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**Anna Maria Gatidou PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Anastasios Kottaras PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Dimitrios Lytras PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Christina Gatidou PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Paris Iakovidis PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Ioannis Kottaras PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

**Corresponding Author:**  
**Dimitrios Lytras PT**  
Department of Physiotherapy,  
Faculty of Health Sciences  
International Hellenic  
University - Alexander  
Campus PO Box 141, 57400  
Sindos, Thessaloniki, Greece

## Physiotherapy management of Bell's palsy - A review of evidenced based physiotherapy practice

**Anna Maria Gatidou PT, Anastasios Kottaras PT, Dimitrios Lytras PT, Christina Gatidou PT, Paris Iakovidis PT and Ioannis Kottaras PT**

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### Abstract

Bell's palsy (BP) or otherwise known as idiopathic facial nerve palsy is a form of paralysis or weakness of one side of the face. Physiotherapy interventions accelerate recovery, improve facial function and reduce the occurrence of complications. The aim of this review was to study in the modern literature the effect of different physiotherapy interventions for the treatment and improvement of BP symptoms. Method: We reviewed the literature in all modern databases, for the period 2015 - 2021, for studies related to the effect of different physiotherapy interventions on the symptoms of patients with BP. Inclusion criteria were: to refer to patients with BP, to contain experimental and control groups and the studies to be clinical trials. Results: Out of the 114 papers that included in their title and abstract the search terms, only 10 were included in our literature review. In the studies, the average sample was 41.2 patients with a distribution of 10 to 94 individuals. Conclusions: The results of the studies showed a great improvement of the facial function, faster recovery and in particular an improvement of the facial symmetry when a program of the Proprioceptive Neuromuscular Facilitation (PNF) method or the Kabat technique is applied in combination with nerve stimulation. In general, facial exercises seem to play an important role in improving the functioning of facial muscles when combined with other techniques or methods, while the application of acupressure massage seems to significantly reduce the underlying symptoms of paralysis and help improve the affected side.

**Keywords:** Bell's palsy, physiotherapy, rehabilitation

### Introduction

Bell's palsy (BP) or otherwise known as idiopathic facial nerve palsy is a form of paralysis or weakness of one side of the face. It results from the dysfunction of the facial nerve (cranial nerve VII), which is responsible for the innervation of the mimetic muscles of the face [1]. Paralysis can cause complete or partial loss of mobility on one side of the face and its onset is perceived by pain in the mastoid process [2]. The facial nerve transmits nerve impulses to the lacrimal and salivary glands and for this reason during paralysis tearing and salivation are caused. Risk factors for palsy include diabetes, pregnancy, preeclampsia, obesity and hypertension [3].

BP is the most common cause of facial nerve palsy accounting for 49-51% of all cases, with an estimated annual prevalence of 20-32.2 per 100,000 people. Its incidence is higher in the ages of 15-45 years [1] and there is a recurrence rate of 8-12%. Regarding patients 70% of them have a full recovery without any treatment.

Physiotherapy interventions such as electrotherapy, massage, therapeutic exercise, patient feedback and heat therapy have been shown to accelerate recovery, improve facial functioning and reduce complications [4]. Furthermore, they can maintain muscle tone and nerve stimulation of facial muscles which is essential for patients with BP. Physiotherapy techniques that aim to retrain the muscles help prevent the formation of muscle contractures and prevent atrophy of the facial muscles [5-6].

The aim of this literature review was to study in the modern literature the effect of different physiotherapy interventions to treat and improve the symptoms of BP.

### Method

The Google Scholar, Medline and Pedro databases were searched. Criteria for including the studies in our sample were: to refer to patients with BP, to contain an experimental group

and a control group and the studies to be clinical trials. The search terms used were Bell’s palsy, physiotherapy, rehabilitation. There was no language restriction but there

was a time limit from February 2015 to May 2021 in our search. The search strategy is presented in detail in Figure 1.

