Diagnostic Accuracy of Sagittal Condylar Movement Patterns for Identifying Internal Derangement of the Temporomandibular Joint

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The aim of this study was to compare sagittal condylar movement patterns (SCMP, Axiograph) and high-field (1.5 T) magnetic resonance imaging (MRI) findings of the temporomandibular disorders. One hundred forty-one patients with TMD signs and/or symptoms were selected for this study. SCMP was categorized into six patterns: normal, figure-eight (early/intermediate/late), limited, and other irregularities. The MRI findings of TMJ internal derangement were defined as one of five stages according to Wilkes criteria and then compared to the SCMP findings. Among normal SCMP, MRI revealed disc displacement in 27%. Sixty-three percent of figure-eight SCMP were regarded as stage I or II with reducible disc displacement. The sensitivity and specificity of SCMP for detecting TMJ internal derangement were 0.79 and 0.62, respectively. The point of deflection in figure-eight SCMP and the degree of disc displacement were not significantly related. However, a significant relationship was observed between the point of deflection in figure-eight SCMP and any type of disc deformation (chi-square = 9.80, P = .002). Thus, SCMP is not yet accurate enough for diagnosing a TMJ condition, especially in the case of chronic and/or adaptive internal derangement.
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It is very important for dentists to understand the pathologic status of the temporomandibular joint (TMJ) in patients with any sign or symptom of temporomandibular disorders (TMD), and the clinical signs and symptoms involving the TMJ have been used as preliminary diagnostic criteria for this purpose. Several comparative studies have been conducted to determine the diagnostic accuracy of the following methods and techniques: clinical diagnosis and magnetic resonance imaging (MRI) findings or arthrography;[1–3] sagittal condylar movement pattern (SCMP) and MRI diagnosis;[4–6] double-contrast arthrotomography and arthroscopic examination;[7] high-field MRI and surgical findings,[8] and high-field MRI findings and autopsy specimens.[9]

The image quality and the diagnostic accuracy of MRI of the TMJ are better at high-field than at low-field strength when comparable imaging times are used. High-field MRI has a reported 0.85 to 1.00 accuracy for identifying TMJ abnormalities, such as disc position,

Table 1 Distribution of Patients by Age and Sex

	Range in age (y)							
Sex	11–14	15–19	20–24	25–29	30–34	35–43	Total	Mean age ± SD
Male	5	6	5	8	1	1	26	21y 10m ± 6y 8m
Female	19	37	28	20	8	3	115	21y 3m ± 6y 6m
Total	24	43	33	28	9	4	141	21y 5m ± 6y 7m

Table 2 Interval Between SCMP and MRI Examinations

	Interval (d)									
	0–10	11–20	21–30	31–40	41–50	51–60	61–70	71–80	81–100	Mean ± SD
No. of patients (n = 141)	26	17	22	19	21	15	9	10	2	35.3 ± 22.8 days

configuration, and bony deformation.[9] In contrast, Paesani and coworkers[1] and Wajima et al[2] demonstrated that clinical examination has a diagnostic accuracy of 0.43 and 0.60 to 0.80, respectively. Toyama et al[3] performed MRI diagnosis on patients with unilateral TMJ disorder and found that disc displacement was observed in 47% of the contralateral asymptomatic joints. It is thus evident that clinical diagnosis alone may not be accurate enough to evaluate anatomical TMJ irregularities without symptoms.

Further, concerning the diagnostic accuracy of instruments, Rozencweig[4] compared MRI findings with the three patterns of condylar movement analyzed by Axiograph and reported a diagnostic agreement of 0.72. Parlett et al[5] also compared the four most common radiographic diagnoses (normal disc position, disc displacement with reduction, disc displacement without reduction, and disc displacement without reduction associated with degenerative joint disease) with Axiograph and MRI findings and concluded that the diagnostic sensitivity of SCMP was 0.64 and the specificity was 1.00. However, the association between internal derangement of the TMJ (disc position and configuration) and the detailed patterns of condylar motion, including deflection in the figure-eight type of SCMP,[10] has not been tested.

The purpose of this study was to investigate the diagnostic accuracy of SCMP analysis with the Axiograph as compared to high-field (1.5 T) MRI, which is widely regarded as the "gold standard" for identifying internal derangement of the TMJ. In addition, the relationship between the point of deflection in figure-eight SCMP and disc configuration and degree of disc displacement was examined.

