteoarthritis, right hip
M16.52	Unilateral post-traumatic osteoarthritis, left hip
M16.6	Other bilateral secondary osteoarthritis of hip
M16.7	Other unilateral secondary osteoarthritis of hip
M16.9	Osteoarthritis of hip, unspecified

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ICD-10-CM Diagnosis Codes	Description
M17.0	Bilateral primary osteoarthritis of knee
M17.10	Unilateral primary osteoarthritis, unspecified knee
M17.11	Unilateral primary osteoarthritis, right knee
M17.12	Unilateral primary osteoarthritis, left knee
M17.2	Bilateral post-traumatic osteoarthritis of knee
M17.30	Unilateral post-traumatic osteoarthritis, unspecified knee
M17.31	Unilateral post-traumatic osteoarthritis, right knee
M17.32	Unilateral post-traumatic osteoarthritis, left knee
M17.4	Other bilateral secondary osteoarthritis of knee
M17.5	Other unilateral secondary osteoarthritis of knee
M17.9	Osteoarthritis of knee, unspecified
M19.011	Primary osteoarthritis, right shoulder
M19.012	Primary osteoarthritis, left shoulder
M19.019	Primary osteoarthritis, unspecified shoulder
M19.071	Primary osteoarthritis, right ankle and foot
M19.072	Primary osteoarthritis, left ankle and foot
M19.079	Primary osteoarthritis, unspecified ankle and foot
M19.111	Post-traumatic osteoarthritis, right shoulder
M19.112	Post-traumatic osteoarthritis, left shoulder
M19.119	Post-traumatic osteoarthritis, unspecified shoulder
M19.211	Secondary osteoarthritis, right shoulder
M19.212	Secondary osteoarthritis, left shoulder
M19.219	Secondary osteoarthritis, unspecified shoulder
M19.271	Secondary osteoarthritis, right ankle and foot
M19.272	Secondary osteoarthritis, left ankle and foot
M19.279	Secondary osteoarthritis, unspecified ankle and foot
M23.321	Other meniscus derangements, posterior horn of medial meniscus, right knee
M23.322	Other meniscus derangements, posterior horn of medial meniscus, left knee
M23.329	Other meniscus derangements, posterior horn of medial meniscus, unspecified knee
M23.90	Unspecified internal derangement of unspecified knee
M23.91	Unspecified internal derangement of right knee
M23.92	Unspecified internal derangement of left knee
M24.011	Loose body in right shoulder
M24.012	Loose body in left shoulder
M24.019	Loose body in unspecified shoulder
M24.111	Other articular cartilage disorders, right shoulder
M24.112	Other articular cartilage disorders, left shoulder
M24.119	Other articular cartilage disorders, unspecified shoulder
M24.211	Disorder of ligament, right shoulder
M24.212	Disorder of ligament, left shoulder
M24.219	Disorder of ligament, unspecified shoulder
M24.311	Pathological dislocation of right shoulder, not elsewhere classified
M24.312	Pathological dislocation of left shoulder, not elsewhere classified
M24.319	Pathological dislocation of unspecified shoulder, not elsewhere classified
M24.411	Recurrent dislocation, right shoulder
M24.412	Recurrent dislocation, left shoulder

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ICD-10-CM Diagnosis Codes	Description
M24.419	Recurrent dislocation, unspecified shoulder
M24.511	Contracture, right shoulder
M24.512	Contracture, left shoulder
M24.519	Contracture, unspecified shoulder
M24.611	Ankylosis, right shoulder
M24.612	Ankylosis, left shoulder
M24.619	Ankylosis, unspecified shoulder
M24.811	Other specific joint derangements of right shoulder, not elsewhere classified
M24.812	Other specific joint derangements of left shoulder, not elsewhere classified
M24.819	Other specific joint derangements of unspecified shoulder, not elsewhere classified
M24.871	Other specific joint derangements of right ankle, not elsewhere classified
M24.872	Other specific joint derangements of left ankle, not elsewhere classified
M24.873	Other specific joint derangements of unspecified ankle, not elsewhere classified
M24.874	Other specific joint derangements of right foot, not elsewhere classified
M24.875	Other specific joint derangements left foot, not elsewhere classified
M24.876	Other specific joint derangements of unspecified foot, not elsewhere classified
M25.311	Other instability, right shoulder
M25.312	Other instability, left shoulder
M25.319	Other instability, unspecified shoulder
M25.511	Pain in right shoulder
M25.512	Pain in left shoulder
M25.519	Pain in unspecified shoulder
M25.551	Pain in right hip
M25.552	Pain in left hip
M25.559	Pain in unspecified hip
M25.561	Pain in right knee
M25.562	Pain in left knee
M25.569	Pain in unspecified knee
M25.571	Pain in right ankle and joints of right foot
M25.572	Pain in left ankle and joints of left foot
M25.579	Pain in unspecified ankle and joints of unspecified foot
M25.611	Stiffness of right shoulder, not elsewhere classified
M25.612	Stiffness of left shoulder, not elsewhere classified
M25.619	Stiffness of unspecified shoulder, not elsewhere classified
M43.07	Spondylolysis, lumbosacral region
M43.08	Spondylolysis, sacral and sacrococcygeal region
M43.17	Spondylolisthesis, lumbosacral region
M43.18	Spondylolisthesis, sacral and sacrococcygeal region
M43.27	Fusion of spine, lumbosacral region
M43.28	Fusion of spine, sacral and sacrococcygeal region
M45.7	Ankylosing spondylitis of lumbosacral region
M45.8	Ankylosing spondylitis sacral and sacrococcygeal region
M46.07	Spinal enthesopathy, lumbosacral region
M46.08	Spinal enthesopathy, sacral and sacrococcygeal region
M46.1	Sacroiliitis, not elsewhere classified
M46.47	Discitis, unspecified, lumbosacral region

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ICD-10-CM Diagnosis Codes	Description
M46.48	Discitis, unspecified, sacral and sacrococcygeal region
M46.57	Other infective spondylopathies, lumbosacral region
M46.58	Other infective spondylopathies, sacral and sacrococcygeal region
M46.87	Other specified inflammatory spondylopathies, lumbosacral region
M46.88	Other specified inflammatory spondylopathies, sacral and sacrococcygeal region
M46.97	Unspecified inflammatory spondylopathy, lumbosacral region
M46.98	Unspecified inflammatory spondylopathy, sacral and sacrococcygeal region
M47.27	Other spondylosis with radiculopathy, lumbosacral region
M47.28	Other spondylosis with radiculopathy, sacral and sacrococcygeal region
M47.817	Spondylosis without myelopathy or radiculopathy, lumbosacral region
M47.818	Spondylosis without myelopathy or radiculopathy, sacral and sacrococcygeal region
M47.897	Other spondylosis, lumbosacral region
M47.898	Other spondylosis, sacral and sacrococcygeal region
M48.07	Spinal stenosis, lumbosacral region
M48.08	Spinal stenosis, sacral and sacrococcygeal region
M48.17	Ankylosing hyperostosis [Forestier], lumbosacral region
M48.18	Ankylosing hyperostosis [Forestier], sacral and sacrococcygeal region
M48.27	Kissing spine, lumbosacral region
M48.37	Traumatic spondylopathy, lumbosacral region
M48.38	Traumatic spondylopathy, sacral and sacrococcygeal region
M48.8X7	Other specified spondylopathies, lumbosacral region
M48.8X8	Other specified spondylopathies, sacral and sacrococcygeal region
M49.87	Spondylopathy in diseases classified elsewhere, lumbosacral region
M49.88	Spondylopathy in diseases classified elsewhere, sacral and sacrococcygeal region
M50.20	Other cervical disc displacement, unspecified cervical region
M51.17	Intervertebral disc disorders with radiculopathy, lumbosacral region
M51.27	Other intervertebral disc displacement, lumbosacral region
M51.370	Other intervertebral disc degeneration, lumbosacral region with discogenic back pain only
M51.371	Other intervertebral disc degeneration, lumbosacral region with lower extremity pain only
M51.372	Other intervertebral disc degeneration, lumbosacral region with discogenic back pain and lower extremity pain
M51.379	Other intervertebral disc degeneration, lumbosacral region without mention of lumbar back pain or lower extremity pain
M51.47	Schmorl's nodes, lumbosacral region
M51.87	Other intervertebral disc disorders, lumbosacral region
M51.9	Unspecified thoracic, thoracolumbar and lumbosacral intervertebral disc disorder
M51.A3	Intervertebral annulus fibrosus defect, lumbosacral region, unspecified size
M51.A4	Intervertebral annulus fibrosus defect, small, lumbosacral region
M51.A5	Intervertebral annulus fibrosus defect, large, lumbosacral region
M53.2X7	Spinal instabilities, lumbosacral region
M53.2X8	Spinal instabilities, sacral and sacrococcygeal region
M53.3	Sacrococcygeal disorders, not elsewhere classified
M53.87	Other specified dorsopathies, lumbosacral region
M53.88	Other specified dorsopathies, sacral and sacrococcygeal region

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ICD-10-CM Diagnosis Codes	Description
M54.17	Radiculopathy, lumbosacral region
M54.18	Radiculopathy, sacral and sacrococcygeal region
M54.30	Sciatica, unspecified side
M54.31	Sciatica, right side
M54.32	Sciatica, left side
M54.50	Low back pain, unspecified
M54.51	Vertebrogenic low back pain
M54.59	Other low back pain
M54.81	Occipital neuralgia
M54.89	Other dorsalgia
M54.9	Dorsalgia, unspecified
M62.411	Contracture of muscle, right shoulder
M62.412	Contracture of muscle, left shoulder
M62.419	Contracture of muscle, unspecified shoulder
M67.811	Other specified disorders of synovium, right shoulder
M67.812	Other specified disorders of synovium, left shoulder
M67.813	Other specified disorders of tendon, right shoulder
M67.814	Other specified disorders of tendon, left shoulder
M67.819	Other specified disorders of synovium and tendon, unspecified shoulder
M67.911	Unspecified disorder of synovium and tendon, right shoulder
M67.912	Unspecified disorder of synovium and tendon, left shoulder
M67.919	Unspecified disorder of synovium and tendon, unspecified shoulder
M70.60	Trochanteric bursitis, unspecified hip
M70.61	Trochanteric bursitis, right hip
M70.62	Trochanteric bursitis, left hip
M70.70	Other bursitis of hip, unspecified hip
M70.71	Other bursitis of hip, right hip
M70.72	Other bursitis of hip, left hip
M70.811	Other soft tissue disorders related to use, overuse and pressure, right shoulder
M70.812	Other soft tissue disorders related to use, overuse and pressure, left shoulder
M70.819	Other soft tissue disorders related to use, overuse and pressure, unspecified shoulder
M71.011	Abscess of bursa, right shoulder
M71.012	Abscess of bursa, left shoulder
M71.019	Abscess of bursa, unspecified shoulder
M71.111	Other infective bursitis, right shoulder
M71.112	Other infective bursitis, left shoulder
M71.119	Other infective bursitis, unspecified shoulder
M71.20	Synovial cyst of popliteal space [Baker], unspecified knee
M71.21	Synovial cyst of popliteal space [Baker], right knee
M71.22	Synovial cyst of popliteal space [Baker], left knee
M71.311	Other bursal cyst, right shoulder
M71.312	Other bursal cyst, left shoulder
M71.319	Other bursal cyst, unspecified shoulder
M71.351	Other bursal cyst, right hip
M71.352	Other bursal cyst, left hip
M71.359	Other bursal cyst, unspecified hip

