



CHRONIC BELL'S PALSY LITERATURE REVIEW AND CASE REPORT: ARE THERE ANY REHABILITATION STRATEGIES AVAILABLE?

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Bell's palsy, or idiopathic peripheral facial nerve palsy is a neurologic condition characterized by unilateral weakness of facial muscles. The evidence-based guidelines mostly consider the acute treatment of Bell's palsy. However, chronic cases of Bell's palsy are not supported by strong evidence regarding treatment options, except for a weak recommendation to utilize physical therapy. This case report has presented an application of a combination of physical therapy modalities (Mirror Book Therapy, High Intensity Laser Therapy, and Acupuncture) within 10 weeks, to treat a patient with long-term sequelae. This combination of therapies has resulted in a significant improvement in the level of recovery measured by facial grading scales. However, further research is necessary to provide stronger evidence regarding the benefits of this treatment option.

Keywords: BELL'S PALSY, LASER THERAPIES, ACUPUNCTURE TREATMENT, MIRROR THERAPY

INTRODUCTION

Peripheral facial nerve palsy refers to a lower motor neuron lesion of the facial nerve and is considered the most common mononeuropathy (1). In most cases (60-75%) it is idiopathic and is then referred to as Bell's palsy. The remaining 25-40% of cases have a known cause such as viral aetiology, Lyme disease, postsurgical complication, nerve compression, neurological conditions, traumatic injury, or rare genetic syndromes (1).

The symptoms that may range from a minimum paresis to the complete paralysis develop within few hours and are usually at their maximum within 48 to 72

hours. Most patients with Bell's palsy recover fully while approximately 30% of the patients develop long-term sequelae such as facial spasm, synkinesis, muscle contracture, tinnitus, or facial asymmetry (2, 3). These long-term sequelae are linked not only to physical impairments, but also psychological and sociological difficulties resulting in the reduced quality of life (4). Therefore, the imperative in the Bell's palsy treatment is early diagnosis, intervention, and prevention of long-term sequelae.

According to the most recent clinical guidelines, the treatment for the acute Bell's palsy is well established and primarily focused on the pharmacological treatment including the corticosteroid and antiviral therapy implemented within 72 hours. Physical therapy including exercises and electrostimulation is not recommended in the acute phase due to the lack of good quality evidence. No recommendations could be made considering the effectiveness of acupuncture. Further, the facial nerve decompression is also not proven to be beneficial in the acute Bell's palsy (Table 1.) (5-8).

When it comes to the chronic Bell's palsy there are no official clinical guidelines, although there are some recommendations based on the weak evidence that exercise physical therapy might be beneficial (Table 1.) (5, 6). Therefore, since present scientific literature is lacking high quality evidence regarding the effectiveness of physical therapy treatment options of the chronic Bell's palsy cases, the specialists are left scares with evidence-based rehabilitation strategies. So, the treatment of the chronic Bell's palsy is based solely on the rehabilitation specialists' experience, skills, and resources, to choose and apply most suitable treatment strategies for the patient.

Considering our patient presented with symptoms of the prolonged sequelae of Bell's palsy, in which therapeutic options are limited, we decided to combine three treatment modalities (acupuncture, High Intensity Laser Therapy and mirror book therapy) each with its own possible beneficial effects in the treatment of peripheral facial paresis. We are unaware of any such therapeutic combination used in a patient with sequelae of Bell's palsy in up-to-date literature.

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Table 1.
Summary of clinical guidelines recommendations for physical therapy management of Bell's palsy.

Treatment recommendation	Acupuncture	Laser therapy	Mirror book therapy	Physical therapy	Electrotherapy
Clinical guidelines					
Fieux et al. 2020*	Not recommended for acute Bell's palsy (Grade C)	NA	NA	Contraindicated -forced exercises (chewing gum and biofeedback) for acute Bell's palsy Recommended in severe or persisting beyond the first month Bell's palsy (expert opinion)	Contraindicated for acute Bell's palsy (expert opinion)
De Almeida et al. 2014**	NA	NA	NA	Not recommended for acute Bell's palsy (very low level of confidence). Recommended for persistent Bell's palsy (very low level of confidence)	Not recommended for acute Bell's palsy (very low level of confidence)
Baugh et al. 2013**	No recommendation for acute Bell's palsy (low level of confidence)	NA	NA	No recommendation for acute Bell's palsy (low level of confidence)	No recommendation for acute Bell's palsy (low level of confidence)