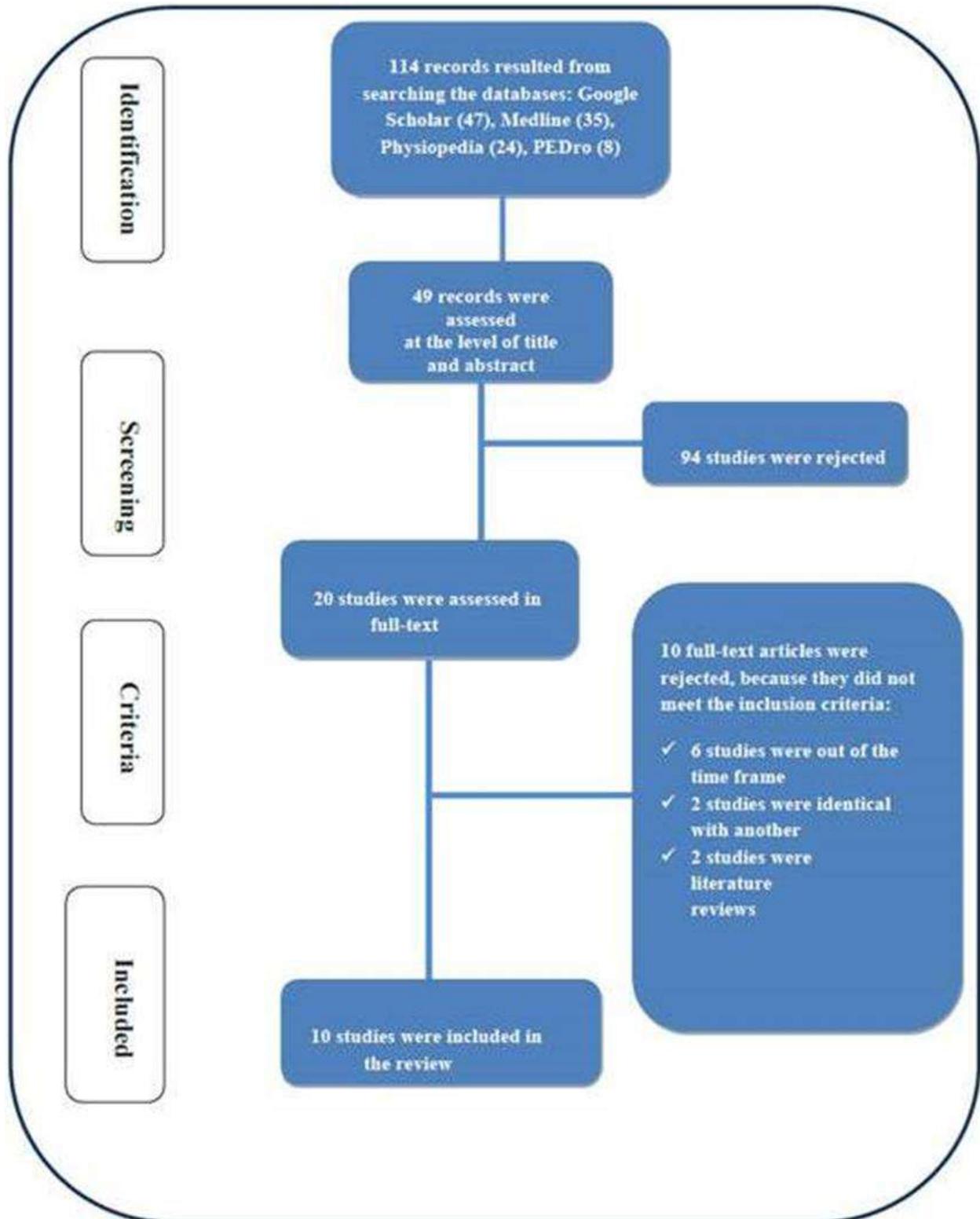


Fig 1: Study search flowchart

**Results**

As shown in Figure 1, out of the total of 114 tasks that included the search terms in their title and abstract, only 20 of them were examined in full-text as the remaining 94 were not relevant to the purpose of this review. Eventually only 10 were included in our literature review after meeting all the criteria we had set. Exclusion criteria for the 94 studies

were: there was no control group, repetition of studies, they were systematic reviews and they were outside of the time frame. The studies included in the review had a sample average of 41.2 patients with a distribution of 10 to 94 people as shown in Table 1 with the main characteristics of the participants.

**Table 1:** Main characteristics of participants

	Martineau <i>et al.</i> , 2020 <sup>[7]</sup>	Marotta <i>et al.</i> , 2020 <sup>[7]</sup>	Palekar <i>et al.</i> , 2019 <sup>[9]</sup>	Khanzada <i>et al.</i> , 2018 <sup>[10]</sup>	Tharani <i>et al.</i> , 2018 <sup>[11]</sup>	Ordahan & Karahan, 2017 <sup>[12]</sup>	Mirzakhani <i>et al.</i> , 2017	Banu <i>et al.</i> , 2017 <sup>[14]</sup>	Monini <i>et al.</i> , 2016 <sup>[15]</sup>	Lee & Chung, 2015 <sup>[16]</sup>
Number of participants	10	20	30	52	20	46	20	60	94	60
Age	50.7	42.2±7.6	20-40 years	35.85±8.46 36.38±8.34	20-50 years	44.7±4.5 45.3±3.8	42±16.21 45.4±14.6	29.1±7.07 28.6±6.65	57.1 55.7	20-50 years
Gender (M/W)	4M/6W	14M/6W	-	14M/38W	-	40M/6W	9M/11W	32M/28W	49M/45W	28M/32W

