CASE REPORT OF 5 PATIENTS

TREATMENT WITH 10 WATT SEMICONDUCTOR PULSE LASER DEVICE

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We reported the significant treatment effects of a 10 Watt Semiconductor Pulse Laser Device in 5 cases. When we treat patients with chronic pain, Patient Based Medicine is the most important. We partially quoted from Narrative Based Medicine (NBM) that Richard, Greenhalgh, and Hurwitz advocated.

Key Words: LLLT, chronic pain Narrative Based Medicine (NBM)

Introduction

In 1998, we (1) carried out a random double blind controlled study with chronic pain patients using a 1 Watt Semiconductor Laser Device. This was the first device of its kind in Japan. We had significant Evidence Based Medicine (EBM), therefore we reported to the Ministry of Health and Welfare in Japan. Mochida Siemens Medical Systems Co., Ltd. then obtained a license to sell the device.

In February, 2007, a 10 Watt Semiconductor Pulse Laser Device was brought to market as an improved version of the 1 Watt Semiconductor Laser Device.

Two doctors, Shigeru Saeki and Setsuro Ogawa (2) reported the results of chronic pain patient’s medical treatments using this new device with results including 79% of effectiveness.

We also used this new device (fig. 1) to treat 50 chronic pain cases recently. From those cases, we will report 5 with noticeable effects.

Materials and Methods

Materials: 5 cases out of 50 chronic pain patients who visited our rehabilitation department at Toho University Hospital.

We received informed consent from all patients before we carried out Low Level Laser Therapy (LLLT). Treatment period was 4 months, from February to May, 2007. The laser irradiation regions were chronic pain regions or tender points. Irradiation time was 30 seconds each part, 6 regions total (3 minutes) every time.

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The laser treatments were given once (1 day) or twice (2 days) a week, a total of 10 times (10 days).

We then evaluated the effects of the treatments in terms of doctors’ evaluations and patient satisfaction. **Table 1** shows specifications for the Semiconductor Pulse Laser Device. **Fig. 2** shows the pattern of 10 Watt Pulse Irradiation.

For the pain scale, we applied a pain score, using the Visual Analogue Scale (VAS). Results did not go through any statistical process. We also determined that this study did not violate medical ethics.

### 5 case reports

**Case 1**

Patient: 58-year-old female, Restaurant Owner
Chief Complaint: left elbow joint pain
Present Illness: She had been complaining about pain in her left elbow joint. She consulted a doctor at our rehabilitation department on the 5th of February, 2007. The doctor diagnosed tennis elbow or lateral epicondylitis. Cooking and accounting were her everyday work. The pain got worse with wrist dorsi-flexion and writing. Considering her job, she could have been over using them. The pain became chronic. She did not have redness or swelling on the left elbow region. There was a tender point on the lateral epicondylar part of the left humerus.

The range of left elbow joint motion was normal. Her right hand grasping power was 28kg and left hand was 8kg. Her first pain score was VAS: 90.

The 1st irradiation (3 minutes total) reduced the pain. The effect lasted for 4 days. With the 5th Low Level Laser Therapy (LLLT), VAS fell from 90 to 20.

She regained her left hand grasping power up to 20kg, which was 8kg at first. Her doctor investigated her lifestyle, and which movements caused the pain. Then he advised her about Activities of Daily Living (ADL). By the end of February, she was able to start cooking and accounting again. Therefore, we finished LLLT.

**Case 2**

Patient: 57-year-old male, a pharmacist His job is writing manuscripts and typing at his pharmacy.
Chief Complaint: Left side neck pain
Present Illness: He had been feeling pain in his left side neck since the end of December, 2006. Because it was gradually getting worse, he visited our rehabilitation department on the 6th of February, 2007. The previous day, he was diagnosed with cervical spondylosis at the Department of Orthopaedic Surgery in our hospital. His cervical spine motion was limited to 50% of normal range. When extending his neck, pain shot through his back.

At the first visit, VAS was 70, right hand grasping power was 30kg, and was 7 kg with the left hand. After the 1st irradiation, VAS fell from 70 to 40. The effect lasted for 3 days. By the third LLLT, he regained his cervical spine mobility up to 70% of normal range, right hand grasping power up to 35kg, and left hand up to 30kg. After the 5th irradiation, VAS was 20, then they finished LLLT. He was able to put forth effort again when he played golf. ADL advice was to limit neck extension.

**Case 3**

Patient: 59-year-old female, business administrator
Chief Complaint: Left shoulder joint pain

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**Table 1**: Specifications of 10 Watt Semiconductor Pulse Laser Device

<table>
<thead>
<tr>
<th>Laser Element:</th>
<th>semiconductor laser diode Gallium - Aluminum - Arsenide (Ga - Al - As)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength:</td>
<td>830nm ± 20nm</td>
</tr>
<tr>
<td>Mean Power:</td>
<td>1 Watt ± 20%</td>
</tr>
<tr>
<td>Peak Power:</td>
<td>10 Watt ± 20%</td>
</tr>
<tr>
<td>Pulse-Width:</td>
<td>20ms (millisecond)</td>
</tr>
<tr>
<td>Rest Time:</td>
<td>180ms</td>
</tr>
<tr>
<td>Irradiation Time:</td>
<td>5sec. / 10sec. / 15sec. / 30sec.</td>
</tr>
<tr>
<td>Power Supply:</td>
<td>AC100V, 50 – 60Hz</td>
</tr>
</tbody>
</table>

**Fig. 2**: The pattern of 10 Watt Pulse Irradiation
CASE REPORT

Present Illness: In October, 2006, she fell down the stairs and contused her left shoulder joint. The pain on the joint remained. However, she was too busy to see a doctor.

