

## Evaluation of Facial Synkinesis With Applied Blink Reflex Test

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Blink reflex could be a useful tool to differentiate facial synkinesis as one of complications of facial neuropathy, from volitional associated movements. We had performed applied blink reflex test for 23 patients with objective evidence of hemifacial weakness in which orbicularis oculi muscle(zygomatic branch) and mentalis muscle(mandibular branch) are electrophysiologically evaluated in response to supraorbital stimulation of trigeminal nerve. For an unaffected side of face there is no evidence of positive blink reflex from the mentalis muscle. We concluded that a positive blink reflex from mentalis muscle is almost always suggestive of chronic facial neuropathy even in clinical silence of facial synkinesis, or an aberrant reinnervation after peripheral facial neuropathy, and does not electrophysiologically correlate with the severity of facial palsy.

**Key Words:** Synkinesis, Blink reflex test, Facial neuropathy

(facial synkinesis) (mandibular branch) (hemifacial spasm) 가 (mentalis muscle) 가

(orbicularis oculi muscle), (orbicularis oris muscle), (platysma muscle)

가 , 가 . 1 60 10 , 12 (Table 1). 2. Sweep speed 10 ms/div, 0.2 mV/div, 20 Hz, 10,000 Hz, duration 200  $\mu$ s , 5 : 1) (unaffected side of face)

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**Table 1.** Data of facial neuropathies with applied blink reflex test

No.	LATENCY (NL: 3.08ms)		CMAP (NL: 1.1mV)		RIGHT ORBICULARIS OCULI		RIGHT MENTALIS		LEFT ORBICULARIS OCULI		LEFT MENTALIS		DIAGNOSIS	
	R	L	R	L	R1r (11.9ms)	R2r (38.9ms)	R2f (39.1ms)	R1mr	R2mr	R1l	R2l	R1ml		R2ml
1	2.4	2.4	1.7	1.4	10.8	35.6	38.4	12.0	36.0	11.2	36.8	37.2	NP	R-chronic
2	3.4	2.4	0.6	1.6	16.4	NP	NP	12.8	47.2	12.0	40.4	NP	NP	R-chronic & L
3	2.2	2.6	2.1	1.2	11.2	36.4	37.6	31.6	41.2	12.0	37.2	38.4	NP	R-chronic & L
4	3.0	3.0	0.4	1.7	NP	NP	NP	18.0	56.0	11.6	42.4	40.8	NP	R-chronic & L due to the pontine lesion
5	2.4	2.8	2.2	1.3	10.8	37.2	39.2	NP	NP	10.8	42.8	40.4	12.0	L-chronic
6	2.0	3.0	1.5	1.2	10.4	34.8	34.8	NP	NP	10.0	35.2	32.8	10.8	L-chronic
7	3.0	3.0	2.2	1.6	11.6	35.2	33.6	NP	NP	12.0	37.2	38.8	11.6	L-chronic
8	2.8	3.0	2.6	1.8	11.6	35.6	36.0	NP	NP	11.2	36.4	36.8	11.6	L-chronic
9	3.4	2.8	0.3	1.7	14.0	40.0	40.0	NP	NP	12.0	36.8	36.0	11.2	L-chronic & R
10	2.8	2.4	0.4	3.0	NP	NP	NP	NP	NP	11.2	35.2	36.0	NP	R
11	3.4	2.8	0.3	2.0	NP	NP	NP	NP	NP	11.2	34.8	36.4	NP	R
12	4.2	2.8	0.4	1.7	NP	NP	NP	NP	NP	10.8	32.4	32.8	NP	R
13	2.4	2.2	2.2	3.6	NP	NP	NP	NP	NP	11.2	36.8	36.8	NP	R
14	3.0	3.0	1.7	3.1	NP	NP	NP	NP	NP	11.2	36.0	36.4	NP	R
15	2.8	3.0	2.3	1.3	10.4	32.0	36.4	NP	NP	NP	NP	NP	NP	L
16	2.8	3.0	2.2	2.5	11.6	35.6	37.2	NP	NP	NP	NP	NP	NP	L
17	3.0	3.4	2.3	1.2	10.8	35.2	34.8	NP	NP	NP	NP	NP	NP	L
18	1.6	2.8	2.2	1.0	12.0	35.6	38.4	NP	NP	NP	NP	NP	NP	L
19	2.6	2.6	2.1	1.3	12.0	37.6	38.4	NP	NP	NP	NP	NP	NP	L
20	2.8	4.0	2.8	0.3	11.2	34.8	34.8	NP	NP	NP	NP	NP	NP	L
21	3.4	2.4	0.5	3.8	NP	NP	NP	NP	NP	12.0	47.6	45.2	NP	L
22	2.6	2.6	2.0	2.3	11.6	34.4	36.4	NP	NP	26.0	43.2	38.0	NP	Compatible to L

Shaded areas are affected sides of facial synkinesis.

