

## Ramsay Hunt Syndrome: Case Report of a Multifaceted Physical Therapy Intervention

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### Abstract

**Background and purpose:** Ramsay Hunt Syndrome is an uncommon diagnosis that has as part of its presentation unilateral facial paralysis. Functional limitations can include: asymmetric facial expression and difficulty speaking, drinking and eating. The most effective treatment is not clear based on published research. The following case study describes the use of various interventions to assist in facial muscle activation in a patient diagnosed with Ramsay Hunt Syndrome.

**Case description:** A 55 year old female patient presented with right sided facial paralysis two months after diagnosis of Ramsay Hunt Syndrome. The patient received progression of range of motion exercises, neuromuscular re-education, soft tissue mobilization, and trials of electrical stimulation as outlined in the current research. In conjunction, she received instruction and application of kineshetic taping to facilitate and/or inhibit facial muscle activation. The patient was seen for 21 visits over a 14 month time period.

**Outcomes:** House Brackmann grades improved from a grade V to a grade II. Strength increased from 1<sup>-</sup> to 4<sup>+</sup>. Functional improvements included improvements in communication, eating/drinking, and facial symmetry at rest. The patient also reported significant improvement in experienced pain. Presence of watery eye, and synkinesis were still mildly observed.

**Discussion:** Limited research is available regarding the treatment of Ramsay Hunt Syndrome. The combination of interventions described in this report was observed to improve muscle activation, facilitate a decrease in pain, and coincide with an improved House Brackmann grade. Further research should include randomized controlled trials to explore the cause and effect of each treatment.

**Keywords:** Facial paralysis; Electrical stimulation; Kineshetic taping

### Introduction

Research describing physical therapy interventions for patients diagnosed with Ramsay Hunt Syndrome is limited. [1,2]. Ramsay Hunt Syndrome is a rare, devastating diagnosis that involves unilateral peripheral facial paralysis and in some cases vesicular rash on the ear or in the mouth. Physical therapy treatment for facial paralysis includes transcutaneous electrical stimulation, massage, neuromuscular re-education, exercises, and limited accounts of taping [2,3]. Estimates indicate that twenty-five in 100,000 people in the United States are affected with unilateral facial paralysis, 5.7% are diagnosed as suffering from Ramsay Hunt Syndrome [4]. Patients with Ramsay Hunt Syndrome can experience severe paralysis at onset, and are less likely to recover completely when compared to other etiologies of facial paralysis [4,5]. Limitations in facial muscle activation can affect the patient's ability to communicate emotion and speak clearly [6].

The generally accepted cause of Ramsay-Hunt Syndrome is the reactivation of the Varicella Zoster Virus (VZV). The seventh cranial nerve (CNVII) is typically involved due to inflammation of the geniculate ganglion. The VZV infection may also affect CN VIII, IX, V and VI due to the proximity of their pathway alignments in the temporal bone [7]. When CN VII is impaired, unilateral peripheral facial nerve palsy can result in facial paralysis and eye watering. Due to the functions of CN VIII, IX, V and VI, other presenting signs may include: vertigo, tinnitus, hearing loss, and nystagmus [4].

Research has shown mixed outcomes associated with physical therapy for patients diagnosed with facial paralysis. Garanhani reported improvements in initial symptoms after treatment employing

kinesiotherapy [2]. Although specific protocols were not discussed, the physical therapy treatments consisted of combinations of transcutaneous electrical stimulation, massage, neuromuscular re-education, and exercise [2,8]. Flores studied the effects of electrical stimulation and concluded that recovery time was decreased in patients that received faradic electrical stimulation [1]. Brach and Van Swearingen describe defective neuromuscular re-education for these patients to include "accurate facial movement patterns and isolated muscle control", as opposed to mass muscle contraction needed for full expression [9]. Brach and Van Swearingen called for a tailored physical therapy approach that included treatment based on stages of progression. These stages were classified as 1) initiation, 2) facilitation, 3) movement control and 4) relaxation [8,9]. Initiation can be the most frustrating step due to the gross disfigurement and its impact on psychosocial function [8]. Prior to commencing treatment, the Brach and Van Swearingen entreatment approach seemed appropriate for the patient discussed in this report. It should be noted, however, that the ability to generalize Brach and Van Swearingen's results to

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Ramsay Hunt patients was limited since only 3 subjects in their study were diagnosed with Ramsay Hunt Syndrome [9]. Limited outlined interventions and lack of significant outcomes made replicating an evidence-based plan of care challenging for treating our patient with Ramsay Hunt Syndrome.

