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Effectiveness of Low-Level Laser Therapy Vs Ultrasound in Patients with Moderate to Severe Bell's Palsy.

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ABSTRACT

BACKGROUND: There are many factors that may cause facial paralysis. They can be idiopathic, trauma, infection, diabetes mellitus and other inflammatory causes. Many interventions are available for the treatment of Bell's palsy. Therefore, need for the present research is to find-out the effectiveness of low-level laser therapy and ultrasound in moderate to severe bell's palsy.

OBJECTIVE: This objective of this research is identifying and comparing the effectiveness of LLLT and Ultrasound in the subjects with moderate to severe BP.

METHODS: A sample of 20 patients was recruited from Saveetha medical college and hospital. They were randomly segregated into 2 groups – group A and group B. The inclusion criteria were irrespective of age or gender and consisted of any patient identified having moderate to severe BP with House-Brackmann scale of 1-5. Patients diagnosed with central nervous system pathology or loss of sensation over the face, or a repeated case of Bell's palsy were excluded from the study. Group A was intervened by low-level laser therapy and group B was intervened by Ultrasound therapy.

RESULTS: The comparison between low-level laser therapy group and ultrasound group showed statistical difference between the post-test values. It has been found that on comparison of both groups, patients of group A showed statistical improvement in comparison with patients of group B.

CONCLUSION: The findings of this research shows that low-level laser therapy has significant improvement than ultrasound therapy for the patients recognized with BP by improving facial symmetry and functioning. Therefore, after comparison of the outcomes of both the groups, this research concludes that LLLT is more beneficial in treating BP than ultrasound therapy.

KEYWORDS: Ultrasound, bell's palsy, low-level laser therapy.

INTRODUCTION:

Bell's palsy (BP) is an acute condition which has an impact over half of the muscles of face and can cause its paralysis [1]. The disorder cannot be cured or prevented; it is self-limiting and does not pose a threat to one's life. The syndrome has been reported to have an incidence rate of 13–34 per 100,000 people, and it is mostly seen in the age group of (15-42 years) [2]. Common features of BP are: Peripheral dysfunction of the facial nerve**,** the onset is abrupt, with the maximum facial weakness occurring between 24 and 72 hours and affected site is characterized by: Hypersensitivity to sound; reduced taste sensation on affected side; pain or numbness around the ear [3].

The etiology of BP is unknown inspite of its severe effects. There are few known factors that can lead to Bell's palsy. It can either be anatomical, exposure to cold, inflammation, ischemia, or viral infection [4]. Treatment of Bell palsy is still

controversial. However, studies have shown that corticosteroids therapy can be used. Apart from that, physiotherapy, acupuncture, and neuromuscular facilitation are also applicable [5].

Some physical therapy modalities can be utilized in management of BP like facial exercises and massages. These modalities use exercise or electrotherapy to improve muscle and nerve function. There is also reduction in swelling and enhanced blood flow by application of thermal methods and massage. It thereby increases amount of oxygen in the impaired hypoxic tissues and aids the recovery process [6].

Low-level laser therapy is one of the physiotherapy techniques that can be used to treat BP [7]. LLLT is applied using an LP-1000 gallium–arsenide diode (GaAIAs) laser. It has a wavelength of 795 nm (±5Nm) and 1 W power output.. It has 1 J/cm² in 1 second of average energy density along with 1 cm ² irradiation spot size [8]. According to previous studies, low-LLLT can show improvement in the damaged peripheral nerve and can prevent or reduce its degeneration. It is painless and is considered as an ideal therapeutic modality which can be efficiently utilized with various patients including diabetic and hypertensive patients who cannot use corticosteroids [6].

Ultrasound is another modality that can be used to treat Bell's palsy. Therapeutic ultrasound is a one-way energy delivery system that employs sound waves above the range of human hearing at frequency of 1 or 3 MHz Therapeutic range of ultrasound is 0.75-3.3 MHz It has both thermal and mechanical effects. Some of the major effects like blood flow rates variations, tissue metabolism and enhanced functional activity of the nerve have been observed when exposed to ultrasound. Therapeutic ultrasound can accelerate the regeneration of facial nerve [9].