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ICD-10-CM Diagnosis Codes	Description
M71.371	Other bursal cyst, right ankle and foot
M71.372	Other bursal cyst, left ankle and foot
M71.379	Other bursal cyst, unspecified ankle and foot
M71.551	Other bursitis, not elsewhere classified, right hip
M71.552	Other bursitis, not elsewhere classified, left hip
M71.559	Other bursitis, not elsewhere classified, unspecified hip
M71.561	Other bursitis, not elsewhere classified, right knee
M71.562	Other bursitis, not elsewhere classified, left knee
M71.569	Other bursitis, not elsewhere classified, unspecified knee
M71.571	Other bursitis, not elsewhere classified, right ankle and foot
M71.572	Other bursitis, not elsewhere classified, left ankle and foot
M71.579	Other bursitis, not elsewhere classified, unspecified ankle and foot
M71.811	Other specified bursopathies, right shoulder
M71.812	Other specified bursopathies, left shoulder
M71.819	Other specified bursopathies, unspecified shoulder
M71.851	Other specified bursopathies, right hip
M71.852	Other specified bursopathies, left hip
M71.859	Other specified bursopathies, unspecified hip
M71.861	Other specified bursopathies, right knee
M71.862	Other specified bursopathies, left knee
M71.869	Other specified bursopathies, unspecified knee
M71.871	Other specified bursopathies, right ankle and foot
M71.872	Other specified bursopathies, left ankle and foot
M71.879	Other specified bursopathies, unspecified ankle and foot
M72.2	Plantar fascial fibromatosis
M75.00	Adhesive capsulitis of unspecified shoulder
M75.01	Adhesive capsulitis of right shoulder
M75.02	Adhesive capsulitis of left shoulder
M75.100	Unspecified rotator cuff tear or rupture of unspecified shoulder, not specified as traumatic
M75.101	Unspecified rotator cuff tear or rupture of right shoulder, not specified as traumatic
M75.102	Unspecified rotator cuff tear or rupture of left shoulder, not specified as traumatic
M75.110	Incomplete rotator cuff tear or rupture of unspecified shoulder, not specified as traumatic
M75.111	Incomplete rotator cuff tear or rupture of right shoulder, not specified as traumatic
M75.112	Incomplete rotator cuff tear or rupture of left shoulder, not specified as traumatic
M75.120	Complete rotator cuff tear or rupture of unspecified shoulder, not specified as traumatic
M75.121	Complete rotator cuff tear or rupture of right shoulder, not specified as traumatic
M75.122	Complete rotator cuff tear or rupture of left shoulder, not specified as traumatic
M75.20	Bicipital tendinitis, unspecified shoulder
M75.21	Bicipital tendinitis, right shoulder
M75.22	Bicipital tendinitis, left shoulder
M75.30	Calcific tendinitis of unspecified shoulder
M75.31	Calcific tendinitis of right shoulder

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ICD-10-CM Diagnosis Codes	Description
M75.32	Calcific tendinitis of left shoulder
M75.40	Impingement syndrome of unspecified shoulder
M75.41	Impingement syndrome of right shoulder
M75.42	Impingement syndrome of left shoulder
M75.50	Bursitis of unspecified shoulder
M75.51	Bursitis of right shoulder
M75.52	Bursitis of left shoulder
M75.80	Other shoulder lesions, unspecified shoulder
M75.81	Other shoulder lesions, right shoulder
M75.82	Other shoulder lesions, left shoulder
M75.90	Shoulder lesion, unspecified, unspecified shoulder
M75.91	Shoulder lesion, unspecified, right shoulder
M75.92	Shoulder lesion, unspecified, right shoulder
M76.20	Iliac crest spur, unspecified hip
M76.21	Iliac crest spur, right hip
M76.22	Iliac crest spur, left hip
M77.30	Calcaneal spur, unspecified foot
M77.31	Calcaneal spur, right foot
M77.32	Calcaneal spur, left foot
M79.671	Pain in right foot
M79.672	Pain in left foot
M79.673	Pain in unspecified foot
M79.674	Pain in right toe(s)
M79.675	Pain in left toe(s)
M79.676	Pain in unspecified toe(s)
M99.04	Segmental and somatic dysfunction of sacral region
R07.82	Intercostal pain
R51.0	Headache with orthostatic component, not elsewhere classified
R51.9	Headache, unspecified
S34.22XA	Injury of nerve root of sacral spine, initial encounter
S34.22XD	Injury of nerve root of sacral spine, subsequent encounter
S34.22XS	Injury of nerve root of sacral spine, sequela
S43.431A	Superior glenoid labrum lesion of right shoulder, initial encounter
S43.432A	Superior glenoid labrum lesion of left shoulder, initial encounter
S43.439A	Superior glenoid labrum lesion of unspecified shoulder, initial encounter
S43.491A	Other sprain of right shoulder joint, initial encounter
S43.492A	Other sprain of left shoulder joint, initial encounter
S43.499A	Other sprain of unspecified shoulder joint, initial encounter
S46.011A	Strain of muscle(s) and tendon(s) of the rotator cuff of right shoulder, initial encounter
S46.012A	Strain of muscle(s) and tendon(s) of the rotator cuff of left shoulder, initial encounter
S46.019A	Strain of muscle(s) and tendon(s) of the rotator cuff of unspecified shoulder, initial encounter
Z96.651	Presence of right artificial knee joint
Z96.652	Presence of left artificial knee joint
Z96.653	Presence of artificial knee joint, bilateral

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ICD-10-CM Diagnosis Codes	Description
Z96.659	Presence of unspecified artificial knee joint

General Background

The nervous system is composed of the central nervous system (brain and spinal cord) and the peripheral nervous system, which includes the nerves extending from the spinal cord. Peripheral nerves transmit electrochemical signals between the central nervous system and muscles or organs. When injury or disease leads these nerves to send persistent pain signals, targeted interventions may be used to interrupt signal transmission. Peripheral nerve blocks (i.e., injecting anesthetics or chemicals such as glycerol around the nerve) may be performed for diagnostic purposes to identify the pain source or for temporary therapeutic relief. When a diagnostic or therapeutic block is successful, nerve ablation may be recommended.

Multiple neuroablative techniques are used to reduce pain transmission through specific peripheral nerves. Cryoanalgesia (e.g., cryoneuroablation, cryoneurolysis) uses cold temperatures of approximately −70 °C to freeze the nerve, creating a temporary axonal injury that blocks pain signals while preserving the surrounding nerve structure, allowing natural regeneration (Law, et al., 2024). Radiofrequency ablation (RFA) (e.g., rhizotomy, neurotomy) uses electromagnetic energy to heat neural tissue. Conventional (thermal) RFA applies temperatures of about 60–90 °C for 90–120 seconds to induce focal neurodestruction. Pulsed RFA (PRF) delivers brief bursts of energy while maintaining temperatures below 42 °C, altering nociceptive signaling without destroying tissue. Cooled RFA (CRFA) uses internally cooled probes that function around 60 °C, enabling surrounding tissues to reach approximately 80 °C and creating a larger, more uniform lesion, which can be advantageous in areas with complex innervation (Rodríguez et al., 2023).

Chemical neurolysis, another ablative option, involves injecting neurolytic agents such as phenol or alcohol to intentionally destroy targeted nerve fibers. This approach is typically considered when repeated diagnostic or therapeutic nerve blocks with local anesthetics provide short-lived but reliable pain relief. Phenol and alcohol neurolysis can offer prolonged analgesia but must be used cautiously due to risks of neuritis, neuraxial spread, or unintended destruction of adjacent tissues (Fazekas et al., 2023).

All neuroablative procedures carry potential risks. Complications of nerve destructive procedures include bleeding, infection, prolonged numbness or tingling, temporary increased pain, or damage to nearby tissue. Cryoanalgesia may also cause skin color changes or frostbite-type injury (Law, et al., 2024). These techniques are proposed to offer minimally invasive options to help manage pain when other conservative treatments have not been effective, however, firm proof of efficacy is still needed.

U.S. Food and Drug Administration (FDA)
Injectable chemical neurolytic agents used for peripheral nerve destruction are regulated under drug labeling and approval pathways. Cryoablation systems and radiofrequency (RF) generators with associated probes are classified as Class II medical devices and require FDA clearance through the 510(k) process. These devices are indicated for use in blocking pain by temporarily ablating peripheral nerves or lesioning nerve tissue. (FDA, 2025).

Device or Product	Identifier	Manufacturer
cryoICE cryoSPHERE cryoablation probe	K182565	AtriCure, Inc.
cryoICE cryoXT cryoablation probe (cryoXT)	K250371	AtriCure, Inc.
iovera° System	K243677	Pacira Biosciences, Inc.
COOLIEF* Radiofrequency Generator	K242057	Avanos Medical, Inc.
COOLIEF Cooled Radiofrequency Kit Advanced	K203066	Avanos Medical, Inc.
GX1 Radiofrequency Generator Kit	K251247	Boston Scientific Neuromodulation Corporation
OneRF Ablation System	K231675	Neuroone Medical Technologies Corp.

*FDA product codes: GXH, GXD, GXI

Note: Coverage decisions are not based solely on FDA approval. Device or product names are provided for example purposes only. Their inclusion does not indicate endorsement or preference for any specific brand or model. This list is not intended to reflect all available products or technologies.

Headache/Occipital Neuralgia

Cervicogenic headache is defined by the International Headache Society as head pain originating from disorders of the cervical spine including bones, discs, or soft tissues such as those affected by trauma (e.g. whiplash injury) or arthritis. This condition affects approximately 2–4% of the global population and accounts for an estimated 17.7% of severe headaches, with a higher prevalence in women. Cervical nerves (C1–C3) share pathways with the trigeminal nerve, enabling cervical pain to be referred to the occipital, auricular, frontal, parietal, and orbital regions of the head. The trapezius, sternocleidomastoid, and splenius capitis muscles are also innervated by cervical nerves and may develop trigger points that contribute to cervicogenic headache. Occipital neuralgia is a related condition which occurs when the greater occipital nerve is irritated or entrapped as it passes through neck muscles, resulting in cervicogenic headache symptoms (Edwards, et al., 2023).

Cervicogenic headaches are distinguished from other types of headaches such as migraines and tension-type headaches by unilateral pain that begins in the neck and may radiate to the front or side of the head. The pain is typically steady and non-throbbing, often aggravated by neck movement or pressure. Occipital neuralgia presents as sharp, shooting pain in the back of the head, sometimes radiating to the scalp, forehead, or behind the eyes. Additional symptoms may include limited neck mobility, discomfort in the neck, shoulder, or arm, and occasional dizziness. Diagnosis relies on clinical criteria, history, physical examination, and imaging (MRI or CT). Relief following a diagnostic nerve block supports the diagnosis (Edwards, et al., 2023).

