



BlueCross BlueShield  
of Alabama

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**Name of Blue Advantage Policy:**

**Low-Level Laser and High-Power Laser Therapies**

Policy #: 270  
Category: Therapy

Latest Review Date: November 2020  
Policy Grade: B

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**BACKGROUND:**

*Blue Advantage medical policy does not conflict with Local Coverage Determinations (LCDs), Local Medical Review Policies (LMRPs) or National Coverage Determinations (NCDs) or with coverage provisions in Medicare manuals, instructions or operational policy letters. In order to be covered by Blue Advantage the service shall be reasonable and necessary under Title XVIII of the Social Security Act, Section 1862(a)(1)(A). The service is considered reasonable and necessary if it is determined that the service is:*

1. *Safe and effective;*
2. *Not experimental or investigational\*;*
3. *Appropriate, including duration and frequency that is considered appropriate for the service, in terms of whether it is:*
  - *Furnished in accordance with accepted standards of medical practice for the diagnosis or treatment of the patient's condition or to improve the function of a malformed body member;*
  - *Furnished in a setting appropriate to the patient's medical needs and condition;*
  - *Ordered and furnished by qualified personnel;*
  - *One that meets, but does not exceed, the patient's medical need; and*
  - *At least as beneficial as an existing and available medically appropriate alternative.*

*\*Routine costs of qualifying clinical trial services with dates of service on or after September 19, 2000 which meet the requirements of the Clinical Trials NCD are considered reasonable and necessary by Medicare. Providers should bill **Original Medicare** for covered services that are related to **clinical trials** that meet Medicare requirements (Refer to Medicare National Coverage Determinations Manual, Chapter 1, Section 310 and Medicare Claims Processing Manual Chapter 32, Sections 69.0-69.11).*

## **POLICY:**

### **For dates of service October 20, 2020 and after:**

**Blue Advantage** will treat **low-level laser therapy** as a **covered benefit** for prevention of oral mucositis in patients undergoing cancer treatment associated with increased risk of oral mucositis, including chemotherapy and/or radiotherapy, and/or hematopoietic cell transplantation.

**Blue Advantage** will treat **low-level laser therapy** as a **non-covered** benefit and as **investigational** for **ALL** other indications including but not limited to:

- Carpal tunnel syndrome
- Chronic headache
- Temporomandibular joint dysfunction
- Low back pain
- Fibromyalgia
- Other painful musculoskeletal disorders
- Chronic non-healing wounds
- Neurological dysfunctions
- Smoking cessation
- Weight loss/Appetite suppression
- Trismus
- Raynaud's phenomenon
- Chronic neck pain
- Lateral epicondylitis (tennis elbow)
- Arthritis conditions
- Plantar fasciitis
- Shoulder pain
- Knee pain
- Rheumatoid arthritis
- Lymphedema
- Myofascial Pain

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### **Effective for dates of service on or after August 29, 2006 and prior to October 20, 2020:**

**Blue Advantage** will treat **low level laser therapy (LLLT)** , also known as **cold laser therapy or class III laser, high-power laser therapy (HPLT), also known as class IV therapeutic laser, and laser acupuncture** as a **non-covered** benefit and as **investigational** for **all** indications, including, but not limited to:

- Carpal tunnel syndrome
- Chronic headache
- Temporomandibular joint dysfunction
- Low back pain
- Fibromyalgia
- Other painful musculoskeletal disorders
- Chronic non-healing wounds
- Neurological dysfunctions
- Smoking cessation

- Weight loss/Appetite suppression
- Trismus
- Raynaud's phenomenon
- Chronic neck pain
- Lateral epicondylitis (tennis elbow)
- Arthritis conditions
- Planter fasciitis
- Shoulder pain **(Effective February 28, 2012)**
- Knee pain **(Effective February 28, 2012)**
- Rheumatoid arthritis **(Effective February 28, 2012)**
- Lymphedema **(Effective February 28, 2012)**
- Myofascial Pain **(Effective December 12, 2012)**
- Oral Mucositis **(Effective December 12, 2012)**

*Blue Advantage does not approve or deny procedures, services, testing, or equipment for our members. Our decisions concern coverage only. The decision of whether or not to have a certain test, treatment or procedure is one made between the physician and his/her patient. Blue Advantage administers benefits based on the members' contract and medical policies. Physicians should always exercise their best medical judgment in providing the care they feel is most appropriate for their patients. Needed care should not be delayed or refused because of a coverage determination.*

## **DESCRIPTION OF PROCEDURE OR SERVICE:**

Low-level laser therapy (LLLT), also called photobiomodulation, is being evaluated to treat various conditions, including, among others, oral mucositis, myofascial pain, joint pain, lymphedema, and chronic wounds.

### **Oral Mucositis**

Oral mucositis describes inflammation of the oral mucosa and typically manifests as erythema or ulcerations that appear seven to ten days after initiation of high-dose cancer therapy. Oral mucositis can cause significant pain and increased risk of systemic infection, dependency on total parenteral nutrition, and use of narcotic analgesics.

### **Treatment**

Treatment planning may also need to be modified due to dose-limiting toxicity. There are a number of interventions for oral mucositis that may partially control symptoms, but none is considered a criterion standard treatment. When uncomplicated by infection, oral mucositis is self-limited and usually heals within two to four weeks after cessation of cytotoxic chemotherapy. Low-level laser therapy (LLLT) has been used in cancer therapy-induced oral mucositis in patients treated with radiotherapy and/or chemotherapy and hematopoietic cell transplantation.

### **Musculoskeletal and Neurologic Disorders**

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy and the most commonly performed surgery of the hand. The syndrome is related to the bony anatomy of the

wrist. The carpal tunnel is bound dorsally and laterally by the carpal bones and ventrally by the transverse carpal ligament. Through this contained space run the nine flexor tendons and the median nerve. Therefore, any space-occupying lesion can compress the median nerve and produce the typical symptoms of CTS-pain, numbness, and tingling in the distribution of the median nerve. Symptoms of more severe cases include hypesthesia, clumsiness, loss of dexterity, and weakness of pinch. In the most severe cases, patients experience marked sensory loss and significant functional impairment with thenar atrophy.

