Laser Treatment of Onychomycosis

Policy # 00371
Original Effective Date: 07/17/2013
Current Effective Date: 09/12/2022

Applies to all products administered or underwritten by Blue Cross and Blue Shield of Louisiana and its subsidiary, HMO Louisiana, Inc. (collectively referred to as the “Company”), unless otherwise provided in the applicable contract. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

Note: Laser Treatment of Acne and Rosacea is addressed separately in medical policy 00162.

Services Are Considered Investigational
Coverage is not available for investigational medical treatments or procedures, drugs, devices or biological products.

Based on review of available data, the Company considers laser treatment of onychomycosis to be investigational.*

Background/Overview
Onychomycosis
Onychomycosis is a common chronic fungal infection of the nail. It is estimated to cause up to 50% of all nail disease and 33% of cutaneous fungal infections. The condition can affect toenails or fingernails but is more frequently found in toenails. Primary infectious agents include dermatophytes (e.g., Trichophyton species), yeasts (e.g., Candida albicans), and nondermatophytic molds. In temperate Western countries, infections are generally caused by dermatophytes.

Aging is the most common risk factor for onychomycosis, most likely due to decreased blood circulation, longer exposure to fungi, and slower nail growth. Also, various medical conditions increase the risk of comorbid onychomycosis. They include diabetes, obesity, peripheral vascular disease, immunosuppression, and HIV infection. In certain populations, onychomycosis may lead to additional health problems. Although there is limited evidence of a causal link between onychomycosis and diabetic foot ulcers, at least 1 prospective study with diabetic patients found onychomycosis to be an independent predictor of foot ulcers. Moreover, onychomycosis, especially more severe cases, may adversely impact the quality of life. Patients with onychomycosis have reported pain, uncomfortable nail pressure, embarrassment, and discomfort wearing shoes.
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Diagnosis
The diagnosis of onychomycosis can be confirmed by potassium hydroxide preparation, culture, or histology.

Treatment
Treatments for onychomycosis include topical antifungals such as nail paints containing ciclopirox (ciclopiroxolamine) or amorolfine and oral antifungals such as terbinafine and itraconazole. These have low-to-moderate efficacy and a high relapse rate. Topical antifungals and some long-available oral medications (eg, griseofulvin) require a long course of treatment, which presents issues for patient compliance. Moreover, oral antifungal medications have been associated with adverse effects such as a risk of hepatotoxicity.

Several types of device-based therapies are under investigation for the treatment of onychomycosis, including ultrasound, iontophoresis, photodynamic therapy, and laser systems. A potential advantage of lasers is that they have greater tissue penetration than antifungal medication and thus may be more effective at treating infection embedded within the nail. Another potential advantage is that laser treatments are provided in a clinical setting in only 1 or several sessions and, thus, require less long-term patient compliance.

Laser treatment of onychomycosis uses the principle of selective photothermolysis, defined as the precise targeting of tissue using a specific wavelength of light. The premise is that light is absorbed into the target area and heat generated by that energy is sufficient to damage the target area while sparing the surrounding area. The aim of laser treatment for onychomycosis is to heat the nail bed to temperatures required to disrupt fungal growth (approximately 40°-60°C) and at the same time avoid pain and necrosis to surrounding tissues.

Characteristics of laser systems used to treat onychomycosis are listed in Table 1.

Table 1. Characteristics of Lasers for Treating Onychomycosis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>Lasers are single-wavelength light sources. There needs to be sufficient tissue penetration to adequately treat nail fungus. The near-infrared spectrum tends to be used because this part of the spectrum has maximum...</td>
</tr>
</tbody>
</table>
tissue penetrance in the dermis and epidermis and the nail plate is similar to the epidermis. To date, most laser systems for treating onychomycosis have been Neodymium yttrium aluminum garnet (Nd:YAG) lasers that typically operate at 1064 nm; 940- to 1320-nm and 1440-nm wavelengths are also options.

