

Gonarthrosis Treatment by Laser Therapy

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Abstract: Introduction: Osteoarthritis (OA) is a chronic degenerative disorder characterized by many factors, like articular cartilage loss, bone remodeling and presence of subcondral osteofits formations. Minimisation and limitation of articular function and pain control are two main objectives for optimal treatment of (OA). Usually the knee is the most affected by OA. Medication, physiotherapy modalities, rehabilitating exercises are the modality of treatment. Laser therapy with low level (LLLT) is the most common modality. Our study is based on the assessment of efficiency of LLLT and high level laser therapy (HLLT) in the treatment of knee (OA) by comparing two different laser therapy. Material and methods: The study is based on treating patients with gonarthrosis in Hospital Center "Mother Theresa", Tirana. This study is a prospective study. It is conducted in a period of 3 months (January 2013 - March 2013) and it is based on a questionnaire, Womac Index and Lequesne index. 30 patients with gonarthrosis were obtained in this study. The average age is 62.5 years old (from 45 - 80 years old). Patients were divided into three study groups: Group I: 10 patients were treated with LLLT (low level laser therapy) for 60 seconds each, in 4 pain areas on the surface of knee, 1.8 J / cm² dose plus exercises; Group II: 10 patients were treated with HLLT for 120 seconds, 3.6 J / cm² dose plus exercises; Group III: 10 patients were treated with placebo laser group plus exercises. All patients received a total of 10 cycles of treatment, therapy and exercise programs that continued throughout the study (3 months). All patients were assessed for pain evaluation according to VAS scale, evaluation of articular amplitude of the knee in flexion / extension, the global definition of walking, at a distance of 15 metres. Result: Post-therapy improvements were confirmed statistically in many parameters, in pain (assessed by VAS), in function (assessed by WOMAC and Lequesne) compared with the period before therapy in both groups that received laser therapy. Also we note pain decreasing in walking distance as well as during the morning, period which the patient suffer from stiffness. Improvements were observed more in the 2nd group in which laser therapy dose was doubled, compared with the other group. But on the other hand there was no difference in the improvement of pain and ROM in the group treated with placebo laser therapy. Conclusion: In conclusion, this study showed that treatment with laser therapy with low intensity in two different doses makes a significant reduction of pain and amplitude articular in OA. Although there are differences in the results obtained between the two active groups treated with laser therapy. As a result, we can say that the higher doses of LT, the higher the reduce in pain and the higher the improvement in ROM and functionality of genu articular.

Keywords: Osteoarthritis, knee, degenerate articular, Laser therapy; pain; function.

1. Introduction

Gonarthrosis is a degenerative disease, chronic, non-inflammatory, which is characterized by a progressive loss of articular cartilage and structures that surrounds it. Osteoarthritis of genu articular also is accompanied by constructive lesions (osteofits) and destructive lessions (osteoporosis and geode). Gonarthrosis is clinically manifested by: mechanical pain, limited motion articular (ROM), morning stiffness, crepitations, reduction of AVL (activities of daily living)²⁹. Treatment protocol of gonarthrosis involves Drugs (AINS), Electrotherapy (laser therapy), manual therapy (various exercises). In case of not taking the appropriate effect of treatment, a surgical intervention is indicated (arthroplastic).

2. The Incidence and Prevalence

Gonarthrosis generally affects older ages, 50-60 years old to 20% -40%. Although there is a possibility of affecting the young too. It is confirmed that 1% of the population under 30 and 10% of the population under 40 years old have signs of osteoarthritis. Ratio F / M: gonarthrosis occurs more often in women than in men, but this fact is different in different countries. In Europe about 75% of the population over 65 years old have gonarthrosis. In America 80% of the population over 65 have radiological signs of gonarthrosis, while 60% have symptoms of it.

Gonarthrosis diagnosis is based on: clinical signs; radiologic examination; physiotherapy assessment of pain, evaluation of articular amplitude; evaluation of muscular force. Gonarthrosis treatment is based on: drug treatment, rehabilitation (physical therapy, electrotherapy, laser therapy and manual therapy) and surgical treatment when treatments mentioned above are ineffective. Electrotherapy is considered one of the most important forms of physical therapy for the treatment of gonarthrosis, which uses electricity for therapeutic effect. Electrotherapy has its effects due to bioelectric effects and biochemical effects in cartilago articular knee.