### **Treatment**

Mild-to-moderate cases of CTS are usually first treated conservatively with splinting and cessation of aggravating activities. Other conservative therapies include oral steroids, diuretics, nonsteroidal anti-inflammatory drugs, and steroid injections into the carpal tunnel itself. Patients who do not respond to conservative therapy or who present with severe CTS with thenar atrophy may be considered candidates for surgical release of the carpal ligament, using either an open or endoscopic approach. LLLT is also used to treat CTS.

### **Low-Level Laser Therapy**

LLLT is the use of red-beam or near-infrared lasers with a wavelength between 600 and 1000 nm and power between 5 and 500 MW. (By comparison, lasers used in surgery typically use 300 W.) When applied to the skin, LLLT produces no sensation and does not burn the skin. Because of the low absorption by human skin, it is hypothesized that the laser light can penetrate deeply into the tissues where it has a photobiostimulative effect. The exact mechanism of its effect on tissue healing is unknown; hypotheses have included improved cellular repair and stimulation of the immune, lymphatic, and vascular systems.

LLLT is being evaluated to treat a wide variety of conditions, including soft tissue injuries, myofascial pain, tendinopathies, nerve injuries, joint pain, and lymphedema.

### **KEY POINTS:**

The most recent literature search was performed through August 20, 2020. The following is a summary of the key findings to date.

### **Summary of Evidence**

#### **Oral Mucositis**

For individuals who have increased risk of oral mucositis due to some cancer treatments (e.g., chemotherapy, radiotherapy) and/or hematopoietic cell transplantation who receive low-level laser therapy (LLLT), the evidence includes randomized controlled trials (RCTs) and systematic reviews. The relevant outcomes are symptoms, morbid events, QOL, and treatment-related morbidity. A 2014 systematic review included 18 RCTs and found better outcomes with LLLT used to prevent oral mucositis than with control treatments. Recent RCTs published after the systematic review had similar findings. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

## **Musculoskeletal and Neurologic Disorders**

For individuals who have carpal tunnel syndrome who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Both a 2016 systematic review and a 2010 TEC Assessment did not find sufficient evidence from RCTs that LLLT improves outcomes. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have neck pain who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. A 2013 systematic review identified 17 trials, most of which were considered low quality. Only two trials were considered moderate quality and they found that LLLT led to better outcomes than placebo for chronic neck pain. A 2010 TEC Assessment found conflicting evidence. Additionally, laser types, application dosages, and treatment schedules vary in the available evidence and require further study. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have subacromial impingement syndrome who receive LLLT, the evidence includes RCTs. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Most trials did not show a significant benefit of LLLT compared with sham treatment or with an alternative intervention (e.g., exercise). The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have adhesive capsulitis who receive LLLT, the evidence includes RCTs and a systematic review. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. A Cochrane review on treatments for adhesive capsulitis identified two RCTs assessing LLLT. Due to the small number of trials and study limitations, reviewers concluded that the evidence was insufficient to permit conclusions about the effectiveness of LLLT for adhesive capsulitis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have temporomandibular joint pain who receive LLLT, the evidence includes RCTs and several systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Meta-analyses of RCTs had mixed findings. A 2015 meta-analysis, which included 14 placebo-controlled RCTs, did not find a statistically significant impact of LLLT on pain but did find that LLLT significantly improved functional outcomes (e.g., mouth opening). Furthermore, RCTs have not compared the impact of LLLT with physical therapy. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have low back pain who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Meta-analyses of RCTs found that LLLT resulted in a significantly greater reduction in pain scores and global assessment scores than a placebo control in the immediate posttreatment setting. Meta-analyses also found that other outcomes (e.g., disability index, range of motion) were significantly better immediately after treatment with active rather

than placebo LLLT, but not at longer term follow-up. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have OA knee pain who receive low LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. A 2020 systematic review, which pooled study findings, did find that LLLT significantly improved pain or functional outcomes compared with a sham intervention; however, the study was limited by high heterogeneity and inconsistency between regimens and follow up duration. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have heel pain (i.e., Achilles tendinopathy, plantar fasciitis) who receive LLLT, the evidence includes RCTs. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Findings of sham-controlled randomized trials were inconsistent, and RCTs lack long term follow up. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have RA who receive low LLLT, the evidence includes RCTs and a systematic review. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. A systematic review of RCTs found an inconsistent benefit of LLLT for a range of outcomes. A 2010 RCT, published after the systematic review, did not find that LLLT was significantly better than a placebo treatment on most outcomes. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have Bell palsy who receive LLLT, the evidence includes two RCTs. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. One RCT found a significant short-term benefit of LLLT over exercise. Longer-term outcomes beyond 6 weeks were not available. Because Bell palsy often improves within weeks and may completely resolve within months, it is difficult to isolate specific improvements from laser therapy over the natural resolution of the illness. In addition, no sham-controlled trials are available. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have fibromyalgia who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. The RCTs evaluating LLLT for treatment of fibromyalgia are small (i.e., <25 patients each). One RCT (n=20 patients) found significantly better outcomes with LLLT than with sham, while another (n=20 patients) did not find statistically significant between-group differences for similar outcomes. Additional RCTs with sufficient numbers of patients are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

### **Wound Care and Lymphedema**

For individuals who have chronic non-healing wounds who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. The few existing RCTs tend to have small sample sizes and

potential risk of bias. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have lymphedema who receive LLLT, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. Multiple systematic reviews found methodologic flaws in the available studies and did not consistently find better outcomes for patients receiving LLLT than receiving a control condition for the treatment of lymphedema. The evidence is insufficient to determine the effects of the technology on health outcomes.

### **Practice Guidelines and Position Statements**

#### **Mucositis Prevention Guideline Development Group**

In 2017, the Mucositis Prevention Guideline Development Group published guidelines on preventing oral and oropharyngeal mucositis in children undergoing hematopoietic cell transplantation. The guidelines were based on an evidence review consisting of randomized controlled trials that evaluated interventions such as cryotherapy and low-level laser therapy (LLLT). The guidelines suggested that LLLT could be offered to children but classified this recommendation as weak.

#### **Multinational Association of Supportive Care in Cancer et al**

In 2020, the Mucositis Guidelines leadership Group of the Multinational Association of Supportive Care in Cancer (MASCC) and the International Society of Oral Oncology (ISOO) published a guideline on the management of mucositis secondary to cancer therapy.