Materials and Methods

Patients

One hundred forty-one orthodontic patients were selected who showed signs or symptom of TMD as identified through clinical examination prior to orthodontic treatment, and who had undergone both SCMP and MRI examination within a time span of 100 days between January 1991 and July 1995 at the Orthodontic Clinic, Hiroshima University Dental Hospital. The 26 male and 115 female patients had a mean age of 21 years, 5 months (SD ± 6 years, 7 months), ranging from 11 years, 4 months to 43 years, 1 month (Table 1). Magnetic resonance imaging was performed after SCMP examination, and the mean interval between the SCMP and MRI examinations was 35.3 days (SD ± 22.8 days, range 0 to 97 days) (Table 2).

SCMP Analysis

Sagittal condylar movement patterns were analyzed using an Axiograph (Sam Präzisionstechnik, München, Germany) prior to orthodontic treatment. With this instrument, the total weight of loading on the mandible is 175 g. Before the analysis, the kinematic axis[11] for condylar movements was determined through repeated jaw movements.[12] Patterns of sagittal condylar movement during jaw opening and closing were classified into four types: normal, figure-eight, limited, and other irregularities, according to the modified Mauderli criteria.[12]

Among the diagnostic criteria for these SCMP, normal was defined as a smooth convex path that

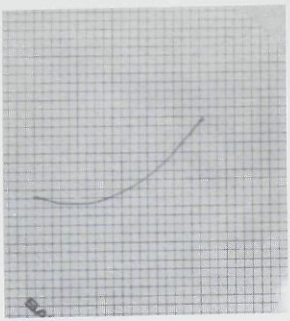


Fig 1 Normal SCMP was defined as a smooth and convex path without abrupt directional changes. The length of the normal path is more than 10 mm. A normal SCMP was used to diagnose a normal TMJ.

showed no abrupt directional changes. The length of the normal path was more than 10 mm (Fig 1). Joints that demonstrated a normal SCMP were diagnosed as normal joints. The figure-eight SCMP was defined as a pattern that resembled a horizontal figure-eight. This type was further subclassified as early, intermediate, and late[13] according to the point of deflection on the opening trajectory. Joints that demonstrated a figure-eight SCMP were diagnosed as disc displacement with reduction. Limited SCMP was defined as either a stable or an unstable pattern that exhibited a limited straight trajectory.[14] The length of the limited SCMP path was less than 10 mm. Joints that demonstrated a limited SCMP were diagnosed as disc displacement without reduction. The remaining patterns were defined as other irregularities (Fig 2) associated with osteoarthrosis.

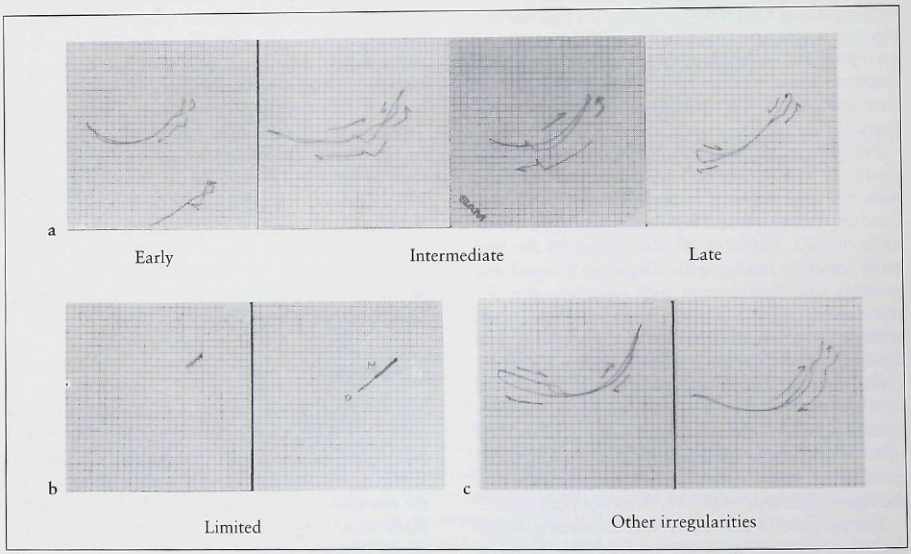
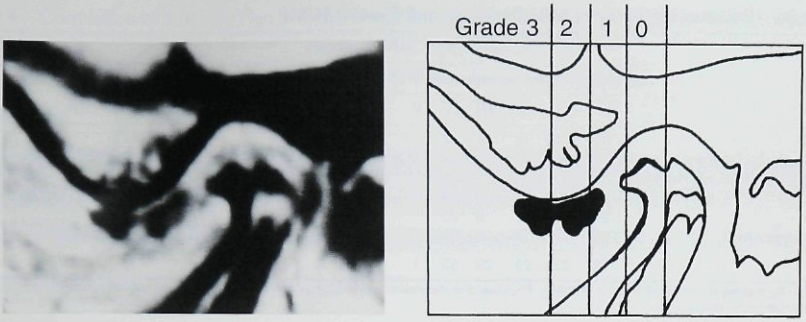