Treatment includes conservative non-pharmacologic measures (e.g., physical therapy, massage, cold compresses, posture exercises, transcutaneous electrical nerve stimulation, psychotherapy) and medications such as tricyclic antidepressants, antiepileptics, muscle relaxants, and nonsteroidal anti-inflammatory drugs (NSAIDs). If conservative therapy fails, nerve ablation may be proposed for longer-lasting relief (Edwards, et al., 2023). Side effects of nerve ablation are generally temporary and include numbness, weakness, or pain at the injection site; rare

complications include infection, bleeding, or nerve injury. Radiofrequency ablation may cause myofascial pain, transient eyelid swelling, hematoma, or, rarely, spinal anesthesia if the needle is misplaced. Occipital nerve procedures carry a risk of hematoma and ecchymosis due to the area's vascularity. While some studies report benefits from interventions such as radiofrequency ablation, the overall evidence remains limited and conflicting; further large, high-quality studies are needed to confirm efficacy of nerve ablation (Tybout, et al., 2024).

Literature Review
Randomized controlled trials (RCTs), non-randomized controlled trials, observational studies, retrospective studies, and systematic reviews of these studies have evaluated the effectiveness of peripheral nerve destruction for the treatment of cervicogenic headaches, occipital headaches, and chronic migraines. Outcomes have lacked consistent significant improvement in headache symptoms and/or improved quality of life scores. Additionally, these studies have been limited by small sample populations, lack of control groups, and lack of long-term clinical outcomes (Nagar, et al., 2015; Yang, et al., 2015)

Oliveira et al. (2024) performed a systematic review evaluating pulsed radiofrequency neuromodulation (PRFN) of the greater occipital nerve (GON) for headache disorders in adults. The review included two randomized controlled trials, eleven cohort studies, and nine case reports/series, encompassing 608 participants aged 22 to 82 years. Diagnoses included occipital neuralgia (36.7%), cervicogenic headache (36.5%), chronic migraine (19.4%), cluster headache (2.5%), and rare cases of short-lasting unilateral neuralgiform headache attacks, tension-type headache, and headache due to atlantoaxial instability. Eligible studies enrolled adults with headache disorders per International Classification of Headache Disorders, 3rd Edition (ICHD-3), without restrictions on headache duration or frequency. Studies with mixed pain populations lacking extractable data were excluded. Interventions involved PRFN of the GON using distal or proximal approaches or targeting the C2 dorsal root ganglion, with variable treatment cycles (one to three), temperatures (38–42°C), durations (90–900 seconds), voltages (40–60 V), and pulse widths (five or twenty milliseconds). Comparators included no treatment, placebo, or conventional medical management. The primary outcome was pain intensity measured by numeric rating scale (NRS) or visual analogue scale (VAS); secondary outcomes included headache frequency, mental and physical health measures, mood, sleep, analgesic use, quality of life, and patient satisfaction. Follow-up durations ranged from one week to two years with four studies not specifying follow-up time points. Results of the RCTs indicated the PRFN group demonstrated significant and superior pain reduction up to 6 months post-intervention as compared to baseline for those with occipital neuralgia ($p=0.017$). No significant differences were noted between groups in terms of headache frequency, depression, rescue analgesic consumption, or quality of life. Study results focused on chronic migraine showed that PRFN provided significant reduction monthly headache days ($p=0.0001$) and headache intensity ($p< 0.0005$) at one, three, and six months. There was no significant change in analgesic consumption. In terms of secondary outcome measures, some studies reported overall quality of life improvements with respect to cognitive function ($p=0.026$), emotional functioning ($p<0.001$), physical function ($p<0.001$) and sleep quality ($p< 0.001$). Adverse events included worsened headache (<10 days), cervicalgia, local discomfort, dizziness, rash, localized swelling, and injection site pain, all resolving within three weeks. Limitations include lack of high-quality randomized trials, substantial heterogeneity in study design, headache diagnosis, PRFN targets and settings, image guidance, as well as short-term follow-up durations.

Suer et al. (2022) conducted a systematic review of four randomized controlled trials (three unique studies and one subgroup analysis) that encompassed 66 participants and sought to assess the safety and efficacy of conventional or cooled radiofrequency ablation (RFA) for cervical facet joint pain and cervicogenic headaches. Included studies were RCTs involving individuals with chronic cervical facet joint pain lasting over three months, and RFA completed using fluoroscopic

guidance with controls for false-positive responses. The following types of studies were excluded: retrospective studies, nonrandomized prospective studies, cadaver studies, injection technique descriptions, ultrasound-guided injections, case reports/series, reviews, guidelines, letters, expert opinions, and studies on other therapeutic facet joint procedures. In each of the 3 included RCTs participants were randomized to receive either RFA or sham treatment. RFA procedures involved 1–4 lesions at temperatures between 67°C and 85°C for 60–90 seconds, using parasagittal, oblique, or posterolateral approaches. Studies reported primary outcomes regarding pain relief and duration using measures such as the Visual Analog Scale (VAS) and McGill Pain Questionnaire (MPQ). Secondary outcomes included function, sleep, mood, return to work, additional treatments (opioid use, injections, surgery), and complications. Follow-up periods ranged from 3–5 days to 24 months. Results varied with successful pain relief ranging from 30% to 50%, and variable median duration. In one study, outcomes were similar for both groups at six months and subsequent follow-ups, but the control group performed better at 24 months. Another study reported VAS improved and number of headaches decreased at all follow-up time points for both active treatment and control participants without statistically significant differences. A significant association ($p<0.001$) was found between complete pain relief and resolution of psychological distress in one study; no other significant results were reported. Adverse events included increased neck pain post-treatment, numbness or dysesthesias, and development of a psoriatic rash (Kobner's phenomenon) one week after intervention. Limitations of the review included the paucity of RCTs, small sample sizes, variability in outcome measures, incomplete data reporting, participant attrition, and short-term follow-up durations.

Professional Societies/Organizations
The **American Association of Neurological Surgeons** (AANS) website provides the following information: treatment of occipital neuralgia can be non-surgical or surgical and aims to alleviate the pain but is not a cure. Non-surgical interventions include heat, rest, physical therapy including massage, anti-inflammatory medications, muscle relaxants, and oral anticonvulsant medications. Percutaneous nerve blocks can be used to diagnose and treat occipital neuralgia. Nerve blocks involve either the occipital nerves or in some patients, the C2 and/or C3 ganglion nerves. It is important to keep in mind that repeat blocks using steroids may cause serious adverse effects. Surgical interventions including occipital nerve stimulation, spinal cord stimulation, and C2,3 ganglionectomy may be considered when the pain is chronic, severe and does not respond to conservative treatment (AANS, 2024).

The **American Society of Interventional Pain Physicians (ASIPP)** comprehensive evidence-based guidelines for facet joint interventions in the management of chronic spinal pain published in 2020 issued a moderate strength recommendation for cervical radiofrequency ablation (RFA) when performed after a diagnostic block with 80% pain relief. It is noted RFA may provide long-term improvement of cervicogenic pain including headaches. The guideline states recommendations are impacted by the paucity of high-quality studies (Manchikanti, et al., 2020).

In their 2021 evidence-based recommendations on radiofrequency neurotomy (RFN), the **American Society of Pain and Neuroscience (ASPN)** notes that occipital nerve RFN is primarily utilized for occipital neuralgia presenting as posterior head pain and has also been described for migraine syndromes characterized by occipital tenderness. A diagnostic occipital nerve block should be performed prior to RFN, and alternative etiologies should be excluded. The recommendations indicate current evidence most strongly supports pulsed radiofrequency (PRF), although comparative data across RFN techniques remain limited. Available studies demonstrate pain relief lasting up to six months; however, long-term outcomes are insufficient to guide recommendations for repeat procedures. The guideline notes evidence gaps persist. PRF may offer theoretical advantages due to its lower temperature profile and reduced risk of tissue injury given the superficial course of the occipital nerves, but further evidence is required to establish efficacy,

safety, and comparative performance relative to conventional and water-cooled RF. Both continuous and pulsed RF have shown benefit over 6 weeks to 6 months, though higher-quality data are needed. In consensus it is stated occipital neurotomy may be selectively offered when the greater or lesser occipital nerves are confirmed as the pain generator through diagnostic blockade. This is supported by one multicenter randomized double-blind sham-controlled RCT, one additional RCT, five clinical studies, one case series, and one case report (Lee et al., 2021).

The **American Society of Regional Anesthesia and Pain Medicine (ASRA-PM)** and the **American Academy of Pain Medicine (AAPM)** consensus practice guidelines on interventions for cervical spine (facet) joint pain acknowledges the controversial nature of cervical spine joint procedures including joint injections, nerve blocks and radiofrequency ablation to treat chronic neck pain. The multispecialty international working group concluded that cervical medial branch radiofrequency ablation may benefit well-selected individuals. The guideline indicates there are limitations in recommendations due to a lack of high-quality randomized controlled trials and variability in study designs. The need for additional high-quality research is highlighted (Hurley, et al., 2021).

The 2023 **Department of Veterans Affairs and the Department of Defense** evidence-based clinical practice guideline for the management of headache states there is insufficient evidence to recommend for or against pulsed radiofrequency procedure of the upper cervical nerves for the treatment of chronic migraine. The guideline highlighted that available studies have limitations including small sample sizes and are considered low quality.

There is insufficient evidence in the published medical literature to demonstrate the safety and efficacy of peripheral nerve ablation, using any method, for treatment of cervicogenic headache and/or occipital neuralgia.

Intercostal Neuralgia

Intercostal neuralgia is a clinical syndrome characterized by neuropathic pain in the distribution of one or more intercostal nerves, typically presenting as sharp, aching, radiating, burning, or stabbing pain along the ribs, chest, or upper abdominal wall. Pain may be constant or intermittent, often described as band-like, and may include paresthesias such as numbness or tingling. Exacerbating factors include movement, coughing, and respiration; severe cases may impair motor function. The two most common causes of intercostal neuralgia are thoracic nerve damage from thoracotomy (post-thoracotomy pain syndrome) and herpes zoster infection (post-herpetic neuralgia). Other causes of intercostal nerve injury or inflammation may be related to trauma, iatrogenic procedures (e.g., chest tube placement, breast surgery), anatomical compression, pregnancy, and inflammatory, infectious, or neoplastic processes. Although more common in older adults, it can occur at any age following intercostal nerve damage. Early, multimodal pain management reduces chronicity risk and may include NSAIDs, opioids, anticonvulsants, antidepressants, topical agents, physical therapy, and interventional nerve blocks. Some individuals respond to conservative therapy, while others develop chronic, disabling pain. Neurolytic techniques such as chemical or radiofrequency ablation may provide prolonged relief in refractory cases (Fazekas, et al., 2023).

Literature Review

The safety and efficacy of peripheral nerve ablation techniques for intercostal neuralgia arising from conditions such as chronic post-surgical thoracic pain, postherpetic neuralgia, trauma, nerve entrapment, and oncologic pain have primarily been assessed in observational studies, cohort studies, case reports, case series, and retrospective reviews, with few randomized controlled trials. The available comparative studies have evaluated conventional and pulsed radiofrequency ablation, cryoablation, and chemical neurolysis to other accepted therapeutic modalities, including

systemic or local pharmacotherapy and regional anesthesia (e.g., nerve blocks). Primary outcomes focus on pain intensity measured by numeric rating scales (NRS) or visual analogue scales (VAS), with additional outcomes assessing quality of life, functional improvement, opioid reduction, and hospital length of stay. Some evidence suggests meaningful reductions in pain scores, opioid use, and hospital length of stay; however, statistical rigor is often lacking. Commonly reported adverse effects include site irritation and hematoma, with rare serious complications such as infection, pleural effusion, and pneumothorax. In general, these studies have limitations such as small sample sizes, absence of control groups, heterogeneity in protocols, and short follow-up durations that restrict generalizability of findings (Iglesias, et al., 2025; Van Polen, et al., 2025; Aryan, et al., 2024; Eldredge and McMahon, 2023; Kwater, et al., 2023; Nemecek, et al., 2023; Vachirakorntong, et al., 2023; Du, et al., 2022; Bauman, et al., 2021; Cha, et al., 2021; Abd-Elsayed, et al., 2018; Chrona, et al., 2017).

