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Is Physical Therapy Session Duration Effective on Functionality in Rehabilitation of Bell's Palsy (Idiopathic Facial Paralysis)?

Bell Palsi (İdiyopatik Fasiyal Paralizi) Rehabilitasyonunda Fizik Tedavi Seans Süresi Fonksiyonellik Üzerine Etkili Mi?

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ÖZ

Amaç: Bell Palsili hastalarda değişen fizik tedavi seans sayısının fonksiyonellik düzeyine etkisinin değerlendirilmesi amaclanmıştır.
Araçlar ve Yöntem: Bu retrospektif çalışmada Bell Palsi (BP) tanısı ile elektroterapi, infraruj ve mimik egzersizlerinden oluşan fizik tedavi programı uygulanan hastaların verileri incelendi. BP tanısı ile rehabilite edilen ve 15 seans tedavi gören 21 hasta ile 30 seans tedavi gören 21 hastanın verileri analiz edildi. Hastaların yaş, cinsiyet ve komorbiditeleri kaydedildi. Hastaların fonksiyonellikleri Yüz felci engellilik indeksi Facial Disability Index, House Brackmann Evrelemesi ve Sunny Brook Evrelemesi ile tedavi öncesi ve sonrası değerlendirildi.
Bulgular: Hastaların tüm grup içi klinik ve işlevsellik değerlendirmelerinde hem 15 seans sonrasında hem de 30 seans sonrasında her iki grupta da anlamlı düzelme gözlendi ($p<0.001$). Gruplar arasındaki karşılaştırmalarda istatistiksel olarak fark bulunmadı
Sonuç: Çalışmanın sonuçları BP tansıyla fizik tedavi gören hastalarda 15 seans fizik tedavinin belirgin fonksiyonel iyileşme sağladığını ve fizik tedavi seans sayısını 30 seansa çıkarmanın fonksiyonellik üzerine ek biretkisi olmadığını göstermektedir.

Anahtar Kelimeler: house brackmann evrelemesi; idiopatik fasiyal paralizi; sunny brook evrelemesi; rehabilitasyon süresi; yüz felci engellilik indeksi

ABSTRACT

Purpose: The aim of the study is to evaluate the effect of the changing number of physical therapy sessions on the functionality level of the patients with Bell Palsy.
Materials and Methods: In this retrospective study, the data of patients who were diagnosed with Bell's Palsy (BP) and applied a physical therapy program consisting of electrotherapy, infrared and mimic exercises were examined.The data of 21 patients who were rehabilitated with the diagnosis of BP and received 15 sessions of treatmentand 21 patients who received 30 sessions of treatment were analyzed. Age, gender and comorbidities of the patients were recorded. The functionality of the patients was evaluated with Facial Disability Index (FDI), House Brackmann System (HBS) and Sunny Brook Grading System (SBGS) before and after treatment.
Results: In all intragroup clinical and functionality evaluations of the patients, significant improvement wasobserved in both groups, both after 15 sessions and after 30 sessions ($p<0.001$). No statistical difference was found in the comparisons between the groups.
Conclusion: The results of this study show that 15 sessions of physical therapy provide significant functional improvement in patients undergoing physical therapy with BP, and that extending thenumber of physical therapy sessions to 30 sessions does not have an additional effect on functionality.

Keywords: facial disability index; house brackmann system; idiopatic facial paralysisbell; sunny brook grading system; rehabilitation duration

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INTRODUCTION

Peripheral facial paralysis occurs as a result of the peripheral part of the facial nerve being affected due to conditions such as trauma, metabolic and neoplastic causes, and infections. Bell's palsy (BP) is diagnosed in patients with peripheral facial paralysis after all these etiological causes are excluded.[1] The incidence of BP has been reported to be between 20 and 30 per 100.000. BPaffects both sexes equally and can occur at any age. The etiology of BP is not clear, but it has been reported that there is evidence of a viral etiology, such as herpes simplex virus.[2] The prognosis of patients with BP is variable. Functional status at baseline, time to start physiotherapy, hypertension, diabetes, and previous BP have been reported as prognostic factors.[2, 3]

Additionally, it has been reported that there is limited data on factors affecting the treatment guideline and prognosis of BP.[4]