MATERIALS AND METHODS:

Study Design: This was an Experimental study conducted over a 3 week period

Study Setting: the research was carried out among patients in Saveetha Medical College

Sample Size: A total of 20 patients were selected who were diagnosed with Bell's palsy

Inclusion criteria:

• Patient having moderate to severe Bell's palsy

• All age groups

• Both men and women

• House-Brackmann grading between 1-5

Exclusion criteria:

• Patients diagnosed with pathology of central nervous system

• Patients who had s repetition of Bell's palsy

• Patients with complete loss of sensation over the face

Randomization: 20 patients were selected and then randomly categorized into two groups. . A computerized random number generator was used to allocate the subjects into:

• Group A

• Group B

Intervention Protocols:

Group A: Subjects received Low level laser therapy with intensity of 3W/cm².

Group B: Subjects received ultrasound therapy with intensity of 0.5W/cm²

Outcome Measures:

• House- Brackmann scale for Bell's palsy

RESULTS:

The objective of this research was comparing the effectiveness of low-level laser therapy vs Ultrasound in treatment of patients with moderate to severe Bell's palsy. The following data a is collected from both the groups. Group A was intervened by low-level laser therapy and group B was given ultrasound therapy.

- **Table 1 : Group A**

Parameter	Test	Mean	SD	SEM	N value
House - Brackmann	Pre-test	3.40	1.07	0.34	10
House - Brackmann	Post-test	1.70	0.82	0.26	10

- **Table 2 : Group B**

Parameter	Test	Mean	SD	SEM	N value
House - Brackmann	Pre-test	3.60	0.97	0.31	10
House – Brackmann	Post-test	2.30	0.82	0.26	10

- **Table 3 : Comparison of post-test values of Group A and Group B**

Group	Mean	SD	SEM	N value
Group A	1.70	0.82	0.26	10
Group B	2.30	0.82	0.26	10

From the statistical analysis made with the quantitative data, a noticeable difference was identified between the pre- and post-test values of both the groups respectively. An evident statistical difference was also found in the individual post-test values of Group A and Group B.

This study included 20 patients, low-level laser therapy (group A) consisted of 10 patients whose pre-test statistical mean value is shown as 3.40 (SD 1.07) and post-test value showed statistical mean value as 1.70 (SD 0.82) [Table 1]. The patients intervened by Ultrasound therapy (group B) consists of 10 patients whose pre-test statistical mean value is 3.60 (SD 0.97) and post-test values showed statistical mean value as 2.30 (SD 0.82) [Table 2].

The comparison between low-level laser therapy group and ultrasound group showed statistical difference in the respective post-test values. Comparison between the two groups is shown in Table 3 and it shows a significant statistical difference between the mean difference of pre-test and post-test value of low-level laser group and ultrasound therapy group. The value of LLLT is about 1.70 whereas that of ultrasound is about 2.30. It has been found that on comparison of both groups, patients with low-level laser therapy showed significant statistical improvement rather than patients intervened with ultrasound for treating BP.

DISCUSSION:

For this research, 20 patients recognized with moderate to severe BP were selected, who fulfilled the inclusion and exclusion criteria, after receiving formal informed consent from the patients. These patients were categorized into two groups. Low-level laser therapy was given to Group A and Group B was given ultrasound therapy. The results obtained from the study concludes that Laser application has shown significant statistical improvement in comparison with ultrasound therapy among the subjects with BP.

Behrouz Attarbashi Moghaddam (2019) et al, found that relevant evidence cautiously suggests that laser application to patients with Bell's palsy can show appreciable results. LLLT is an effective intervention used for repair and regeneration of peripheral nerve. It also initiates axonal growth, myelination, and anti-inflammation.

Mohamed Salaheldien Mohamed Alaya (2014) et al, concluded that for promoting restoration in patients with Bell's palsy, laser therapy is an advantageous physical therapy modality. Also, in comparison with exercises and facial massage, LLLT is considered more effective.

Mohamed B. Ibrahem (2015) et al, concluded that ultrasound can show effectiveness on nervous tissue. It is capable of propagating action potential and can influence the nerve conduction velocity of peripheral nerves.

CONCLUSION:

The findings of this study shows that there is significant improvement in patients identified with BP, when intervened by low-level laser therapy than ultrasound therapy by enhancing facial symmetry and functioning. Therefore, after comparison of the outcomes of both the groups, this study concludes that for management of moderate to severe Bell's palsy, LLLT is more effective than ultrasound therapy.

LIMITATIONS:

This study had several limitations. The intervention period was relatively short(3 weeks) and no long term follow – up was conducted to assess any further improvements or problems. Also, there were no facial exercises given to the patients and results were based only on electrotherapy equipments. Additionally, there was no control group included in this study.

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FINDING:

This study was funded independently by our team

DATA AVAILABILITY:

Data is available under reasonable request to corresponding author.

CONFLICT OF INTERESTS:

The authors declare they have no conflict of interest.

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