Weksler et al. (2024) conducted a randomized controlled trial (RCT) to evaluate the efficacy of cryoablation of intercostal nerves in patients undergoing minimally invasive thoracic surgery. A total of 103 participants (≥18 years) were randomized to either the cryoablation group (n=51) or standard care group (n=52). All subjects received lidocaine and bupivacaine with epinephrine injections at each intercostal space near the incision, while the cryoablation group additionally underwent ablation of 5–6 intercostal nerves at -80°C for 2 minutes per nerve. Baseline characteristics, including age, sex, BMI, and preoperative lung function, were comparable between groups. Inclusion criteria encompassed adults undergoing lung wedge resection, segmental resection, or lobectomy. Exclusion criteria included emergency or urgent surgery, chronic narcotic use, substance abuse, fibromyalgia, gabapentin use, advanced liver disease, and renal failure requiring dialysis. All patients received an internal intercostal block from the second to the tenth intercostal nerve, perioperative multimodal analgesia, and postoperative patient-controlled analgesia followed by scheduled tramadol and breakthrough oxycodone as needed. The primary outcome was postoperative narcotic consumption (morphine milligram equivalents) during hospitalization and the first two weeks post-discharge. Secondary outcomes included incentive spirometry volumes, pain scores, and neuropathy scores at two weeks. Results demonstrated no significant differences between groups in narcotic use, pain scores, or incentive spirometry decline during the early postoperative period. Notably, the cryoablation group exhibited higher neuropathy scores at two weeks (p=0.019). Limitations include single-center design, lack of anesthesia standardization, unblinded nursing staff, and short-term follow-up.

Professional Societies/Organizations
The **American Society of Anesthesiologists (ASA)** and **American Society of Regional Anesthesia and Pain Medicine (ASRA)** issued practice guidelines for chronic pain management (1997; updated 2010) addressing ablative techniques such as chemical denervation, cryoneurolysis, and radiofrequency ablation (RFA). The guidelines recommend reserving neuroablative procedures for individuals who have not achieved adequate relief with conservative or less invasive therapies. The guidelines indicate cryoablation may be considered for select cases, such as post-thoracotomy pain syndrome, though evidence is limited to observational studies and expert consensus among consultants, ASA members, and ASRA members is equivocal.

There is insufficient evidence in the published medical literature to demonstrate the safety and efficacy of peripheral nerve ablation, using any method, for treatment of intercostal neuralgia.

Shoulder Pain
Shoulder pain is a common and potentially debilitating musculoskeletal condition, affecting up to 30% of the general population and ranking among the top three musculoskeletal complaints alongside back and neck pain. The etiology of shoulder pain is diverse, with sources including the neck, glenohumeral and acromioclavicular joints, rotator cuff, and surrounding soft tissues. Risk

factors include degenerative changes (e.g., osteoarthritis), rotator cuff injuries, and prior surgical interventions such as total shoulder arthroplasty. Clinical presentation typically involves localized pain, restricted range of motion, and functional impairment. Management is multidisciplinary, incorporating physical therapy, pharmacologic interventions, and invasive procedures such as intra-articular steroid injections or regional anesthesia. Radiofrequency ablation (RFA) has been proposed as a potential treatment for chronic shoulder pain, particularly in individuals with symptomatic osteoarthritis, those who are poor surgical candidates, individuals with primary rotator cuff injuries, or those with persistent pain following arthroplasty. Both thermal and pulsed RFA have been used to target sensory nerve branches, most commonly the suprascapular nerve which innervates up to 70% of the shoulder, or axillary, lateral pectoral, and subscapular nerves depending on pain distribution. Complications of RFA of the shoulder are scarcely described in the literature; reported complications are generally minor, including puncture site pain, transient hypotension, and small hematomas. Serious adverse events include structural damage and pneumothorax (Rausch and Abdallah, 2024).

Literature Review
Nerve ablation techniques for shoulder pain have been evaluated in randomized control trials (RCTs), prospective and retrospective studies, cohort studies, case series, case reports, and systematic reviews. Studies have compared conventional and pulsed radiofrequency ablation to intra-articular steroid injections, nerve blocks, or sham treatment. Primary outcomes focus on pain scores, functional or physical disability scores, and/or changes in analgesic consumption. Some studies have demonstrated significant improvement in pain and/or function for patients in the treatment group (Abd-Elsayed, et al., 2025a; Wu, et al., 2025). Other study results have indicated that radiofrequency ablation was no better than placebo, intra-articular injections or nerve blocks (Batten, et al., 2023; Orhurhu, et al., 2019b; Eyigor, et al., 2010). In general, these studies are limited by small sample sizes (n=6–96), absence of control groups, heterogeneity in techniques, and short follow-up durations with most falling in the 3–12 month range and one extending to 18 months.

Abdelfatah et al. (2025) conducted a randomized controlled trial evaluating the efficacy of pulsed radiofrequency ablation (PRFA) in patients with chronic shoulder pain due to impingement syndrome unresponsive to conservative therapy. Sixty adults (aged 21–60) were randomized to receive either PRFA targeting the suprascapular nerve (n=30) or a control intervention consisting of suprascapular nerve block (SSNB) combined with intra-articular corticosteroid injection (n=30). Inclusion required chronic pain (>3 months) confirmed by clinical tests (e.g. Neer’s sign, Hawkins-Kennedy test) and imaging. Exclusions were contraindications to regional anesthesia, recent shoulder interventions within 3 months before or 1 year following the study, uncontrolled diabetes, and chronic pain syndromes secondary to alternative shoulder pathologies (e.g., fibromyalgia, cervical discopathy, or brachial plexus injury). All participants received a glenohumeral steroid injection and SSNB, and the experimental group also underwent PRFA at 42°C, with 20 ms pulse width, 45 V, 2 Hz, for a total of 480 seconds. The primary outcome was the Shoulder Pain and Disability Index (SPADI); secondary outcomes included the Numerical Rating Scale (NRS) for pain and active range of motion (AROM). Assessments occurred at 15 days, 1-, 3-, and 6-months post-procedure. Both groups demonstrated significant improvements; however, PRFA yielded superior SPADI scores ($p<0.001$), greater reductions in median NRS ($p<0.0001$), and enhanced AROM for internal rotation ($p=0.001$), external rotation ($p=0.006$), and abduction ($p=0.003$) at 6 months. No significant difference was observed in flexion improvement. Study limitations include small sample size, single-center design, lack of placebo or sham control, subjective outcome measures, absence of blinding, short-term follow-up, and heterogeneity in pain characteristics and prior treatments.

In 2021, Kim and Chang performed a single-center, prospective, randomized controlled trial to evaluate the effectiveness of pulsed radiofrequency ablation (PRFA) of the suprascapular nerve compared with intra-articular corticosteroid injection for chronic hemiplegic shoulder pain following stroke. Twenty adults (13 men, 7 women; aged 42–69 years) with hemiplegia and significant shoulder pain persisting for at least three months despite four weeks of pharmacologic intervention were randomized to receive either PRFA (n=10) or intra-articular corticosteroid injection (n=10), in addition to standard rehabilitation therapy. Exclusion criteria included prior intra-articular injection in the shoulder, severe aphasia, or cognitive dysfunction. PRFA was administered at 42°C, 30 ms pulse width, 45 V, 2 Hz, for 360 seconds. Primary outcomes were pain using a numeric rating scale and passive range of motion, assessed at 1- and 2-months post-procedure. Both groups demonstrated significant reductions in pain scores and improvements in range of motion compared to baseline ($p<0.001$). Notably, intra-articular corticosteroid injection resulted in greater reductions in pain and superior improvements in all range of motion measurements compared to PRFA ($p<0.001$). Study limitations include lack of blinding and placebo group, heterogeneity in pain mechanisms and participant selection, and short-term follow-up.

There is insufficient evidence in the published medical literature to demonstrate the safety and efficacy of peripheral nerve ablation for the treatment of shoulder pain.

Sacroiliac (SI) Joint Pain/Low Back Pain

The SI joint lies between the sacrum and the ileum, and functions more for stability than for movement. The joint's stability is maintained in part by several large ligaments and muscle groups. Pain may arise in this highly innervated joint or in the related muscles and ligaments. Pain may be felt in the lower back or may radiate to one or both hips and/or one or both legs. RF ablation of the SI joint theoretically destroys the sensory nerves to the SI joint thereby alleviating pain. The sensory innervation of the SI joint has not been defined as definitively as that of the lumbar facet joints, however. Most of the posterior sensory innervation is thought to be transmitted from the S1, S2, and S3 dorsal rami via the lateral branches, as well as through medial branches from the L4 and L5 dorsal rami (Aydin, 2010).

Literature Review

Radiofrequency (RF) denervation for sacroiliac (SI) joint pain has been evaluated in randomized controlled trials (RCTs), prospective and retrospective studies, observational studies, case series, systematic reviews, and meta-analyses. Studies have compared thermal and cooled RF techniques to bipolar RF, exercise programs, and placebo/sham treatment. Primary outcomes focus on pain scores and functional disability measures, with some studies reporting significant improvements in pain and function following cooled RF (Lee, et al., 2023; Sun, et al., 2018). Other studies, including large multicenter RCTs and systematic reviews, found RF denervation provided no clinically meaningful benefit compared to exercise or placebo (Juch, et al., 2017; Maas, et al., 2015; King, et al., 2015). Overall, these studies are limited by small sample sizes, variability in diagnostic criteria and RF techniques, lack of control groups in observational studies, and short follow-up durations, with most ranging from 12 weeks to 12 months and few extending to 2 years.