(Age is presented as Mean ± SD, Men/Women)

**Table 2:** Main characteristics of included studies

Author/ Country	Sample/ Participants	Intervention	Comparison	Evaluation Tool	Main Findings
Martineau <i>et al.</i> , 2020 <sup>[7]</sup>	10 Women - Men	(n = 5) 2 weeks/4 sessions Mirror Therapy was applied and facial exercises were performed	(n = 5) Received instructions to avoid excessive contraction of the facial muscles	Facial Nerve Grading System 2.0 Sunnybrook Facial Grading System	The results showed that the intervention group had better facial symmetry and faster recovery than the control group. In addition, it was observed that the subjects who received the treatment had an improvement in their speech and ingestion
Marotta <i>et al.</i> , 2020 <sup>[7]</sup>	20 Women - Men	(n = 10) 4 weeks/5 sessions per week /30 minutes Neuromuscular electrical stimulation (NMES), shortwave diathermy (SWD) and facial exercises were performed  All patients received therapeutic massage and performed breathing and relaxation exercises, exercises for opening and closing the eyes and lips, facial expression exercises and pronunciation of letters and words	(n = 10) Performed only supervised facial exercises	Sunnybrook Facial Grading System	The intervention group showed an increase in cheekbone mobility ( $p<.05$ ) and a significant improvement in facial symmetry during voluntary contraction ( $p<.05$ , 55.4) in relation to the control group (46.4). However, no difference was found between the groups in the symmetry of the face at rest

The study of Martineau *et al.* <sup>[7]</sup> attempted to evaluate the efficacy of Mirror Therapy in patients with BP. Participants were 10 people (mean age 50.7 years), who underwent sessions with Mirror Therapy and facial exercises (four sessions per week) for two weeks. The control group only received instructions from the specialists. The evaluation was done with the Facial Nerve Grading System 2.0 (FNGS 2.0) and Sunnybrook Facial Grading System (SFGS) scales. The results showed that the intervention group had better facial symmetry and faster recovery than the control group. In addition, it was observed that the participants who received the treatment had an improvement in their speech and ingestion.

Positive results were also seen in the study of Marotta *et al.* <sup>[8]</sup> who evaluated the efficacy of Neuromuscular Electrical Stimulation (NMES) and Shortwave Diathermy (SWD) in patients with chronic BP. Their research included 20 people (mean age 42.2years) who were randomly divided into the intervention and control groups. NMES was induced in the intervention group and SWD was applied in combination with exercises for the face (30 minutes, five times per week) for four weeks, whereas the control group performed only the exercises. All participants received massage, breathing exercises, relaxation exercises and face exercises. SFGS was used to assess palsy. The intervention group showed an increase in cheekbone mobility ( $p<.05$ ) and a significant improvement in facial symmetry during voluntary contraction ( $p<.05$ , 55.4) compared to the control group (46.4). However, no difference was found between the groups in the symmetry of the face at rest.

In a study conducted by Palekar *et al.* <sup>[9]</sup> they compared the Proprioceptive Neuromuscular Facilitation (PNF) method with the application of Kinesio Tape to facial expressions in patients with BP. 30 people aged 20-40 participated and were assigned to groups A and B. Group A underwent physical therapy with the PNF method (two sets, 15 repetitions 30") with maximum resistance, while group B performed facial exercises and applied Kinesio Tape. Both groups received the corresponding treatment for four weeks five times per week with a session duration of 30 minutes. The results showed that group B had a greater improvement in facial muscle function than group A.

The study by Khanzada *et al.* <sup>[10]</sup> aimed to compare the effect of the Kabat technique and facial exercises on 52 individuals (mean age 36.11) with BP, who were divided into intervention and control groups. In both groups nerve stimulation was induced, which was combined with the Kabat technique in the intervention group and with facial exercises in the control group. SFGS and Facial Disability Index (FDI) were used to evaluate patients. The results showed that the patients who received the Kabat technique showed a greater improvement in facial symmetry at rest and voluntary contraction than the control group. The intervention group also had a greater improvement in the physical functioning and socialization of the participants ( $p>.05$ ).

