A Study on Pantronic PRI for Diagnosing TMJ Dysfunction

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INTRODUCTION

The temporomandibular joint with unique anatomy and function is the most important component of the masticatory system, which regulates mandibular movement in coordination with the surrounding neuromuscular system. Hence, disorders of the TMJ can induce TMJ dysfunction in which cardinal symptoms are pain, joint sounds and impaired mandibular movement.[1-6] However, patients may also be identified as having dysfunction when only one of the signs or symptoms is present. A diagnosis of TMJ dysfunction is subjective, and no instrument is available that identifies all of the signs or symptoms. Clinical dysfunction indices[7,8] and electromyograph etc.[9,10] have been applied on a limited basis. As dysfunction develops, the mandibular muscles develop spasms and lose their coordination. It appears that incoordinated movement is one of the first signs and symptoms of TMJ dysfunction, and it may remain after most of the clinically detectable signs and symptoms disappear. Because some patients can perform reproducible mandibular movements and others cannot, a hypothesis has been developed that a pantograph, developed by Guichet in 1969[11], can be used to determine the coordination of the mandibular movement.

Pantographic tracings, quantitated by a pantographic reproducibility index (PRI), can be used to diagnose the presence and degree of TMJ dysfunction.[12] The PRI was originally designed for use with the mechanical pantograph (M-pantograph)[13-15] and for research.[16-18] To avoid bias, use of the PRI required an operator who recorded the dysfunctional pantographic tracing and a scorer who scored the tracing. Although the PRI used in this manner was accurate for research, it was not convenient in private practice.

Electronic and computers have been used to develop an electronic computerized pantograph (Pantronic, Denar Corp., Anaheim, Calif.) in 1979. As mandibular movements are made, electronic transducers, which replace the mechanical styli, measure the movement. As the Pantronic can analyse mandibular movement for articular settings, it is likely that it can be programmed to score incoordinated mandibular movements and give PRI scores.

The Pantronic was evaluated clinically against the M-pantograph and the articular settings were comparable.[19-21] The electronic computer components were more consistent in repeating the setting with different operators, with different patients, and at different times.[22-24]

In Korea, there are a few investigations to study mandibular movements by using a pantograph[25] or the Pantronic,[26] but few investigation about the PRI, especially the Pantronic PRI. The purposes of this study are (1) to compare the ability of the Pantronic PRI with that of the Helkimo's clinical dysfunction index for detection of TMJ dysfunction and (2) to evaluate the consistency of the Pantronic PRI scores and the dysfunction categories within each session and over time.

MATERIALS AND METHODS

1. Subjects

20 male senior students of the School of Dentistry, Seoul National University aged between 23 and 25 years participated in this study. They did not have the experience of previous treatment for TMJ dysfunction and missing teeth except 3rd molars. Their occlusions were Angle class I occlusions and bilateral canine protected occlusions.

2. Equipments

An electronic computerized pantograph (Pantronic, Denar Corp., Anaheim, Calif.) which gave the Pantronic PRI (P-PRI) scores was used for this study (Fig. 1). For comparing with the P-PRI, the Helkimo's clinical dysfunction index (HDI)[7] was also used.

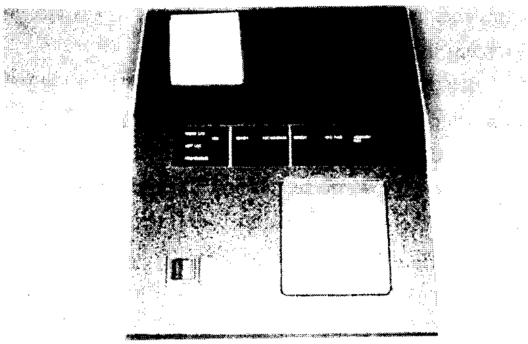


Fig. 1. The Pantronic computer box.

3. Pantographic recording

In obtaining a pantographic record, the subject's head was firmly seated in a headrest and his torso was oriented in the upright position. And the Pantronic was assembled on each subject (Fig. 2). Acrylic resin (The L.D. Caulk Co., U.S.A.) clutches were constructed for each subjects, adjusted to the minimal vertical opening (about 1 mm), and fitted to the teeth (Fig. 3). An arbitrary hinge axis was located 13mm along and 5.9mm inferior to a line from the superior border of the tragus to the outer canthus of the eye. To locate the arbitrary hinge axis points, reference plane locator was used. The posterior tracing tables were located on this axis. The right and left reference plane angles were determined by aligning the reference plane protractor on each posterior vertical table with the anterior reference point which was measured up 43mm from the incisal edge of the central or lateral incisor, toward the inner corner of the eye. These two reference angles were entered into the computer. Each posterior stylus assembly was equipped with 3 electronic styli located on the table reference points and perpendicular to their respective tables (Fig. 4). Anterior recording tables were used to aid in achieving the best possible movements.