Even though BP is greatly improved, facial asymmetry, synkinesia, and motor paralysis sequelae may develop.[4] The first evaluation of patients with BP is made by otorhinolaryngologists. As a medical treatment, steroid therapy and antiviral agents, vitamin B12 supplements, analgesics, and eyedrops are used to reduce edema in the nerve.[5] In the literature, there are studies on the rehabilitation of BP that include electrical stimulation, ultrasound, laser therapy, biofeedback, acupuncture, kinesiology taping and various exercises.[6-10] In a recent article examining systematic reviews and meta-analyses, it was reported that there is no study in the literature that these rehabilitation protocols are more effective than others.[5] A Cochrane review reported that studies involving facial exercises, electrical stimulation, and other physical therapy modalities in lumbar palsy rehabilitation were of low quality.[11] For facial exercises, it has been reported that there may be positive effects on recovery time in acute paralysis at a low level of evidence.

A low level of evidence has been reported regarding the positive effects of facial exercises on recovery time in acute BP rehabilitation. In BP rehabilitation, it has been recommended thatthe physiatrist define a patient-specific treatment approach according to the clinical picture, the degree of injury, and the healing process. It has been reported that more studies are needed to evaluate the effectiveness of rehabilitation in patients with BP.[5]

As far as we know, there is no study in the literature examining the effect of the number of physiotherapy sessions on functionality. It was emphasized that the determination of the physiotherapy period of the patient should be determined by the physician in a way that would be specific to the patient.[5] Determination of the rehabilitation period in patients with BP is also important in terms of the economic burden of physiotherapy on the health system. In this retrospective study, we constituted two groups equal in terms of initial paralysis level and prognosticfactors. In this study, it was aimed to examine the effectiveness of different physical therapy sessions given in the rehabilitation of BP on the functional recovery of the patient. The aim of the study is to evaluate the effect of the changing number of physical therapy sessions on the functionality level of the patients.

MATERIALS and METHODS

In this retrospective study, the data of patients who were referred to the Physical Medicine and Rehabilitation outpatient clinic with the diagnosis of BP after completing oral steroid treatment at the same dose and duration by an otolaryngologist were used. The data of patients who received a physical therapy session consisting of electrotherapy, infrared and mimic exercises for the diagnosis of BP between March 2020 and October 2021 were examined.

Mimic exercises, including self-massage, relaxation exercises, chewing gum, frowning, pouting lips, whistling, puffing cheeks, trying to drink water with a straw, and pronouncing letters, were taught to the patients by the physiotherapist. The patients were asked to do 30 minutes of home exercise everyday throughout the duration of the sessions.

Direct current was applied to the patients as electrotherapy. The intensity of the flow was gradually increased until a good contraction was obtained and continued at that intensity when the contraction was seen. Infrared was applied for the purpose of a superficial heating effect. Care was taken to protect the eyes during the application.

The data of 21 patients who were rehabilitated with the diagnosis of BP and received treatment for 3weeks (15 seasons) and 21 patients who received treatment for 6 weeks (30 seasons) were analyzed.

Measures

The age, gender, and comorbidities of the patients were recorded. The patients' functionality was evaluated with Facial Disability Index (FDI), House Brackmann System (HBS), and the Sunny Brook Grading System (SBGS) before and after the treatment.

FDI is a scale that evaluates the limitations of the functionality of individuals with facial palsy with a total of 10questions. The first 5 questions measure physical limitations, while the other questions measure social limitations. The Turkish validity and reliability study of the index was conducted.

HBS grades facial nerve involvement between 1 and 6. In HBS, 6 are considered complete paralysis, and 1 is considered normal (12). HBS is often preferred in studies in the literature.

Facial paralysis SBGS allows for regional assessment of facial paralysis. It also measures resting symmetry, symmetry of voluntary movements, and synkinesis. The total score is between 0-100. A score of 100 indicates normal function and a score of 0 indicates complete facial paralysis. Turkish validity and reliability study of the SBGS was performed (13). It has been reported that SBGS allows it tobe evaluated more locally than HB, can classify it better and allows to evaluate the prognosis. In our study, we evaluated functional recovery with FDI and SBGS.