<table>
<thead>
<tr>
<th>Pulse duration</th>
<th>Pulses need to be short to avoid damaging the tissue surrounding the target area. For example, short-pulse systems have microsecond pulse durations and Q-switched lasers have nanosecond pulse durations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition rate</td>
<td>Spot size to the diameter of the laser beam. For treating onychomycosis, laser spot sizes range from 1 to 10 nm.</td>
</tr>
<tr>
<td>Fluence (in J/cm²)</td>
<td>Fluence refers to the amount of energy delivered into the area</td>
</tr>
</tbody>
</table>

**FDA or Other Governmental Regulatory Approval**

**U.S. Food and Drug Administration (FDA)**

Multiple Nd:YAG laser systems have been cleared by the U.S. Food and Drug Administration (FDA) for marketing for the temporary increase of clear nail in patients with onychomycosis. The FDA has determined that these devices were substantially equivalent to existing devices. Table 2 lists select approved laser systems.

**Table 2. Select Laser Systems Approved for Temporary Increase of Clear Nail in Patients with Onychomycosis**

<table>
<thead>
<tr>
<th>Device</th>
<th>Manufacturer</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nd:YAG 1064-nm laser systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PinPointe™‡ FootLaser™‡</td>
<td>PinPointe USA (acquired by NuvoLase 2011)</td>
<td>2010</td>
</tr>
<tr>
<td>GenesisPlus™‡</td>
<td>Cutera</td>
<td>2011</td>
</tr>
<tr>
<td>JOULE ClearSense™‡</td>
<td>Sciton</td>
<td>2011</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>GentleMax Family of Laser Systems</th>
<th>Candela</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nordlys</td>
<td>Ellipse A/S</td>
<td>2016</td>
</tr>
<tr>
<td>Dual-wavelength Nd:YAG 1064-nm and 532-nm laser system</td>
<td>Light Age</td>
<td>2011</td>
</tr>
</tbody>
</table>


**Rationale/Source**

This medical policy was developed through consideration of peer-reviewed medical literature generally recognized by the relevant medical community, U.S. Food and Drug Administration approval status, nationally accepted standards of medical practice and accepted standards of medical practice in this community, technology evaluation centers, reference to federal regulations, other plan medical policies, and accredited national guidelines.

Onychomycosis is a common fungal infection of the nail. Currently available treatments for onychomycosis, including systemic and topical antifungal medications, have relatively low efficacy and require a long course of treatment. Laser systems are proposed as another treatment option.

**Summary of Evidence**

For individuals who have onychomycosis who receive treatment with laser therapy, the evidence includes small, randomized controlled trials. Relevant outcomes are symptoms, change in disease status, medication use, and treatment-related morbidity. The randomized controlled trials reported inconsistent results and had methodologic limitations. Clinical and mycologic outcomes differed across the trials, lacked consistent blinding of outcome assessments, and often reported outcomes on a per-nail basis without accounting for correlated measurements. The published evidence to date does not permit determining whether laser treatment improves health outcomes in patients with onychomycosis. Additionally, some registered clinical trials are completed without publication of results, indicating potential publication bias. Additional well-designed, adequately powered, and well-conducted randomized controlled trials are needed. The evidence is insufficient to determine that the technology results in an improvement in the net health outcomes.
Supplemental Information
The purpose of the remaining sections in Supplemental Information is to provide reference material regarding existing practice guidelines and position statements, U.S. Preventive Services Task Force Recommendations and Medicare National Coverage Decisions and registered, ongoing clinical trials. Inclusion in the Supplemental Information does not imply endorsement and information may not necessarily be used in formulating the evidence review conclusions.

Practice Guidelines and Position Statements
Guidelines or position statements will be considered for inclusion in ‘Supplemental Information’ if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

No Practice Guidelines or Position Statements regarding issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE) were identified.

U.S. Preventive Services Task Force Recommendations
Not applicable.

