



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

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 (eg, *Trichophyton* species), yeasts (eg, *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.

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

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

Variables	Characteristics
Wavelength	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 tissue penetrance in

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

	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.
Pulse duration	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.
Repetition rate (frequency of pulses, in hertz)	Spot size to the diameter of the laser beam. For treating onychomycosis, laser spot sizes range from 1 to 10 mm.
Fluence (in J/cm ²)	Fluence refers to the amount of energy delivered into the area

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

Device	Manufacturer	Approved
Nd:YAG 1064-nm laser systems		
PinPointe ^{TM‡} FootLaser ^{TM‡}	PinPointe USA (acquired by NuvoLase 2011)	2010
GenesisPlus ^{TM‡}	Cutera	2011
VariaBreeze ^{TM‡}	CoolTouch	2011
JOULE ClearSense ^{TM‡}	Sciton	2011

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

GentleMax Family of Laser Systems	Candela	2014
Nordlys	Ellipse A/S	2016
Dual-wavelength Nd:YAG 1064-nm and 532-nm laser system		
Q-Clear ^{TM†}	Light Age	2011

Nd:YAG 1064-nm laser systems (FDA product code: GEX); dual-wavelength Nd:YAG 1064-nm and 532-nm laser system (FDA product code: PDX).

Rationale/Source

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.

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

Practice Guidelines and Position Statements

British Association of Dermatologists

In 2014, the British Association of Dermatologists issued guidelines on the management of onychomycosis. Due to the limited nature of the evidence, the Association concluded that “lasers

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

are showing promising results in the treatment of onychomycosis, but recommendations cannot be made at this stage” (level of evidence 1-).

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.

Table 3. Summary of Key Trials

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

NCT: national clinical trial; Nd:YAG: neodymium yttrium aluminum garnet

a Denotes industry-sponsored or cosponsored trial

* No results published as of October 2020

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

References

1. Blue Cross and Blue Shield Association, Medical Policy Reference Manual, “Laser Treatment of Onychomycosis”, 2.01.89, January 2021.
2. Rodgers P, Bassler M. Treating onychomycosis. *Am Fam Physician*. Feb 15 2001; 63(4): 663-72, 677-8. PMID 11237081
3. Boyko EJ, Ahroni JH, Cohen V, et al. Prediction of diabetic foot ulcer occurrence using commonly available clinical information: the Seattle Diabetic Foot Study. *Diabetes Care*. Jun 2006; 29(6): 1202-7. PMID 16731996
4. Drake LA, Scher RK, Smith EB, et al. Effect of onychomycosis on quality of life. *J Am Acad Dermatol*. May 1998; 38(5 Pt 1): 702-4. PMID 9591814
5. Elewski BE. Onychomycosis. Treatment, quality of life, and economic issues. *Am J Clin Dermatol*. Jan-Feb 2000; 1(1): 19-26. PMID 11702301
6. Gupta A, Simpson F. Device-based therapies for onychomycosis treatment. *Skin Therapy Lett*. Oct 2012; 17(9): 4-9. PMID 23032936
7. Bristow IR. The effectiveness of lasers in the treatment of onychomycosis: a systematic review. *J Foot Ankle Res*. 2014; 7: 34. PMID 25104974
8. Bunyaratavej S, Wanitphakdeedecha R, Ungaksornpairote C, et al. Randomized controlled trial comparing long-pulsed 1064-Nm neodymium: Yttrium-aluminum-garnet laser alone, topical amorolfine nail lacquer alone, and a combination for nondermatophyte onychomycosis treatment. *J Cosmet Dermatol*. Jan 10 2020. PMID 31925917
9. El-Tatawy RA, Abd El-Naby NM, El-Hawary EE, et al. A comparative clinical and mycological study of Nd-YAG laser versus topical terbinafine in the treatment of onychomycosis. *J Dermatolog Treat*. Oct 2015; 26(5): 461-4. PMID 25669435
10. Hamed Khater M, Khattab FM. Combined long-pulsed Nd-Yag laser and itraconazole versus itraconazole alone in the treatment of onychomycosis nails. *J Dermatolog Treat*. Jun 2020; 31(4): 406-409. PMID 31157575
11. Karsai S, Jager M, Oesterhelt A, et al. Treating onychomycosis with the short-pulsed 1064-nm-Nd:YAG laser: results of a prospective randomized controlled trial. *J Eur Acad Dermatol Venereol*. Jan 2017; 31(1): 175-180. PMID 27521028
12. Kim TI, Shin MK, Jeong KH, et al. A randomised comparative study of 1064 nm Neodymium-doped yttrium aluminium garnet (Nd:YAG) laser and topical antifungal treatment of onychomycosis. *Mycoses*. Dec 2016; 59(12): 803-810. PMID 27402466

