Effect of Physiotherapy on the Motor Recovery and Improvement in Patients with Facial Palsy

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المستخلص

الهدف: بيان مدى كفاءة طرائق العلاج الطبيعي لتحسين درجة شفاء شلل العصب لوجهيّ المحيطيّ.

المنهجيّة: أنجزت هذه الدراسة في مركز التأهيل الطبّيّ في بغداد للمُدّة من تشرين الثاني ٢٠٠٩ ولغاية آذار ٢٠١٠. تضمّنت هذه الدراسة ٤٠ مريضاً تراوحت أعمارهم من١٣-٥٥ سنة (٢٤ ذكراً و١٦ انثى) يعانون من شلل العصب لوجهي أحادي الجانب لسببٍ غير مُحدّد.تمّ تقييم درجة التضرر والشفاء للعصب الوجهيّ باستعمال نظام House–Brackham Score قبل وبعد استعمال العلاج الطبيعيّ.

النتائج: وضحت النتائج أنّ جلسات العلاج الطبيعيّ ضمّنت التأثير الفعّال للتحفيز الكهربائيّ، التمارين والمساج في علاج شلل العصب لوجهيّ. أعظم استجابة للإناث مقارنة بالذكور للتحسن الكليّ، أعظم استجابة للتحسّن الجزئيّ مقارنة بالتحسّن الكليّ.

التوصيات: ننصح المرضى والمعالجين الطبيعيين بالمتابعة واستعمال جلسات كاملة واستعمال جميع خطوات العلاج التي تتضمن التحفيز الكهربائيّ، المساج والتمارين.

Abstract:

Objectives: The study aims to investigate the efficiency of physiotherapy methods to improve the degree of the clinical recovery of the peripheral facial palsy.

Methodology: This study is carried out at the Rehabilitation Center-Baghdad from November 2009 till March 2010. This study includes (40) patient, their ages are from (13) to (55) years old; (24) male and (16) female with unilateral facial palsy of undetermined cause. House-Brackmann facial recovery scores have been used before and after the physiotherapy treatment.

Results: The results show that the physiotherapy sessions obtained the best effect of the electrical stimulation, exercises and massage in the treatment of facial palsy. Highly respondents in females compared to males in the total improvement, highly respondents in partial recovery compared to total recovery.

Recommendations: The study recommends that the physiotherapists and patients should use the physiotherapy sessions with follow-up that include stimulation, massage and exercises and complete all sessions of treatment.

Keywords: Facial Palsy; Physiotherapy; Electrical Stimulation

Introduction

Facial palsy occurs from nervous input interruption at any of the facial nerve segments [1,2]. This may result in complete or partial paralysis of the facial muscles and may be associated with tasting, salivation and tearing disorders, hyperacusis and hyposthesia of the external auditory canal [3,4]. In about 50% of the population affected by facial palsy, the first and foremost incidence is agnogenic, or Bell's palsy (a complex neuro-muscular facial disorder of unknown etiology commonly affecting the motor neurons of facial muscles receiving their neurological innervations from the seventh cranial nerve (the facial nerve) (Figure 1) [5]. Most patients' symptoms spontaneously resolve however some patients continue to suffer in the long-term. The second cause is trauma. Among others [6], high blood pressure, diabetes mellitus, viruses, pregnancy are deemed conditions [7-9]. The degree of facial nerve recovery depends on patient's age, lesion type, nerve nurturing, neuromuscular involvement and therapy installed [10-11]. Facial nerve injury recovery may take weeks or up to four years [12-13,3]. Facial palsy requires medical, physiotherapeutic, speech and hearing therapeutic approaches [14].

