



## Low Level Laser Therapy & Arteriosclerosis

### clinical research

#### Low Level Laser Therapy in the Treatment of Arteriosclerosis of the Lower Limbs

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#### Abstract

Twenty patients with arteriosclerosis in the lower limbs were treated by low level laser therapy with lumbar paravertebral application a 20mW continuous wave He-Ne laser(632nm) and simultaneously a 250mW continuous diode laser (830 nm) was applied transcutaneously to the lumbar region by the scanner for 30 minutes 6 days per week for 2 months. The mean value of percentage of success was 87.2%. The results of the study indicate that low level laser therapy can influence beneficially arteriosclerosis in the lower limbs which is generally difficult to treat.

#### Introduction

Arteriosclerosis is a chronic obliterative disease affecting the lower portion of the aorta, its main branches and the arteries supplying the extremities. The condition occurs predominantly in patients between the ages of 45 and 70 years. It is present much more frequently in males than in females. It may be caused by an error in the metabolism of lipids (Oliver, 1955). Buck (1959) believed that the abnormal vascularization of the arterial wall has also been proposed as a significant factor in the development of the disease. Also, the Question of heredity as a factor in the pathogenesis of the disease must be raised (McKusick, 1958). The patient complains of pain in the extremities typical of intermittent claudication and difficulty in walking, finally rest pain is experienced particularly at night, characterized by a sensation of coldness or burning, hyperesthesia and tingling (Abramson, 1974). The purpose of the study was to evaluate the efficacy of low power laser in the treatment of arteriosclerosis. Materials and methods Twenty patients with arteriosclerosis of the lower limbs from the out-patient clinic of the General medicine Department of both Tanta University Hospital and Alhikmah Hospital, Mansoura were included in the study. The male to female ratio was 4:1. The ages ranged from 45 to 69 years. The duration of symptoms ranged from one to 8 months (table 1). The patients were experiencing pain in both calf muscles after walking distances (claudication distance) ranging from 200 to 500 meters. Three patients experienced rest pain at night. Clinical examinations revealed palpable walls of superficial arteries, particularly the dorsalis pedis. In the study, the claudication distance was determined for every patient in meters prior to treatment. Control normal individuals within the patients' age group walked an average of 1500 meters without experiencing calf pain.

## Results

Pain was relieved in 16 patients who received 3 to 7 courses of treatment. Eight patients were able to walk 1500 meters without experiencing any pain in the calf muscles, hence their rate of success was 100%. The remaining patients showed improvement from 73% to 95 (table 2). Three patients discontinued treatment for reasons not related to the treatment. One patient, age 69, with 4 months duration and claudication distance of 240 meters showed no improvement after receiving 7 courses of treatment. The mean rate of success was 87.2%.

## Discussion

It was not easy to discuss the treatment of arteriosclerosis and only in the last 20 years have advancements been made. Although physical therapy is only part of the total management of arteriosclerosis of the lower limbs, it could play an important role in the management. No references were found in literature concentrating the use of low level laser therapy in the management of arteriosclerosis. This work has shown that low level laser therapy is capable of increasing the circulation in muscles and, with prolonged treatment, a considerable significant improvement in circulation can be achieved in cases of arteriosclerosis. Low level laser therapy not only influences the superficial circulation but also deep circulation. The mechanism of this action is probably due to the sympathetic effect, but it could also be used on the action of normal skin excitation. It can be assumed that apart from the increase in the pain threshold (Nikolova, 1968) and muscular excitation threshold, there is also an increase in the threshold for sympathetic stimulation (Pabst, 1960). By this paravertebral application, we must concede more importance to the sympathetic action, than to the direct action on the vasometer assumed by some authors (Monode, 1951; Zinn, 1956). The results obtained in the treatment of arteriosclerosis by means of low level laser therapy are certainly based on a number of different effects. First, there is sympathetic action. Also, the analgesic action of this type of current deserves special attention, since it is the cause of the subjective improvement which frequently precedes the objective improvement in cases of severe arteriosclerosis when pain is felt while resting. Also, rest pain did not mean the presence of irreversible pathologic change as the three patients with rest pain showed a good degree of improvement. The patient who showed no improvement after 7 courses of treatment may have an irreversible pathologic change and, this age of 69 years may have also contributed to the failure of treatment.

## Conclusion

Low level laser therapy may be considered in the treatment of peripheral arteriosclerosis.

**Table 1 - Clinical data and claudication distance**

No	age	sex	Duration of pain in months	Claudication distance in meters
1.	45	Male	7	250
2.	50	Male	6	300
3.	49	Male	4	Rest pain
4.	55	Female	3	360

5.	54	Male	4	380
6.	60	Male	6	200
7.	58	Male	8	320
8.	69	Male	4	240
9.	63	Male	3	Rest pain
10.	60	Male	4	350
11.	62	Male	3	380
12.	59	Male	4	400
13.	58	Female	5	450
14.	56	Female	6	500
15.	60	Male	7	300
16.	55	Male	2	250
17.	54	Male	1	Rest pain
18.	60	Female	3	350
19.	64	Male	2	300
20.	58	Male	5	260

**Table 2 - Claudication distance in metres before treatment and the distance walked without experiencing pain after treatment.**

No	Distance before treatment	Distance after treatment	Improvement
1.	250	1300	84%
2.	300	1450	85.8%
3.	Rest pain	1100	73.3%

4.	360	1500	100%
5.	380	1500	100%
6.	200	Discontinued	-
7.	320	1350	87.2%
8.	240	No improvement	0%
9.	Rest pain	1200	80%
10.	350	Discontinued	-
11.	380	1500	100%
12.	400	1500	100%
13.	450	1500	100%
14.	500	1500	100%
15.	300	1500	100%
16.	250	1350	88%
17.	Rest pain	1250	83.3%
18.	350	1500	100%
19.	300	1400	91.6%
20.	260	Discontinued	-

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