



e-ISSN:2582-7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 7, July 2024



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.521



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Physiotherapy Intervention in Bell's Palsy: A Case Study of a 34-Year-Old Female Patient

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ABSTRACT: Bell's Palsy is a neurological condition involving Cranial Nerve VII characterized by facial drooping and weakness. This is a fictitious case study for educational purposes on Bell's Palsy involving a 34-year old women, Shilpa, who was referred to physiotherapy (PT). The patient reported primary complaints of difficulty drinking without spilling on herself or drooling, headache, pain in her right jaw, trouble speaking clearly and right eye dryness. Cranial Nerve VII examination findings found right sided facial droop and drooping at the corner of her right eye and right side of her mouth. The PT intervention included education, facial muscle strengthening exercise, eye protection exercises, modalities and acupuncture. Referrals were made to an optometrist and a speech language pathologist. Following PT intervention, Shilpa increased her facial muscle strength, with a near complete recovery at 6 months, and was discharged from PT. In the future, more high quality research and evidence is needed to support the role of PT in treating Bell's Palsy.

I. INTRODUCTION

Bell's Palsy is an idiopathic condition caused by a dysfunction in Cranial Nerve VII (CN VII), also known as the Facial Nerve[1] . CN VII has motor, sensory and parasympathetic components. CN VII innervates the muscles of facial expression, sensory for taste to the anterior 2/3 of the tongue and parasympathetic innervation to the lacrimal gland (tear duct) and most of the salivary glands. Factors that may increase the risk of Bell's Palsy are diabetes, high blood pressure, toxins, infections (herpes simplex virus 1 (HSV 1), human immunodeficiency virus (HIV), shingles/chickenpox, Lyme Disease, Epstein-Barr Virus and ischemia[2] [3]. Bell's Palsy can occur at any age, but it is most common between 15-60 years of age, and is believed to be a possible reaction to a viral infection that causes inflammation and swelling to CN VII[4]. Many studies support the use of corticosteroids and eye care to improve the symptoms of Bell's Palsy[5][6]. However, the evidence supporting PT treatment is less conclusive. There is some evidence that facial muscle exercises can decrease the recovery time but there is a lack of high-quality evidence[6]. This case study describes a patient with Bell's Palsy who presents with moderate-severe symptoms of facial drooping and weakness on the right side leading to difficulties with drinking, speaking and controlling the muscles of facial expression. This report aims to describe methods for testing and managing Bell's Palsy and help physiotherapist create a treatment plan in the absence of high-quality evidence.

II. PATIENT CHARACTERISTICS

Shilpa is a 34 year old female who works as a secretary at a law firm and spends 80% of the day sitting in front of a computer screen. She is a mother of a 5-year old daughter and her husband works as a fireman. She was taken to the hospital after her husband thought she was having a stroke due to a right-sided facial droop. The doctors ruled out stroke as a possible option and diagnosed her with Bell's Palsy. A positive HSV1 test and a previous diagnosis of high blood pressure and diabetes helped establish the diagnosis^{[7][8]}. Shilpa was prescribed corticosteroids to reduce inflammation and swelling as well as ibuprofen for pain as needed^{[9][10]}. The doctor recommended PT for her right sided facial weakness. As a result of her symptoms, Shilpa complains of trouble with speaking and drinking. Eye dryness has also made it difficult for her to look at a computer screen for extended periods of time.

III. EXAMINATION FINDINGS

Subjective

•**Patient Profile:** 34 y/o female. **Present Illness:** Patient presented to the hospital two days ago with facial drooping on the right side. Upon examination she was given a diagnosis of Bell's Palsy which may be linked



to a positive HSV1 test^[11]. A diagnostic electromyography (EMG) test of the facial muscles confirmed the diagnosis^{[12][13]}.

- **Past Medical History:** Type 2 diabetes and hypertension.
- **Medications:** Thiazide diuretics^[14], metformin^[15], corticosteroids.
- **Health Habits:** Non-smoker, three glasses of wine per week.
- **Social History:** Works as a secretary at a local law firm. Lives with her husband who is employed as fireman, and one daughter in a 2-story home.
- **Patient complaints:** Complains of difficulty drinking without spilling on herself and drooling, headache and pain at back of right jaw. She also reports trouble speaking clearly, which makes it difficult to speak to clients on the phone at work. Complains of dry right eye that worsens over the workday while looking at a computer screen^[12].