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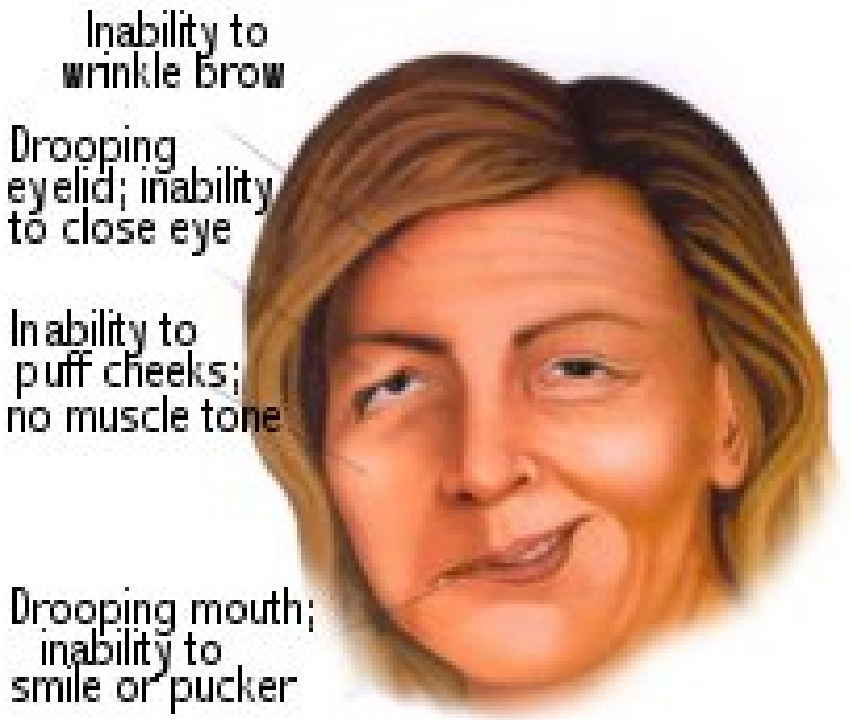

Figure 1. Possible Symptoms of Bell's Palsy

Methodology

This study is carried out at the Rehabilitation Center/ Baghdad during the period from November 2009 till March 2010.This study includes (40) patient, their ages are from (13) to (55) years old; (24) male and (16) female with unilateral facial palsy of undetermined cause. House-Brackmann facial recovery scores (Table1) are used for evaluate before and after the treatment (electrical stimulation, massage and exercise).

Table1. House-Brachmann facial nerve grading scores (House, 1985)

Grade		Defined By
1	Normal	Normal facial function in all areas
2	Mild dysfunction	Slight weakness noticeable only on close inspection. at rest: normal symmetry of forehead, ability to close eye with minimal effort and slight asymmetry, ability to move corners of mouth with maximal effort and slight asymmetry. no synkinesis, contracture or hemi facial spasm.
3	Moderate dysfunction	Obvious but not disfiguring difference between two sides, no functional impairment, noticeable but not severe synkinesis, contracture, or hemi facial spasm. At rest: normal symmetry and tone. motion: slight to no movement or forehead, ability to close eye with maximal effort and obvious asymmetry, ability to move corners of mouth with maximal effort and obvious asymmetry .patients who have obvious but not disfiguring synkinesis ,contracture, or hemi facial spasm are grade 3 regardless of degree of motor activity.

Table 1. (Continued)

4	Moderately severe dysfunction	Obvious weakness or disfiguring asymmetry. At rest: normal symmetry and tone. Motion: no movement of forehead, inability to close eye completely with maximal effort. Patients with synkinesis, mass action, or hemi facial spasm severe enough to interfere with function are grade 4 regardless of motor activity.
5	Severe dysfunction	Only barely perceptible motion. At rest: possible asymmetry with droop of corner of mouth and decreased or absence of nasal labial fold. Motion: no movement of forehead, incomplete closure of eye and only slight movement of lid with maximal effort, slight movement of corner of mouth. synkiness, contracture, and hemi facial spasm usually absent.
6	Total paralysis	Loss of tone; asymmetry, no motion, no synkinsis, contracture, or hemi facial spasm.

Results:

Table 2. Summary of statistics of studied parameters in the two repeated periods distributed in gender

	Gender	**n**	**Mean**	**SD**	**Std. Error Mean**
Partial Improvement	Male	11	2.910	1.220	0.370
	Female	5	4.400	1.340	0.600
Total Improvement	Male	6	5.000	0.000	0.000
	Female	10	5.700	0.480	0.150

n= Number of patients; SD= Standard deviation; Std. error= Standard error

According to score domain, the score where highly respondents in female compared to males (Table 2).