For the prevention of oral mucositis, the MASCC/ISOO recommended the following treatments, based on level I evidence: LLLT in patients receiving HSCT conditioned with high-dose chemotherapy with or without total body irradiation; recombinant human keratinocyte growth factor-1 in patients receiving high-dose chemotherapy and total body irradiation, followed by autologous stem cell transplantation for a hematological malignancy; benzydamine mouthwash in patients with head and neck cancer receiving moderate dose radiotherapy without concomitant chemotherapy.

Additionally, numerous treatments were recommended for the prevention of oral mucositis based on level II evidence, including LLLT in patients undergoing radiotherapy, without concomitant chemotherapy, for head and neck cancer. Several LLLT protocols are outlined by the guideline based on cancer treatment modality, ranging in wavelength from 632.9 to 660 nm.

#### **American Physical Therapy Association**

In 2018, the American Physical Therapy Association published an updated guideline on the diagnosis and treatment of Achilles tendinitis. The use of LLLT was given a level D recommendation, meaning that no recommendation could be made due to contradictory evidence. This is a change from the previous version of the guideline published in 2010, which gave LLLT a level B recommendation.

### **National Institute for Health and Clinical Excellence**

The U.K.'s National Institute for Health and Clinical Excellence 2009 Guideline on early management of persistent nonspecific low back pain did not recommend laser treatment, citing limited evidence. The 2016 updated guidance does not mention laser therapy.

### **American College of Physicians**

In 2017, the American College of Physicians released guidelines relating to noninvasive treatments for chronic low back pain. The guidelines strongly recommended that patients with chronic low back pain should first seek nonpharmacologic treatment such as exercise, multidisciplinary rehabilitation, acupuncture, and mindfulness-based stress reduction-all based on moderate quality evidence.

The recommendation also stated that patients with chronic low back pain should seek treatments such as tai chi, yoga, motor control exercise, progressive relaxation, electromyography biofeedback, LLLT, operant therapy, cognitive behavioral therapy, or spinal manipulation-all based on low-quality evidence. While the College stated that LLLT has a small effect on pain and function, it found the evidence insufficient for the use of LLLT.

In 2020, the American College of Physicians published a joint guideline on management of acute pain from non-low back musculoskeletal injuries with the American Academy of Family Physicians. No recommendations are made specific to LLLT, but the guideline notes that laser therapy did not significantly reduce pain in 1 to 7 days compared to placebo.

### **American Academy of Orthopaedic Surgeons**

In 2016, the American Academy of Orthopaedic Surgeons' guidelines on management of carpal tunnel syndrome rated laser therapy state: "limited evidence". The guidelines state "limited evidence supports that laser therapy might be effective compared to placebo."

### **U.S. Preventive Services Task Force Recommendations**

Not applicable.

### **KEY WORDS:**

Low-level laser therapy (LLLT), laser therapy, cold laser, cold laser therapy, class III laser, Micro Light laser, photobiomodulation, high power laser therapy (HPLT), class IV high power laser, MLS laser therapy, Cutting Edge MLS M6 Robotic Laser, Avicenna's laser, GRT LITE, Excalibur IV Laser, Acculaser Pro, Tuco Erchonia PL3000, Light Stream low level laser, FX-635, Super Pulsed Laser Technology



**APPROVED BY GOVERNING BODIES:**

**Table 1. Low-Level Laser Therapy Devices Cleared by the U.S. Food and Drug Administration**

<b>Device</b>	<b>Manufacturer</b>	<b>Date Cleared</b>	<b>510 (k)</b>	<b>Indication</b>
FX-635	Erchonia Corporaion	6/01/2019	K190572	For adjunctive use in whole body musculoskeletal pain therapy
Super Pulsed Laser Technology	Multi Radiance Medical	01/13/2018	K171354	Providing temporary relief of minor chronic neck and shoulder pain of musculoskeletal origin
Lightstream Low-Level Laser	SOLICA CORPORATION	04/03/2009	K081166	For adjunctive use in the temporary relief of pain associated with knee disorders with standard chiropractic practice
GRT LITE, MODEL 8-A	GRT SOLUTIONS, INC.	02/03/2006	K050668	Use in providing temporary relief of minor chronic neck and shoulder pain of musculoskeletal origin
MICROLIGHT 830 LASER SYSTEM	MICROLIGHT CORPORATION OF AMERICA	02/06/2002	K010175	Use in pain therapy or related indication

A number of low-level lasers have been cleared for marketing by the U.S. Food and Drug Administration through the 510(k) process for the treatment of pain. Data submitted for the MicroLight 830® Laser consisted of the application of the laser over the carpal tunnel 3 times a week for 5 weeks. The labeling states that the "MicroLight 830 Laser is indicated for adjunctive use in the temporary relief of hand and wrist pain associated with Carpal Tunnel Syndrome." In 2006, GRT LITE™ was cleared for marketing, listing the TUCO Erchonia PL3000, the Excalibur System, the MicroLight 830® Laser, and the Acculaser Pro as predicate devices. Indications of the GRTLITE™ for CTS are similar to the predicate devices: "adjunctive use in

providing temporary relief of minor chronic pain." In 2009, the LightStream™ LLL device was cleared for marketing by the FDA through the 510(k) process for adjunctive use in the temporary relief of pain associated with knee disorders treated in standard chiropractic practice. A number of clinical trials of LLLT are underway in the U.S., including studies of wound healing. Since 2009, many more similar LLLT devices have received 510(k) clearance from the FDA.

**BENEFIT APPLICATION:**

Coverage is subject to member’s specific benefits. Group specific policy will supersede this policy when applicable.