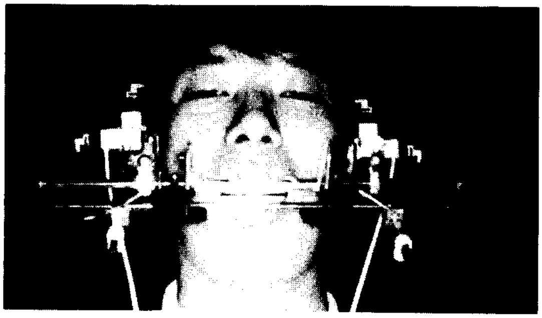


Fig. 2. The Pantronic is assembled on each subject.

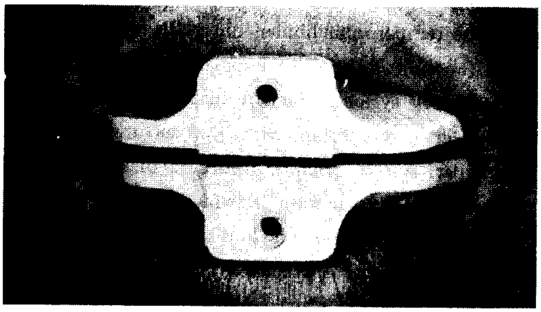


Fig. 3. Clutches are constructed for each subject, adjusted to the minimal vertical opening (about 1 mm).

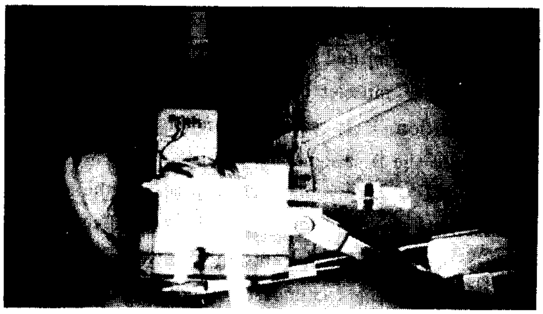


Fig. 4. Each posterior stylus assembly is equipped with 3 electronic styli located on the table reference points and perpendicular to their respective tables.

A third measurement, clutch angle, was entered in the computer to compensate for subject skeletal asymmetry and the ability to align the assembly perpendicular to the head.

In recording mandibular movements, the subject was assisted through mandibular movements using chin-point guidance (Fig. 5). Three lateral movements in each direction followed by three protrusive movements constituted a recording. The computer printed out the settings for the articulator and the P-PRI scores and the dysfunction categories. (Fig. 6, 7). During each session, four P-PRI recordings were made by one operator. Each subject had recordings made by one operator at each of three sessions 2 weeks apart. A total of 240 recordings were made in this study.

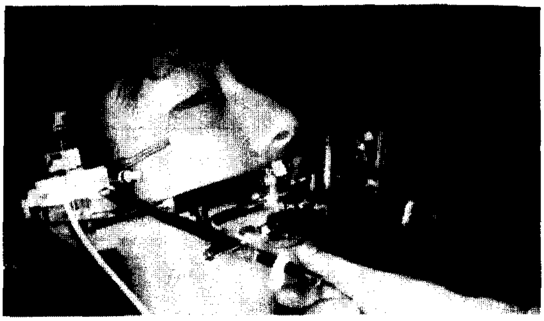
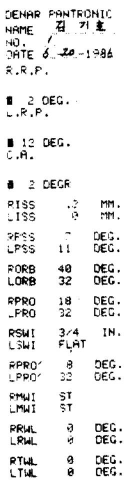


Fig. 5. The subject is assisted through mandibular movements using chin-point guidance.



DENAR PANTRONIC
NAME 김 기 호
NO. 1
DATE 6-20-1986
R.R.P.

2 DEG.
L.R.P.

12 DEG.
C.A.

2 DEGR

RISS .2 MM.
LISS 0 MM.

RPSS 7 DEG.
LPSS 11 DEG.

RORB 40 DEG.
LORB 32 DEG.

RPRO 18 DEG.
LPRO 32 DEG.

RSWI 3/4 IN.
LSWI FLAT

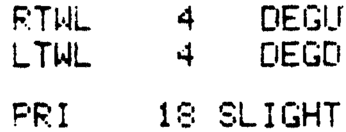
RPRO' 8 DEG.
LPRO' 32 DEG.