Table 3. Comparison significant of studied parameters between the two repeated periods

Paired Differences of Parameters	Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
partial involvement - partial recovery	3.380	1.410	0.350	2.620	4.130	9.586	15	0.000
total involvement - total recovery	5.630	0.490	0.100	5.420	5.830	55.723	23	0.000

df= Degree of Freedom; SD= Standard deviation; Sig.=Significance; Std. error= Standard error; t=T-test

Table (3) shows the comparison between partial- total involvement and partial -total recovery between the two periods or repeated measurements.

Table 4. Summary of statistics of studied parameters in the two repeated periods

	Samples Statistics	Mean	n	SD	Std. Error Mean
	Partial involvement	4.560	16	0.630	0.160
	Partial recovery	1.190	16	1.470	0.370
	Total involvement	6.000	24	0.000	0.000
	Total recovery	0.380	24	0.490	0.100

n= Number of patients; SD= Standard deviation; Std. error= Standard error

This table represents the summary statistics of the studied parameters according to the mean values and SD, after the physiotherapy treatment.

Table 5. Significant comparison of studied parameters relative to gender

Parameters	Levene's Test for Equality of Variances		t-test for Equality of Means			C.S. P-value
	p	Sig.	t	df	Sig. (2-tailed)	
Partial Improvement	0.018	0.896	-2.200	14	0.045	S P< 0.05
Total Improvement	27.562	0.000	-4.583	9	0.001	HS P<0.01

C.S= Comparative significance; df= Degree of freedom; p=Probability level; P-value= Level of probability at P≤ 0.05; Sig.= Significance; t= T-test

Table (5) shows the significant comparison between the female and male obtained high significance at P<0.01.

Table 6. Summary statistics of studied parameters improvement along the two repeated periods distributed in side

	Side Involvement	n	Mean	SD	Std. Error Mean
Partial Improvement	Right	10	3.700	1.340	0.420
	Left	6	2.830	1.470	0.600
Total Improvement	Right	10	5.300	0.480	0.150
	Left	6	5.670	0.520	0.210

n= Number of patients; SD= Standard deviation; Std. error= Standard error

Table (6) shows the summary of statistics of improvement along the two repeated periods distributed in side.

Table 7. Significant comparison of studied parameters between the two sides

Parameters	Levene's Test for Equality of Variances		t-test for Equality of Means			C.S. P-value
	p	Sig.	t	df	Sig. (2-tailed)	
Partial Improvement	0.000	0.984	1.210	14	0.246	NS P> 0.05
Total Improvement	0.065	0.803	-1.434	14	0.174	NS P>0.05

C.S= Comparative significance; df= Degree of freedom; p=Probability level; P-value= Level of probability at P≤0.05; Sig.= Significance; t= T-test

The total improvements are obtained slightly reverse more changeable than occurred in partial improvements.

Table 8. Summary of statistics of studied parameter of improvements along the two repeated periods Distributed in Age Groups

	Age Groups	n	Mean	SD	Std. Error
Partial Improvement	10 - 19	3	4.000	1.000	0.580
	20 - 29	4	3.250	1.500	0.750
	30 - 39	5	4.200	1.300	0.580
	40 - 49	3	2.330	0.580	0.330
	50 - 60	1	1.000	.	.
Total Improvement	10 - 19	3	5.000	0.000	0.000
	20 - 29	4	5.000	0.000	0.000
	30 - 39	3	5.670	0.580	0.330
	40 - 49	4	5.750	0.500	0.250
	50 - 60	2	6.000	0.000	0.000

n= Number of patients; SD= Standard deviation; Std. error= Standard error

This table indicates the summary of statistics of the studied parameters of partial and total improvements along the two repeated periods distributed in Age Groups.

Table 9. Significant comparison of studied parameters between the age groups

Criteria	Test of Homogeneity of Variances		ANOVA- Test of equality of means	
	Levene Statistic	Sig.	F	Sig.
Partial Improvement	1.605	0.241	2.295	0.124
Total Improvement	6.869	0.005	4.893	0.016(*)

ANOVA= Analysis of variance; F= F-statistics; Sig.=Significance; (*) Sig: at P≤0.05

This table shows that the significant comparison between the partial improvement and total improvement.