A less common treatment approach for patients with facial paralysis is the use of kinesthetic taping techniques [3]. Non-elastic tape used as an intervention for facial paralysis has been described by Schrom and Haberman for subjects with paralytic ectropion (lower eyelid droop). Adhesive tape was applied to “bridge” the lower lid along the superior zygomaticus, limitations included a small number of subjects (n=9), only the inferior portion of orbicularis oculi was addressed, and motor function was not considered [3]. Kinesthetic taping is thought to assist in proprioception, muscle facilitation and inhibition [10-13]. Research has shown that kinesthetic tape may correct muscle function by supporting weakened muscles and decreasing pain by neurologic stimulation [10,12]. The literature review for this report found no published research addressing the use of elastic / kinesthetic tape to facilitate facial muscles in cases of facial paralysis.

The purpose of this case report is to describe a course of treatment intended to increase facial muscle activation in a female patient with Ramsay Hunt Syndrome. Changes were identified by: 1) Patient subjective reports, 2) House Brackmann grade, 3) Strength grading adapted from Kendall “zero” to “normal” scale (Table 1), and 4) photographic documentation [6,14,15].

## Case Description

### Patient history

A 55 year old female presented to the physical therapy outpatient clinic two months after a diagnosis of Ramsay Hunt Syndrome. The initial examination revealed pertinent comorbidities that included type II diabetes, hypertension, arteriosclerotic disease, hypothyroidism, and osteoarthritis. Medication and monitoring for diabetes and high blood pressure were reported. Primary patient concerns included functional limitations of blurry vision, inability to say letters/words effortlessly, difficulty containing foods/beverages inside the mouth, difficulty with oral communication, facial tone changes described as “tightness/pain”, and asymmetry of facial tone at rest. Prior level of function was reported as an active social life, no communication deficits, normal facial muscle tone, and regular physical exercise without difficulty.

The patient reported that her condition began as a feeling of vertigo. Interestingly, she was referred for physical therapy early in the progression of the Syndrome. Records from that early intervention show that she denied dizziness, hearing loss or nystagmus. In addition to the early round of physical therapy, other treatment included Acyclovir and Prednisone prescribed by the patient’s neurologist and follow up with the primary care physician.

### Systems review

As outlined in *Guide to PT*, a systems review was performed at initial evaluation [16].

Desired effect	Presentation of muscle group observed	Strength grade**	Interventions of taping and exercise	Repetitions	Frequency per day
Initiate	Asymmetric at rest; very little palpable to no movement against gravity	Zero to trace	PROM to AAROM – gravity assisted position Tape*: activate - origin to insertion. Manual stretching increase circulation, decrease pain	<10 reps	3-4
Facilitate	Slight asymmetry at rest, minimal range of motion with gravity, moderate to full with gravity assisted or eliminated	Poor to fair	AAROM to AROM – gravity assisted to eliminated increasing to against gravity with success Tape: activate - origin to insertion Manual stretching increase circulation, decrease pain	10-20	1-2
Movement control***	Facial symmetry minimally decreased to equal, moderate to full range of motion, synkinesis present	Good	AROM against gravity isolated movement patterns, initiating with effected side and matching. Tape: inhibit -synkinesis insertion to origin and activate as needed Manual stretching of platysma, constant pressure areas of high tone	Quality in reps to fatigue	3-4
Relaxation***	Able to perform full range inconsistently , slight synkinesis	Good to normal	AROM-Visually relax non-effected side attempting to match full range of motion, without synkinesis. Tape: as needed for minor facilitate and or inhibit in combination to desired movement pattern. Manual stretching of non-effected or effected side for pain/soreness management.	<10	1

Intervention algorithm modified from Brach et al table of “Treatment based categories and matched treatment”.<sup>11</sup>

\*Kinesio Tex® kinesthetic elastic taping.