Cohen et al. (2025) conducted a randomized, multicenter, comparative effectiveness study evaluating cooled radiofrequency ablation (CRFA) versus standard medical management (SMM) in individuals with injection-confirmed sacroiliac joint pain. A total of 210 participants from 15 centers were randomized (n=105 per group) to receive either CRFA targeting the L5 dorsal ramus and S1–S3/4 lateral branches or SMM, which included pharmacotherapy, physical and chiropractic therapy, lifestyle modifications, acupuncture, yoga, and therapeutic injections. All participants were encouraged to maintain or initiate regular physical activity, and no acupuncture or injections were permitted within four weeks of follow-up visits. Eligibility required adults over 21 years with

chronic sacroiliac joint pain lasting at least three months, at least one positive provocation test (e.g., thigh thrust, compression, sacral thrust), ≥50% pain relief from diagnostic or therapeutic sacroiliac joint injection and lateral branch block, an average Numeric Rating Scale (NRS) pain score ≥4 over the past 7 days, and no other major identifiable source of low back pain. Key exclusion criteria included prior sacral lateral branch radiofrequency ablation, active hip pathology, lumbosacral radicular pain, body mass index >40 kg/m², opioid use ≥90 mg oral morphine equivalents per day and implanted electronic devices. The primary outcome was mean change in average low back pain (NRS), with secondary outcomes including quality of life and function (Oswestry Disability Index [ODI], SF-36 Physical Function, EuroQoL-5D-5L), and responder status (≥30% or ≥2-point NRS reduction plus Patient Global Impression of Change (PGIC) ≥5). Follow-up occurred at 1, 3, 6, 9, and 12 months. At three months, 52.3% of the CRFA group met responder criteria compared to 4.3% in the SMM group ($p<0.0001$), and 41.9% of the CRFA group achieved ≥50% pain reduction versus 6.5% in SMM ($p<0.0001$). The CRFA group demonstrated greater improvements in SF-36 and ODI scores compared to SMM ($p<0.0001$ for both). 89 SMM patients crossed over at or after 3 months, of which 63 completed 12-month follow-up. At 12 months, combined analysis of 124 treated individuals showed 43.5% with substantial pain improvement and 56.5% classified as responders. Over 12 months, 129 adverse events were reported, with 16 considered procedure-related, including severe post-procedure pain, neuritis, delayed worsening pain, and one case of new-onset lumbar radiculopathy. Study limitations include lack of blinding, absence of a control group beyond three months, heterogeneity in symptom duration and characteristics, and participant attrition.

Li et al. (2022) conducted a systematic review and network meta-analysis of ten randomized controlled trials evaluating the efficacy of radiofrequency denervation techniques for facet joint–derived chronic low back pain (LBP) in 715 participants (n=30–150 per study). Eligible studies enrolled adults with LBP persisting for more than one month, diagnosed with facet joint syndrome by single or double diagnostic block, and required at least three months of follow-up. Exclusion criteria included studies involving acute causes of LBP (e.g., fracture, osteoporosis, or malignancy), as well as letters, conference abstracts, and commentaries. Interventions assessed included conventional radiofrequency denervation (CRF, n=319), pulsed radiofrequency denervation (PRF, n=76), pulsed radiofrequency treatment of the dorsal root ganglia (PRF-DRG, n=50), radiofrequency facet capsule denervation (RF-FC, n=40), and radiofrequency ablation under endoscopic guidance (ERFA, n=50), compared with sham controls (CRF-sham, n=180). The primary outcome was the mean change in visual analog scale (VAS) score from baseline, with follow-up durations ranging from three months to three years. CRF demonstrated greater pain relief than sham control at follow-up periods of six months or less (standardized mean difference [SMD] −1.58, 95% confidence interval [CI] −2.98 to −0.18) and at twelve months (SMD −4.90, 95% CI −5.86 to −3.94). PRF was more effective than sham control for pain relief at twelve months (SMD −1.30, 95% CI −2.17 to −0.43). ERFA showed greater pain relief than sham control at both six months or less (SMD −3.07, 95% CI −5.81 to −0.32) and twelve months (SMD −4.00, 95% CI −4.95 to −3.05). RF-FC was more effective than sham control at twelve months (SMD −1.11, 95% CI −2.07 to −0.15), and PRF-DRG was more effective than sham control at six months or less (SMD −5.34, 95% CI −8.30 to −2.39). Limitations included the small number of high-quality randomized controlled trials, small sample sizes in individual studies, heterogeneity in study designs, incomplete data reporting, and insufficient long-term outcome data.

Chou et al. (2021) conducted a systematic review on interventional treatments for acute and chronic pain for the Agency for Healthcare Research and Quality (AHRQ). The report evaluated randomized controlled trials (n=6) of conventional, cooled, and pulsed radiofrequency denervation for sacroiliac and presumed lumbar facet joint pain. Study quality ranged from good (n=1) to fair (n=3) and poor (n=2). Cooled radiofrequency denervation for sacroiliac pain demonstrated moderate to large pain reduction and small to large functional improvement at one month, with

moderate improvements in pain and function at three months. Evidence was insufficient to determine the effectiveness of pulsed radiofrequency denervation for presumed facet joint pain. Reported complications were minimal and included transient pain worsening and an isolated instance of nonpainful paresthesias. Study limitations included heterogeneity in patient selection, procedural techniques, small sample sizes, and short follow-up durations.

Professional Societies/Organizations
The **American Society of Anesthesiologists (ASA)** and **American Society of Regional Anesthesia and Pain Medicine (ASRA)** published practice guidelines for chronic pain management (1997; updated 2010) that address ablative techniques such as chemical denervation, cryoneurolysis, and radiofrequency ablation (RFA). The guidelines recommend reserving ablative procedures for cases in which conservative and less invasive treatments have failed. Cryoablation may be considered for select cases, such as low back pain involving the medial branch, though evidence is limited to observational studies and consensus is equivocal. For facet-mediated low back pain, the guidelines report strong agreement among consultants, ASA members, and ASRA members supporting conventional or thermal RFA of the medial branch nerves when diagnostic or therapeutic blocks have produced temporary benefit, citing randomized controlled trial data. Water-cooled RFA may be used for chronic sacroiliac joint pain, though both supportive evidence and expert consensus are limited. Routine use of conventional or thermal RFA targeting the dorsal root ganglion is not recommended for lumbar radicular pain.

An Update of Comprehensive Evidence-Based Guidelines for Interventional Techniques in Chronic Spinal Pain published by the **American Society of Interventional Pain Physicians (ASIPP)** (2000; updated 2013) provides evidence-based recommendations for interventional management of chronic low back pain. The guideline reports good evidence supporting conventional radiofrequency neurotomy for facet-mediated chronic low back pain, based on six positive randomized controlled trials and 10 observational studies, demonstrating both short- and long-term benefit. In contrast, evidence for pulsed radiofrequency neurotomy is limited, supported only by one randomized trial and one observational study. For sacroiliac joint interventions, the guideline reports fair evidence supporting cooled radiofrequency neurotomy, based on two randomized controlled trials that had noted methodological shortcomings, as well as two observational studies and one case report. The guideline concludes that evidence is limited for pulsed radiofrequency, supported only by a single non-randomized prospective evaluation, and is also limited for conventional radiofrequency neurotomy, which is informed by two observational studies (Manchikanti, et al., 2013).

The **American Society of Interventional Pain Physicians (ASIPP)** comprehensive evidence-based guidelines for facet joint interventions in chronic spinal pain (2020) issued a moderate strength recommendation for lumbar radiofrequency ablation (RFA), based on systematic reviews and randomized controlled trials. The guideline states that lumbar radiofrequency neurotomy may be appropriate for individuals who demonstrate at least 80% pain relief following dual diagnostic blocks. While all available studies reported short-term effectiveness, evidence for sustained benefit at one year is limited. Additionally, the guideline notes that the small number of participants in the trials impacts the strength of guidance (Manchikanti, et al., 2020).

The **American Society of Pain and Neuroscience (ASPN)** Best Practice Guideline for the Treatment of Sacroiliac Disorders (2024) recommends considering neuroablative procedures for sacroiliac joint (SIJ) pain only after an adequate trial of conservative therapy and a positive response to diagnostic blockade. The primary neuroablative modality is radiofrequency ablation (RFA) targeting the lateral branches of the S1–S3 dorsal rami and the medial branches of the L5, with possible inclusion of L4. Evidence indicates that anatomical variability in lateral branch nerve pathways can limit the consistency of outcomes, and lateral sacral RFA may not address pain

originating from the ventral SIJ, as it primarily denervates the posterior joint complex. Overall, available evidence shows that lateral branch RFA can be effective, with responder rates ranging from 32% to 89%; however, high-quality data remain limited, with only two randomized, sham-controlled trials. Comparative studies of RFA modalities are lacking, with mixed findings regarding the relative benefit of cooled versus monopolar RFA. Less common neuroablative techniques—such as intra-articular chemical neurolysis and cryoablation—have only low-quality evidence supporting modest benefit and carry additional concerns due to adverse effect profiles (Sayed, et al., 2024).

The **American Society of Regional Anesthesia and Pain Medicine (ASRA-PM)** 2020 consensus practice guidelines on interventions for lumbar facet joint pain, developed by a multispecialty international working group, recommend lumbar medial branch radiofrequency ablation (RFA) as a potential benefit for well-selected individuals with facet joint–mediated low back pain. Prognostic screening with a single medial branch block (MBB) is preferred over intra-articular (IA) injections, as MBB is more predictive of denervation outcomes. The committee advises a three-month trial of conservative therapies including medications, physical treatments, integrative approaches, and lifestyle modifications prior to considering facet interventions. In terms of technique, creating larger lesions may improve the likelihood of targeting the intended nerves, though caution is advised to avoid damage to non-targeted structures; this carries a grade C recommendation with low certainty for efficacy and grade I with low certainty for increased duration of pain relief. The committee emphasizes individualized care based on known variables and practice goals, reflecting a grade C recommendation with low-to-moderate certainty (Cohen, et al., 2020).

The 2022 **Department of Veterans Affairs and the Department of Defense** evidence-based clinical practice guideline for the diagnosis and treatment of low back pain issues a weak recommendation for lumbar medial branch and/or sacral lateral branch radiofrequency ablation in individuals with chronic low back pain. The guideline reports that modest improvements in pain, disability, and quality of life associated with radiofrequency neurotomy are counterbalanced by potential harms, including post-radiofrequency neuritis and possible denervation of paraspinal musculature, resulting in a rating of moderate confidence. The guideline also emphasizes that limitations in the available evidence, including methodological variability and generalizability concerns, reduce the overall strength of the recommendation.

The clinical effectiveness and duration of effect of sacroiliac joint nerve ablation has not been consistently demonstrated in well-designed studies. The evidence in the medical literature is insufficient to demonstrate safety and efficacy of SI joint radiofrequency (RF) ablation or ablation of lumbar or sacral dorsal rami for the treatment of SI joint and other lumbar-related pain. In addition, there is insufficient evidence in the peer-reviewed scientific literature to determine safety and efficacy for other ablative modalities (e.g., laser, chemical, electrical) when employed for treatment of sacroiliac joint and other similar type pain.

Hip Pain

Osteoarthritis (OA) is a disease of joint tissue destruction that affects adults later in life. As OA of the hip progresses, it affects a person's mobility and quality of life. The pathogenesis of OA includes factors such as biomechanical factors, proinflammatory mediators, and proteases (Loeser, 2023). The initial approach to treatment includes nonpharmacologic measures such as exercise, walking aids and weight management. Patients will concomitantly start pharmacologic therapy of oral nonsteroidal anti-inflammatory drugs (NSAIDs); however, these are contraindicated in patients with cardiovascular comorbidities. If there is insufficient relief with these measures, there is a lack of other nonsurgical treatment alternatives (Deveza and Eyles,

2024). It has been proposed to target ablation on the obturator and femoral nerves to stop the transmission of pain signals and reduce pain in the hip with osteoarthritis.

Literature Review
Current evidence on nerve ablation for hip pain primarily consists of case series, observational studies, and retrospective reviews, with few non-randomized controlled trials. Comparative studies have evaluated ablative techniques versus conservative management, including exercise programs and pharmacologic therapy. Reported outcomes include changes in Numerical Rating Scale (NRS), Harris Hip Score (HHS), Oxford Hip Score (OHS), and Western Ontario and McMaster Universities Arthritis Index (WOMAC) scores. Results are inconsistent; some studies demonstrate short-term improvements in pain and function, but durability is limited. Adverse events such as neuritis and femoral artery puncture have been reported. Evidence is constrained by small sample sizes (n=14–52), retrospective or observational design, lack of blinding, absence of comparator groups, and short follow-up periods of 6–12 months (Diwan, et al., 2024; Petroni, et al., 2024; Mariconda, 2020; Kapural, 2018; Tinnirello, 2018; Chye, 2015).