**CURRENT CODING:**

**CPT Codes:**

<b>97026</b>	Application of a modality to one or more area; infrared
<b>97039</b>	Unlisted modality (specify type and time if constant attendance)
<b>97139</b>	Unlisted therapeutic procedure
<b>0552T</b>	Low-level laser therapy, dynamic photonic and dynamic thermokinetic energies, provided by a physician or other qualified health care professional

**HCPCS**

<b>S8948</b>	Application of a modality (requiring constant provider attendance) to one or more areas; low-level laser; each 15 minutes
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**REFERENCES:**

1. Abrisham SM, Kermani-Alghoraishi M, Ghahramani R et al. Additive effects of low-level laser therapy with exercise on subacromial syndrome: a randomized, double-blind, controlled trial. Clin Rheumatol 2011; 30(10):1341-6.
2. Alayat MS, Elsoday AM, El Fiky AA. Efficacy of high and low level laser therapy in the treatment of Bell’s palsy: A randomized double blind placebo-controlled trial. Lasers Med Sci 2013.
3. Alfredo PP, Bjordal JM, Dreyer SH et al. Efficacy of low level laser therapy associated with exercises in knee osteoarthritis: a randomized double-blind study. Clin Rehabil 2012; 26(6):523- 33.
4. Altan L, et al. Investigation of the effect of GaAs laser therapy on cervical myofascial pain syndrome. Rheumatology International, January 2005; 25(1): 23-27.
5. American Academy of Orthopaedic Surgeons. Clinical practice guideline on the treatment of carpal tunnel syndrome. 2008. Available online at: [www.aaos.org/research/guidelines/CTSTreatmentGuideline.pdf](http://www.aaos.org/research/guidelines/CTSTreatmentGuideline.pdf).
6. American Academy of Orthopaedic Surgeons. Management of Carpal Tunnel Syndrome: Evidence-Based Clinical Guideline. 2016;

www.aaos.org/uploadedFiles/PreProduction/Quality/Guidelines\_and\_Reviews/guidelines/CTS%20CPG\_6%207%202016.pdf. Accessed August 21, 2020.

7. Antunes HS, Herchenhorn D, Small IA et al. Phase III trial of low-level laser therapy to prevent oral mucositis in head and neck cancer patients treated with concurrent chemoradiation. *Radiother Oncol* 2013.
8. Aras MH, Güngörmüş M. The effect of low-level laser on trismus and facial swelling following surgical extraction of a lower third molar. *Photomed Laser Surg* 2009; 27(1):21-24.
9. Ay S, Dogan SK, Evcik D. Is low-level laser therapy effective in acute or chronic low back pain? *Clin Rheumatol* 2010; 29(8):905-10.
10. Bakhtiary AH, et al. Ultrasound and laser therapy in the treatment of carpal tunnel syndrome. *The Australian Journal of Physiotherapy*, January 2004; 50(3): 147-151.
11. Bal A, Eksioglu E, Gurcay E, Gulec B, Karaahmet O, and Cakci A. Low-level laser therapy in subacromial impingement syndrome. *Photomed Laser Surg* 2009; 27(1):31-6.
12. Barbosa RI, Fonseca MC, Rodrigues EK, et al. Efficacy of low-level laser therapy associated to orthoses for patients with carpal tunnel syndrome: A randomized single-blinded controlled trial. *J Back Musculoskelet Rehabil*. Sep 25 2015.
13. Basford JR, et al. Laser therapy: A randomized, controlled trial of the effects of low intensity Nd:YAG laser irradiation on lateral epicondylitis. *Archives of Physical Medicine and Rehabilitation*, November 2000; 81(11): 1504-1510.
14. Basford JR, et al. Laser therapy: A randomized, controlled trial of the effects of low-intensity Nd:YAG laser irradiation on musculoskeletal back pain, *Archives of Physical Medicine and Rehabilitation*, June 1999; 80(6): 647-652.
15. Bensadoun RJ, et al. Low-energy He/Ne laser in the prevention of radiation-induced mucositis. *Support Care in Cancer*, July 1999; 7(4): 244-252.
16. Bingöl V, et al. Low-power laser treatment for shoulder pain, *Photomedicine and Laser Surgery*, October 2005; 23(5): 459-464.
17. Bjordal JM, Johnson MI, Lopes-Martins RA, et al. Short-term efficacy of physical interventions in osteoarthritic knee pain. A systematic review and meta-analysis of randomised placebo-controlled trials. *BMC Musculoskelet Disord* 2007; 8:51.
18. Bjordal JM, Lopes-Martins RA, Joensen J, et al. A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow). *BMC Musculoskelet Disord* 2008; 9:75.
19. Blue Cross and Blue Shield Technology Evaluation Center (TEC). Low-level laser therapy for carpal tunnel syndrome and chronic neck pain. TEC Assessment. Nov 2010; Vol 25, Tab 4.
20. Borg-Stein J, Simons DG. Focused review: Myofascial pain. *Archives Physical Medicine Rehabilitation* 2002 83(3suppl1): S 40-7, S48-9.
21. Bot SD, Bouter LM. The efficacy of low level laser for chronic neck pain. *Pain* 2006 124(1-2): 5-6.
22. Brosseau L, et al. Randomized controlled trial on low level laser therapy (LLLT) in the treatment of osteoarthritis (OA) of the hand, *Lasers in Surgery and Medicine* 2005; 36: 210-219.
23. Brosseau L, Robinson V, Wells G, et al. Low level laser therapy (Classes I, II and III) for treating rheumatoid arthritis. *Cochrane Database Syst Rev* 2005; (4):CD002049.