\*\*Adapted and modified from Kendall in describing facial strength grades - “zero” - No contraction observed or palpated; “trace” - Muscle contraction can be palpated to tighten, no observable movement produced; “poor” - Muscle movement with gravity eliminated; unable to activate muscle against gravity; “fair” - Able to contract muscle partially against gravity; “good” - Full range of motion against gravity (we defined as equal to non effected side with cued expression; not found to be consistent with expression in communicating, or synkinesis present); “normal” - Consistently equal to non effected side with full ROM (for our documentation - without synkinesis).<sup>6</sup>

\*\*\* Functional neuromuscular re-education was emphasized -for example, cues such as talking on the phone in front of mirror with attention to symmetrical expression and muscle activation.

Table 1: Intervention Description – taping with exercise progression.

Treatment	Visit # 1-2	Visit # 3	Visit # 4-7	Visit # 8	Visit # 9-13	Visit #14-20	Visit #21
STM*	X	X	X	X	X	X	X
PROM**-AAROM***	X	X	X	X	X	X	X
AAROM - AROM****					X	X	X
E-stim. galvanic^	X						
E-stim. pulsed^^		X					
E-stim. sensory^^^			X				
Kinesio Tex® to facilitate				X	X	X	X
Kinesio Tex® to inhibit						X	X
<i>Self driven services received outside of PT setting (1-2 x a week) :</i>							
Acupuncture				X	X	X	X
Massage therapy							X

\*STM - soft tissue mobilization; \*\* PROM - passive range of motion; \*\*\* AAROM - active assistive range of motion; \*\*\*\* AROM - active range of motion; ^ E-stim - electrical stimulation galvanic current motor threshold (3-10Hz, 40ms on: 200ms off); ^^E-stim - electrical stimulation narrow pulsed current sub motor (100Hz, 20 mA); ^^ E-stim - electrical stimulation transcutaneous (100pps sensory threshold).

**Table 2:** Timeline of Treatment interventions per visit\*.

### Cardiovascular/pulmonary findings

The patient’s blood pressure was 126/66 mmHg, pulse 72 beats/min, and BMI 33.3.

### Integumentary

No visible external vesicles were seen in the patient’s ear or mouth. The tone in the right side of patient’s face was decreased compared to left side giving a sagging appearance.

### Neuromuscular findings

Gross facial asymmetry was observed with right eye lid droop, flaccid jaw, and the corner of mouth turned downward. Sensation was intact to light touch along CN V (ophthalmic, maxillary and mandibular branches) and C1- C3 bilaterally. Upper and lower motor neuron testing was normal in the bilateral upper and lower extremities.

### Musculoskeletal

Expression and movement was limited on right side of the patient’s face. The patient articulated speech with compensations of speaking out of the left side of her mouth and demonstrated difficulty pronouncing the letters / consonant blends “p”, “th”, “f”. Upper and lower extremity range of motion was full, and strength was within normal limits. Gait was found to be unassisted and normal.

### Psychological/social

The patient was alert and oriented to person, place, time, and event. She was well educated and had researched her diagnosis. She was anxious to try new interventions, and was an advocate for her recovery throughout the course of rehabilitation (Table 2). The patient felt frustrated with the lack of facial muscle return she had experienced to the point that we began her care.

### Examination/Tests and Measures

Due to the severity of right sided facial paralysis at rest and limitations in symmetrical facial expression, further testing was performed. Cranial nerve testing was administered. The base line House Brackmann grade was established. A strength grade for each facial muscle was determined [6]. Photographs were taken of the patient’s



**Figure 1:** At initial evaluation, at rest position (left) and with risorius activation (right) - 9 weeks after diagnosis of Ramsay Hunt Syndrome.

face at initial presentation in positions of rest and with attempting expression (Figure 1) [14].

