

MRI

1

2

: (temporomandibular joint surface coil)
 MRI
 : MRI
 가 20 36 50
 , T1 , 가
 가
 : 24 (48%), 23 (46%)
 T1 가 34 (68%)
 T1 가 (40%) (55%),
 (80%) 18 12 (66.6%) 14
 (fair) 11 (75%)
 12 (85%)
 6 4 (66.6%)
 : MRI (fair)
 MRI MRI
 MRI 가
 가
 가
 MRI
 MR MRI
 (1, 2). MRI 가

1

2

1999 11 17 2000 5 30

1997 1 1999 5

가 20 MRI
가 12 , 8 MRI
56.8 (16-67), 10 , 10
가 14 , 가 1 ,
가 5 .
MRI
1 9 , 2 3 , 5 1 , 7 1 ,
9 1 , 18 1 , 1 2 , 2 1
8 1 .
MRI 36
50 (32 , 18
)
1.0 T (Vistar, Picker)
T1 (TR/TE: 500~600/20),
1.5 mm 2.5 mm,
3 mm 5 mm 18 Gadolini-
um - DTPA (Magnevist, Shering, Germany) 0.1 mmol/kg
T1
(FOV) 110 mm, 192 × 256
Mark (3)
(buckling)
(Fig. 1).

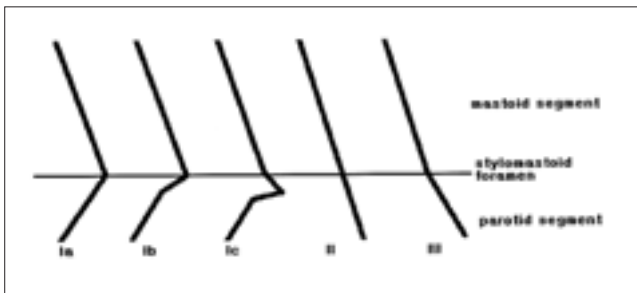


Fig. 1. Course of facial nerve from distal tympanic segment to proximal parotid segment. I : anterior angulation, I-a : obtuse , I-b : acute, I-c : buckling, II : straight, III : posterior angulation.

MRI
2 가
1 가 가
가
MRI
가
(absent), (mild),
(fair), (marked)
MR
24 (48%) ,
23 (46%) , 3 (6%)
(Fig. 2).
34 (68%)
가 , 15 (30%) , 1
(2%) . 16
8 (50%)
1.38 ± 0.27 mm
(p = 0.091).
SSPS for windows (SSPS Inc., U.S.A.) paired
sampled T - test
0.15 ± 0.12 mm 가
1 (6.25%)
18 12 (66.6%)
(mild) 12 ,
11
(Table 1).
MR
가 14 ,
가 5 , 1
가 14 , 8
8
가 6
11 (55%)
가 , 7 , 2 , 2
(buckling) . 8 (40%)
1
(5%) 3
(Fig. 3).
가 가 16 (80%)
가 4 (20%)
9 (45%) ,