Medicare National Coverage
There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

Ongoing and Unpublished Clinical Trials
Some currently ongoing and unpublished trials that might influence this review are listed in Table 3.
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Table 3. Summary of Key Trials

<table>
<thead>
<tr>
<th>NCT No.</th>
<th>Trial Name</th>
<th>Planned Enrollment</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ongoing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCT02019446</td>
<td>Laser Treatment for Onychomycosis in Diabetesa</td>
<td>60</td>
<td>Dec 2021</td>
</tr>
<tr>
<td><strong>Unpublished</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCT01915355</td>
<td>Pulsed Dye Laser Treatment of Onychomycosis</td>
<td>11</td>
<td>Jul 2015 (completed)</td>
</tr>
<tr>
<td>NCT02812043</td>
<td>Comparison Between Long-pulsed Nd:YAG, Amorolfine and Combination Treatment in Treating Non-dermatophyte Onychomycosis</td>
<td>60</td>
<td>June 2019 (completed)*</td>
</tr>
</tbody>
</table>

NCT: national clinical trial; Nd:YAG: neodymium yttrium aluminum garnet
a Denotes industry-sponsored or cosponsored trial
* No results published as of October 2020

References
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Policy History
Original Effective Date: 07/17/2013
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06/27/2013 Medical Policy Committee review
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07/17/2013    Medical Policy Implementation Committee approval.
07/10/2014    Medical Policy Committee review
07/16/2014    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
08/06/2015    Medical Policy Committee review
08/19/2015    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
08/04/2016    Medical Policy Committee review
08/17/2016    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
01/01/2017    Coding update: Removing ICD-9 Diagnosis Codes
08/03/2017    Medical Policy Committee review
08/09/2018    Medical Policy Committee review
08/15/2018    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
08/01/2019    Medical Policy Committee review
08/14/2019    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
11/19/2019    Coding update
08/06/2020    Medical Policy Committee review
08/12/2020    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
08/05/2021    Medical Policy Committee review
08/04/2022    Medical Policy Committee review
08/10/2022    Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

Next Scheduled Review Date:  08/2023
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**Coding**
The five character codes included in the Blue Cross Blue Shield of Louisiana Medical Policy Coverage Guidelines are obtained from Current Procedural Terminology (CPT®)‡, copyright 2021 by the American Medical Association (AMA). CPT is developed by the AMA as a listing of descriptive terms and five character identifying codes and modifiers for reporting medical services and procedures performed by physician.

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CPT is a registered trademark of the American Medical Association.

Codes used to identify services associated with this policy may include (but may not be limited to) the following:

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT</td>
<td>17999, 96999</td>
</tr>
<tr>
<td>HCPCS</td>
<td>No codes</td>
</tr>
<tr>
<td>ICD-10 Diagnosis</td>
<td>B35.1, L60.0-L60.9</td>
</tr>
</tbody>
</table>

*Investigational – A medical treatment, procedure, drug, device, or biological product is Investigational if the effectiveness has not been clearly tested and it has not been incorporated into...
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standard medical practice. Any determination we make that a medical treatment, procedure, drug, device, or biological product is Investigational will be based on a consideration of the following:

A. Whether the medical treatment, procedure, drug, device, or biological product can be lawfully marketed without approval of the U.S. Food and Drug Administration (FDA) and whether such approval has been granted at the time the medical treatment, procedure, drug, device, or biological product is sought to be furnished; or

B. Whether the medical treatment, procedure, drug, device, or biological product requires further studies or clinical trials to determine its maximum tolerated dose, toxicity, safety, effectiveness, or effectiveness as compared with the standard means of treatment or diagnosis, must improve health outcomes, according to the consensus of opinion among experts as shown by reliable evidence, including:

1. Consultation with technology evaluation center(s);
2. Credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community; or
3. Reference to federal regulations.

‡ Indicated trademarks are the registered trademarks of their respective owners.

NOTICE: If the Patient’s health insurance contract contains language that differs from the BCBSLA Medical Policy definition noted above, the definition in the health insurance contract will be relied upon for specific coverage determinations.

NOTICE: Medical Policies are scientific based opinions, provided solely for coverage and informational purposes. Medical Policies should not be construed to suggest that the Company recommends, advocates, requires, encourages, or discourages any particular treatment, procedure, or service, or any particular course of treatment, procedure, or service.