Cranial nerve testing was performed and demonstrated CN VII involvement as evidenced by the inability to smile, frown, show teeth, puff out cheeks, or close the eye completely on the right side of the face. The patient also demonstrated asymmetry in clenching teeth and opening mouth against manual resistance indicating motor fiber involvement of CN V [17,18]. Cranial nerve testing was performed as described by Sullivan [18]. The House Brackmann scale was used throughout course of treatment [15]. The scale is considered to be valid and is accepted by the American Academy of Otolaryngology Head and Neck for grading facial paralysis [19,20]. Concurrent criterion validity of the House Brackmann scale has been demonstrated as moderate (kappa = 0.55). Intra-observer correlations from this scale support reliability (ICC: 0.85, 0.86, and 0.90) and it is generally accepted as a simple and quick assessment tool [19-22]. This patient had become familiar with the House Brackmann scale through her own research and was able to understand her progression as measured by the scale. At the initial visit, the patient’s grade was a Grade V or “severe impairment”. Identifying a baseline for each muscle through facial expression allowed for a more specific approach in determining exercise and progression. Facial muscles were graded using Kendall’s manual muscle testing procedure [6]. Grading of facial strength through expression is on a “zero” to “normal” scale (Table 1) [6]. The patient initially demonstrated “zero” to “trace” for all the facial

Weeks after diagnosis	House Brackmann grade <sup>13</sup>	Strength of facial muscle (Z, T, P, F, G, N)*				Functional improvement report per patient**
		Frontalis	Zygomaticus major	Orbicularis oris	Depressor anguli	
9	V	Z	T	T	T	Difficulty seeing entire eye lash, able to say “p”, “b”, “m”, and “f” with effort.
10-11	V	T	T	T	T	Able to say the word “door” without spittle, notes feeling “smiling” muscles more consistently
12	V-IV	T	T	T	T	Wishes for change in treatment for home use to “increase” facial muscles (start of Kinesio Tex® tape instruction).
13-14	IV	P	P	P	P	New tingling sensation around eye and now able to take large bites of food, still majority of chewing left sided.
17-19	III	F	F	F	F	Able to close eye with forceful wink consistently, at week 19 able to perform reciprocal blinking first time since onset – does note eye watery at times
22	III-II	F	F	F	F	Now able to say “fifty-five thousand” without excess sounds or spittle. Feels 75-80% back to full recovery.
41-48	III-II	G	F	G	G	Now able to apply eyeliner and lipstick without difficulty. Denies difficulty with extra sounds when speaking for work as teacher. Concerns regarding hypertrophy of left side and pulling mouth over with speaking – now limiting left side with tape and increase stretching.
53-66	II	N	G	G	N	Synkinesis starting to become more noticeable, HEP not being performed routinely due to busy work schedule. Tugging, not pain reported – better with platysma stretch. Feels after blocking abnormal movement and performing isolated facial expression facial symmetry improved.
73	II	N	G	G	N	Able to drink out of bottle of water without difficulty, feels 95+/- 2% back to full recovery. Following up with primary physician due to recent death in family and diabetes in need of regulation. Watery eye and synkinesis increases with stress and fatigue, but rare and variable.

\* Z = zero, T= trace, P= poor, F= fair, G = good, N= normal<sup>6</sup>

\*\*Statements taken directly from documentation as per patient report at respective visit

**Table 3:** Outcomes of House Brackmann grade, strength, and subjective findings per week.

muscles and “poor” for the muscles of mastication (Table 3). Photographs were used to document the progression of the course of treatment and to visually track active expression and passive rest. Published literature supports the validity of using photographs to describe facial muscle performance [14,20]. Serial photographs were used to document change in facial tone and strength at rest and to observing facial creases for symmetry during expression. Reliability testing on photographs to capture change has not been found in the literature.

The patient’s subjective functional outcomes were also recorded as informal findings throughout course of rehabilitation. The patient’s report of eating, drinking, speaking without limitations or “extra sounds or spittle”, were set as her personal goals [1].

### Evaluation

The patient presented with right sided facial paralysis from Ramsay Hunt Syndrome with involvement in CN VII and CN V. Diagnosed comorbidities of diabetes mellitus type II, hypertension and obesity were expected to negatively impact the patient’s rate of recovery. The patient was advised regarding referral to dietician and psychosocial counseling

services. Limitations of expressing emotion, eating/drinking, speaking in public, and aesthetic concerns were verbalized by the patient.

### Diagnosis

The patient demonstrated pattern 5D in *The Guide to Physical Therapist Practice*, Impaired motor function and sensory integrity associated with non-progressive disorders of the central nervous system acquired in adolescence or adulthood [16].