Table 1. Summary of MRI Findings in Facial Nerve Paralysis

Case No/ sex/age	Dx	Time interval from onset to MRI	Course	Atrophy	Site of facial nerve enhancement							
					Unaffected Side				Affected Side			
					G	T	M	P	G	T	M	P
1/F/48	B	1week	obtuse	-		+	+	-		++	++	+
2/M/16	B	1week	obtuse	-		+	+	-		+	+	+
3/M/47	B	1week	obtuse	-		+	+	-		+	+	+
4/F/59	B	1week	obtuse	-		+	+	-		++	++	+
5/F/66	B	1week	straight	-		+	+	-	++	++	+	-
6/F/59	B	1week	straight	-		+	+	-		+	+	+
7/M/41	PT	1week	straight	-		-	-	-		++	++	-
8/F/33	PT	1week	obtuse	-		+	-	-		++	++	+
9/M/47	PT	1week	buckling*	-		+	+	-		++	+	+
10/M/64	B	2weeks	obtuse	-		+	+	-		++	++	+
11/M/37	PT	2weeks	buckling	-		-	-	-		+++	++	+
12/M/64	B	2weeks	posterior	-		+	+	-	++	++	++	+
13/M/67	B	5weeks	straight	-		-	-	-		++	++	++
14/F/59	B	7weeks	obtuse	-		+	+	-	++	++	+	+
15/M/57	B	9weeks	straight	+		-	-	-	++	++	++	+
16/M/23	PT	18weeks	buckling	+								
17/M/59	B	1year	obtuse	-								
18/M/59	B	1year	obtuse	-		+	+	-		++	+	+
19/F/54	B	2years	straight	+		-	-	-		-	-	-
20/M/54	H	8years	straight	+		-	-	-		-	-	-

Dx : diagnosis, B : Bell 's palsy, PT : post-traumatic or post-operative facial nerve palsy, H : Herpes Zoster oticus facial neuritis, G : geniculate ganglion, T : tympanic segment, M : mastoid segment, P : proximal parotid segment, - : absent, + : mild, ++ : fair, +++ : marked enhancement.

buckling*: buckling of proximal mastoid segment of facial nerve

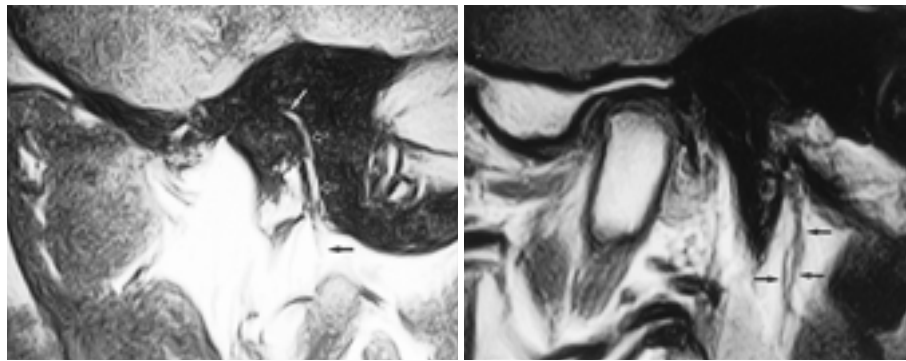
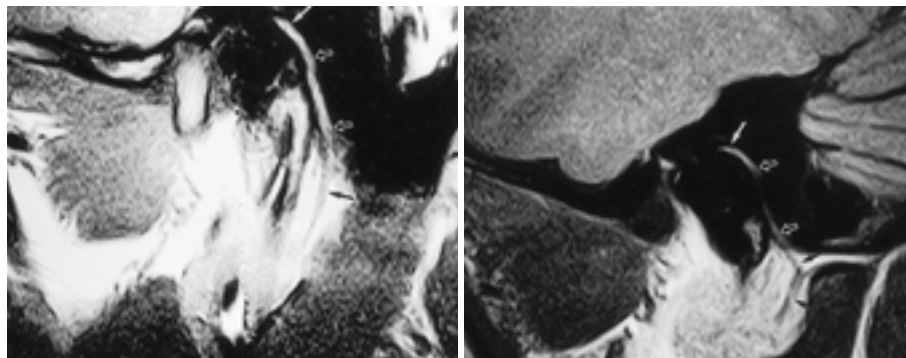


Fig. 2. Course of normal facial nerve from tympanic segment (white arrow) to mastoid segment (open arrows) to parotid segment (black arrow). Oblique sagittal T1WI using TMJ surface coil.

A, B. Straight type. Oblique sagittal T1WI (B) shows branches of parotid portion (arrows) of facial nerve.