*Low overall quality of guideline according to AGREE II; **High overall quality of guideline according to AGREE II; NA - Not Applicable

CASE REPORT

A 30-year-old male presented at a private rehabilitation clinic in Split, Croatia, 18 months after the first symptoms of the severe right sided Bell's Palsy. Although patient underwent corticosteroid therapy as well as multiple two-week cycles of the conventional physical therapy during one-year period, minimum recovery effect has been achieved. Physical therapy included in front of the mirror facial exercises, chewing gum and electrostimulation. Patient complained on the left side synkinesis, facial stiffness and tearing of the right eye. During the clinical examination, he could not wrinkle the right side of forehead, or raise the right eyebrow, and the right mouth corner was lowered. He could close his right eye but had a significant synkinesis in the left eye muscles, and spasm of the sternocleidomastoid muscles bilaterally, more prominent on left side (Figure 1). Pre-treatment, House-Brackmann scale was 4/6, Sunnybrook Facial Grading System result was 24/100, and Facial Disability Index was 43/200.

Since the conventional therapy did not have any effect and the patient still had a moderate facial paresis, to diminish the long term sequelae, we have decided to apply an alternative, multimodal treatment approach which included acupuncture, HILT, and a mirror book therapy. The treatment goal was to incre-

ase the facial muscle function, diminish the synkinesis and to increase the blood flow to the affected tissues, increasing the amount of oxygen available to the damaged hypoxic tissues to stimulate recovery. In this way, we tried to stimulate the recovery of the muscular and neural structures affected. The improvement of psychosocial aspects of the chronic facial palsy was also anticipated.

Local acupuncture points used on the affected side were ST 2, ST 4, ST 6, ST 7, TE 17, Ex-HN5, PC 5, PC 6, HT 7, LR 2, LR 3, GV 20, GV 24, Ex-HN3, and CV 24; while peripheral acupuncture points ST 36, LI 4, LI 10, and GB 14, were needled bilaterally. The treatment was performed three times a week for 4 weeks, continuing with two times a week for 6 weeks.

HILT device used in our case study was BTL-6000 HIGH INTENSITY LASER 12 W with following options: wavelength 1,064 nm, power 7 W, dosage 80 J/cm², area 10 cm². HILT laser was applied using 30 mm spacer with back-and-forth skin contact along the facial nerve branches. HILT laser was used three times a week for 3 weeks, continuing with two times a week for 5 weeks.

To address a chronic case of facial palsy, we developed our version of the mirror book therapy named FACE-UP, based on the mirror box developed

by Ramachandran to treat the phantom limb pain and paralysis (9). FACE-UP bi-fold mirror has following dimensions, 20x40x70 cm and it is made of a high-quality acrylic. FACE-UP was placed vertically on a hard, stable surface at an angle of 90° to prevent any distortions to the reflection and allow the display of virtual images of the patient's face in the frontal and sagittal planes. In this case the damage to the lower right motoneuron has affected the right side, so we placed FACE-UP in a way that the patient sees the left side of his face duplicated symmetrically. The therapy protocol also included gentle facial facilitations based on the Bobath therapy method, buccal massage, imitation training, facial expression exercises and diction exercises. The treatment lasted for 60 minutes and has been conducted twice a week for 7 weeks. Before engaging in the exercise, the patient was asked if he could maintain focus in the double-reflected image in the sagittal part of FACE-UP. The patient was instructed to perform the movements voluntarily under the supervision of the certified mirror therapist, which allowed the patient to form the exercise in a self-disciplined manner. It is believed that while observing performance of exercises with healthy side, the activity of the patient's motor pathways stimulates neuroplasticity.