In a double-blinded, single-center, prospective randomized controlled trial, Reysner et al. (2025) evaluated the safety and efficacy of ultrasound-guided 95% ethanol neurolysis of the pericapsular nerve group (PENG) versus a sham procedure in adults with chronic hip pain due to osteoarthritis. One hundred participants (median age 82 years; 49% male) with persistent pain (NRS >3) despite NSAIDs, paracetamol, and co-analgesics were enrolled. Exclusion criteria were opioid dependence, active malignancy, and dementia. Participants were randomized to receive either ethanol neurolysis (n=50) or sham (n=50). All underwent a diagnostic PENG block, and only those with >50% pain reduction for at least six hours proceeded to neurolytic intervention. The procedure involved initial lidocaine 2% blockade, followed by slow injection of 2.5 ml 95% ethanol or 0.9% NaCl, per group assignment, to ensure targeted neurolysis and minimize ethanol spread. The primary outcome was pain intensity using a numeric rating scale (NRS). Secondary outcomes included opioid consumption (oral morphine equivalents), quality of life (EQ-5D-5L questionnaire), and observed neurological deficits. Follow-up assessments occurred at 7 days, 30 days, 3 months, and 6 months. Ethanol neurolysis resulted in significantly lower NRS scores, reduced opioid use, and improved quality of life at all time points compared to controls ($p<0.0001$). No neurological deficits or adverse events were observed. Study limitations include single-center design, reliance on subjective measures, and short follow-up duration.

Bhatia et al. (2018) completed an evidence-based narrative review regarding radiofrequency procedures to relieve chronic hip pain. Fourteen publications (case reports, case series) involving 90 subjects who underwent ablative RF treatments of innervation of the hip joint were included in the review. A high success rate of these procedures in relieving chronic pain of the hip joint was reported at 8 days to 36 months after the procedures, however none of the publications were randomized controlled trials. There was evidence for improvement in function and a lack of serious adverse events of RF treatments. The authors concluded radiofrequency treatments for the sensory innervation of the hip joint have the potential to reduce pain secondary to degenerative conditions although concerns remain regarding the anatomic targets, as well as quality, procedural aspects, and monitoring outcomes in publications on this topic. Randomized controlled trials of high methodological quality are required to further elaborate the role of these interventions in this population.

Professional Societies/Organizations
The **American Society of Pain and Neuroscience (ASPN)** 2021 evidence-based practice guidelines report that hip joint radiofrequency neurotomy (RFN) targeting the obturator and femoral nerve branches may be considered for managing hip joint pain in individuals who demonstrate benefit from diagnostic nerve blocks. Supporting evidence consists of one small

clinical trial (n=18), two retrospective cohort studies, a case series, and a research article. The guideline concludes that the strongest evidence supports conventional RF, with emerging but less-established evidence for cooled RF. Significant evidence gaps remain regarding optimal patient selection and procedural technique, prompting a recommendation for further investigation (Lee et al., 2021).

There is insufficient evidence in the published medical literature to demonstrate the safety and effectiveness of peripheral nerve ablation, using any method, for the treatment of hip pain.

Knee Pain (e.g., osteoarthritis, degenerative)

Chronic osteoarthritis of the knee occurs frequently with advanced age and is the most common form of arthritis. Rheumatoid and posttraumatic arthritis are less common forms of arthritis affecting the knee joint, however all forms result in inflammation and pain. Treatment generally includes lifestyle modifications, exercise, weight loss, physical therapy, assistive devices, and pharmacologic agents (e.g., corticosteroids, NSAIDs, intra-articular viscosupplements). Surgical methods are recommended when conservative measures fail to relieve symptoms and include arthroscopy and knee replacement procedures. Recently, neuroablative destruction of the genicular and other nerves has been investigated as a method of treatment for knee pain and disability caused by osteoarthritis of the knee. Anatomically genicular nerves are in close proximity to the genicular arteries and vascular injury is a potential complication of RF of the genicular nerve (Kim, et al., 2016). Additional complications include septic arthritis, pes anserine tendon injury, third-degree skin burn, and clinically significant hematoma and/or hemarthrosis (McCormick, et al., 2021).

Literature Review

Evidence evaluating neuroablative methods for chronic knee pain focuses primarily on radiofrequency (RF) techniques and includes case reports, observational case series, systematic reviews, narrative reviews, and controlled trials. Randomized controlled trials, systematic reviews, and meta-analyses have compared conventional, pulsed, and cooled RF ablation of genicular nerves to sham procedures, intra-articular corticosteroid or hyaluronic acid injections, local anesthetic blocks, oral NSAIDs, and physical therapy. Primary outcomes include pain reduction (VAS/NRS), functional improvement (WOMAC, Oxford Knee Score), and patient satisfaction, with secondary outcomes assessing quality of life and analgesic use. Several studies and meta-analyses reported significant improvements in pain and/or function for RF compared to controls at short-term follow-up (1–6 months), and sustained benefits up to 12–24 months for cooled RF (Soetjahjo, et al., 2024; Orhurhu, et al., 2019a; Hunter, et al., 2019; Li, et al., 2021; Iannaccone, et al., 2017; Bhatia, et al., 2016). However, other trials found no significant advantage of RF over comparators for functional outcomes or pain relief beyond early time points (Hong, et al., 2019; Gupta, et al., 2017; Qudsi, et al., 2017). Chemical ablation of the genicular nerve with phenol has also been studied (Risso, et al., 2020), but evidence remains insufficient. Across studies, limitations include variability in ablative technique, heterogeneity in patient selection and comparators, small sample sizes (n=14–151), lack of blinding, and most studies reporting short follow-up durations of 3–6 months, with only a few extending to 12–24 months.

Almeida et al. (2025) conducted a systematic review and meta-analysis of twenty-five randomized controlled trials to assess the efficacy and safety of minimally invasive interventions targeting the genicular nerves for knee osteoarthritis (OA). The analysis included 2049 adults (n=20–200 per study; aged 48–74 years; 47–95% female) with clinically or radiographically confirmed knee OA (mean symptom duration: 7 years) who received genicular nerve block (GNB), radiofrequency ablation (RFA), cryoneurolysis, or alcoholic neurolysis. Postoperative patients were excluded. Studies evaluated RFA (n=16), GNB (n=8), and cryoneurolysis (n=1), with comparators including sham/placebo, intra-articular injections, and physical therapy with conventional analgesics.

Primary outcomes were pain intensity, physical function, and serious adverse events; secondary outcomes included quality of life and patient-reported global perceived effect. Study durations ranged from 2 to 12 months. RFA versus sham showed moderate pain reduction at 1 month (MD −1.70, 95% CI −3.03 to −0.36) and 3 months (MD −1.86, 95% CI −2.82 to −0.89), but little to no difference at 6–12 months. No significant improvements in function were observed. When comparing RFA to intra-articular injections evidence suggests that RFA may result in moderate improvements in pain and function across multiple time points (pain 1 month MD −0.66, 95% CI −0.99 to −0.34, 4 trials; 3 months MD −0.61, 95% CI −0.82, −0.39, 5 trials, 6 months MD −1.83, 95% CI −3.06 to −0.60, 4 trials; 12 months MD −2.70, 95% CI −3.26 to −2.14, 1 trial), however, the authors indicated this is very low certainty due to risk of bias, imprecision, and inconsistency. RFA versus conservative therapy demonstrated small to medium improvements for up to 6 months. Cryoneurolysis versus sham showed small improvements at 1 month, with no significant differences at later time points. Across all comparisons, no significant differences in serious adverse events were observed. Limitations included small sample sizes, lack of blinding, protocol variability, methodological differences, and short follow-up durations. The authors concluded that current evidence does not support routine use of RFA or related minimally invasive interventions for knee OA, recommending against their use until more robust data are available.

Ma et al. (2024) conducted a prospective randomized controlled trial (RCT) to evaluate the efficacy of ultrasound-guided radiofrequency ablation (RFA) for moderate to severe chronic osteoarthritis knee pain in individuals over 50 years of age. A total of 112 participants were randomly divided into the RFA group (n=56) or the nerve block control group (n=56); both groups received intra-articular chitosan. Inclusion criteria required chronic knee pain for more than six months, numeric rating scale (NRS) ≥ 4, and Kellgren–Lawrence grade III–IV. Exclusion criteria included rheumatoid arthritis, knee joint tumors, gout, prior knee surgery, lower limb neurovascular injury or coagulation dysfunction, cognitive impairment, severe comorbidities, chronic infections, and anesthetic allergy. RFA was performed at 70°C for 120 seconds, targeting the superomedial genicular nerve (SMGN), inferior medial genicular nerve (IMGN), and superolateral genicular nerve (SLGN) branches according to pain distribution. Primary outcomes were worst and average NRS scores, with clinically relevant pain reduction defined as a decrease of ≥ 2 points. Secondary outcomes included Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Global Perceived Effect (GPE), and analgesic use. Follow-up assessments occurred at one, three, and six months. Results demonstrated statistically significant improvements in NRS and WOMAC pain, physical function, and total scores for the RFA group compared to controls at all time points ($p<0.01$), while WOMAC stiffness scores did not differ significantly. GPE scores favored RFA ($p<0.05$), and analgesic use was consistently lower in the RFA group. Higher severity of osteoarthritis was associated with reduced likelihood of successful outcome at six months ($p<0.01$). Adverse events were limited to transient subcutaneous bruising, resolving spontaneously within days, with no serious complications reported. Study limitations include single-center design, small sample size, participant attrition, and short follow-up duration.

ECRI (2023) conducted a clinical evidence assessment of cryoablation for knee osteoarthritis pain including three randomized controlled trials (RCTs; n=16–180), two nonrandomized controlled studies (n=57–267), and one retrospective comparison study (n=100), totaling 744 participants. Eligible studies reported participant-oriented outcomes such as pain reduction, functional improvement, opioid use reduction, quality of life, hospital length of stay, and adverse events in individuals undergoing total knee arthroplasty (TKA) or treated for pain with the Iovera System. Studies were excluded if they were noncomparative, narrative reviews, included fewer than 10 participants, or were conference abstracts. Follow-up ranged from 3 to 12 months. Two RCTs found no significant differences in pain scores between Iovera and standard of care or sham treatment at 3 and 6 months, respectively. A nonrandomized comparison study also reported no statistical difference in pain change from baseline between multimodal pain management plus

Iovera and multimodal pain management alone at 3 months. Findings regarding hospital length of stay were inconsistent: one study reported 17% of Iovera participants required a stay of 2 days or more ($p<0.001$), while another found no significant difference compared to controls. Quality of life (QoL) and functional status outcomes were mixed; one study observed significant improvements in KOOS JR ($p=0.007$) and mental scores ($p=0.007$) at 12 months, but two others found no statistical difference in functional status or QoL at 3 and 6 months. Regarding opioid use, one RCT found no significant difference in cumulative opioid consumption post-TKA between Iovera and standard care, while another RCT reported general reductions in opioid use and sleep disruptions due to pain on postoperative days 4–21. A retrospective study observed significantly fewer morphine milligram equivalents at week 6 in the Iovera group compared to historical controls ($p<0.0001$). ECRI identified limitations including conflicting study results, limited generalizability due to small sample sizes, and high risk of study bias. The report recommends multicenter, double-blinded RCTs with adequate follow-up and additional participant-relevant outcomes, such as functional status, return to activities of daily living, and complication rates for other surgical indications.