Fig 2 Classification of SCMP. Figure-eight SCMP was defined as a pattern depicting a horizontal figure-eight. (*a*) This type was subclassified into early, intermediate, and late according to the point of deflection associated with disc reduction on the trajectory. (*b*) Limited SCMP exhibits a limited and straight trajectory with an unstable pattern. The length of the pattern in the limited trajectory type associated with disc displacement without reduction was less than 10 mm. (*c*) The remaining patterns were defined as other irregularities. These types of SCMP were diagnosed as condylar bone changes associated with osteoarthrosis.



Figs 3a and 3b The distance between the deepest point of the glenoid fossa and the lowest point on the articular eminence was divided into three equal parts. The degree of disc displacement was classified into three grades (1 to 3) based on the position of the posterior band.

MRI Examination

For MRI diagnosis, a 1.5 T magnet (Signa, General Electric) and a 3-inch dual-surface TMJ coil were used. The plane of imaging was designed to be perpendicular to the long axis of the condyle. Images of both TMJs for each patient were acquired with the dentition in full intercuspal occlusion and with the mouth open. The scanning variables with a 3-inch dual-surface coil were 2200/20 or 80 milliseconds (relaxation time/echo time [TR/TE]) with the dentition in occlusion, and 1000/17 milliseconds (TR/TE) with the mouth open, 1 nose to ear to xiphoid 256 × 192 matrix, and a 13-cm field of view. Contiguous 3-mm-thick sagittal slices were obtained.

Magnetic resonance images were used to evaluate the degree of disc displacement and the disc configuration. The degree of disc displacement was evaluated on sagittal MR images passing through the mediolateral center of the condyle. The distance between the deepest point of the glenoid fossa and the lowest point on the articular eminence was divided into three equal parts. Normal disc position was defined as the central position of the posterior band over the mandibular head (grade 0). The degree of disc displacement was classified into three grades (1 to 3) based on the position of the posterior band relative to the three predefined areas (Fig 3). The disc configuration was defined as biconcave (normal), enlargement of the posterior band, biplanar, spectacle-shaped, shortening, biconvex, or folding according to the classifications of Westesson et al[15] and of de Leeuw et al.[16] Based on the MRI findings, the pathologic status of each TMJ was classified into seven stages (0 to V, and others) according to the Wilkes[17] and to the Schellhas[18] criteria.

Statistical Analysis

The MRI findings used to determine the pathologic status of each TMJ were compared with those of the SCMP. The sensitivity, specificity, and positive and negative predictive values for the pathologic status were then obtained for the SCMP analysis.[19] Statistical analysis between the point of deflection and the pathologic status of the displaced disc was conducted on a personal computer using the program StatView v4.54 for Windows (Abacus Concepts, Berkeley, CA). The nonparametrical Mann-Whitney *U* test was used to compare the point of deflection to the degree of disc displacement. The chi-square test was used to compare the point of deflection to disc deformation.

Results

SCMP and MRI Diagnosis of TMJ

Eighty (71%) of the 113 joints with a normal SCMP demonstrated no disc displacement (Table 3a). However, the remaining 31 joints (27%) appeared to be in various pathologic stages of internal derangement as demonstrated by MRI (14 joints in stage I, 3 in stage II, 7 in stage III, and 7 in stage IV).