24. Calis HT, Berberoglu N, Calis M. Are ultrasound, laser and exercise superior to each other in the treatment of subacromial impingement syndrome? A randomized clinical trial. *Eur J Phys Rehabil Med* 2011.
25. Carcia CR, Martin RL, Houck J et al. Achilles pain, stiffness, and muscle power deficits: achilles tendinitis. *J Orthop Sports Phys Ther* 2010; 40(9):A1-26.
26. Carrasco TG, Guerisoli LD, Guerisoli DM et al. Evaluation of low intensity laser therapy in myofascial pain syndrome. *Cranio* 2009; 27(4):243-7.
27. Ceccherelli F, Altafini L, Lo Castro G, et al. Diode laser in cervical myofascial pain: A double-blind study versus placebo. *Clinical Journal of Pain* 1989; 5: 301-304.
28. Chan L, Turner JA, Comstock BA, et al. The relationship between electrodiagnostic findings and patient symptoms and function in carpal tunnel syndrome. *Archives Physical Medicine Rehabilitation* 2007 88(1): 19-24.
29. Chang WD, Lee CL, Lin HY, et al. A Meta-analysis of Clinical Effects of Low-level Laser Therapy on Temporomandibular Joint Pain. *J Phys Ther Sci*. Aug 2014; 26(8):1297-1300.
30. Chang W D, Wu J H, Jiang J A, et al. Carpal tunnel syndrome treated with a diode laser: A controlled treatment of the transverse carpal ligament. *Photomedicine and Laser Surgery* 2008; 26:551-557.
31. Chen C, Hou WH, Chan ES, et al. Phototherapy for treating pressure ulcers. *Cochrane Database Syst Rev*. 2014; 7:CD009224.
32. Chen J, Huang Z, Ge M, et al. Efficacy of low-level laser therapy in the treatment of TMDs: a meta-analysis of 14 randomized controlled trials. *J Oral Rehabil*. Apr 2015; 42(4):291-299.
33. Chou R, Huffman LH; American Pain Society; American College of Physicians. Nonpharmacologic therapies for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Ann Intern Med* 2007; 147(7): 492-504.
34. Chou R, Loeser JD, Owens DK et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidence-based clinical practice guideline from the American Pain Society. *Spine (Phila Pa 1976)* 2009; 34(10):1066-77.
35. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med*. Oct 2 2007; 147(7):478-491.
36. Chow R T, Barnsley L, Heller G Z, et al. A pilot study of low-power laser therapy in the management of chronic neck pain. *Journal of Musculoskeletal Pain* 2004; 12: 71-81.
37. Chow R T, Heller G Z, Barnsley L. The effect of 300 mw, 830 nm laser on chronic neck pain: A double-blind, randomized, placebo-controlled study. *Pain* 2006; 124: 201-210.
38. Chow R T, Johnson M I, Lopes-Martins R A, et al. Efficacy of low-level laser therapy in the management of neck pain: A systematic review and meta-analysis of randomized placebo or active-treatment controlled trials. 2009; *Lancet*; 374: 1897-1908.
39. Cinar E, Saxena S, Uygur F. Low-level laser therapy in the management of plantar fasciitis: a randomized controlled trial. *Lasers Med Sci*. Jul 2018;33(5):949-958.
40. Conti PC. Low level laser therapy in the treatment of temporomandibular disorders (TMD): A double-blind pilot study. *The Journal of Craniomandibular Practice*, April 1997; 15(2): 144-149.
41. da Cunha LA, Firoozmand LM, da Silva AP, et al. Efficacy of low-level laser therapy in the treatment of temporomandibular disorder. *Int Dent J* 2008; 58(4): 213-7.

42. deBie RA, et al. Low level laser therapy in ankle sprains: A randomized clinical trial, Archives of Physical Medicine and Rehabilitation. November 1998; 79(11): 1415-1420.
43. Devereaux M. Neck Pain. Medical Clinics of North America, 2009; 93(2): 273-284 vii.
44. Dincer V, Cakar E, et al. The effectiveness of conservative treatments of carpal tunnel syndrome: splinting, ultrasound, and low-level laser therapies. Photomedicine and Laser Surgery 2009; 27(1): 119-125.
45. Djavid GE, Mehrdad R, Ghasemi M, et al. In chronic low back pain, low level laser therapy combined with exercise is more beneficial than exercise alone in the long term: a randomised trial. Aust J Physiother 2007; 53(3):155-60.
46. Doeuk C, Hersant B, Bosc R, et al. Current indications for low level laser treatment in maxillofacial surgery: a review. Br J Oral Maxillofac Surg. Apr 2015; 53(4):309-315.
47. Dogan SK, Ay S, Evcik D. The effectiveness of low laser therapy in subacromial impingement syndrome: a randomized placebo controlled double-blind prospective study. Clinics (Sao Paulo) 2010; 65(10):1019-22.
48. Ebneshahidi NS, et al. The effects of laser acupuncture on chronic tension headache—a randomized controlled trial. Acupuncture in Medicine, March 2005; 23(1): 13-18.
49. Ekim A, Armagan O, Tascioglu F, et al. Effect of low level laser therapy in rheumatoid arthritis patients with carpal tunnel syndrome. Swiss Med Wkly 2007; 137(23-24):347-52.
50. Elad S, Cheng KKF, Lalla RV, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis secondary to cancer therapy..Jul 28 2020.
51. Emshoff R, Bösch R, Pümpel E, et al. Low-level laser therapy for treatment of temporomandibular joint pain: a double-blind and placebo-controlled trial. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2008; 105(4): 452-6.
52. Evcik D, Kavuncu V, Cakir T, et al. Laser therapy in the treatment of carpal tunnel syndrome: A randomized controlled trial. Photomed Laser Surg 2007; 25(1):34-9.
53. Ferreira B, da Motta Silveira FM, de Orange FA. Low-level laser therapy prevents severe oral mucositis in patients submitted to hematopoietic stem cell transplantation: a randomized clinical trial. Support Care Cancer. Mar 2016; 24(3):1035-1042.
54. Figueiredo AL, Lins L, Cattony AC et al. Laser therapy in the control of oral mucositis: a meta-analysis. Rev Assoc Med Bras 2013.
55. Fikáčková H, Dostálová T, Navrátil L, et al. Effectiveness of low-level laser therapy in temporomandibular joint disorders: A placebo-controlled study. Photomedicine and Laser Surg 2007; 25(4): 297-303.
56. Fulop AM, Dhimmer S, Deluca JR et al. A meta-analysis of the efficacy of laser phototherapy on pain relief. Clin J Pain 2010; 26(8):729-36.
57. Fusakul Y, Aranyavalai T, Saensri P, et al. Low-level laser therapy with a wrist splint to treat carpal tunnel syndrome: a double-blinded randomized controlled trial. Lasers Med Sci. May 2014;29(3):1279-1287.
58. Gautam AP, Fernandes DJ, Vidyasagar MS et al. Low Level Helium Neon Laser therapy for chemoradiotherapy induced oral mucositis in oral cancer patients - A randomized controlled trial. Oral Oncol 2012; 48(9):893-7.
59. Gautam AP, Fernandes DJ, Vidyasagar MS, et al. Low level laser therapy against radiation induced oral mucositis in elderly head and neck cancer patients-a randomized placebo controlled trial. J Photochem Photobiol B. Mar 2015; 144:51-56.