NP: no obtainable potentials

L-chronic; left chronic peripheral facial neuropathy

L: left peripheral facial neuropathy

R: right peripheral facial neuropathy

RSRR: right supraorbital stimulation & right orbicularis oculi response

LSRR: left supraorbital stimulation & right orbicularis oculi response

RSRRm: right supraorbital stimulation & right mentalis response

LSLRm: left supraorbital stimulation & left mentalis response

CMAP: compound motor action potentials

2) (affected side of face)  
 3) , 4) , 5)  
 3)  
 , 6)  
 4)  
 가  
 (Fig. 1).  
 (latency)  
 (compound motor action potentials,  
 가 (Table 2),  
 가  
 (R1 latency) (R2  
 latency)  
 (Table 3), t - test p value correlation p value

LSLR: R1I & R2I)  
 (right supraorbital stimulation & right mentalis  
 response, RSRRm: R1mr & R2mr left supra-  
 orbital stimulation and left mentalis response:  
 LSLRm: R1ml & R2ml)  
 (No. 1-4 in  
 Table 3), R1r:12.8 ms, R1mr:18.8 ms,  
 R2r:36.0 ms, R2mr:38.6 ms R1  
 가 4 2 no obtainable

22 9 (41%)  
 , 1.3 32 ( 14.8 )  
 . 33%(3/9 )  
 , 67%(6/9 )

( :2.7 ms, :2.8 ms)  
 ( :1.5 mV, :1.5 mV) 가  
 가 (t-

test p=0.82 & 0.92, Table 3).  
 (right  
 supraorbital stimulation & right orbicularis oculi  
 response, RSRR: R1r, R2r left supraorbital  
 stimulation & left orbicularis oculi response,

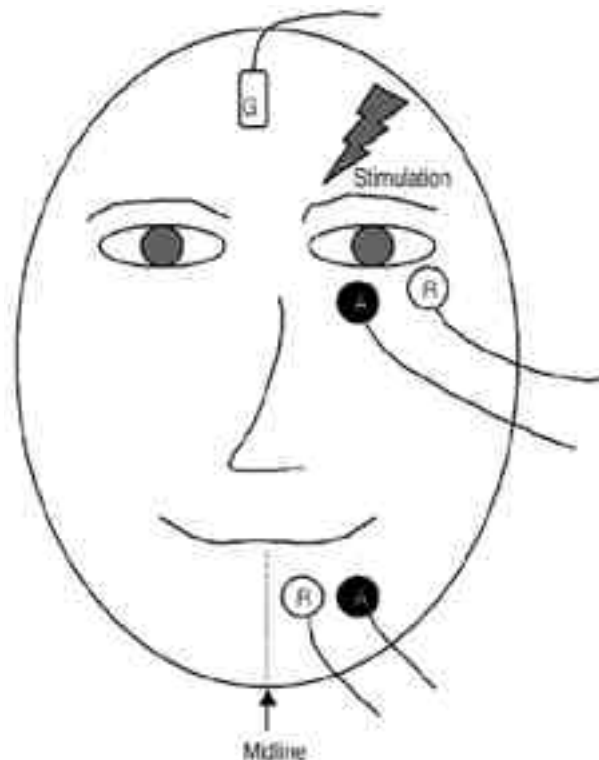


Figure 1. Applied blink reflex test: G; ground, A; active surface electrode, R; reference surface electrode.

Table 2. Bilateral facial nerve conduction velocity study

PATIENT No.	LATENCY (NL:3.08 ms)		CMAP (NL:1.1mV)	
	Affected side (A)	Unaffected side (U)	Affected side (A')	Unaffected side (U')
1	2.4	2.4	1.7	1.4
2	2.4	3.4	1.6	0.6
3	2.2	2.6	2.1	1.2
4	3.0	3.0	0.4	1.7
5	2.8	2.4	1.3	2.2
6	3.0	2.0	1.2	1.5
7	3.0	3.0	1.6	2.2
8	3.0	2.8	1.8	2.6
9	2.8	3.4	1.7	0.3
Mean	2.7	2.8	1.5	1.5
t-test p value	0.82 (A vs U)		0.92 (A' vs U')	
Correlation p value	0.91 (A vs U)		0.67 (A' vs U')	

potentials(NP) 가 2 가 가

(t - test , 3,10,11  
 p=0.50) , R2 t - test .

p=0.45 가 , 가 1,4  
 가 (correlation)  
 correlation p=0.73(R1r vs  
 R1mr), p=0.00(R2r vs R2mr) R1 가