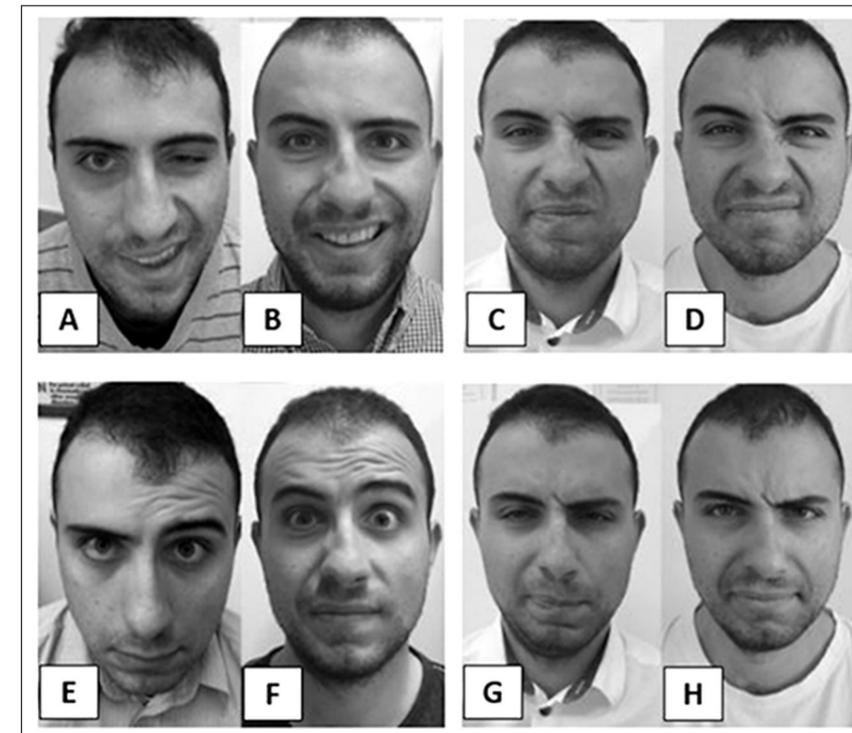


Figure 1.
Clinical presentation of a patient with the chronic Bell's palsy before and after 10 week treatment.

A) Presents the patient before the treatment while smiling during which the reflex closure of the eyelid is evident. Also, the inactivity in the area of m. zygomaticus minor et major, m. orbicularis oris and m. buccinator is obvious. B) Presents the patient after 10 weeks of continuous therapy while smiling, with a significant improvement. Further, disappearance of synkinesis, with a fully open eyelid and the activation of the previously mentioned muscle groups is visible. C) Presents the patient before the treatment while attempting to wrinkle the nose. The incomplete activation of the m. levator labii superioris alaeque and excessive muscle strength of m. orbicularis oris is evident. D) Presents the patient with significantly better activation of the m. levator labii superioris alaeque with softer movement in the lip area, but also activation of the m. frontalis as a synergist in this movement, after 10 weeks of continuous therapy. E) Presents the patient before the treatment while performing the eyebrow raising during which a complete lack of muscular activation of the m. frontalis on the affected side of the face is visible. F) Presents a normal movement with full activation of the m. frontalis as well as the synergist m. levator labii superioris alaeque bill. after 10 weeks of continuous therapy. G) Presents the patient before the treatment while performing the frowning and eyebrow contraction during which the incomplete activation of the m. frontalis and m. orbicularis oculi with accompanying synkinesis in the lower part of the face is visible. H) Presents a normal movement with an improvement in the activation of m. frontalis in its medial part as well as the synergist m. levator labii superioris alaeque bill. and m. orbicularis oris, after 10 weeks of continuous therapy.

After the completion of this combined physical therapy protocol, a significant clinical improvement was noticed. Patient had a normal symmetry and a muscle tone in the resting position with mild muscle weakness and slight mouth corner asymmetry on exertion, as well as the minimal asymmetry on active wrinkling of the forehead (Figure 1). House-Brackmann scale was 2/6, Sunnybrook Facial Grading System result was 71/100, and Facial Disability Index was graded 173/200.