60. Gautam AP, Fernandes DJ, Vidyasagar MS et al. Low level laser therapy for concurrent chemoradiotherapy induced oral mucositis in head and neck cancer patients - A triple blinded randomized controlled trial. *Radiother Oncol* 2012; 104(3):349-54.
61. Gautam AP, Fernandes DJ, Vidyasagar MS et al. Effect of low-level laser therapy on patient reported measures of oral mucositis and quality of life in head and neck cancer patients receiving chemoradiotherapy—a randomized controlled trial. *Support Care Cancer* 2013; 21(5):1421-8.
62. Glazov G, Yelland M, Emery J. Low-level laser therapy for chronic non-specific low back pain: a meta-analysis of randomized controlled trials. *Acupunct Med.* Oct 2016; 34(5):328-341.
63. Gross AR, Dziengo S, Boers O et al. Low level laser therapy (LLLT) for neck pain: a systematic review and meta-regression. *Open Orthop J* 2013; 7:396-419.
64. Gur A, et al. Efficacy of low power laser therapy in fibromyalgia: A single-blind placebo-controlled trial, *Lasers in Medical Science* 2002; 17: 57-61.
65. Gur A, Sarac A J, Cevik R, et al. Efficacy of 904 nm gallium/arsenide low level laser therapy in the management of chronic myofascial pain in the neck: A double-blind and randomize-controlled trial. *Laser Surgery Medicine* 2004; 35: 229-235.
66. Harazaki M, et al. Soft laser irradiation effects on pain reduction in orthodontic treatment, *Bulletin Tokyo Dental College*, November 1997; 38(4): 291-295.
67. Hegedus B, Viharos L, Gervain M et al. The effect of low-level laser in knee osteoarthritis: a double-blind, randomized, placebo-controlled trial. *Photomed Laser Surg* 2009; 27(4):577-84.
68. Honda Y, Sakamoto J, Hamaue Y, et al. Effects of Physical-Agent Pain Relief Modalities for Fibromyalgia Patients: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Pain Res Manag.* 2018 Oct 1;2018:2930632.
69. Huang Z, Chen J, Ma J, et al. Effectiveness of low-level laser therapy in patients with knee osteoarthritis: a systematic review and meta-analysis. *Osteoarthritis Cartilage.* Sep 2015; 23(9):1437-1444.
70. Hui A C, Wong S, Leung C H, et al. A randomized controlled trial of surgery vs. steroid injection for carpal tunnel syndrome. *Neurology* 2005; 64(12): 2074-2078.
71. Ilbuldu E, Cakmak A, Disci R, et al. Comparison of laser, dry needling, and placebo laser treatments in myofascial pain syndrome. *Photomedicine and Laser Surg* 2004; 22: 306-311.
72. Irvine J, et al. Double-blind randomized controlled trial of low-level laser therapy in carpal tunnel syndrome, *Muscle Nerve* 2004; 30: 182-187.
73. Jang H, Lee H. Meta-analysis of pain relief effects by laser irradiation on joint areas. *Photomed Laser Surg* 2012; 30(8):405-17.
74. Kiritsi O, Tsitas K, Malliaropoulos N et al. Ultrasonographic evaluation of plantar fasciitis after low-level laser therapy: results of a double-blind, randomized, placebo-controlled trial. *Lasers Med Sci* 2010; 25(2):275-81.
75. Konstantinovic LM, Cutovic MR, Milovanovic AN et al. Low-level laser therapy for acute neck pain with radiculopathy: a double-blind placebo-controlled randomized study. *Pain Med* 2010; 11(8):1169-78.
76. Koldas Dogan S, Ay S, Evcik D. The effects of two different low level laser therapies in the treatment of patients with chronic low back pain: A double-blinded randomized clinical trial. *J Back Musculoskelet Rehabil.* Jul 2017;30(2):235-240.

77. Konstantinovic LM, Kanjuh ZM, Milovanovic AN et al. Acute low back pain with radiculopathy: a double-blind, randomized, placebo-controlled study. *Photomed Laser Surg* 2010; 28(4):553-60.
78. Lagan KM, et al. Low-intensity laser therapy/combined phototherapy in the management of chronic venous ulceration: A placebo-controlled study. *Journal of Clinical Laser Medicine and Surgery*, June 2002; 20(3): 109-116.
79. Lalla RV, Bowen J, Barasch A, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis secondary to cancer therapy. *Cancer*. May 15 2014; 120(10):1453-1461.
80. Lim HM, et al. A clinical investigation of the efficacy of low level laser therapy in reducing orthodontic postadjustment pain, *American Journal of Orthodontics and Dentofacial Orthopedics*, December 1995; 108: 614-622.
81. Li ZJ, Wang Y, Zhang HF, et al. Effectiveness of low-level laser on carpal tunnel syndrome: A meta-analysis of previously reported randomized trials. *Medicine (Baltimore)*. Aug 2016; 95(31):e4424.
82. Lucas C, van Gemert MJ, de Haan RJ. Efficacy of low-level laser therapy in the management of stage III decubitus ulcers: a prospective, observer-blinded multicentre randomised clinical trial. *Lasers Med Sci*. 2003;18(2):72-77.
83. Ordahan B, Karahan AY. Role of low-level laser therapy added to facial expression exercises in patients with idiopathic facial (Bell's) palsy. *Lasers Med Sci*. May 2017;32(4):931-936.
84. Machado RS, Viana S, Sbruzzi G. Low-level laser therapy in the treatment of pressure ulcers: systematic review. *Lasers Med Sci*. May 2017;32(4):937-944.
85. Macias DM, Coughlin MJ, Zang K, et al. Low-level laser therapy at 635 nm for treatment of chronic plantar fasciitis: a placebo-controlled, randomized study. *J Foot Ankle Surg*. Sep-Oct 2015; 54(5):768-772.
86. Malliaropoulos N, Kiritsi O, Tsitas K et al. Low-level laser therapy in meniscal pathology: a double-blinded placebo-controlled trial. *Lasers Med Sci* 2013; 28(4):1183-8.
87. Marini I, Gatto MR, Bonetti GA. Effects of superpulsed low-level laser therapy on temporomandibular joint pain. *Clin J Pain* 2010; 26(7):611-6.
88. Martin RL, Chimenti R, Cuddeford T, et al. Achilles Pain, Stiffness, and Muscle Power Deficits: Midportion Achilles Tendinopathy Revision 2018.. May 2018; 48(5): A1-A38.
89. Matsutani LA, Marques AP, Ferreira EA, et al. Effectiveness of muscle stretching exercises with and without laser therapy at tender points for patients with fibromyalgia. *Clin Exp Rheumatol* 2007; 25(3):410-5.
90. Meireles SM, Jones A, Jennings F et al. Assessment of the effectiveness of low-level laser therapy on the hands of patients with rheumatoid arthritis: a randomized double-blind controlled trial. *Clin Rheumatol* 2010; 29(5):501-9.
91. Migliorati C, Hewson I, Lalla RV et al. Systematic review of laser and other light therapy for the management of oral mucositis in cancer patients. *Support Care Cancer* 2012.
92. Naeser MA, et al. Carpal tunnel syndrome pain treatment with low-level laser and microamperes transcutaneous electric nerve stimulation: A controlled study, *Archives of Physical Medicine and Rehabilitation*, July 2002, Vol. 83, pp. 978-988.
93. Naeser MA. Photobiomodulation of pain in carpal tunnel syndrome: Review of seven laser therapy studies. *Photomedicine and Laser Surgery* 2006; 24: 101-110.

