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內文：

#### I. Abstract

Temporomandibular disorders (TMD) are characterized by the presence of temporomandibular joint (TMJ) and/or masticatory muscle pain and dysfunction. Low-level laser is presented as an adjuvant therapeutic modality for the treatment of TMD, especially when the presence of inflammatory pain is suspected. The aim of this study is to systematically review studies that investigated the effect of low level laser therapy (LLLT) on the pain levels in individuals with TMD.

#### II. Introduction

1. Signs and symptoms of this dysfunction are present in 86% of the population, most frequently in women in the 30 year-old age group.
2. Pain has most debilitating and unbearable effect on the patient's life. Masticatory muscle pain is the chief complaint of patients with TMD.
3. The treatment of this disorder is extensive and diverse, including low level laser therapy, acupuncture, transcutaneous electrical nerve stimulation (TENS), ultrasound, massage, pharmacotherapy, use of occlusal splints, and psychological treatment
4. The term LLLT is used when working in compliance with the threshold of cell survival. Karu(2001) stated that this is a non-thermal therapy that can promote cell and tissue alterations caused by different types of metabolic activation, such as: increased activity in the mitochondria and Na(+)/K(+) pump, increased vascularization and the formation of fibroblasts, resulting in an increase in the recovery process and/ or tissue healing with non-invasive characteristics.
5. The therapeutic properties of lasers, such as tissue repair, mediation of inflammatory processes, and analgesia in acute and chronic pain as well as improvement of local microcirculation have been proven by several authors.

#### III. Material and Method

1. Data base: Scopus, Embase, Ebsco, and PubMed, from January 2003 to October 2010.
2. Key words: laser therapy, low level laser therapy, temporomandibular joint disorders, temporomandibular joint dysfunction syndrome, temporomandibular joint, facial pain, and arthralgia.
3. Exclusion: intervention in animals and those that were not written in English.
4. Only 14 met the specific inclusion criteria. Numbers of patients ranging from 14~80 per group.

#### IV. Results

1. Methods used for diagnosis of TMD: Research Diagnostic Criteria(RDC/TMD), Visual Analogue Scale (VAS)
2. Sites of laser application: 7 beamed the laser into the joint and/or the affected

muscles, 3 applied the laser only at the TMJ, 2 irradiation only in the affected muscles, 1 at acupuncture points as well as the TMJ. (7 made application of laser light at the points of greatest pain of the patient.)

3. Wavelengths: 6 with infrared range, 5 with red wavelength, 2 with red and infrared, 1 not specific.
4. Number of sessions: from 1 to 20
5. Frequency: from daily (10 days) to 1 time per week(4 weeks)
6. Re-evaluation period: from 1 week to 12 months.
7. The effectiveness: reduction of pain after the end of the laser photobiomodulation sessions, except for 1 study still showed pain in TMJ during mandibular function.

V. Discussion

1. Musculoskeletal condition, like TMD are the major cause of non-dental pain in the orofacial region. Currently, it is disturbing to see the number of patients with TMD treated with nonevidence-based therapies, often without competent professional assistance.
2. LLLT with its analgesic, anti-inflammatory, antiedematous, and biostimulatory effects has proven to be effective in reducing pain and muscle tension in patients with TMD.
3. For diagnosis of individual cases, a detailed history is still the most important procedure in formulating the initial diagnostic impression.
4. As can be observed in the papers included in the present review, there are no standardization of the diagnostic criteria, which is a limitation of most of systematic reviews involving musculoskeletal conditions as TMD.
5. The use of LLLT for musculoskeletal disorders is based on the irradiation of some specific and interrelated areas: the painful area, trigger points and the area of referred pain as well as in acupuncture points.
6. The antiinflammatory and analgesic effects of laser light occur only in the affected tissue, which explains the importance of muscle and joint palpation for the identification of points causing the patient’s pain.
7. Lasers with an infrared wavelength are the most suitable due to their greater penetration. The most commonly used are located in the electromagnetic spectrum from 780 to 904 nm.
8. The laser applications promoted a relief of painful symptomatology for at least 30 days after the last irradiation.
9. The effectiveness of LLLT is more accentuated when using the laser in wavelengths in the infrared region of light spectrum, as well as with higher irradiation protocols (energy density and/or power density) and a larger number of sessions and frequency of application.

題號	題目
1	What is the most common complaint of patients with TMD? (A) Myofacial pain and dysfunction (MPD) (B) Ankylosis (C) Disk displacement (D) Degenerative joint disease
答案(A)	出處：Contemporary Oral and Maxillofacial Surgery
題號	題目
2	The most important part of the evaluation? (A) Radiographic examination

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	(B) Dental evaluation (C) Physical examination (D) The patient' s history
答案(D)	出處：Contemporary Oral and Maxillofacial Surgery