DISCUSSION

Even though most patients with Bell's palsy recover fully, there are still many cases of patients that develop a long-term sequela. It brings about not only physical impairments, but also psychological and sociological difficulties. Incomplete recovery affects both self-esteem and life quality (10). In this case, the patient has developed a long-term Bell's palsy sequela that has significantly affected his daily functioning and well-being. The combination of HILT, acupuncture and

mirror book therapy has shown significant improvement in recovery as well as self-esteem and social functioning of our patient. Moreover, this case report has shown that this combination of methods has provided a significant improvement in a short period even though it began 18 months after the onset of symptoms.

Our Institute of Physical Medicine and Rehabilitation with Rheumatology, Clinical Hospital Centre Split has a long tradition of acute Bell's palsy treatment with conventional physical therapy modalities. Physical therapy for acute Bell's palsy is performed on daily basis in our Institution although according to the international guidelines it is not recommended due to the scarce evidence of its efficacy (Table 1). Scarce evidence of physical therapy efficacy in the treatment of Bell's palsy can be attributed to a small sample size in RCTs and heterogeneous study population due to the possibility of the inadequate diagnosis of Bell's palsy when there might be an underlying cause. Classically, electrostimulation, galvanic currents, paraffin, and mimic exercise performed in front of the mirror are applied in every acute Bell's palsy patient with mostly good results. However, the efficacy of physical therapy is difficult to assess due to a high rate of spontaneous recoveries within 6 weeks to 3 months (1). Treating chronic Bell's palsy still poses a clinical challenge. Therefore, our group of the rehabilitation specialists skilled in performing acupuncture and laser therapy, and physiotherapists skilled in performing mirror and Bobath therapy decided to take a new approach to the chronic Bell's palsy treatment.

According to the meta-analysis from 2019 that comprised randomised control trials (RCTs) regarding the effectiveness of acupuncture in comparison to other treatments, it is considered to be an effective treatment for Bell's palsy (11). Moreover, these RCTs have considered the recovery rates of early stage (within one month) Bell's palsy, and it has shown that acupuncture had better outcomes than oral medications or topical injection. However, it is important to consider the high rates of spontaneous recovery of Bell's Palsy when observing these re-

sults. Furthermore, a systematic review from 2015 has included RCTs with a wider range of symptoms duration, from 1 day to 6 months. It has found a greater prevalence of total effective response rate in acupuncture when compared to other therapy interventions (12). Also, an RCT from a 2015 study has suggested that acupuncture is also effective in the long-term Bell's palsy cases. However, the results of these studies are to be considered carefully due to the methodological flaws, including heterogeneity of the reviewed studies in the meta-analysis and systematic review, and poor choice of control group in the RCT (11-13).

Although there is a high rate of spontaneous recovery in Bell's palsy, we believe it should be encouraged by effective physical therapy modalities. There is some evidence that adverse consequences of Bell's palsy could be preventable if the patients had received complementary treatment to conventional therapy with laser within 15 days of the diagnosis (14). Therefore, the laser provides an excellent passive addition to the therapy since it improves the recovery from facial palsy while eliminating the possibility of side effects caused by corticosteroids. Moreover, it reduces the remaining impairments which would otherwise be treated with conventional therapy. Also, this therapy modality is safe for patients who cannot be given corticosteroids and still provide similar or better results (15). Laser therapy has a favorable prognosis in the regeneration of peripheral nerves in both neurosensory and neuromotor deficits. Moreover, the High Intensity Laser Therapy (HILT) combined with massage and exercises has been proven as a more effective therapeutic modality when compared to the low level laser therapy LLLT combined with massage and exercises, and when compared to massage, exercises, and sham laser (14-16). However, the studies on the efficiency of HILT are scarce and further research is needed to confirm these findings.

Further, the mirror book therapy (referred as FACE-UP in this case report) has been suggested as an efficient addition to facial nerve palsy rehabilitation since it significantly improves outcomes in the treatment of idiopathic facial palsy.