Objective

Observation: Facial droop on right side, drooping at corner of right eye and right side of the mouth

CN VII Testing:

Side of Face	Lift corner of mouth	Raise eyebrow	Pucker lips	Squint	Scrunch face	Open mouth	Total
Left side	Complete	Complete	Complete	Complete	Complete	Complete	6/6
Right side	Incomplete	Incomplete	Complete	Incomplete	Incomplete	Complete	2/6

- **Sensation testing:** Taste to anterior 2/3 of tongue intact (Test: cotton swab dipped in salt vs sugar)^[16]
- **Outcome measure:**
 - Visual Analogue Scale (VAS) for right jaw pain
 - At rest: 3/10
 - After eating or speaking: 6/10
 - House-Brackmann Facial Nerve Scale: grade 4 (moderately severe)^[17]
- **Functional status:** Speech slightly slurred, noticeable effort when talking
- **Phase of recovery:** Acute (2 days post symptom onset)

IV. CLINICAL IMPRESSION

Physiotherapy Diagnosis

This case presented a patient, Shilpa age 34, with a diagnosis of Bell’s Palsy, who presented with acute right-sided facial muscle weakness and facial droop, dry eye and functional difficulty with speaking and drinking. Her facial weakness is classified as moderately severe on the House-Brackmann facial nerve scale. The patient’s primary concerns were jaw pain, functional difficulties with speaking and drinking and trouble working at the computer due to dry eye.

Prognosis

The prognosis for Bell’s Palsy generally has good outcomes. About 70% of people will completely resolve without any treatment intervention There is some evidence to suggest that treatment with steroid medication within seven days of symptom onset will result in better outcomes for recovery^[19]. It appears that age, gender, side of palsy and comorbidities, such as diabetes mellitus or hypertension, do not influence the prognosis or recovery outcomes of Bell’s Palsy^[20]. However, there is limited and low-quality research in this area. This posed a challenge in confidently communicating a prognosis to Shilpa.



Problem List

Body Structure and Function	Activity	Participation
Pain in right jaw	Unable to drink fluids without spilling	Trouble speaking on the phone at work
Right-sided muscle weakness	facial Unable to speak clearly/words are slurred	Unable to work a full day in front of the computer
Headache	Difficulty eating hard/crunchy foods due to jaw pain	Challenges with in-person communication due to trouble making facial expressions
Dry right eye		
Facial droop on right side		
Drooling		

V. INTERVENTION

Patient goals

- Shilpa will improve House-Brackman Facial Nerve Scale to a grade 2 within 8 weeks of initial treatment.
- Shilpa will be able to work on the computer for one hour without feeling discomfort in her right eye within 8 weeks of initial treatment.
- Shilpa will be able to speak for 4 minutes with minimal slurred speech within 4 weeks of initial treatment.

Treatment

Intervention	Frequency	Intensity	Rationale	Additional Notes
Eye closing exercise	5 reps every hour	Active Assisted (if needed)	Improve lubrication of the eye to decrease eye dryness and strengthen the eye lid muscles ^[21] .	Focus on point 5 feet ahead of you on the ground and practice closing eyes fully.
AAROM (smile, eyebrow raise, frown, pucker lips, scrunching face)	10 reps 3 times daily	Isometric hold working up to 10 seconds	Exercises to help strengthen facial muscles ^[22] .	Do exercises in front of mirror for visual feedback. See video examples below.
Neuro-proprioception facilitation techniques. (Physiotherapist provides resistance to various muscles of facial expression).	10 reps 3 times daily	Activate muscles as much as possible.	Exercises to help strengthen facial muscles ^[23] .	This treatment was provided once Shilpa was able to active muscles independently.
Low Level Laser Therapy (LLLT) ^[24]	Once per week	10 J/cm ² for 2 minutes (8	Improve muscle function to assist with drinking and	Completed on opposite days from



			points)	speaking ^[25] .	acupuncture.
Soft Tissue Mobilization (effleurage)	2 times per week	5 minutes (8 points)	Improve circulation of the facial muscles ^[26] .		
Acupuncture	Once per week	10 needles for 30 minutes	Can help to regulate nerve channels, strengthen resistance to pathogenic factors, increase the excitability of the damaged nerve and promote regeneration of the nerve fibers ^[27] .	Completed on opposite days from LLLT.	