94. National Institute for Health and Care Excellence (NICE). Low back pain in adults: early management [CG88]. 2009; <https://www.nice.org.uk/guidance/CG88>. Accessed August 21,2020.
95. National Institute for Health and Care Excellence (NICE). Low back pain and sciatica in over 16s: assessment and management [NG59]. 2016; [www.nice.org.uk/guidance/NG59/chapter/Recommendations](http://www.nice.org.uk/guidance/NG59/chapter/Recommendations). Accessed August 21,2020.
96. News Now Staff. Laser Therapy a Slight Winner in Analysis of Electrotherapy Modalities for Adhesive Capsulitis PT in Motion News 2014; <http://www.apta.org/PTinMotion/News/2014/10/3/LaserTherapyCapsulitis/>. Accessed August 21,2020.
97. Nussbaum EL, Biemann I, Mustard B. Comparison of ultrasound/ultraviolet-C and laser for treatment of pressure ulcers in patients with spinal cord injury. *Phys Ther.* Sep 1994;74(9):812-823; discussion 824-815.
98. Nunez S C, et al. Management of mouth opening in patients with temporomandibular disorders through low-level laser therapy and transcutaneous electrical neural stimulation, *Photomedicine and Laser Surgery*, February 2006; 24(1): 45-49.
99. Oberoi S, Zamperlini-Netto G, Beyene J, et al. Effect of prophylactic low level laser therapy on oral mucositis: a systematic review and meta-analysis. *PLoS One.* 2014; 9(9):e107418.
100. Omar MT, Shaheen AA, Zafar H. A systematic review of the effect of low-level laser therapy in the management of breast cancer-related lymphedema. *Support Care Cancer* 2012; 20:2977-84.
101. Omar MTA, Ebid AA, El Morsy AM. Treatment of post-mastectomy lymphedema with laser therapy: double blind placebo control randomized study. *J Surg Res* 2011; 165(1):82-90.
102. Ordahan B, Karahan AY. Role of low-level laser therapy added to facial expression exercises in patients with idiopathic facial (Bell's) palsy. *Lasers Med Sci.* May 2017;32(4):931-936.
103. Ostelo R W, Deyo R A, Stratford P, et al. Interpreting change scores for pain and functional status in low back pain: Towards International consensus regarding minimal important change. *Spine (Phila Pa 1976)* 2008; 33(1): 90-94.
104. Oton-Leite AF, Correa de Castro AC, Morais MO et al. Effect of intraoral low-level laser therapy on quality of life of patients with head and neck cancer undergoing radiotherapy. *Head Neck* 2012; 34(3):398-404.
105. Oton-Leite AF, Silva GB, Morais MO, et al. Effect of low-level laser therapy on chemoradiotherapy-induced oral mucositis and salivary inflammatory mediators in head and neck cancer patients. *Lasers Surg Med.* Apr 2015; 47(4):296-305.
106. Ozyurehglu T, McCabe S J, Goldsmith L J, et al. The minimal clinically important difference of the carpal tunnel syndrome symptom severity scale. *Journal Hand Surg Am.* 2006; 31(5): 733-738.
107. Page MJ, Green S, Kramer S, et al. Electrotherapy modalities for adhesive capsulitis (frozen shoulder). *Cochrane Database Syst Rev.* Oct 1 2014; 10:CD011324.
108. Peng J, Shi Y, Wang J, et al. Low-level laser therapy in the prevention and treatment of oral mucositis: a systematic review and meta-analysis. *Oral Surg Oral Med Oral Pathol Oral Radiol.* Oct 2020; 130(4): 387-397.e9.



109. Petrucci A, Sgolastra F, Gatto R et al. Effectiveness of low-level laser therapy in temporomandibular disorders: a systematic review and meta-analysis. *J Orofac Pain* 2011; 25(4):298-307.
110. Plaghki L, Mouraux A. EEG and laser stimulation as tools for pain research. *Current Opinion in Investigational Drugs*. January 2005; 6(1):58-64.
111. Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. Apr 4 2017; 166(7):514-530.
112. Qaseem A, McLean RM, O'Gurek D, et al. Nonpharmacologic and Pharmacologic Management of Acute Pain From Non-Low Back, Musculoskeletal Injuries in Adults: A Clinical Guideline From the American College of Physicians and American Academy of Family Physicians.. Aug 18 2020.
113. Rankin IA, Sargeant H, Rehman H, et al. Low-level laser therapy for carpal tunnel syndrome. *Cochrane*.  
<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD012765/full> Published 22 August 2017. Accessed 21 August 2020.
114. Rayegani S, Bahrami M, Samadi B et al. Comparison of the effects of low energy laser and ultrasound in treatment of shoulder myofascial pain syndrome: a randomized single-blinded clinical trial. *Eur J Phys Rehabil Med* 2011; 47(3):381-9.
115. Ruaro JA, Frez AR, Ruaro MB, et al. Low-level laser therapy to treat fibromyalgia. *Lasers Med Sci*. Nov 2014; 29(6):1815-1819.
116. Salaffi F, Stancati A, Silvestri C A, et al. Minimal clinically important changes in chronic musculoskeletal pain intensity measured on a numerical rating scale. *European Journal of Pain* 2004; 8(4): 283-291.
117. Samson D, Lefevre F, Aronson N. Wound-healing technologies: low-level laser and vacuum-assisted closure. *Evid Rep Technol Assess (Summ)* 2004; (111):1-6.
118. Savigny P, Watson P, et al. Early Management of persistent non-specific low back pain: summary of NICE guidelines. June 2009; 338: b 1805 *British Medical Journal*.
119. Schubert MM, Eduardo FP, Guthrie KA et al. A phase III randomized double-blind placebo-controlled clinical trial to determine the efficacy of low level laser therapy for the prevention of oral mucositis in patients undergoing hematopoietic cell transplantation. *Support Care Cancer* 2007; 15(10):1145-54.
120. Shapiro B E, Preston D C, Entrapment and Compressive Neuropathies. *Medical Clinics of North America* 2009; 93(2): 285-315, vii.
121. Shobha R, Narayanan VS, Jagadish Pai BS, et al. Low-level laser therapy: A novel therapeutic approach to temporomandibular disorder - A randomized, double-blinded, placebo-controlled trial. *Indian J Dent Res*. Jul-Aug 2017;28(4):380-387.
122. Shooshtari SM, Badiie V, Taghizadeh SH, et al. The effects of low level laser in clinical outcome and neurophysiological results of carpal tunnel syndrome. *Electromyogr Clin Neurophysiol*. Jun-Jul 2008; 48(5):229-231.
123. Sim J, Jordan K, Lewis M, et al. Sensitivity to change and internal consistency of the Northwich Park neck pain questionnaire and derivation of a minimal clinically important difference. *Clinical Journal of Pain* 2006; 22(9): 820-826.
124. Smoot B, Chiavola-Larson L, Lee J, et al. Effect of low-level laser therapy on pain and swelling in women with breast cancer-related lymphedema: a systematic review and meta-analysis. *J Cancer Surviv*. Jun 2015; 9(2):287- 304.