### Prognosis

Subjects with Ramsay Hunt Syndrome have a prognosis that is fair to good with regard to the likelihood that treatment and the natural progression of the Syndrome will result in an increased motor activity and facial symmetry. With multiple cranial nerve involvement, patients with Ramsay Hunt Syndrome have been shown to have full recovery rates of only 27.3%, and with single cranial nerve involvement percentage of full recovery can be as high as 67.7% [21].

### Plan of care

The patient was instructed in therapeutic exercises for range of motion progression, soft tissue mobilization to reduce pain and

increase mobility, and patient education related to Ramsey Hunt Syndrome. The patient agreed to trial electrical stimulation for muscle activation and pain management [23,24,25].

Electrical stimulation was tried initially because it is supported by the literature as to examples of positive outcomes and no published evidence of harm has been shown [1,23,25]. The electrical stimulation treatments included a direct current at intensities sufficient to produce a motor response, a pulsed wave form delivered at sub-motor threshold, and transcutaneous electrical stimulation (TNS) for addressing pain (Table 2) [1,23,24]. At visit #8 all electrical stimulation was discontinued due to patient reported skin irritation and lack of facial motor function carry over at home.

A therapeutic exercise progression was employed to promote strength and range of motion. Range of motion techniques were introduced at the initial evaluation in conjunction with other treatment interventions and continued as the patient progressed (Table 2). Due to concerns for synkinesis with large facial expressions, the tailored approach of Brach and Van Swearingen was included in the plan of care (Table 1) [8,9]. The patient was treated with soft tissue mobilization (STM) for pain management, increase circulation, and gentle manual stretching (Table 1) [9].

It is important to report that the patient, outside the direction of the physical therapist and not as a part of the PT plan of care, did receive acupuncture and massage therapy during the physical therapy episode of care (Table 2). The patient exhibited a tendency to search for alternative and additional interventions and expressed a desire to add interventions that might increase muscle activation. She wanted an intervention that could be easily applied as part of her home program and had become aware of kinesthetic taping and asked that we explore it as an option. The patient needed instruction in facial muscle anatomy and application of tape for carry-over to her home exercise program. We agreed to use muscle strength, facial tone, and symmetry at rest and with expression as indicators of effectiveness for all interventions including the taping technique. The patient agreed to the modified plan of care to include kinesthetic taping to assist in facial muscle activation.

Tape was first applied to our patient with the intent to increase muscle contraction in the frontalis and orbicularis oris. To initiate the frontalis, two strips measuring 0.5 inches wide by 2.5 inches long were cut and applied, securing first at the scalp. The frontalis was manually placed on stretch to raise the eye brows (Figure 2). At home, the patient applied the tape and performed the active assisted exercise (eye brow raise) laying supine with slight cervical extension for gravity assisted ROM. Tape for orbicularis oris was cut ¼ inch in a “V” shape. The tape was secured at the corner of the mouth and pulling the top lip/bottom lip into stretch and securing the tape mid line one lip at a time. Assisted “puckering” motion was then performed. Patient was instructed to perform the orbicularis oris exercises in seated forward flexion for gravity assisted ROM. The reason for beginning with frontalis and orbicularis oris was to target the most limiting facial muscles in communicating facial expression.

The same instruction in taping progressed with depressor angulioris and zygomaticus major. Due to the agonist-antagonist relationship and overlapping of facial muscles, the patient was instructed to apply the tape for specific facial expression, remove and reapply for alternating expression.

Tape for limiting painful left side motions when synkinesis presented was also used. Since inhibition was the goal, the insertion to origin application technique was employed.

All taping was combined with exercise progression based on presentation and levels of strength (Table 1) [8,9].

## Outcomes

The patient was first seen 9 weeks after diagnosis of Ramsay Hunt Syndrome. All facial muscles were measured for strength with mimicking expression in each visit and graded (Appendix 4) [6]. The mentalismuscle demonstrated the first progression. Midway through week 10 post-diagnosis (2<sup>nd</sup> week of intervention) its contraction grade progressed from trace to poor. During week 12 (3<sup>rd</sup> week intervention) the House Brackmann score increased from grade V, to grade IV with increase in right nasolabial fold and top lip increase in normal tone (Figure 2). During weeks 17-19, the patient was able to demonstrate a partial range of motion against gravity for zygomaticus major and orbicularis oris.