Wu et al. (2022) conducted a systematic review and meta-analysis of twenty-one randomized controlled trials to evaluate various radiofrequency ablation (RFA) treatments for knee osteoarthritis. The analysis included 1818 participants (n=24–206 per study). Eligible studies were randomized controlled trials evaluating radiofrequency ablation versus placebo or other active treatments in individuals with clinically and radiographically confirmed knee osteoarthritis, and were required to report pain or functional outcomes, follow-up duration, and comprehensive details of ablation methodology, target, and electrode configuration. Exclusion criteria comprised cohort or case-control trials, scientific or case reports, anatomical or autopsy studies, individuals with non-OA knee pain, and continuation studies assigning individuals with severe pain to RFA or total knee arthroplasty. RFA was delivered using conventional, cooled, or pulsed modalities, via monopolar or bipolar configurations, and compared with intra-articular injections, nonsteroidal anti-inflammatory drugs (NSAIDs), exercise, and placebo. The primary outcome was analgesic efficacy measured by the visual analog scale (VAS), and the secondary outcome was knee function assessed by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Follow-up duration ranged from 3 to 12 months. Most treatments, except exercise, demonstrated significantly decreased VAS compared with placebo at 3 months. At 6 months all treatments showed significantly decreased VAS compared with exercise at 6 months, except for NSAIDs. Conventional bipolar genicular nerve RFA yielded the greatest net benefit on VAS at 6 months (MD, -5.5; 95% CI, -4.3 to -6.7; SUCRA, .98). Most treatments, except exercise, nonsteroidal anti-inflammatory drugs, and pulsed monopolar IPRFA, showed significantly decreased WOMAC compared with placebo at 3 months; all treatments outperformed exercise at 6 months. Cooled monopolar genicular nerve RFA provided the greatest net benefit on WOMAC at 6 months (MD, -33; 95% CI, -37 to -29; SUCRA, .99). Adverse events were reported in six studies, with twenty (3.9%) events possibly related to RFA, including pain (n=5), post-procedural pain (n=7), falls (n=5), stiffness (n=1), and swelling (n=2). Limitations included heterogeneity in ablative parameters or techniques, small sample sizes, and short-term follow-up.

Lyman et al. (2022) conducted a prospective, observational extension of a randomized controlled trial conducted by Chen and colleagues in 2020 to evaluate the durability of genicular cooled radiofrequency ablation (CRFA) for chronic osteoarthritic knee pain. Of the original 88 participants, 27 completed the durability review, having not undergone additional knee procedures. In the initial study individuals were randomized to receive either CRFA or a single intra-articular hyaluronic acid injection. Prior to randomization, all underwent fluoroscopically guided blockade of four genicular nerves, with positive responders (≥50% reduction in Numeric Rating Scale [NRS] pain score) proceeding to randomization. CRFA was performed at a probe temperature of 60°C for 2.5 minutes, yielding tissue temperatures above 80°C. After 6 months, individuals dissatisfied

with hyaluronic acid could cross over to CRFA; however, only those initially randomized to CRFA were eligible for the 18- and 24-month extension. The primary outcome was the proportion of individuals achieving ≥50% reduction in daily knee pain from baseline at 18 months and 2 years post-CRFA, assessed by NRS. Secondary outcomes included function (WOMAC), subjective benefit (Global Perceived Effect scale), and quality of life (EQ-5D-5L). At 18 months and 2 years, NRS pain scores remained significantly reduced ($p<0.0001$), with 69% and 63% of individuals, respectively, maintaining at least a 50% reduction in pain. WOMAC scores indicated sustained improvements in pain, stiffness, and function ($p=0.0007$). Sixty-three percent reported persistent improvement in knee pain, and quality of life scores increased significantly at both time points ($p<0.0001$ at 18 months; $p=0.0146$ at 2 years). Radiographic evaluation showed 68.2% had no change in Kellgren-Lawrence grade, 22.7% worsened by one grade, and 9.1% by two grades over 2 years. Study limitations include small sample size, participant attrition, protocol deviations due to COVID-19, and lack of blinding.

Professional Societies/Organizations
The 2021 **American Academy of Orthopaedic Surgeons (AAOS)** evidence-based clinical practice guideline on the management of knee osteoarthritis (non-arthroplasty), endorsed by the **American Association of Hip and Knee Surgeons (AAHKS)**, addresses denervation therapy. The guideline provides a limited recommendation for denervation techniques—including cryoneurolysis, chemical ablation, thermal ablation, and radiofrequency ablation—based on high- and moderate-quality evidence that was downgraded due to concerns identified in the Evidence-to-Decision framework, thereby reducing overall confidence in the findings.

The **American Society of Pain and Neuroscience (ASPN)** 2021 evidence-based practice guidelines indicate that radiofrequency ablative technologies targeting the nociceptive sensory innervation of the knee is an effective treatment option for chronic knee pain associated with osteoarthritis and post-surgical etiologies, supported by evidence from randomized controlled trials and meta-analyses. Targeted genicular nerves for conventional and cooled RFN include the superomedial (SM), superolateral (SL), and inferomedial (IM) branches. It is stated that due to substantial anatomical variability, larger lesion sizes may increase procedural success. Pre-procedural diagnostic blocks using low-volume anesthetic can help refine patient selection and predict treatment response. Studies have evaluated genicular RFN with follow-up periods of up to 12 months, however, the literature continues to show variability in outcomes, underscoring the need for further research to clarify optimal patient selection, the role and predictive value of prognostic blocks, and the ideal timing of RFN within a multimodal pain management strategy. The guideline indicates additional investigation should determine how demographic factors (e.g., BMI, sex, osteoarthritis severity) influence outcomes, establish standardized treatment protocols, and evaluate long-term (>12 months) durability given the chronic nature of knee pain (Lee et al., 2021).

In December of 2018, the **Washington State Healthcare Authority** published an evidence report evaluating peripheral nerve ablation for the treatment of limb pain. As part of the review, the authors collected and evaluated 13 RCTs which met their inclusion criteria; seven focused on osteoarthritic knee pain. A total of five studies evaluated conventional RF; most outcomes were measured at 6 months with one study reporting 12-month outcomes. One study evaluated cooled RFA (6-month outcomes) and one evaluated cryoablation for knee pain (6-month outcomes). Although there was some improvement in function and pain scores, according to the authors the studies had significant limitations and/or high risk of biased assessments. Using the GRADE system, the group reported there was low quality evidence in favor of peripheral nerve ablation to improve some short-term functional and pain measures for moderate to severe pain resulting from chronic knee OA. The evidence demonstrated some improvement that was both statistically

significant and likely to be clinically meaningful, although improvements were small in magnitude and not consistent.

Strong evidence-based conclusions regarding the effects of neuroablative methods for chronic knee pain cannot be made, and additional well-designed, homogeneous studies involving larger populations and long-term outcomes are needed to confirm safety and efficacy.

Foot Pain (e.g., Plantar fasciitis)

Pain can occur in any number of areas of the foot but most commonly occurs in the heel or near the toes. Symptoms involving the nerves of the foot/ankle typically involve burning, tingling, numbness, and/or pain that radiates along a nerve.

Plantar fasciitis is a common cause of heel pain. Symptoms usually start gradually with mild pain located at the heel which occurs following exercise and/or with standing first thing in the morning. First-line nonsurgical treatment includes a program of stretching exercises, ice, activity modification, weight loss in overweight patients, adaptive footwear, arch taping, nonsteroidal anti-inflammatory medications, shock-absorbing shoe inserts or orthoses, and iontophoresis. When first-line treatment fails to relieve symptoms, second line therapy may be recommended and includes night splints, steroidal anti-inflammatory injections, and/or a walking cast. Surgical intervention (plantar fasciotomy) and ablative methods may be recommended for intractable pain following 6-12 months of first- and second-line therapies.

Literature Review

Radiofrequency lesioning has been investigated as a treatment of plantar fasciitis. The results of mainly retrospective case series (Arslan, et al., 2016; Erken, et al., 2014; Cozzarelli, et al., 2010) suggests RF reduces pain resulting from plantar fasciitis. A majority of these studies are flawed by retrospective design, lack of controls, short-term outcomes, and use of various outcome measures making comparisons across studies difficult.

In 2024, Armağan et al. conducted a single-center, prospective, randomized controlled trial involving 30 individuals diagnosed with plantar fasciitis to compare the effectiveness of pulsed radio frequency ablation (PRFA) and surgical intervention for pain relief and functional outcomes. Participants were randomized into two groups: PRFA (n=17), and surgical control (n=13). Inclusion criteria required individuals over 18 years of age with symptoms persisting for at least 12 months, confirmed diagnosis via clinical and radiographic assessment, and lack of response to at least six months of conservative therapy. Exclusion criteria encompassed prior heel surgery, recent steroid injection, heel trauma, anesthetic allergy, bone anomalies, local infection, pacemaker presence, peripheral neuropathy, and malignancy. PRFA was administered at 42°C for eight minutes at 20 ms intervals in the experimental group while the control group underwent open plantar fascia release. Outcomes were assessed using the Foot Function Index (FFI), American Orthopaedic Foot & Ankle Society (AOFAS) ankle-hindfoot score, Visual Analog Scale (VAS), Roles-Maudsley Score (RMS), and radiographic evaluation. Clinical assessments occurred preoperatively and at three, six, and twelve months postoperatively. Both interventions significantly reduced pain and improved function. PRFA was associated with shorter operative time and faster return to activities ($p<0.001$). At three months, PRFA demonstrated superior VAS, FFI, and RMS scores ($p<0.05$); however, at six and twelve months, outcomes were comparable between groups ($p>0.05$), indicating similar efficacy. Radiological outcomes did not differ significantly. While adverse events were not detailed, study authors indicate no major complications occurred, and minor complications were more frequent in the surgical group ($p<0.01$). Study limitations include small sample size, single-center design, and short-term follow-up.

Authors of two comparative trials (Ozan, et al., 2017; Osman, et al., 2016) evaluated RF ablation for treatment of plantar fasciitis. Ozan et al. (2017) compared RF (n=16) to extracorporeal shockwave therapy (n=40). Subjects were followed for six months using VAS and modified Roles-Maudsley (RM) scores at one, three- and six-months following treatment. There was no significant difference in baseline and post-treatment scores between groups. Both VAS and RM scores were significantly decreased in both groups ($p<.05$) at all follow-up periods, although the RM at one month was significantly different in the RF group compared to the ESWT group. In a second trial, Osman et al (2016) compared continuous RF to pulsed RF ablation for treatment of refractory plantar fasciitis (n=20). This group of authors used a numeric verbal rating scale and satisfaction score for assessment of outcomes up to 24 weeks following treatment. All subjects demonstrated significant improvement in pain scales following treatment; the pulsed RF group achieved pain relief more rapidly. The authors concluded randomized trials are necessary to confirm the therapeutic effects and optimal dose of RF. Both studies are limited by small sample population, short term outcomes and a variety of outcome measures precluding generalization of results.