3. Study Aim

The aim of this study is exploring the effectiveness of laser therapy in the form of low level laser therapy (LLLT), and high level laser therapy (HLLT) in the treatment of pain and improving articular amplitude in patients with gonarthrosis.

4. Method of study

This study is based on patients with gonarthrosis, treated in Hospital Center "Mother Theresa", Tirana. This study is a prospective study, comparative. This study is conducted on a 3 month period (January 2013 - March 2013). 30 patients diagnosed with gonarthrosis were obtained in the study. Patients completed a questionnaire for the degree of pain, articular amplitude, everyday activity based on: Womac and Lequesne Index. The average age of patients was 62.5 years

old (from 45 to 80 years old). These 30 patients were diagnosed with knee osteoarthritis according to American College of Rheumatology (ACR). The patients were divided randomly into three treatment groups. Group I: current LLLT was applied to 10 patients for 60 seconds each in 4 pain areas on the surface of knee, 1.8 J / cm² dose plus exercises; Group II: current HLLT was applied to 10 patients for 120 seconds, 3.6 J / cm² dose plus exercises; Group III: placebo laser plus exercise were applied to 10 patients.

Patients received a total of 10 cycles of treatment, and a program with therapeutic exercises that continued for 3 months of study. All patients were evaluated for pain (VAS), for articular amplitude of knee in flexion / extension, for the necessity of taking analgesic -paracetamol, for assessment of pain and knee articular amplitude at a distance of 15 metres walking free at the second week and at twelfth week according to Western Ontario and Mc Master Osteoarthritis Universities Index (WOMAC), Lequesne index. Patients and doctors analyst had no recognition of the code for active laser or laser placebo group until all information (analytical data) were completed (21).

a) Inclusive criteria

Patients diagnosed with primary gonarthrosis through a radiographic examination of genu articular, where the presence of osteofits were observed in 100% of cases and articular space narrowing and osteoporosis in 45% of cases; the presence of pain (EVA) with an average of 5-7 degrees; limitation of amplitude of the articular genu in flexion, average 60 degrees.

b) Exclusive criteria

All cases with secondary gonarthrosis within any known cause (infection, trauma, arthritis etc.) were excluded from the study. It was studied and evaluated the degree of articular pain and ROM articular of these patients before treatment with laser therapy and after treatment. It is used a questionnaire based on Wilcoxon test, Lequesne index, according Womax \ Scoring. To assess the degree of pain is used Visual Analogue Scale of pain (VAS) .30 To assess knee articular amplitude is used goniometre. Statistical analysis and outcome: statistical analysis of this study is according to SPSS 15.0 (Statistical Package for Social Sciences, version 15.0 Chicago, IL). To submit distributions of our variables are used distribution accumulation rates, real frequency and proportion. This is a prospective and randomized study. RR relative risk was used to compare pain and articular amplitude before and after treatment with laser therapy. Evaluation p <0.0001 was statistically significant.

Table 1: Intensity of pain according to VAS scale before and after treatment

	VAS Before treatment	VAS After treatment.
Group I (LLLТ)	6 degrees	3 degrees
Group II (HLLT)	6 degrees	2 degrees
Group III (placebo laser)	6 degrees	5-6 degrees

From the table above it is noted that: 30 patients who undertook the treatment entered in the treatment with the degree 6 of pain. After 10 sessions of treatment was observed that the degree of pain changed as follow:

Group I: current LLLT was applied to 10 patients for 60 seconds each in 4 pain areas on the surface of knee, 1.8 J / cm² dose plus exercises; the degree of pain was reduced to 3 degrees.

Group II: current HLLT was applied to 10 patients for 120 seconds, 3.6 J / cm² dose plus exercises; the degree of pain was reduced to 2 degrees.