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

13. Nijenhuis-Rosien L, Kleefstra N, van Dijk PR, et al. Laser therapy for onychomycosis in patients with diabetes at risk for foot ulcers: a randomized, quadruple-blind, sham-controlled trial (LASER-1). *J Eur Acad Dermatol Venereol*. Nov 2019; 33(11): 2143-2150. PMID 30920059
14. Sabbah L, Gagnon C, Bernier FE, et al. A Randomized, Double-Blind, Controlled Trial Evaluating the Efficacy of Nd:YAG 1064 nm Short-Pulse Laser Compared With Placebo in the Treatment of Toenail Onychomycosis. *J Cutan Med Surg*. Sep/Oct 2019; 23(5): 507-512. PMID 31296045
15. Xu Y, Miao X, Zhou B, et al. Combined oral terbinafine and long-pulsed 1,064-nm Nd: YAG laser treatment is more effective for onychomycosis than either treatment alone. *Dermatol Surg*. Nov 2014; 40(11): 1201-7. PMID 25322165
16. Ameen M, Lear JT, Madan V, et al. British Association of Dermatologists' guidelines for the management of onychomycosis 2014. *Br J Dermatol*. Nov 2014; 171(5): 937-58. PMID 25409999

Policy History

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

- | | |
|------------|---|
| 06/27/2013 | Medical Policy Committee review |
| 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 |
| 08/23/2017 | Medical Policy Implementation Committee approval. Coverage eligibility unchanged. |
| 08/09/2018 | Medical Policy Committee review |

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

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

08/11/2021 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

Next Scheduled Review Date: 08/2022

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 2020 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.

The responsibility for the content of Blue Cross Blue Shield of Louisiana Medical Policy Coverage Guidelines is with Blue Cross and Blue Shield of Louisiana and no endorsement by the AMA is intended or should be implied. The AMA disclaims responsibility for any consequences or liability attributable or related to any use, nonuse or interpretation of information contained in Blue Cross Blue Shield of Louisiana Medical Policy Coverage Guidelines. Fee schedules, relative value units, conversion factors and/or related components are not assigned by the AMA, are not part of CPT, and the AMA is not recommending their use. The AMA does not directly or indirectly practice medicine or dispense medical services. The AMA assumes no liability for data contained or not contained herein. Any use of CPT outside of Blue Cross Blue Shield of Louisiana Medical Policy Coverage Guidelines should refer to the most current Current Procedural Terminology which contains the complete and most current listing of CPT codes and descriptive terms. Applicable FARS/DFARS apply.

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

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:

Code Type	Code
CPT	17999, 96999
HCPCS	No codes
ICD-10 Diagnosis	B35.1, L60.0-L60.9

*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 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 the Blue Cross and Blue Shield Association technology assessment program (TEC) or other nonaffiliated 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.

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.



Louisiana

Laser Treatment of Onychomycosis

Policy # 00371

Original Effective Date: 07/17/2013

Current Effective Date: 09/13/2021

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.

©2021 Blue Cross and Blue Shield of Louisiana

Blue Cross and Blue Shield of Louisiana is an independent licensee of the Blue Cross and Blue Shield Association and incorporated as Louisiana Health Service & Indemnity Company.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without permission from Blue Cross and Blue Shield of Louisiana.