In a randomized controlled trial (Landsman, et al., 2013) the authors evaluated RF ablation as a treatment of plantar fasciitis (n=8) compared with sham (n=9). The study was a multicenter, randomized, prospective trial using a crossover design if no improvement was observed four weeks following treatment. Outcome measures included a weekly Visual Analogue Scale (VAS) score, average pain level, and peak pain level. The study demonstrated a statistically significant improvement in symptoms for the RF group and lack of significant improvement in the sham group. Following crossover to the treatment group the sham group also demonstrated statistically significant improvement of symptoms. This study is limited by a small sample population and short-term outcomes.

Foot Pain (e.g., peripheral neuroma, Morton's Neuroma)

In the toe area, interdigital spaces of the foot are common sites for the development of neuromas. These occur most often between the third and fourth digits of the foot where the medial and lateral plantar nerves combine, usually from repetitive trauma or stress, with resultant pain in the ball of the foot often described as a lump on the bottom of the foot. It may also develop in the first, second, or fourth interdigital space (Fields and Atkinson, 2024). Morton's neuroma is a compression neuropathy of the common digital nerve (Thomas, et al., 2009). Initial treatment includes adaptive footwear, orthotics, and injections of anesthetics, corticosteroids, alcohol or phenol (Thomas, et al., 2009). When conservative therapy fails, surgical treatment may be recommended and involves resection of a portion of the nerve or release of the tissue surrounding the nerve (American Orthopaedic Foot and Ankle Society [AOFAS], 2024). Ablative approaches, such as alcohol injections and RF ablation using imaging guidance have also been employed as treatment of refractory Morton's neuroma.

Literature Review

Evidence in the peer reviewed literature evaluating ablative techniques for peripheral neuromas focus primarily on Morton's neuroma using alcohol injections, radiofrequency ablation and cryoablation. Several case series have been published evaluating ultrasound guided alcohol ablation as treatment of Morton's neuroma with some evidence supporting relief of pain and patient satisfaction (Perini, et al, 2016; Pasquali, et al., 2015; Musson, et al., 2012). A majority of these studies involve small sample populations and evaluate short term outcomes. Long-term outcomes of US guided alcohol injection (n=45) reported by Gurdezi et al. (2013) illustrated alcohol injection did not result in permanent resolution of symptoms. At an average follow-up of five years 13/45 subjects had return of symptoms, 16/45 subjects underwent surgical excision at an average of 24 months follow-up, and 13/45 subjects maintained complete resolution of symptoms. In general, the body of evidence evaluating alcohol ablation is insufficient and lacks well-designed controlled trials comparing outcomes with well-established alternative treatments,

such as surgical decompression. A recently published systematic review continues to support short term outcomes and low-level evidence open to methodological bias and interpretation (Santos, et al., 2018).

Evidence evaluating cryoablation for Morton's neuroma is limited. One group of authors reported on the technical aspects of magnetic resonance guided cryoablation and included retrospective results of their preliminary clinical experience (Cazzato, et al., 2016). Measured procedural outcomes included technical success, procedural time, and complications; clinical outcomes included patient satisfaction, residual pain using the VAS scale, and instances of stump neuroma. A total of 20 subjects (24 neuromas) were included in the trial. Follow-up (mean 19.7 months) was available for 18/24 neuromas. Regarding clinical outcomes the authors reported 77.7% of subjects were completely satisfied, 16.6% were satisfied with mild reservations, and 5.7% were satisfied with major reservations. Mean pain score was 3.0 post procedure and there were no instances of stump neuroma. A second group of authors evaluated clinical outcomes associated with ultrasound guided cryoneurolysis (n=20) as treatment of Morton's neuroma (Friedman, et al., 2012). Five subjects had a painful neuroma, 12 had a stump neuroma secondary to surgery or trauma, and three had peripheral neuritis without a visible anatomic lesion. Outcomes were measured four to eight months following treatment with cryoablation. At follow-up, a total of 15 subjects had pain relief (11 subjects had marked or total relief, three had moderate relief, one had mild relief), five subjects had no relief, three of which went on to have surgical treatment. The study is limited by sample size, short-term follow-up and lack of controls.

Evidence evaluating radiofrequency ablation as a treatment of Morton's neuroma in the medical literature is limited to primarily retrospective reviews (Masala, et al 2018; Chuter, et al., 2013; Moore, et al., 2012).

There is insufficient evidence to support the safety and efficacy of neuroablative treatment for a peripheral neuroma (e.g., Morton's neuroma). Treatments such as alcohol injections and radiofrequency ablation of the neuroma have shown promise in observational case series; these treatments should however be considered research treatments until further study clarifies their efficacy (Fields and Atkinson, 2024).

Professional Societies/Organizations

In 2010, the **American College of Foot and Ankle Surgeons (ACFAS)** issued a guideline on the treatment of heel pain. Bipolar radiofrequency is listed as a third-tier option for patients who have failed other treatments. It was given a grade C recommendation, meaning that this treatment option is supported by either conflicting or level IV expert opinion evidence (Thomas, et al., 2010). In an updated clinical consensus statement published by ACFAS for the diagnosis and treatment of adult acquired infracalcaneal heel pain (Schneider, et al., 2018), a recommendation is not made on bipolar RF treatment. The authors concluded the evidence is uncertain, neither appropriate or inappropriate.

Within practice guidelines developed by the **Clinical Practice Guideline Forefoot Disorders Panel of the American College of Foot and Ankle Surgeons (ACFAS)** for Morton's Neuroma the panel reported cryogenic neuroablation may be performed as a treatment although it was further noted cryoablation is limited by lack of permanent results and decreased efficacy when employed for treatment of large neuromas or in the presence of thick fibrosis. In addition, the consensus statement reports that 3 to 7 dilute alcohol injections of 4% alcohol injected at 5-to-10-day intervals has been associated with an 89% success rate with 82% of individuals achieving complete relief of symptoms. However, overuse of corticosteroid injections was cautioned as it may result in atrophy of the plantar fat pad as well as joint subluxation (Thomas, et al., 2009).

The **Association of Extremity Nerve Surgeons** published updated clinical practice guidelines in 2020. Within these guidelines the panel notes denervation procedures include cryoablation, radiofrequency ablation, alcohol injections and surgical resection (Barrett, et al, 2020). With the exception of surgical resection, the authors note these methods destroy tissue in a blind manner without complete control and may not result in permanent resolution of symptoms. Procedures such as cryoablation and radiofrequency ablation should be used with caution. Within the guidelines the authors note based on their clinical experience there is some efficacy for RF ablation of the lower extremity however further research of the technique is needed. Ablation as a primary treatment of Morton's neuroma is not recommended nor is the use of alcohol injections for any indication.

The **American Podiatric Sports Medicine (APSM)** (2003) provides information about Morton's Neuroma, although it is not a formal position statement or clinical recommendation the information available supports orthotics, steroid injection, and surgical removal as treatment of Morton's neuroma, occasionally injection of other substances to ablate the neuroma are effective.

There is insufficient evidence in the published medical literature to demonstrate the safety and effectiveness of peripheral nerve ablation, using any method, for the treatment of foot pain.

Other Pain Related Conditions

There is a paucity of evidence in the peer-reviewed literature evaluating neuroablative procedures as treatment of other pain conditions including chronic regional pain syndrome (Latour, et al., 2023; Straube, et al., 2013), chronic thoracic pain (Abd-Elsayed, et al., 2025b), craniofacial pain syndromes (Do, et al., 2024), pudendal neuralgia, peripheral nerve compression/entrapment conditions (Gupta, et al., 2024; McSweeney and Cichero, 2015), peripheral neuropathic conditions, post-amputation pain, post inguinal herniorrhaphy pain (Wray et al., 2023) and oncologic pain (Elmati, et al., 2024; Nagar, et al., 2024; Dong, et al., 2021). At present the evidence is insufficient to support safety and efficacy of peripheral nerve destruction when performed for treatment of pain related to these conditions.

Health Equity Considerations

Health equity is the highest level of health for all people; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which people are born, grow, live, work, and age.

Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include safe housing, transportation, and neighborhoods; racism, discrimination and violence; education, job opportunities and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

Chronic pain affects approximately one in three U.S. adults (100 million individuals) and, while most prevalent among non-elderly adults, impacts all age groups (Morales & Yong, 2020). Its rising prevalence has driven increased research into treatment strategies and long-term management, alongside growing attention to disparities in care. Evidence consistently demonstrates that racial and ethnic minorities, particularly Black and Hispanic patients, experience higher pain severity, greater pain-related disability, and lower treatment satisfaction, yet remain subject to undertreatment, delayed referrals, and limited interventional options (Morales & Yong, 2020; Vargas et al., 2025). Sociodemographic factors further influence the relationship between chronic pain and quality of life. Gender disparities are also well documented: women report more

severe pain than men but receive less intensive and less clinically effective treatment (Wang & Jacobs, 2023). Additional inequities occur across socioeconomic status and geographic location, with individuals in rural or under-resourced communities facing reduced access to pain clinics and specialized care. Pain assessment and management are complicated by its subjective, multidimensional nature—encompassing physical, emotional, cognitive, and social components—along with the absence of objective biomarkers, variability in pain tolerance, and communication barriers among populations with language limitations, low health literacy, cognitive impairments, or young age (Wang & Jacobs, 2023). A recent retrospective study of 19,919 patients with chronic non-cancer pain found that Non-Hispanic Black and Hispanic patients had significantly lower odds of receiving interventional pain referrals compared to Non-Hispanic White patients (Odds Ratio [OR] = 0.72 and 0.40, respectively), underscoring the need for standardized care pathways to improve equity and outcomes (Vargas et al., 2025). Addressing these disparities requires further research to identify underlying causes and critical points in care where patients are most vulnerable, enabling the development of targeted interventions for at-risk populations.

Medicare Coverage Determinations

	Contractor	Determination Name/Number	Revision Effective Date
NCD	National	Induced Lesions of Nerve Tracts/160.1	Longstanding, no date
LCD	NGS	Sacroiliac Joint Injections and Procedures/ L39455	8/10/2023
LCD	Noridian Healthcare Solutions	Injections - Tendon, Ligament, Ganglion Cyst, Tunnel Syndromes and MORTON's Neuroma/L34076	10/01/2019
LCD	Noridian Healthcare Solutions	Injections - Tendon, Ligament, Ganglion Cyst, Tunnel Syndromes and MORTON's Neuroma/L34218	10/01/2019
LCD	Noridian Healthcare Solutions	Nerve Blockade for Treatment of Chronic Pain and Neuropathy	9/4/2022

Note: Please review the current Medicare Policy for the most up-to-date information.
(NCD = National Coverage Determination; LCD = Local Coverage Determination)

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Revision Details

Type of Revision	Summary of Changes	Date
Annual Review	• Removed policy statement for peripheral nerve destruction for trigeminal neuralgia • Revised policy statement for percutaneous cryoablation • Added policy statement for pulsed radiofrequency ablation	2/15/2026

	• Revised list of not covered or reimbursable conditions	
Focused Review	• No policy statement changes.	10/15/2025
Annual review	• No policy statement changes.	2/15/2025
Annual review	• No policy statement changes.	2/15/2024