RMWI ST
LMWI ST

RRWL 0 DEG.
LRWL 0 DEG.

RTWL 0 DEG.
LTWL 0 DEG.

Fig. 6. A printout of recordings from the Pantronic gives settings for articulator.



RTWL 4 DEGU
LTWL 4 DEGD

PRI 18 SLIGHT

Fig. 7. The Pantronic PRI score and the dysfunction category are shown on computer printout.

4. Obtaining the Pantronic PRI scores and the dysfunction categories.

Computer could not judge the characteristics of the lines as scored manually, bands of varying width (0.2, 0.3, and 0.4 mm) were used. Three repeated lateral movements to each side were recorded. One of the tracings formed one boundary of the band. If the two other tracings were within the band, the score was 0. If one tracing was in the band and the other was not, the socre was 2. If two tracings were outside the band, the score was 6. The scores ranged from 0 to 6, the same range as produced by the mechanical pantograph PRI (M-PRI) (Table I). Because of the change in recording table positions, a posterior table was used instead of the anterior recording tables. Therefore, only 8 scoring positions were used as compared to the 12 scoring positions in the M-PRI. The range in total scores was 0 to 96 for the Pantronic and 0 to 144 for the M-pantograph (Table II).

Table I. A comparison of the Pantronic PRI (P-PRI) and the mechanical Pantograph PRI (M-PRI).

	P-PRI	M-PRI
Line characteristics	0, 2, 6	0, 1, 2, 3, 6
Points	0 – 6	0 – 6
Scoring positions	8	12
Movements (R and L)	2	2
Range of scores	0 – 96	0 – 144

* The P-PRI is 96/144 that of the M-PRI or 0.66 points

Table II. Differences in scores for the dysfunction categories for the Pantronic and the M-pantograph.

	Pantronic	M-Pantograph
scale	0 to 96	0 to 144
Dysfunction category		
None	0 to 10	0 to 15
Slight	11 to 20	16 to 30
Moderate	21 to 40	31 to 60
Severe	41 to 96	61 to 144

Average P-PRI scores in each session used to place subjects into categories of dysfunction (none, slight, moderate, or severe) were calculated as the mean of the four sets of tracings. The HDI was examined for each subject by one operator just before recording the pantographic tracing in each session.

5. Statistical methods

The means and the standard deviations of the P-PRI scores in each session were calculated. Student's t-test was used to test differences of P-PRI scores between dysfunction categories and sessions.

Table III. Comparison of mean of the P-PRI scores between the DiO group and the DiI group according to the *HDI.

	** DiO group (N=11)	*** DiI group (N=9)	t-value	p
	Mean ± SD	Mean ± SD		
Session 1	14.8 ± 8.2	19.8 ± 10.9	−1.29	p > 0.1
Session 2	16.6 ±8.4	21.8 ± 7.5	−1.59	p > 0.1
Session 3	15.8 ± 6.3	21.3 ± 10.9	−1.53	p > 0.1

* HDI ; Helkimo's clinical dysfunction index
** DiO ; Dysfunction index 0
*** DiI ; Dysfunction index I

Table IV. Tabulation of the presence and the degree of TMJ dysfunction according to the P-PRI for 20 subjects.

Dysfunction category	Session 1 subject numbers (%)	Session 2 subject numbers (%)	Session 3 subject numbers (%)
None	4 (20)	3 (15)	4 (20)
Slight	10 (50)	9 (45)	8 (40)
Moderate	6 (30)	8 (40)	8 (40)

RESULTS

The average Pantronic PRI scores in each session used to place subject into categories of TMJ dysfunction (none, slight, moderate, or severe) were calculated for comparing with the Helkimo's dysfunction index in detecting TMJ dysfunction.

According to the HDI, 20 subjects were divided into 2 groups in each session (Table III). 11 subjects (55%) belonged to the DiO (Dysfunction index O; no dysfunction) group and 9 subjects (45%) belonged to the DiI (Dysfunction index I; slight dysfunction) group, it was appeared that 45% of the subjects had some degree of TMJ dysfunction in each session.

20 subjects were categorized into 3 categories according to the average P-PRI scores in each session (Table IV, VI). 4 subjects (20%) were categorized as none dysfunction, 10 subjects (50%) as slight dysfunction, and 6 subjects (30%) as moderate dysfunction in session 1. 3 subjects (15%) were categorized as none dysfunction, 9 subjects (45%) as slight dysfunction, and 8 subjects as modertate dysfunction in session 2. 4 subjects (20%) were categorized as none dysfunction, 8 subjects (40%) as slight dysfunction, and 8 subject (40%) as moderate dysfunction in session 3. Therefore 80% of the subjects had some degree of TMJ dysfunction in each session. Hence it was concluded that the ability to detect the TMJ dysfunction of the P-PRI scores is more sentive that that of the HDI ($p < 0.01$) (Table V).