Table 10. Multiple significant comparisons of studied parameters after ANOVA by (L.S.D.) between the age groups

Dependent Variable	(I) Age Groups	(J) Age Groups	Sig. P-value
Total Improvement	10 - 19	20-29	1.000
		30-39	0.044(*)
		40-49	0.019(*)
		50-60	0.011(*)
	20 - 29	30-39	0.033(*)
		40-49	0.013(*)
		50-60	0.008(**)
	30 - 39	40-49	0.767
		50-60	0.331

Sig.= Significance; P-value= Level of probability at P≤0.05

This table represents the multiple significant comparisons of studied parameters after ANOVA by (L.S.D.) between the Age Groups.

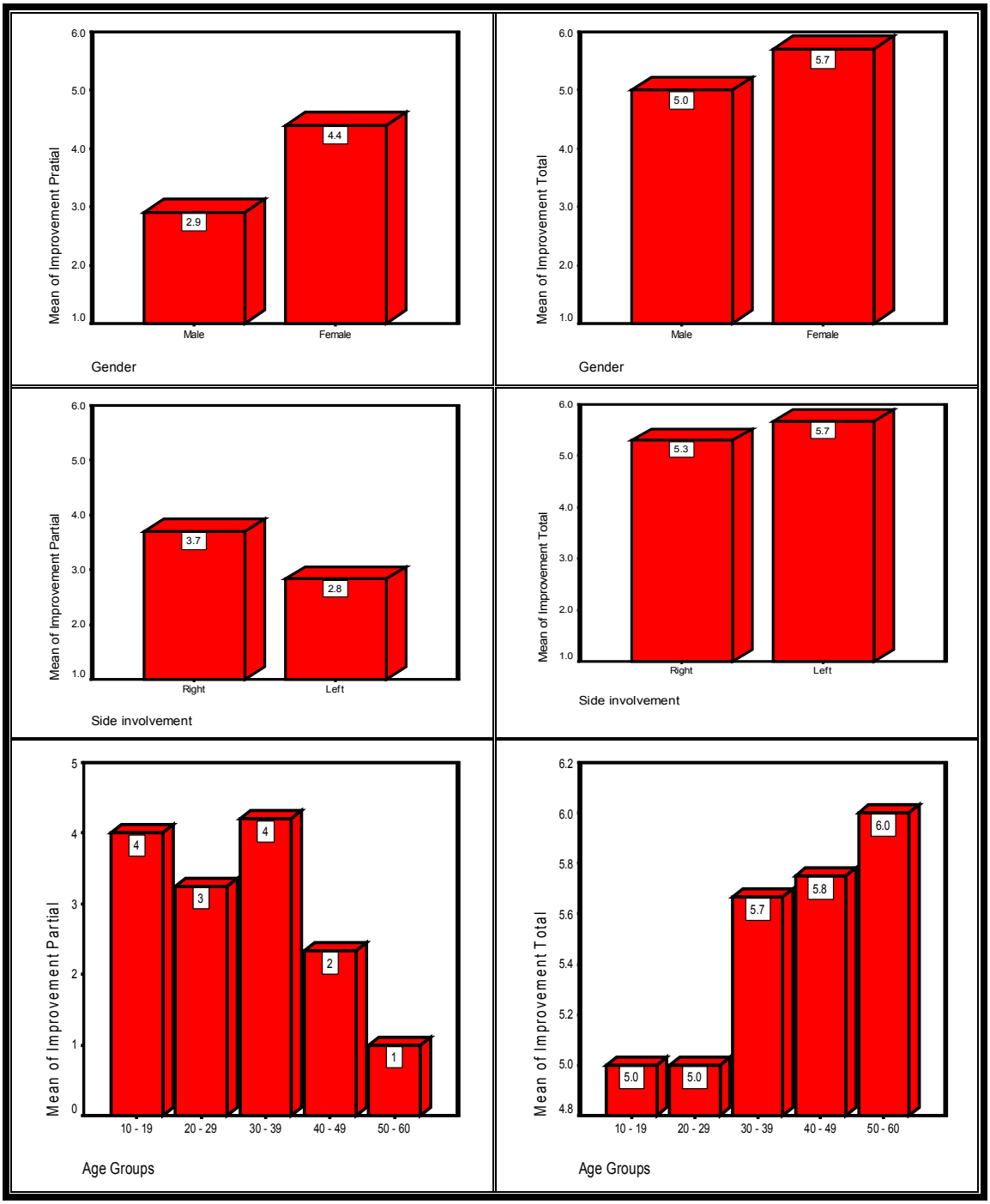

Figure 2. Bar–charts of some related variables to the mean values of improvements for partial and total dysfunction