가 R2 가 5-9  
 (Table 3). 가  
 5 (No. 5-9 in Table 3) R1l:11.2 가  
 ms, R1ml:11.4 ms, R2l:37.7 ms, R2ml:38.4 ms (stylomastoid foramen)  
 R1(p=0.55) R2(p=0.23) (nasalis 가

R2 cor - muslce) 가  
 relation p=0.01 40% 10

R2 가  
 (Table 3). 2 , 3 , 9 (surface recording electrode)  
 3 가  
 , 2 가

가 6 (R1  
 ) 3 ( R2  
 R2' ) ,  
 가 가  
 가 가

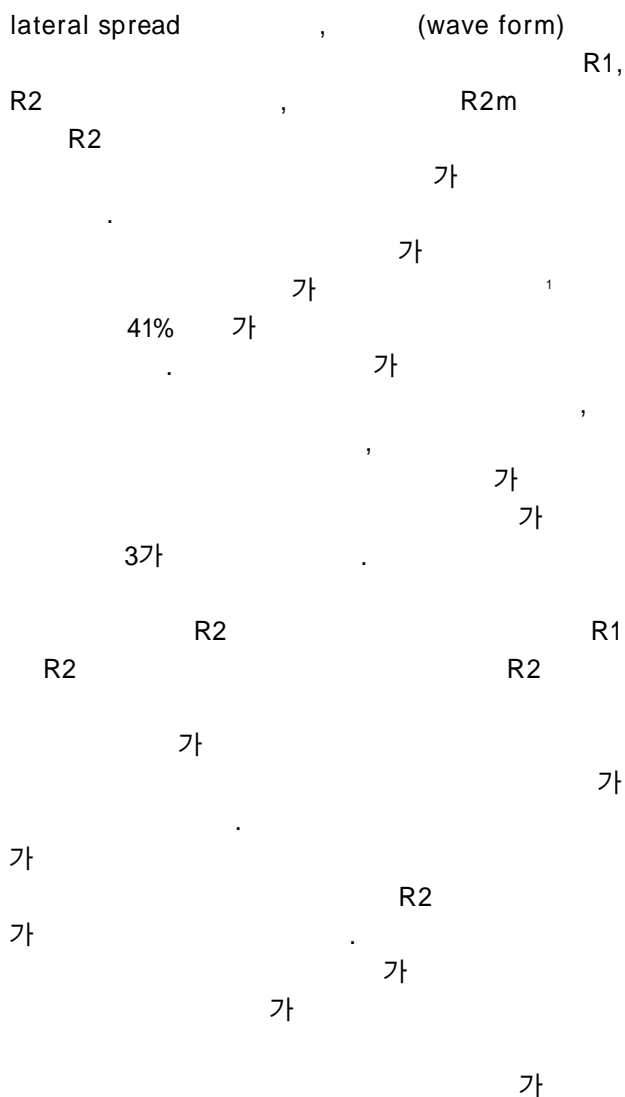
2,12  
 (peripheral ephatic transmission of impulses  
 between axons), (aberrant  
 regeneration of facial nerve fibers),  
 (synaptic reorganiza-  
 tion within the facial nerve nucleus) 3가

**Table 3.** Facial synkinesis evaluation

No	RIGHT					No	LEFT				
	ORBICULARIS OCULI			MENTALIS			ORBICULARIS OCULI			MENTALIS	
	RSRR	LSRR		RSRRm			LSLR	RSLR		LSLRm	
	R1r (NL:11.9 ms)	R2r (NL:38.9 ms)	R2r' (NL:39.1 ms)	R1mr (NL: NP)	R2mr		R1l (NL:11.9ms)	R2l (NL:38.9ms)	R2l' (NL:39.1ms)	R1ml (NL: NP)	R2ml
1	10.8	35.6	38.4	12.0	36.0	5	10.8	42.8	40.4	12.0	44.4
2	16.4	NP	NP	12.8	47.2	6	10.0	35.2	32.8	10.8	34.4
3	11.2	36.4	37.6	31.6	41.2	7	12.0	37.2	38.8	11.6	39.2
4	NP	NP	NP	18.0	56.0	8	11.2	36.4	36.8	11.6	37.2
						9	12.0	36.8	36.0	11.2	36.8
Mean	12.8	36.0	38.0	18.8	38.6		11.2	37.7	37.0	11.4	38.4
t-test p value	0.50 (R1r vs R1mr)			0.45 (R2r vs R2mr)			0.55 (R1l vs R1ml)			0.23 (R2l vs R2ml)	
Correlation p value	0.73 (R1r vs R1mr)			0.00* (R2r vs R2mr)			0.61 (R1l vs R1ml)			0.01* (R2l vs R2ml)	

\* significant value

Shaded area are indicative of case with any abnormal findings of both orbicularis and mentalis muscles



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