In some cases two House Brackmann grades were recorded. We chose this recording method when portions of each grade were observed at rest or during gross movement. For example, during week 22 post-diagnosis (week 13 of intervention) the patient did show the majority of facial rest symmetry except for the corner of her mouth and the upper eye lid (Figure 3).

In weeks 29 through 44 post-diagnosis, the patient did have slight to moderate forehead movement, smile approximately 2/3 of full, and had slight side to side difference at the corner of her mouth. Eye closure varied between easily closed to closing with effort depending on how much she had used facial expression throughout the day.

At week 73 post-diagnosis, the depressor angulioris and frontalis were considered normal for strength. We noted at this time that the orbicularis oris movement increased the synkinesis in the orbicularis oculi variably during conversation. The zygomaticus major was graded good for strength at this time (Table 3). The improvements from initial appointment through discharge were evaluated by comparing photographs, and formal facial paralysis grade and strength. The House Brackmann grades improved from a Grade V, to a Grade II (Table 3).

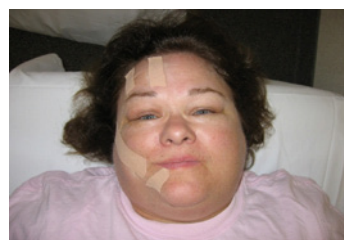


Figure 2: Patient placed supine with tape activating muscle of frontalis, depressor angulioris and zygomaticus with cervical extension, gravity assisted.



Figure 3: Week 22- At rest (left) and with attempting symmetry with zygomaticus (right).

The patient continued to have episodes of right watery eye. These were increased in frequency by general fatigue and amount of speaking during the day. The functional impairments noted at the initial visit all improved by the final visit (Table 3).

## Discussion

Ramsay Hunt Syndrome is a rare diagnosis. The research supporting treatment interventions is often conflicting [1,2,9,23,24,25]. Our patient, suffering from Ramsey Hunt Syndrome, began physical therapy with significant social, functional and aesthetic limitations. The multi-faceted physical therapy plan of care, patient generated alternative treatments, and the normal progression of the Syndrome all coalesced to result in an episode of care that was safe, produced good outcomes and provided the patient with direct control over facial muscle function.

The expected likelihood of a full recovery of facial muscle control in a patient diagnosed with Ramsay Hunt Syndrome is 27.3% to 67.3%. Sixteen percent of these patients are expected to still have episodes of synkinesis and watery eye [4,23]. The patient described in this case report demonstrated a near full recovery of facial muscle function. Watery eye and synkinesis were reported as occurring infrequently and of a mild nature by the end of the episode of care. These associated symptoms were always related to fatigue or stress. The patient reported improvements in eating, drinking, speaking, rest symmetry and socially "felt like being in public".

It is interesting to consider our use of taping in this case. There is published research supporting kinesthetic taping for muscle and proprioception improvements in large muscle groups, but no research has been found addressing kinesthetic taping to treat facial muscles in cases of facial paralysis [2,10,11,12,13]. Our patient was instructed to use a combined Kinesio Tex<sup>®</sup> taping and facial exercises as outlined by Brach and Van Swearingen [8] to increase facial muscle activation. Since the outcomes with this patient were positive, future investigations evaluating kinesthetic taping for low functioning facial muscles seems indicated.

Strength grade through mimicking expression as described by Kendall was beneficial to identify specific muscle groups needing intervention [6]. The repeated facial expressions identified weakness and at times produced synkinetic movement patterns that were then addressed.

The concurrent treatments of acupuncture, massage therapy, soft tissue mobilization, range of motion exercises, neuromuscular re-education and taping all may have made contributions to the improved outcomes. Further randomized controlled studies are needed to evaluate the degree to which any of these interventions might play a positive role in treatment for patients with facial paralysis.

The purpose of this case report was to demonstrate multi-faceted physical therapy plan of care for the treatment of facial muscle paralysis in a patient diagnosed with Ramsey Hunt Syndrome. This treatment program and the course of the syndrome progression resulted in outcomes of improved House Brackmann grade, facial muscle strength, visualized improvements through photographs and most importantly functional and social gains.

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