The study by Tharani *et al.* <sup>[11]</sup> involved 20 people aged 20-50 years, who were divided into groups A and B in order to investigate the efficacy of PNF and facial exercises in the symptoms of BP. Group A received PNF treatment for five weeks (five times per week), as opposed to group B, which

performed facial exercises in front of a mirror for 45 minutes. Nerve stimulation was induced in both groups. According to the results, group A had a greater improvement in facial symmetry and function.

The aim of the study by Ordahan *et al.* [12] was to investigate the effect of low-intensity laser therapy in combination with facial exercises in 46 people (mean age 41) in acute BP. The participants were divided into two groups. The first group received laser treatment and facial exercises, whereas the second group performed only the exercises. The treatments lasted six weeks and were repeated three times a week. Facial function was assessed with the FDI. The results showed a significant improvement in the subjects who received laser treatment in the 3<sup>rd</sup> and 6<sup>th</sup> week of treatment compared to the other group which did not have a significant improvement until the 6<sup>th</sup> week ( $p < .05$ ).

The study by Mirzakhani *et al.* [13] compared two different intervention programs in 20 patients (43.7 median age) with BP. The participants were divided into two groups. In group A, facial exercises (five sets, 20 minutes), PNF treatment and two-minute facial massage were performed. In group B, neuromuscular retraining was performed through biofeedback for 20 minutes. The treatment period was four weeks with a frequency of three times a week. Facial function was assessed with the House-Brackmann Facial Nerve Grading System (HBGS) and quality of life with the 36-item Short Form (SF-36) questionnaire. The results showed a significant increase in quality of life ( $p \leq .001$ ) and improvement of facial function ( $p = .004$ ) in both groups without significant difference between them.

Banu *et al.* [14] studied the effect of Infrared Radiation (IRR) in 60 patients (mean age 28.85). The participants were divided into two groups. The first group received IRR treatment for 15 days (15-minute application) along with PNF exercises and medication, while the second group received the same treatment without applying IRR. According to the results in the first group, 25 patients showed complete recovery and 12 showed early recovery. The second group had a complete recovery and seven of its participants had an early recovery, which constitutes a significant difference.

The research of Monini *et al.* [15] aimed to investigate the efficacy of taking steroids in combination with or without the Kabat technique. 94 people (56.4 mean age) with BP participated in the study and were divided into two groups. Group A received only steroids for 15 days, whereas in group B the Kabat technique was applied along steroid reception for two weeks. The results showed that group B had greater improvement and faster recovery ( $p < .001$ ). However, no difference was found in the contraction of the facial muscles between the two groups.

Lee *et al.* [16] investigated the effect of reflexology (Acupressure Massage) on facial palsy and underlying symptoms in 60 patients aged 20-50 years. The intervention group received acupressure massage (treatment duration: two weeks, session duration: 20 minutes) and the control group received no treatment. Digital Infrared Thermographic Imaging (DITI) was used to compare the healthy and affected side, analysis of covariance (ANCOVA) for the underlying symptoms and the HBGS and FNGS scales for facial palsy. The results showed that the intervention group had a smaller difference between the affected and the healthy side. There was also a significant difference in the underlying symptoms between the two groups ( $p = .016$ ).

Finally, according to FNGS, there was a significant difference in facial palsy between the two groups ( $p < .001$ ), while on the contrary the results of HBGS showed a small difference ( $p = .005$ ).

## Discussion

From the results of the 10 studies, we studied in the present literature, physiotherapy interventions appear as a factor that can improve the symptoms of patients with BP.

Our results showed that neuromuscular retraining through biofeedback, when applied for four weeks three times per week, contributes significantly to the improvement of facial functioning. Our findings are in agreement with those of Ferreira *et al.* [17] who in their own systematic review concluded that neuromuscular retraining through feedback leads to improvement of symptoms in two different stages (acute and chronic).

We concluded that facial exercises along with Mirror Therapy is an effective approach to improve facial symmetry when applied for two weeks four times per week. The positive effect of the exercises is supported by the review of Pereira *et al.* [18] who concluded that facial exercises lead to a great improvement of facial functioning and symmetry, especially when combined with neuromuscular retraining.

Our review has shown that an electrotherapy program can have a positive effect on BP symptoms. Burelo-Peregrino *et al.* [19] agree with our findings as they concluded that electrotherapy helps improve symptoms in both acute and chronic BP. However, it is not clear what parameters (intensity, pulse duration, duration of treatment, Number of sessions) should be applied in order to obtain the best possible results.