Education

Shilpa was educated on her condition, potential prognosis and what PT can provide. Eye care education was also discussed, including wearing an eye patch when sleeping to protect the eye^[28] and taking a 5-10 minute break from looking at a computer every hour to prevent the eye from becoming dry and irritated.

VI. OUTCOME

At the time of initial assessment, it was discussed with Shilpa that the prognosis for Bell’s Palsy is very good and an almost full recovery would be expected at 6 months^{[29] [30]}. Referrals were also made to a speech language pathologist (SLP) and an optometrist. The SLP would assist with her difficulties in speaking while the PT helps work on her muscular strength of the face. An optometrist would provide assistance with eye care, including lubrication of the eye through drops or medications^{[31][30]}.

Initially Shilpa received PT 1-2 times a week until her level of functional disability was decreased such that her CN VII testing score was 4/6 and most of her patient goals were met. When these milestones were achieved, treatment sessions were reduced to biweekly until she scored a grade 2 on the House-Bracken Facial Nerve Scale.

After two months of therapy, Shilpa reported that she had minimal jaw pain (VAS = 0/10 at rest and 2/10 when eating), no issues with speaking, and no resting facial droop. Shilpa had demonstrated significant improvement in CN VII testing results. She completed 5/6 tests on the right side with the squint test remaining incomplete. Shilpa also achieved a grade 2 on the House-Brackmann Facial Nerve Scale. At this time, Shilpa was discharged and encouraged to continue with the facial muscle exercises at home until she was back to her baseline function. Given that Bell’s Palsy has good recovery outcomes, and most cases resolve on their own, it was unnecessary for Shilpa to continue PT until fully recovered.

VII. DISCUSSION

This case study presented a 34-year-old female with an acute onset of Bell’s Palsy causing right sided facial muscle weakness and facial droop, dry right eye and difficulty speaking and drinking. Shilpa received the diagnosis from a medical doctor who prescribed her with corticosteroids and advised her to seek treatment from a physiotherapist. After a full assessment by the physiotherapist, Shilpa received education about the condition and its prognosis. The physiotherapist provided advice to wear an eye patch and to take breaks from the computer to help with her dry eye. Facial muscle strengthening exercises and modalities were provided to help regain normal muscle function.

Evidence

The research around the treatment for Bell’s Palsy shows no significant benefit or harm from PT interventions. Currently, there is some evidence that facial muscle exercises reduces recovery time^[32]. One study showed that there was better improvement on the facial disability scale (self-administered) when LLLT^[24] and facial exercises were combined compared to exercise alone^[33]. It has also been demonstrated that the use of biofeedback when performing facial muscle exercises (by using a mirror, for example) can be beneficial in developing coordinated muscle activity and preventing synkinesis^[34].

However, there is a lack of high-quality evidence which poses a challenge when creating treatment plans for Bell’s Palsy^[35]. Many studies investigating PT as a treatment for Bell’s Palsy have small



sample sizes, short study durations or significant risk of bias in the study design^[35]. Additionally, due to the nature of exercise as an intervention, it is hard to create a placebo control group and thus hard to make conclusive statements on the effect of exercise as an intervention for Bell's Palsy^[35]. Furthermore, evaluating the efficacy of any intervention for Bell's Palsy is especially challenging since ~70% of all cases will resolve spontaneously without any treatment^[35]. This demonstrates the need for more high-quality RTCs and systematic reviews to guide health care providers in making evidence-based treatment plans for patients diagnosed with Bell's Palsy.

There is moderate- to high-quality evidence demonstrating that corticosteroids are an effective treatment for facial nerve paralysis^[35]. Although pharmaceuticals are outside the PT scope of practice, it is important for practitioners to be aware of this so that they can make appropriate referrals to physicians for patients with Bell's Palsy.

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