Table 3a Relationship Between MRI Diagnosis and Type of SCMP

		MRI diagnosis											
		Pathologic stage according to Wilkes											
SCMP		0	I	II	III	IV	V	SpADD	PDDW	DIF	Aplasia	RA	Total
Normal		80	14	3	7	7				2			113
Figure eight	Early	2	5	7	1							15	
	Intermediate											0	38
	Late		2	10	4	4		1*	2*			23	
Limited		24	3	1	8	20				1	1		58
Other irregularities		23	8	7	9	22	1			1		2	73
Total		129	32	28	29	53	1	1	2	4	1	2	282

SpADD = Spontaneous anterior dislocation; PDDW = Posterior disc dislocation with reduction; DIF = Deviation in form; RA = Rheumatoid arthrosis.
*Atypical figure-eight pattern.

Table 3b Contralateral SCMP of Unilateral TMJ Internal Derangement

		MRI diagnosis of contralateral TMJ								
		Pathologic stage according to Wilkes								
SCMP		I	II	III	IV	V	SpADD	DIF	Aplasia	Total
Normal		6	8	12	8	1	1	1	1	38
Figure eight	Early		1							1
	Intermediate									0
	Late									0
Limited		1		5	6					12
Other irregularities		3	2	1	3			1		10
Total		10	11	18	17	1	1	1	1	61

SpADD = spontaneous anterior dislocation; DIF = deviation in form.

According to the MRI results, 24 (63%) of 38 joints with a figure-eight pattern exhibited stage I or stage II disc displacement with reduction. Twelve joints (80%) with early figure-eight SCMP, and 12 (52%) with late figure-eight SCMP showed stage I or stage II anterior disc displacement with reduction, according to the MRI results. However, 1 joint with early and 8 joints with late figure-eight SCMP demonstrated stage III or stage IV nonreducing disc displacement, according to MRI. None of the joints showed intermediate figure-eight SCMP. One joint with an atypical figure-eight SCMP showed spontaneous anterior disc displacement.[20] Two joints judged normal according to MRI showed an early figure-eight pattern (false positives = 5.3%).

Of the 58 joints with limited SCMP, 28 (48%) exhibited disc displacement without reduction, deviation in form of the articular eminence, and hypoplasia of the condyle, as determined by MRI, whereas 24 (41%) showed a normal position (41% false-positive) and 4 (7%) showed disc displacement with reduction, according to MRI. The joints contralateral to the 24 normal joints with limited SCMP exhibited various pathologic stages, such as degenerative joint disease, permanent disc displacement, and/or disc displacement with reduction.

Of the 73 joints with other irregular SCMPs, according to the MRI, 47 showed internal derangement (8 joints in stage I, 7 in stage II, 9 in stage III, 22 in stage IV, and 1 in stage V); one joint showed deviation in form, two showed rheumatoid arthrosis, and 23 exhibited normal disc position (false-positives = 32%).

Twenty-three (38%) of the 61 normal contralateral joints with unilateral internal derangement revealed an abnormal SCMP (Table 3b).

The sensitivity, specificity, and positive and negative predictive values for evaluating four common TMJ internal derangement statuses as identified by SCMP analysis are shown in Table 4. The sensitivity for identifying anterior disc displacement with reduction was 0.40. In contrast, the sensitivity of osteoarthrosis was 0.52.

Table 4 Correlation of Smooth, Figure-Eight, Limited, and Other Irregular SCMPs with MRI Diagnoses

	MRI diagnosis				
SCMP diagnosis	TMJ internal derangement (n = 145)	Normal (n = 129)	Disc displacement with reduction (n = 60)	Disc displacement without reduction (n = 29)	Osteoarthrosis (n = 54)
All abnormalities					
True positive	114				
False positive	49				
False negative	31				
True negative	80				
Sensitivity	0.79				
Specificity	0.62				
Positive predictive value	0.70				
Negative predictive value	0.72				
Smooth/convex					
True positive		80			
False positive		33			
False negative		49			
True negative		120			
Sensitivity		0.62			
Specificity		0.78			
Positive predictive value		0.71			
Negative predictive value		0.71			
Figure eight					
True positive			24		
False positive			14		
False negative			36		
True negative			208		
Sensitivity			0.40		
Specificity			0.94		
Positive predictive value			0.63		
Negative predictive value			0.85		
Limited					
True positive				8	
False positive				50	
False negative				21	
True negative				203	
Sensitivity				0.28	
Specificity				0.80	
Positive predictive value				0.14	
Negative predictive value				0.91	
Other irregularities					
True positive					33
False positive					50
False negative					21
True negative					168
Sensitivity					0.52
Specificity					0.77
Positive predictive value					0.40
Negative predictive value					0.84

Diagnostic criteria for SCMP: Normal = a smooth and convex path without abrupt directional changes, more than 10 mm in length; disc displacement with reduction = a pattern depicting a horizontal figure eight according to the point of deflection on the trajectory; disc displacement without reduction = a limited and straight trajectory with an unstable pattern, less than 10 mm in length; osteoarthrosis = other irregularities of SCMP.