Group III: placebo laser plus exercise were applied to 10 patients; the degree of pain hardly changed from the beginning of treatment and it was reduced to 5-6 degrees.

Table 2: Evaluation of ROM in flexion before and after treatment

	ROM Before treatment	ROM After treatment
Group I (LLLТ)	60 degrees	90 degrees
Group II (HLLT)	60 degrees	100 degrees
Group III (placebo laser)	60 degrees	65 degrees

After treatment for 10 sessions was observed that articular ROM changed as follow:

Group I: current LLLT was applied to 10 patients for 60 seconds each in 4 pain areas on the surface of knee, 1.8 J / cm² dose plus exercises, articular ROM changed to 90 degrees.

Group II: current HLLT was applied to 10 patients for 120 seconds, 3.6 J / cm² dose plus exercises; articular ROM changed to 100 degrees.

Group III: placebo laser plus exercise were applied to 10 patients ; ROM articular hardly changed from the beginning of treatment, it changed from 60 degrees to 65 degrees.

As a result we can say that the level of pain and articular amplitude change significantly after treatment with laser therapy in both groups, mainly in patients treated with HLLT. So we can say that the level of pain in patients of group I before and after treatment with laser therapy has decreased. So treatment with laser therapy decreases (reduces) the risk of having pain level more than 6 degrees. Group I: the improvement of pain level after treatment is from 6 degrees to 3 degrees (RR = 0.006, 95% CI: 0.003-0.09, P = 0.0003).

Group II: pain level changed from 6 degrees to 2 degrees.

Group III: the level of pain hardly changed from 6 degrees to 5-6 degrees.

The articular ROM in flexion in Group I increased. So treatment with low level laser therapy decreases (reduces) the risk of these patients having the ROM's amplitude less than 60 degrees. Improvement is from 60 degrees to 90

degrees after treatment (RR = 0: 52, 95% CI: 0.33-0.83, P = 0.006).

The articular ROM in Group II had a noticeable change from 60 degrees to 100 degrees after treatment. The articular ROM in flexion in Group III changed just a little after treatment, from 60 to 65 degrees.

5. Discussion

Rehabilitation protocols of gonarthrosis conducted in our study are supported in many treatment protocols approved by WHO and also by many other articles.³¹

Physiotherapy treatment is an absolute necessity. It achieves three purposes: the rehabilitation of knee articular eliminating the pain less than two degrees, maintaining the functional activities of daily life; a mobilisation of genu articular in flexion (90-100 degrees) and in extension (0 degrees).

6. Conclusion

In a conclusion, we say for certain that it is more effective at treating pain and articular's ROM in patients with gonarthrosis: HLLT combined with different exercises for 10 sessions, compared to the treatment of pain and articular's ROM by LLLT combined with different exercises for 10 sessions and placebo treatment. This study came to conclusions which correspond with the conclusions of other studies that have been conducted in other European countries, and all over the world.²⁴ This study was necessary because there were very few studies of gonarthrosis treatment with laser therapy in our country. These results will influence the management of treating patients with gonarthrosis in a more effective way.

7. Recommendations

Based on this study we suggest several recommendations:

- a) Recommendations for Rheumatologist doctors: It is very important to combine medication (AINS) and rehabilitative treatment, not just medications in the treatment of gonarthrosis.
- b) Recommendations for family doctors: it is very important to treat patients with gonarthrosis at the right time because it is easier to prevent than to treat deformities.
- c) Recommendations for orthopedic doctors, traumatologist, neurologist: It is very important to inform the patient with gonarthrosis about different ways of treating this disease.

This study comes as a need of patients with gonarthrosis, who seek an adequate treatment for this pathology.

This study comes to the aid of the elderly patients, an age when osteoarthritis are widespread and is necessary taking care to prevent.

This study helps preventing gonarthrosis by eliminating risk factors like: menopause, obesity, high heels, etc. This study is very important for the fact that it is surely better to prevent a pathology than to treat it.

Based on the social - economic cost of arthroplastic intervent, patients with gonarthrosis should be doctors themselves, avoiding all risk factors that lead to gonarthrosis and also taking care to economize the genu articular.

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