Istanbul Health Science University, Kanuni Sultan Süleyman Training and Research Hospital Clinical Research ethics committee approval was obtained before the start of our study (Confirmation number: KAEK/09.12.2021 -2021.12.326). The study was organized in accordance with the Principles of the Declaration of Helsink**i.**

Statistical Analysis

Statistical analysis of all the study data was performed using IBM SPSS Statistics for Windows v.25.0.[14] Descriptive data were expressed in number and frequency or mean±standard deviation. The distribution of variables was checked with the Shapiro-Wilk test. To compare the two groups, an independent sample *t*-test or Mann-Whitney U test was performed for quantitative variables. Categorical variables were compared using the Chi-Square test. The within-group comparisons were analyzed using the Friedman test. The value $p<0.05$ was accepted to indicate statistical significance.

RESULTS

In this study, the data of 42 patients diagnosed with BP, whose treatments and follow-ups were completed in our unit, were analyzed. We divided the patients into two groups according to the duration of physical therapy sessions. Group 1 received physical therapy for 3 weeks (15 sessions) and Group 2 received physical therapy for 6 weeks (30 sessions). There was no statistical differencebetween the two groups in the demographic data of the patients, such as gender, age, Body Mass Index (BMI), and comorbid diseases. Demographic information of the patients is given in Table 1.

There was no significant difference between the two groups in the evaluation parameters of the patients before the treatment. In all in-group clinical and functionality evaluations of the patients, significant improvement was observed in both groups at both the 3rd and 6th weeks ($p<0.001$). No statistical difference was found in the comparisons between the groups (Table 2).

Table 1. Demographic and clinical parameters of the patients

Variables	Group 1 (15 SESSION)	Group 2 (30 SESSION)	p
Gender n(%)			
Female	8(38.1)	11(52.4)	0.352
Male	13(61.9)	10(47.6)	
Age (mean±SD)	46.14±19.33	44.19±17.45	0.733
BMI (mean±SD)	25.69±2.96	26.36±3.24	0.468
Affected side n(%)			
Right	12(57.1)	8(38.1)	0.217
Left	9(42.9)	13(61.9)	
Comorbid illness n(%)			
Hypertension	6(28.6)	5(23.8)	0.726
Diabetes mellitus	7(33.3)	5(23.8)	0.495
Hypothyroidism	1(4.8)	2(9.5)	0.549
Coronary artery disease	2(9.5)	1(4.8)	0.549
Asthma	1(4.8)	1(4.8)	1.000

BMI: Body Mass Indeks

Table 2. Comparison of clinical assessments between groups

Variables	Group 1 (15 SESSION)	Group 2 (30 SESSION)	p
House-Brackmann Grade			
Before treatment	3.50±1.31	3.63±1.06	0.667
3. week	1.90±1.52	1.95±1.31	0.956
6. week	1.60±0.94	1.21±0.41	0.336
p	<0.001	<0.001	
SBGS			
Before treatment	44.80±21.48	42.21±16.69	0.588
3. week	74.65±20.84	72.36±27.00	0.687
6. week	81.60±19.89	86.15±17.83	0.496
p	<0.001	<0.001	
FDI-Physical			
Before treatment	48.25±15.24	46.05±16.71	0.670
3. week	75.50±20.89	74.21±22.19	0.853
6. week	80.75±16.88	85.53±8.48	0.275
p	<0.001	<0.001	
FDI-Social			
Before treatment	63.60±20.92	66.52±18.43	0.649
3. week	76.80±22.48	75.89±22.46	0.898
6. week	88.40±15.85	91.26±12.34	0.532
p	<0.001	<0.001	

SBGS: Sunny Brook Grading System FDI: Facial Disability Index

DISCUSSION

The aim of BP rehabilitation is to prevent the formation of tension in the tissues and to reduce synkinesis.[12] Like the duration of treatment, there is no clear information in the literature about when to start treatment.[13] However, it has been reported that early treatment affects the prognosis positively in patients with BP.[5] Therefore, all patients in our study were included in the physiotherapy program immediately after oral steroid treatment was completed. Additionally, care was taken not to affect the prognostic factors of the baseline parameters, and two homogeneous groups were formed. In a review, it has been reported that physiotherapy added to existing medical treatment has a positive effect on recovery time and functions when compared to drug treatment alone.[12] The results of this study also support the effect of physiotherapy on functional recovery.