Association Between Point of Deflection in Figure-Eight SCMP and Degree of Disc Displacement and Disc Configuration

Of the 15 joints with early-deflection SCMP, 10 exhibited a normal disc configuration and 5 (33%) had a slight deformation of the disc, such as an enlargement of the posterior band or a spectacle-shaped or folding configuration (Table 5). In contrast, of the 20 joints with late-deflection SCMP, 17 had a severe disc deformation, such as a shortening or biconvex configuration.

Table 5 Point of Deflection in Figure-Eight SCMP and Disc Configuration

Disc configuration	Point of deflection		
	Early	Late	Total
Normal			
Biconcave	10	3	13
Deformation			
Biplanar		3	3
Enlargement of the posterior band	2 (1)	3	5 (1)
Spectacle-shaped	2	6 (4)	8 (4)
Folding	1	3 (3)	4 (3)
Shortening		1	1
Biconvex		1 (1)	1 (1)
Total	15 (1)	20 (8)	35 (9)

Chi-square test shows significance between point of deflection and disc deformation (all types together). Chi-square = 9.80, $P = .002$.
Parentheses indicate number of permanent disc displacements.

Table 6 Point of Deflection in Figure-Eight SCMP and Degree of Disc Displacement

Point of deflection	Degree of disc displacement (grade)				
	0	1	2	3	Total
Early	2	3	8	2	15
Late		4	7	9	20
Total	2	7	15	11	35

Mann-Whitney *U* test shows no significance between degree of disc displacement and point of deflection: $P = .06$.

Point of deflection was significantly related to disc deformation (chi square = 9.80, $P = .002$).

The degree of disc displacement in figure-eight SCMP with early deflection varied from grade 0 to grade 3 (Table 6). Twenty joints with a late-deflection type of figure-eight SCMP showed grade 2 or grade 3 disc displacement. However, there were no significant differences between the degree of disc displacement and the point of deflection (Mann-Whitney *U* test, $P = .06$).

Discussion

Generally, a kinematic axis[11,12] or, alternatively, a hinge axis[6,10,21–23] has been used as the reference point for SCMP. However, it was difficult in this study to use both axes as reference points with a high reproducibility, because rotation of the condyle was thought to be affected in most patients by various pathologic stages such as disc displacement, osseous change of the condyle, adhesion, and synovitis. Therefore, these TMJ conditions were considered to influence both the hinge axis and the kinematic axis. However, the influence of the kinematic axis during condylar movement is considered to be lower than that of the hinge axis. Thus, in the present study the kinematic axis was used by trial and error during jaw movements,[12] and then the length and configuration of the SCMP were analyzed.

This study demonstrated that the diagnostic sensitivity of the SCMP for identifying TMJ internal derangement (79%) was greater than that reported in previous studies.[4–6] Rozencweig[4] compared the three patterns of condylar movement analyzed by Axiograph with the MRI findings and reported a diagnostic agreement of 72%. Parlett et al[5] also compared the four most common radiographic diagnoses (normal disc position, disc displacement with reduction, disc displacement without reduction, and disc displacement without reduction associated with degenerative joint disease) as identified by Axiograph and by MRI and concluded that the diagnostic sensitivity of the SCMP was 0.64. The diagnostic sensitivity of the SCMP in this

study as compared to previous studies may have been higher as a result of the more detailed classification of SCMP into six categories: normal, early/intermediate-/late-figure eight, limited, and other irregularities. Similarly, MRI diagnosis was classified into 11 categories. Thus, the diagnostic accuracy for identifying TMJ abnormalities may be dependent on the number of methodical classifications used.

In some cases, a TMJ click was clearly detected upon palpation or by auscultation; however, the deflection of condylar path was not apparent during the SCMP examination with Axiograph. This phenomenon was thought to be caused by a change in the mandibular or condylar position as a result of the loading of the instrument itself (175 g), and by differences in the body position during both examinations. Furthermore, when the degree of disc displacement was slight, as it was in grade 1 as defined in this study, the weight of the instrument may have altered the positional relationships between the condyle, disc, and articular tubercle in the glenoid fossa. Thus, it is important to be aware that the reference points for SCMP and the centric relation defined for this method may be influenced by the weight of the instrument itself.