C. Anterior angulation type.

D. Posterior angulation type.



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MRI



A. Opposite, normal facial nerve. Oblique sagittal Gd-enhanced T1WI shows mild enhancement of tympanic segment (arrows) of the Lt. facial nerve.

Figure 1 consists of two coronal MRI scans of the cervical spine. Image A shows a normal intervertebral disc at the C5-C6 level. Image B shows a herniated intervertebral disc at the C5-C6 level, indicated by a black arrow.

A. Normal side facial nerve. The mastoid segment (arrows) of facial nerve shows course of straight type.

$$\mathbf{A} \quad \mathbf{B} \quad |\mathbf{A}|.$$

•

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, ,

가

‘ ‘ ‘

(17). 가

MRI

'

(buckling),

MRI

(20 - 23).

(localization)

, 11 (78.5%)

(fair)

4

가, 2

MRI가

가

Engstrom (24)

14

1. Perry JR, Hasso AN. Magnetic Resonance Imaging of Cranial Nerve VII. *Topics in Magnetic Resonance Imaging* 1996;8(3):155-163
2. Proctor B. The Anatomy of the Facial Nerve. *Otolaryngol Clin North Am* 1991;24:479-504
3. Mark LP, Yetkin FZ, Nowicki BH, Erickson SJ, Daniels DL, Haughton VM. Visualization of the Distal intratemporal Facial Nerve with MR Imaging: Use of an Oblique Plane. *Radiology* 1992;182:891-893
4. Daniels DL, Czervionke LF, Pojunas KW, Meyer GA, Millen SJ, Williams AL, Haughton VM. Facial Nerve Enhancement in MR Imaging. *AJNR Am J Neuroradiol* 1987;8:605-607
5. Lfkin R, Flannigan B, Teresi L, Bentson J, Wilson G, Hansfee W. *MRI of the facial nerve using surface coils*. Presented at the 24th annual meeting of the American Society of Neuroradiology, San Diego, January 1983
6. Daniels DL, Schenck JF, Foster T, et al. Surface coil magnetic resonance imaging of the internal auditory cannal. *AJNR Am J Neuro-radiol* 1985;6:487-490
7. Reese DF, Harner SG, Kipart DB, Baker HL Jr. *Magnetic resonance display of the internal auditory cannal, cochlea, vestibular apparatus and facial nerve*. Presented at the 22nd annual meeting of the American Society of Neuroradiology, Boston, June 1984
8. Brasch RC. Methods of contrast enhancement for NMR imaging and potential applicatons: a subject review. *Radiology* 1983;147:781-783
9. Mendonee-Dias MH, Gaggelli E, Lauterbur PG. Paramagnetic contrast agents in NMR medical imaging. *Semin Nucl Med* 1983;13:364-376