It was proven to affect the improvement of resting posture, voluntary movement, and synkinesis in Bell's palsy. Moreover, the mirror book therapy has shown to provide a positive psychological support and additional motivation to perform the exercises at home (17). The most recent study on the effectiveness of the mirror book therapy from 2020 observed the comparison between the group with included mirror book therapy within conventional rehabilitation and the group with conventional therapy only. In the mirror book therapy group, the average period between appearance of facial palsy and initiation of the physical therapy treatment was 21.5 months. Therefore, this study has shown that the mirror book therapy does improve the results of conventional rehabilitation for a long-term Bell's Palsy (17). The results of this study can be confirmed by a previously undertaken systematic review from 2011 that included RCTs that observed the effectiveness of the use of mirror feedback (regular mirror, not bifold) while undertaking physical therapy exercises. It observed both studies with acute and chronic Bell's palsy (18). When compared to previous applications of mirror book therapy for facial palsy, our version has combined the facilitations based on the Bobath method and the buccal massage combined with exercises and dictation exercises when compared to exercises alone. Also, when compared to the previous mirror designs, our mirror is larger to avoid the need to hold the mirror by hands or by putting it on a taller table, so it is more stable and appropriate for the patients irrelevant of their height. However, the studies on the efficiency of mirror book therapy for Bell's palsy are scarce and further research in a form of RCT is needed to confirm these findings.

Since there are no clinical guidelines for the treatment of chronic Bell's palsy nor high-quality evidence of physical therapy efficacy, when choosing proper treatment strategies, we still must rely on our knowledge, skills, and clinical experience as well as the needs of the patients. We strongly believe that the individually tailored physical therapy comprised of acupuncture, HILT, and mirror book therapy (FACE UP) could make a

difference. However, to prove the efficacy of these methods, the high quality RCTs are necessary.

CONCLUSION

Based on the outcomes observed in this case report, a combined physical therapy protocol including acupuncture, HILT, and mirror book therapy, has shown to be an effective treatment for the chronic Bell's palsy sequelae in this case. Further RCTs with large sample size for each method or their combinations are needed to confirm the efficacy of presented therapy modalities in the treatment of chronic Bell's palsy.

Abbreviations:

RCT - Randomised Controlled Trial
HILT - High Intensity Laser Therapy
LLLT - Low Intensity Laser Therapy

NOVČANA POTPORA/FUNDING
Nema/None

ETIČKO ODOBRENJE/ETHICAL APPROVAL
Nije potrebno/None

SUKOB INTERESA/CONFLICT OF INTEREST
Autori su popunili the *Unified Competing Interest form* na www.icmje.org/coi_disclosure.pdf (dostupno na zahtjev) obrazac i izjavljuju: nemaju potporu niti jedne organizacije za objavljeni rad; nemaju financijsku potporu niti jedne organizacije koja bi mogla imati interes za objavu ovog rada u posljednje 3 godine; nemaju drugih veza ili aktivnosti koje bi mogle utjecati na objavljeni rad./ *All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.*

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Sažetak

PRIKAZ SLUČAJA KRONIČNE BELLOVE PAREZE: KOJE SU MOGUĆNOSTI REHABILITACIJE?

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Bellova pareza ili periferna idiopatska pareza facijalisa, neurološko je stanje koju karakterizira jednostrana slabost mišića lica. Smjernice za liječenje su uglavnom utemeljene na dokazima o preporukama za liječenje akutnih stadija Bellove pareze. Međutim, kronični slučajevi Bellove pareze nisu potkrijepljeni dovoljno snažnim dokazima o mogućnostima liječenja, osim slabe preporuke u smjeru primjene terapijskih vježbi. Ovaj prikaz slučaja predstavlja primjenu kombinacije modaliteta fizikalne terapije (akupunktura, laser visokog intenziteta i terapija zrcalom) unutar 10 tjedana, za liječenje bolesnika s dugotrajnim posljedicama Bellove pareze. Ova kombinacija terapija rezultirala je značajnim poboljšanjem razine oporavka mjereno kliničkim ljestvicama. Međutim, potrebna su daljnja istraživanja kako bi se pružili snažniji dokazi o prednostima ove kombinacije terapija.

Ključne riječi: BELLOVA PAREZA, TERAPIJA LASEROM, AKUPUNKTURA, TERAPIJA ZRCALOM

Primljeno/Received: 27. 2. 2022.
Prihvaćeno/Accepted: 11. 4. 2022.