She visited our rehabilitation department on the 7th of March, 2007. On the previous day, she was diagnosed with a left shoulder rotator cuff injury. At the first medical examination at our rehabilitation department, she complained about the pain on the lateral part of the left shoulder joint. The pain score was VAS:90. The joint motion range of flexion was 60°, and that of abduction was 40°. As a result of the first irradiation, VAS fell to 50. After that, she started to feel pain again, so she came back to our rehabilitation department. She had the second LLLT that time. VAS fell from 90 to 20. The pain vanished. Left shoulder joint motion range was two thirds of normal range. They finished LLLT after the 5th irradiation. She was able to go for long business trips without any anxiety.

Case 4
Patient: 71-year-old male, foreign trader
Chief Complaint: pain in both plantar parts
Present Illness: He felt the first pain in December, 2006, when he went abroad for a business trip. After coming back to Japan, he visited the Department of Orthopaedic Surgery in our hospital on the 14th of February, 2007. The diagnosis was that spur formation of calcaneus in his plantar parts caused the pain. On the following day (February 15th), he visited our rehabilitation department. He had tenderness in both plantar parts, and gait disturbance.

With the first medical examination at the rehabilitation department, pain score was VAS: 70. After the 1st LLLT irradiation, pain score fell down sharply from VAS:70 to VAS: 20. The effect lasted for no less than 4 days. He did not feel pain with walking or motions of ADL. He was able to even go abroad for business trips as well. They finished LLLT after the 5th irradiation.

Case 5
Patient: 70-year-old, female, Souvenir shop owner
Chief Complaint: Lumbago
Present Illness: She started feeling pain when she overworked from the end of 2006 to the beginning of 2007. She also had a dull pain in her back when she was inactive. In March, 2007, she started feeling it at night as well, therefore she visited the Department of Orthopaedic Surgery in our hospital. As a result of XP examination, she was diagnosed with Osteoporosis of the spine. The following day, she visited our rehabilitation department.

At the first medical examination, the pain score was VAS: 80, and Fingertip-Floor Distance (FFD) was 70cm. After the first LLLT irradiation, the pain score fell down to VAS: 20, and FFD was 20cm. She was able to do trunk flexion as well. The effect lasted for 5 days. After the 5th irradiation, they finished LLLT. At her last visit, we advised about positions when she carries goods, motions with ADL, and about her lifestyle. She was able to go back to work afterwards. Also, she was able to swim, and do social activities.

Discussion

We used Low Level Laser Therapy (LLLT) with 5 cases. Each of them had chronic pain and had different pathogenesis. We found that LLLT is the best possible method as a treatment for chronic pain with various pathogenesis based on degenerative change, as long as it is not malignant and it is not a progressive disease. During LLLT treatment, a patient and a doctor are able to communicate. Through this conversation, the doctor can find out motions, posture, life-style or job history that causes pain. Also, the doctor can figure out properties of the pain, mental or social factors that worsen the pain, and pain coming from the patient's life rhythm or posture at work.

When they can have good conversation, the patient-doctor relationship gets closer. It helps the doctor to understand and share “the patient’s pain,” at least a part of it. The cause of chronic pain is complicated and manifold. Therefore, the medical check and causes of the pain do not match in many cases. So, it is more important to face the patients with Narrative Based Medicine (NBM) rather than be attached to the importance of Evidence Based Medicine (EBM).

The doctors’ attitude toward diagnosis is that making conversation with patients is much more important than investigating the evidence too closely, when a diagnosis is not related to the patient’s pain and a malignant diagnosis is negative.

LLLT is a treatment device which makes the relation between “patient’s pain” and “a medical professional who treats the case” smooth, because LLLT does not hurt the patient and does not have side effects.

In the 20th century, treatments were carried out after “a doctor” and “a patient” agreed on a diagnosis and treatments based on EBM (3 ~ 7).

Still now, diagnoses and treatments based on EBM are mainstream. On the other hand, they lack consideration for NBM.

Evidence mentioned in this report is supported by the fact stated below:
Treatment has a stable effect on patients as a result of correct diagnosis and treatments which are provided only after medical and scientific evidence is proved.

Specific scientific evidence is able to prove change or show improvement, after treatments are given, in terms of proof of focal infection, various diagnostic imaging, blood, urinalysis, electro-physiological diagnosis, such as electrocardiogram (ECG), electromyogram, and so on.

However, even if diagnosis and treatment based on EBM is carried out, it often happens that “the compliments” become chronic, or faculty disorders remain. In these cases, doctors need courage and an earnest attitude toward patients considering them as one person who has disorders rather than focusing on the cause of disease itself. This brought about NBM – “the doctors” listen to the patients’ complaints considering the disease a story through narrations or words of patients when complaining during medical treatment.

We also can say that the idea of “NBM” appeared in the medical field on the base of partiality toward EBM and overestimating it.

An undercurrent of NBM has been advocated by Richard, Greenhalgh, and Hurwitz between the latter half of 20th century and the beginning of the 21st century (8).

Conclusion

In the 5 cases that we reported this time, LLLT was particularly effective. However, these are only 10% of all cases. With other 90%, we keenly realized the necessity to keep patient-based medicine based on NBM.

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