In the assessment of the diagnostic accuracy for progressive disease, the time interval between two comparative examinations is believed to play a significant role in the outcome. Since the MRI was performed after the tracing SCMP, timing may have influenced the results of this study. Moritz et al[6] conducted a comparative study in which all patients first underwent an electronic axiography (based on the hinge-axis recording) and then an MRI examination, either on the same day or within a period of 1 week. Toyama and associates[3] allowed an average interval of 14.4 days between imaging diagnosis and clinical examination. In the present study, the average interval between the SCMP and MRI examinations (35.3 days ± SD 22.8 days) was longer than was the average in the reports cited above. However, the specificity of disc displacement with reduction was higher than with the pathologic states. It is postulated that most of the reducible disc may not progress to permanent disc displacement after tracing. Watt-Smith et al[24] reported that overdiagnosis was probably the result of open-mouth MR images made with the mouth not sufficiently open. In this study, MRI examination was conducted only after confirmation of a click upon palpation or by auscultation and when no changes in clinical symptoms were observed during the SCMP test. Thus, the influence on the differentiation for pathologic stages II and III was assumed to be negligible.

Figure-eight SCMP with a clicking sound has been believed to be a typical sign of anterior disc displacement with reduction. Farrar[13,25] reported that an anterior-displaced disc produced clicking or limited opening and that the condylar path was bent and limited under such a condition. He also proposed that a limitation in the range of protrusive condylar path and posterior- and/or superior-reduced joint space in transcranial radiographic projection can be used as diagnostic criteria for recent anterior dislocation of the disc. In the clinical examination, the association between the characteristics of the protrusive path and the onset of clicking was classified into three groups: early, intermediate, and late. The position of the opening click shifted from early to late as the disc displacement became more severe, and range of motion increased, even in cases of closed lock, along with the progression of disc displacement, as has been shown by arthrography.[26,27] Moreover, it has been proposed that the coexistence of a figure-eight type of SCMP and a reciprocal click may be highly pertinent to disc displacement with reduction.[10,22,23,28] On the other hand, Harper[29] described a case of posterior disc displacement in which an intermediate figure-eight SCMP occurred as a result of the condyle translating past the anterior band of the disc late in the translation phase. In the present study, internal derangement with disc displacement was detected in 27% of the joints with a normal SCMP, and disc displacement with reduction was observed in 63% of those with a figure-eight SCMP. A figure-eight SCMP was also found in nine joints with nonreducing disc displacement (stage III or IV) and in two normal joints. This study demonstrated a diagnostic sensitivity of 0.40 between disc displacement with reduction and a figure-eight SCMP using the Axiograph, which has not been previously reported. These findings suggest that the figure-eight pattern may be produced by other sources of interference, such as the retrodiscal tissue of the posterior band. Thus, it is clear that a figure-eight SCMP, particularly a late type, is not a suitable diagnostic sign for disc displacement with reduction. Furthermore, some association was suggested between clicking and cicatrization of the retrodiscal tissue, because a reciprocal click and a figure-eight SCMP, which are the proposed characteristic symptoms of a disc displacement with reduction, were observed even in joints with disc displacement without reduction. Because the point of deflection was delayed when the disc deformity became more prominent, scarred and wrinkled posterior tissues may also influence the pathway, thereby suggesting that the association of a late click during mouth opening with disc repositioning may not always be warranted. Moreover, it

raises the questions of whether all joints with figure-eight SCMP have disc displacement with reduction, and what kind of disc abnormalities, such as displacement degree and/or configuration, relate to the point of deflection in the figure-eight SCMP. The present study demonstrated that the point of deflection in the figure-eight SCMP is related to deformation of the displaced disc rather than to the degree of disc displacement.