125. Stausholm MB, Naterstad IF, Joensen J, et al. Efficacy of low-level laser therapy on pain and disability in knee osteoarthritis: systematic review and meta-analysis of randomised placebo-controlled trials.. Oct 28 2019; 9(10): e031142.
126. Stergioulas A, Stergioula M, Aarskog R, et al. Effects of low-level laser therapy and eccentric exercises in the treatment of recreational athletes with chronic Achilles tendinopathy. Am J Sports Med 2008; 36(5): 881-7.
127. Stergioulas A. Low-power laser treatment in patients with frozen shoulder: Preliminary results. Photomed Laser Surg 2008; 26(2):99-105.
128. Stergioulas A. Low-power laser treatment in patients with frozen shoulder: preliminary results. Photomed Laser Surg 2008; 26(2):99-105.
129. Sung L, Robinson P, Treister N, et al. Guideline for the prevention of oral and oropharyngeal mucositis in children receiving treatment for cancer or undergoing haematopoietic stem cell transplantation. BMJ Support Palliat Care. Mar 2017;7(1):7-16.
130. Taly AB, Sivaraman Nair KP, Murali T, et al. Efficacy of multiwavelength light therapy in the treatment of pressure ulcers in subjects with disorders of the spinal cord: A randomized double-blind controlled trial. Arch Phys Med Rehabil. Oct 2004; 85(10):1657-1661.
131. Taradaj J, Halski T, Kucharzewski M, et al. Effect of laser irradiation at different wavelengths (940, 808, and 658 nm) on pressure ulcer healing: results from a clinical study. Evid Based Complement Alternat Med 2013;2013:960240.
132. Tascioglu F, Degirmenci NA, Ozkan S et al. Low-level laser in the treatment of carpal tunnel syndrome: clinical, electrophysiological, and ultrasonographical evaluation. Rheumatol Int 2010.
133. Tumilty S, McDonough S, Hurley DA et al. Clinical effectiveness of low-level laser therapy as an adjunct to eccentric exercise for the treatment of Achilles' tendinopathy: a randomized controlled trial. Arch Phys Med Rehabil 2012; 93(5):733-9.
134. Tumilty S, Munn J, McDonough S, et al. Low level laser treatment of tendinopathy: A septemantic review with meta-analysis. PhotoMedicine and Laser Surgery 2010; 28(1): 3-16.
135. U.S. Food and Drug Administration. 510(k) Summary: MicroLight 830. 2002.
136. Venancio RA, et al. Low intensity laser therapy in the treatment of temporomandibular disorders: A double-blind study. Journal of Oral Rehabilitation, November 2005; 32(11): 800-807.
137. Venezian GC, da Silva MA, Mazzetto RG et al. Low level laser effects on pain to palpation and electromyographic activity in TMD patients: a double-blind, randomized, placebo-controlled study. Cranio 2010; 28(2):84-91.
138. Wang W, Jiang W, Tang C, et al. Clinical efficacy of low-level laser therapy in plantar fasciitis: A systematic review and meta-analysis. Medicine (Baltimore). 2019 Jan;98(3):e14088.
139. Winters M, Esker M, Weir A et al. Treatment of medical tibial stress syndrome: a systematic review. Sports Med 2013.
140. World Association of Laser Therapy Recommended treatment doses for low level laser therapy. (revised April 2010). [www.walt.nu/doseage-recommendations.html](http://www.walt.nu/doseage-recommendations.html).
141. Yeldan I, Cetin E and Ozdincler AR. The effectiveness of low-level laser therapy on shoulder function in subacromial impingement syndrome. Disabil Rehabil 2009; 31(11): 935-40.

142. Yousefi-Nooraie R, Schonstein E, Heidari K, et al. Low level laser therapy for nonspecific low-back pain. *Cochrane Database Syst Rev* 2008; (2): CD005107.

## **POLICY HISTORY:**

Adopted for Blue Advantage, June 2006

Available for comment July 13-August 28, 2006

Medical Policy Group, February 2007

Available for comment February 10-March 26, 2007

Medical Policy Group, March 2009

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Medical Policy Group, December 2011

Medical Policy Group, December 2013

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Medical Policy Group, January 2014

Medical Policy Group, November 2014

Medical Policy Group, January 2015

Medical Policy Group, February 2016

Medical Policy Group, March 2017

Medical Policy Panel, July 2018

Medical Policy Group, July 2018 **(6)**: Updates to Key Points, Practice Guidelines and References.

Medical Policy Group, July 2019

Medical Policy Group, November 2020

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*This medical policy is not an authorization, certification, explanation of benefits, or a contract. Eligibility and benefits are determined on a case-by-case basis according to the terms of the member's plan in effect as of the date services are rendered. All medical policies are based on (i) research of current medical literature and (ii) review of common medical practices in the treatment and diagnosis of disease as of the date hereof. Physicians and other providers are solely responsible for all aspects of medical care and treatment, including the type, quality, and levels of care and treatment.*

*This policy is intended to be used for adjudication of claims (including pre-admission certification, pre-determinations, and pre-procedure review) in Blue Cross and Blue Shield's administration of plan contracts.*