## Conclusions

From the present literature review it was found that physiotherapy has many benefits in the rehabilitation of patients with BP, as the results of studies have shown a great improvement in facial function and faster recovery. Additionally, they showed that patients who performed either a program with the PNF method for six weeks or with the Kabat technique for three weeks in combination with nerve stimulation had an improvement in facial symmetry. In general, facial exercises seem to play an important role in improving the function of facial muscles when combined with other techniques or methods such as Kinesio Tape, Mirror Therapy, PNF and electrotherapy. Moreover, the application of acupressure massage for two weeks once per day and for 20 minutes per session seems to significantly reduce the underlying symptoms of palsy and helps to improve the affected side. Further studies are needed to quantify or identify appropriate physiotherapy interventions that yield the best results.

## References

1. Mallis A, Papadas T. Paralysis of the Peripheral Facial Nerve Etiology, Diagnosis and Treatment Archives of Greek Medicine. 2010;27(4):607-613.
2. National Institute of Neurological Disorders and Stroke. (ND) Bell's palsy Fact Sheet, National Institute of Neurological Disorders and Stroke.
3. Falchek SJ. Bell palsy In: The 5-Minute Pediatric Consult, 8th Edition. Walters Kluwer Health, 2018, 100-101.

4. Karaganova I, Mindova S. Bell's palsy Physical therapy and surface electromyography biofeedback In: The 4th International virtual conference on advanced scientific results, 2016, 243-247.
5. Brudny J, Hammerschlag PE, Cohen NL, Ransohoff J. Electromyography rehabilitation of facial function and introduction of a facial paralysis grading scale for hypoglossal-facial nerve anastomosis Laryngoscope. 1988;98(4):405-410.
6. Zotova EG, Arezzo JC. Noninvasive Evaluation of nerve conduction in small diameter fibers in the rat Physiol J. 2013;2013:1-11.
7. Martineau S, Chouinard A, Martel-sauvageau V. A Pilot study on the mirror effect Plus Protocol: A standardized and adapted facial rehabilitation for acute Bell's palsy, Canadian, Journal of speech-language pathology and audiology. 2020;44(2):52-72
8. Marotta N, Demeco A, Inzitari MT, Caruso MG, Ammendolia A. Neuromuscular electrical stimulation and shortwave diathermy in unrecovered Bell palsy Medicine (Baltimore). 2020;99(8):5-9.
9. Palekar T, Khisty A, Basu S, Baxi G. Comparative study between facial PNF and Kinesio taping along with facial exercises in the treatment of Bell's Palsy, Natl J Integr Res Med. 2019;10(2):25-28.
10. Khanzada K, Junaid M, Gondal I *et al.* Comparison of efficacy of Kabat rehabilitation and facial exercises along with nerve stimulation in patients with Bell's palsy, Univ. J Heal Sci. 2018;3(1):31-35.
11. Tharani G, Gopinath Y, Kamatchi K. Comparison of PNF versus convectional exercises for facial symmetry and function in Bell's, International Journal of Current Advanced Research Rawal Med J. 2018;43(3):543-546.
12. Ordahan B, Karahan A. Role of low-level laser therapy added to facial expression exercises in patients with idiopathic facial (Bell's) palsy lasers med sci. 2017;32(4):931-936
13. Mirzakhani N, Angooti L, Akbarzadeh A, Eliyspoor D. The comparison between exercise therapy and biofeedback therapy in facial function and quality of life of Bell's palsy, J Clin. Physiotherapy Research. 2017;2(7):139-143.
14. Banu HB, Rahman S, Hossain S *et al.* Palsy, Effect of Infrared Radiation (IRR) on patients with Bell's, Bangladesh Med J. 2017. 2017;46(1):1-6.
15. Monini S, Iacolucci CM, Di Traglia M, Lazzarino I, Barbara M. Role of Kabat rehabilitation in facial nerve palsy: A randomized study on severe cases of Bell's palsy, Acta Otorhinolaryngology Ital. 2016;36(4):282-288.
16. Lee J, Chung Y. Effect of Acupressure Massage on Temperatures of Acupoints, Severity of facial paralysis, Subjective symptoms and depression in Bell's palsy Patients, J Korean Biol Nurs Sci. 2015;17(2):140-149.
17. Ferreira M, Santos PC, Duarte J. Idiopathic facial palsy and physical therapy: An intervention proposal following a review of practice, Phys Ther Rev. 2011;16(4):237-243
18. Pereira LM, Obara K, Dias JM, Menacho MO, Lavado EL, Cardoso JR. Facial exercise therapy for facial palsy: Systematic review and meta-analysis Clin Rehabil. 2011;25(7):649-658.
19. Burelo-peregrino EG, Salas-magaña M, Arias-Vázquez PI. Efficacy of electrotherapy in Bell's palsy treatment: A systematic review. 2020;33:865-874.