In addition, only 48% of the joints with a limited SCMP actually represent a disc displacement without reduction. Thirty-eight percent of the normal contralateral joints with a unilateral internal derangement revealed an abnormal SCMP. It is therefore suggested that a symptomatic joint with a unilateral internal derangement can also reduce the movement of a normal contralateral joint. The TMJ is a bilateral joint, and others have shown that *(1)* the normal joint is influenced by the symptomatic joint in patients with unilateral derangement, and *(2)* as the disc displacement advances and the joint becomes completely adapted to an altered condition, functional abnormalities may not be easily detected. For these reasons, we determined that the diagnostic ability of the SCMP to detect an altered status of the TMJ is not high, in agreement with previous studies.[4–6]

Miyamoto et al[30] investigated the relationship of the mandibular movement to the degree of disc displacement and configuration in patients with internal derangement of the TMJ. They found that, although the movement was limited when the degree of displacement was mild, the mandibular movement became similar to that of normal individuals when the degree of displacement became severe. It was assumed in this study that in chronic cases with functional adaptation to the progression of disc displacement, the influences on stomatognathic function would be negligible. Therefore, it is very important to thoroughly understand that when the degree of disc displacement has become severe as a result of the progression of internal derangement of the TMJ, the SCMP may not be useful for identifying the actual pathologic status of the TMJ or for suggesting treatment directions.

For those joints that have adapted to internal derangement, long-term observation is required. Sagittal condylar movement pattern examination might be a useful and noninvasive tool for the further confirmation of early cases of internal derangement, and an MRI and/or arthroscopic examinations might be used only for cases of suspected chronic internal derangement. It might also help to screen asymptomatic patients for silent TMJ internal derangement, to anticipate the potential for the onset of more severe symptoms during treatment.

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Resumen

Precisión Diagnóstica de los Patrones del Movimiento Condilar Sagital para la Identificación del Malfuncionamiento Interno de la Articulación Temporomandibular

El propósito de este estudio fue el de comparar los patrones del movimiento condilar sagital (PMCS, Axiograph) y los hallazgos de las imágenes de resonancia magnética (IRM) de campo pleno (1,5 T) en los desórdenes temporomandibulares (DTM). Para este estudio fueron seleccionados 141 pacientes con signos o síntomas de DTM. Los PMCS fueron categorizados en seis patrones (normal, en figura de ocho [temprano/ intermedio/ tardío], limitado y otras irregularidades. Los hallazgos de las IRM en cuanto al malfuncionamiento interno de la ATM fueron definidos como en cinco estados de acuerdo a las normas de Wilkes, y luego fueron comparados a los hallazgos de los PMCS. Entre los PMCS que resultaron normales, las IRM revelaron el desplazamiento del disco en un 27%. El 63% de los PMCS en figura de ocho fueron considerados como estados I o II con un desplazamiento de disco reducible. La sensitividad y la especificidad de los PMCS para detectar los malfuncionamientos internos de la ATM fueron del 79% y 62%, respectivamente. El punto de desviación en los PMCS en figura de ocho y el grado de desplazamiento del disco no estaban relacionados significativamente. Sin embargo, se observó una relación significativa entre el punto de desviación en los PMCS en figura de ocho y cualquier tipo de deformación del disco (Prueba de la X2 =9,80, P=0,002). Por lo tanto se concluye que los PMCS no son lo suficientemente precisos para diagnosticar los problemas de la ATM, especialmente en el caso de malfuncionamientos internos crónicos y/o de adaptación.

Zusammenfassung

Diagnostische Nützlichkeit sagitaler kondyläre Bewegungsmuster bei der Bewertung pathologischer Zustände des TMG

Ziel der vorliegenden Studie war ein Vergleich sagitaler kondylärer Bewegungsmuster (SKB, Axiograph) und pathologischer Zustände des Temporomandibulärgelenks (TMG). Für diese Studie wurden 141 Patienten mit TMG Befunden oder Symptomen ausgewählt. Die SCMP wurden in sechs Muster eingeteilt (normal, Achterfigur (früh, intermediär, spät), begrenzt und andere Irregularit ten). Die pathologischen Zustande des TMG wurden an Hand der auf MRI Befunden basierenden Wilkes Kriterien in fünf Stadien eingeteilt und dann mit den SCMP verglichen. Dabei wurde gefunden, daß unter den normalen SCMP 27% mit Diskusverschiebungen assoziiert waren. Unter den Fällen, die mit der Achterfigur assoziiert waren, wurden 63% als Stadium I oder II mit einrenkbarer Diskusverschiebung klassifiziert. Die Sensitivität und Spezifizität der SCMP beim Nachweis pathologischer Zustände des TMG waren jeweils 79% und 62%. Die SCMP erscheinen daher nützlich für die Beurteilung der TMG Funktion zu sein. Allerdings könnten für chronische/adaptive interne Störungen genauere diagnostische Untersuchungen erforderlich sein.