Discussion:

Throughout our study, the results show that according to score domain (Table 2), the mean score where highly respondents in female (mean=4.400, S.D=1.340) compared to male (Mean= 2.910, S.D=1.220), in the total improvement, (6 males and 10 females) the results also show that the same respondents with despite slight increase in female (5.7, S.D=0.480) compared with male (Mean=5.000, S.D=0.000). These results found in this study are in agreement with the study by Valenca and others (2001), who observed that there was a predominance of females (28) case (60%) had a total motor improvement after physiotherapy treatment [4].

In table (3) the results are so highly significant at P<0.001 which indicate that the physiotherapy sessions obtained the best effect of these resources (electrical stimulation, exercises and massage) this finding is similar to Ljostad study (2005), who reported from (178) case with facial palsy that the clinical impairment measures decreased 28.7±8.1 points (significant P=0.0005) after six months of physiotherapy [(11)].

Table (4) represents the summary of statistics of the studied parameters according to the mean values and SD, after the physiotherapy treatment. The results demonstrate the mean score =4.560 in partial involvement compared to mean value =6.000 in total involvement while the results show that the mean score=1.190 highly respondents in partial recovery compared to mean value=0.380 in the total recovery this findings show that these patients with partial recovery end up with significant cosmetic or functional sequel such as oral dysfunction, muscle contracture, synkinesis and hemi-facial spasm, these results are in agreement with Gronin study (2003), who conducted that from his study, approximately one third of the patients treated with neuro-muscular facial retraining ends up with significant cosmetic or functional squeals [(16)].

Table (5) show that the significant comparison between the female and male obtains highly significance at P<0.01 with the positive side in female followed with significant partial improvement at P<0.05 with the same mentioned positive side (female). This results was in agreement with Wolf (1998) who registered a comparative study showed a higher rate of the total improvement in females (58%) compared to males (41.7%)[(17)].

Table (6) shows the summary of statistics of improvement along the two repeated periods distributed in side, the mean score highly respondents in the total improvement at the left side involvement (Mean =5.670, SD=0.520) compared to (M=2.830, SD=1.470) in the partial improvement. The total improvements are obtained slightly reverse of more changeable than those occurred in partial that related to the small changeability in the total scale i.e., small changeability in total considered high changes in partial (Table 7). This findings is similar to Targan study (2000) who observed that there were a high rate of improvement in patients with left side involvement (22 cases 95.7%) in comparison to 12 cases (52.2%) who had their right side involvement treated with a long-term electrical stimulation [(18)].

In addition to that dispersion indicators shows highly grades in the partial improvements clearly compared with that obtained in the total improvement (Table 8).

Table (9) shows that the significant comparison between the partial improvement and total improvement. The results showed that the total improvement obtained high significance P<0.05 compared to the partial improvement these findings are in agreement with study by Nakamura and others (2003) in which the frequency of the facial palsy improvement varies from (62%) (Partial improvement) to (93%) (Total improvement) after Bio-feedback rehabilitation [(19)].

In our study we find that Table (10) represents the age groups after ANOVA by (LSD), that total improvement recorded at P<0.01 at age groups from (10-19) and (20-29) age group., This finding is similar to Elliott study (2006), who observed that there was a predominance of the total improvement (14) case (60.9%), there average age was of (22.2) years old (SD=16.5) during six months of electrical currents treatment [(20)].

Recommendations:

1. Many resources used in the physiotherapy for patients with facial palsy cause neuromotor recoveries. So, we need studies that show the actual effectiveness of these resources (electrical stimulation, exercises and massage).
2. Recovery of complete lesion is prevented because of synkinesis, it may be related to physiotherapy being applied without follow-up and electro-stimulation. So, we recommend using the physiotherapy sessions with follow-up using all steps of treatment (stimulation, massage and exercises).

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