The use of electrical stimulation has been recommended for all severity levels of acute facial paralysis related to the management of facial paralysis.[12,13] There are studies reporting that electrical stimulation will delay muscle atrophy and increase muscle strength.[15] In another study, it was reported that electrical stimulation could prevent reinnervation and its cost is high.[15] Tuncay et al. reported that electrical stimulation provides a functional and electrophysiological improvement in acute BP.[6] A recent literature article found that electrotherapy was more effective in chronic patients. Although the efficacy of electrostimulation remains unclear, it has been reported to be an option for patients due to its ease of application. In addition, it has been reported that the type, frequency, and application method of electrical stimulation used in studies are different.[5]

In another review, although there is no certain evidence for the effectiveness of rehabilitation in bellpalsy, it has been recommended rehabilitation in clinical practice because it may have an effect on functional recovery. In our study, significant improvement was demonstrated in the 3rd week after starting rehabilitation, which shows the importance of early rehabilitation in BP. Especially theeffectiveness and lower cost of mimic therapy are recommended in terms of monitoring patients with daily home exercise programs.[12] In this study, all patients continued to mimic exercises during their rehabilitation period in addition to electrotherapy and superficial warming.

In Watson et al.'s study, physical therapy has given once a week or more frequently and continued until the patient's symptoms plateaued.[12] In another study, electrical stimulation has planned as 15 sessions.[6] In a recent study, they determined mimic exercises and low-dose laser treatment as 18 sessions while planning the study by considering the improvement of the patients.[13] In studies on mimic therapy, it has been reported that the number of sessions varies between 4 and 10 sessions.[5,15]

Mimic therapy was found to be valuable in terms of increasing the patient's awareness of the movements in the facial muscles and preventing random contractions,

making the movements automatic over time. It has also been reported that synkinesis can be prevented more easily with mimic exercises. During mimic therapy, the use of mirrors is recommended both in terms of biofeedback and prevention of synkinesis.[15,16] In this study, a mirror was used in mimic exercises. Asfar as we know, there is no clear information about the number of sessions in the literature.

Generally, a maximum of 18 sessions are applied. In clinical practice in our country, a long-term rehabilitation program, such as 30 sessions, is applied. Long session durations have a great impact onthe economic burden and loss of the workforce. According to the results of this study, in the evaluation parameters after 15 sessions, improvement is evident in both groups. Increasing the number of sessions had no effect on functional recovery. However, the small sample size and the significant improvement of the patients in the first 3 weeks may be effective in this. Studies with large sample sizes are needed.

In the light of this information, the fact that the duration of physical therapy is left to the physiatrist and the uncertainty about the effectiveness of electrotherapy in terms of evidence-based medicine in acute facial paralysis continues, the number of sessions to be applied to the patient presenting with acute facial paralysis is important in clinical practice. This current study, in which we evaluated the effect of physical therapy duration on the functional recovery of patients with Bell's palsy, is valuable both in terms of economic burden and loss of workforce. While the literature on the effectiveness of physical therapy remains uncertain, the economic burden of long sessions of physical therapy should be considered.

The biggest limitation of our study is its retrospective design, wide age range, and small sample size. In addition, since electrotherapy, superficial warming and mimic exercises were applied together in the rehabilitation protocol in this study, their effects could not be evaluated separately. Despite all these limitations, as far as we know, there is no study in the literature evaluating the rehabilitation ofbell palsy in terms of the number of session and the economic burden. The data of this study will contribute to the literature. In addition, patients should have completed steroid therapy at the same dose and duration; the same starting time of rehabilitation is the strength of our study. In addition, the retrospective design of the study made it possible to form two homogeneous groups.

The results of this study show that 15 sessions of physical therapy provide significant functional improvement in patients undergoing physical therapy with BP, and extending the number of physical therapy sessions to 30 sessions does not have an additional effect on functionality. We recommend conducting prospective studies on this subject in the future, in which patients classified according to different disability levels are followed up functionally. Studies involving low-cost, easily accessible mimic therapy, home exercises, and rehabilitation programs reinforced with telerehabilitation applications may be beneficial.

Conflict of Interest

The authors declare that there is not any conflict of interest regarding the publication of this manuscript.

Ethics Committee Permission

Istanbul Health Science University, Kanuni Sultan Süleyman Training and Research Hospital Clinical Research ethics com-mittee approval was obtained before the start of our study (Confirmation number: KAEK/09.12.2021 -2021.12.326).

Authors' Contributions

Concept/Design: BCK, TŞ. Data Collection and/or Processing: TŞ. Data analysis and interpretation: TŞ. Literature Search: BÇK. Drafting manuscript: BÇK. Critical revision of manuscript: BÇK, TŞ. Supervision: BÇK.

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