10. Kilgore DP, Breger RK, Daniels DL, Poijunas KW, Williams AL, Houghton VM. Cranial Tissues: Normal MR Appearance after Intravenous Injection of Gd-DTPA. *Radiology* 1986;160:757-761
11. May M. The facial nerve. New-York: Thieme , 1986:21-62, 181-216
12. Murphy TP. MRI of the Facial nerve during paralysis. *Otolaryngol Head Neck Surg* 1991;104:47-51
13. Tien R, Dillon WP, Jackler RK. Contrast-enhanced MR Imaging of the Facial Nerve in 11 Patients with Bell's Palsy. *AJNR Am J Neuroradiol* 1990;11:735-741
14. Gebarski SS, Telian SA, Niparko JK. Enhancement along the Normal Facial Nerve in the Facial Cannal: MR Imaging and Anatomic Correlation. *Radiology* 1992;183:391-394
15. . : . 1998;39:461-467
16. Bradbury M. Regional differences in blood-interstitial fluid exchange throughout the nervous system. In The concept of a blood-brain barrier. New York:Wiley, 1979:127-136
17. Saatci I, Sahintuk F, Sennaroglu L, Boyvat F, Guresel B, Besim A. MRI of the facial nerve in idiopathic facial palsy. *Eur Radiol* 1996; 6:631-636
18. Tien RD, Dillon WP. Herpes trigeminal neuritis and rhombencephalitis: enhancement with Gd-DTPA MR. *AJNR Am J Neuroradiol* 1990;11:413-4
19. Martin-Duverneuil N, Sola-Martinez MT, Miaux Y, Cognard C, Weil A, Mompoint D, Chiras J. Contrast enhancement of the nerve on MRI: normal or pathological?. *Neuroradiology* 1997;39:207-212
20. Lundborg G, Rydevik B. Effects of stretching the tibial nerve of the rabbit. A preliminary study of the intraneural circulation and the barrier function of the perineurium. *J Bone Joint Surg* 1973;55B (2):390-401
21. Lundborg G. Structure and function of the intraneural microvessels as related to trauma, edema formation, and nerve function. *J Bone Joint Surg* 1975;57A(7):938-948
22. Kohsyu H, Aoyagi M, Tojima H, Tada Y, Inamura H, Ikarashi T, et al. Facial nerve enhancement in Gd-MRI in patients with Bell's palsy. *Acta Otolaryngol (Stockh)* 1994; 511(suppl):165-9
23. Girard N, Poncet M, Chays A, Florence A, Gignac D, Magnan J, et al. MRI exploration of the intrapetrous facial nerve. *J Neuroradiol* 1993;20:226-38
24. Engstrom M, Abdsaleh S, Ahlstrom H, Johnsson L, Stalberg E. Serial gadolinium-enhanced magnetic resonance imaging and assessment of facial nerve function in Bell's palsy. *Otolaryngol Head Neck Surg* 1997;117:559-566

MR Findings of Facial Nerve on Oblique Sagittal MRI Using TMJ Surface Coil: Normal vs Peripheral Facial Nerve Palsy¹

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Purpose: To evaluate the findings of normal facial nerve, as seen on oblique sagittal MRI using a TMJ (temporomandibular joint) surface coil, and then to evaluate abnormal findings of peripheral facial nerve palsy.

Materials and Methods: We retrospectively reviewed the MR findings of 20 patients with peripheral facial palsy and 50 normal facial nerves of 36 patients without facial palsy. All underwent oblique sagittal MRI using a TMJ surface coil. We analyzed the course, signal intensity, thickness, location, and degree of enhancement of the facial nerve. According to the angle made by the proximal parotid segment on the axis of the mastoid segment, course was classified as anterior angulation (obtuse and acute, or buckling), straight and posterior angulation.

Results: Among 50 normal facial nerves, 24 (48%) were straight, and 23 (46%) demonstrated anterior angulation; 34 (68%) showed iso signal intensity on T1WI. In the group of patients, course on the affected side was either straight (40%) or showed anterior angulation (55%), and signal intensity in 80% of cases was isointense. These findings were similar to those in the normal group, but in patients with post-traumatic or post-operative facial palsy, buckling, of course, appeared. In 12 of 18 facial palsy cases (66.6%) in which contrast materials were administered, a normal facial nerve of the opposite facial canal showed mild enhancement on more than one segment, but on the affected side the facial nerve showed diffuse enhancement in all 14 patients with acute facial palsy. Eleven of these (79%) showed fair or marked enhancement on more than one segment, and in 12 (86%), mild enhancement of the proximal parotid segment was noted. Four of six chronic facial palsy cases (66.6%) showed atrophy of the facial nerve.

Conclusion: When oblique sagittal MR images are obtained using a TMJ surface coil, enhancement of the proximal parotid segment of the facial nerve and fair or marked enhancement of at least one segment within the facial canal always suggests pathology of the facial nerve. The use of this modality, together with the coil, is, therefore, an effective complementary technique for the evaluation of a facial nerve.

Index words : Nerves, facial
Nerves, MR
Magnetic resonance (MR), coils

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