The mean P-PRI scores and the standard deviations (SD) for different HDI groups were as follows: The mean P-PRI scores for the DiO group was 14.8 and SD

Table V. Comparison of ability of the P-PRI with that of the HDI for detection of TMJ dysfunction.

	pantronic PRI subjects with dysfunction (%)	HDI subjects with dysfunction (%)
Session 1	80	45
Session 2	85	45
Session 3	80	45
Mean	82	45
	t = −22.0	p ⟨ 0.01

was 8.2, the mean P-PRI scores for the DiI group was 19.8 and SD was 10.9 in session I; the mean P-PRI scores for the DiO group was 16.6 and SD was 8.4, the mean P-PRI scores for the DiI group was 21.8 and SD was 8.5 in session 2; the mean P-PRI scores for the DiO group was 15.8 and SD was 6.3, the mean P-PRI scores for the DiI group was 21.3 and SD was 10.9 in session 3. Pantronic PRI scores in DiI group were higher than those in DiO group in all sessions, but there was no stastically significant difference between the DiO and the DiI in all sessions (Table III).

The mean P-PRI scores and the standard deviations (SD) for different categories according to the P-PRI were as follows: the mean P-PRI scores for the none category was 7.8 and SD was 1.0, the mean P-PRI scores for the slight category was 13.6 and SD was 3.1, and the mean P-PRI scores for the moderate category was 28.5 and SD was 7.7 in session 1; the mean P-PRI scores for the none category was 9.5 and SD was 0.5, the mean P-PRI scores for the slight category was 15.2 and SD was 3.0, and the mean P-PRI scores for the moderate category was 26.7 and SD was 3.9 in session 2; the mean P-PRI scores for the none category was 8.5 and SD was 1.5, the mean P-PRI scores for the slight category was 15.3 and SD was 2.9, and the mean P-PRI scores for the moderate category was 24.3 and SD was 3.8 in session 3 (Table VI). There was a distinct difference within the scores for subjects in the various P-PRI dysfunction categories. The fluctuations of the P-PRI scores in the slight-to-moderate categories were decidedly greater than in the none categories. This increasing fluctuation was evident in the sverage standard deviations, which increased with an increase in dysfunction (for example, none = 1.0, slight = 3.1, and moderate = 7.7 in session 1). Muscle incoordination could manifest as large fluctuations in the Pantronic PRI scores.

Table VI. Means and standard deviations of the P-PRI scores of the dysfunction categories according to the P-PRI.

Dysfunction category	Session 1 Mean ± SD	Session 2 Mean ± SD	Session 3 Mean ± SD
None	7.8 ± 1.0	9.5 ± 0.5	8.5 ± 1.5
Slight	13.6 ± 3.1	15.2 ± 3.0	15.3 ± 2.9
Moderate	28.5 ± 7.7	26.7 ± 3.9	24.3 ± 3.8

In order to examine the consistency of the P-PRI scores within each session and over time, the author compared the difference of the P-PRI scores among orders of recording in each session and among sessions (Table VII). There was no stastically significant difference of the P-PRI scores among orders of recording in each session and among sessions. Fluctuations of dysfunction categories of the subjects over the experimental period up to 4 weeks were studied (Table VIII). Although there was no subject whose average PRI scores in all sessions were same, 10 subjects (50%) had same categories in all sessions and 10 subjects (50%) had same categories in two sessions and no subject who

Table VII. Means and standard deviations of the P-PRI in the orders of recordings.

Order of recording	Session 1 Mean ± SD	Session 2 Mean ± SD	Session 3 Mean ± SD
1st	16.1 ± 9.9	18.0 ± 9.4	18.3 ± 9.8
2nd	17.4 ± 10.1	19.7 ± 6.9	18.8 ± 8.7
3rd	17.6 ± 11.1	20.7 ± 8.0	16.1 ± 9.0
4th	17.1 ± 8.8	19.0 ± 8.4	19.6 ± 9.2

* Difference among orders of recordings; non-specific (p ⟩ 0.1)

** Difference among sessions; non-specific (P ⟩ 0.1) had different categories in all sessions. The consistency of the P-PRI scores and dysfunction categories over time could be recognized by above results.

Table VIII. Fluctuations of the dysfunction categories of 20 subjects over the experimental period up to 4 weeks.

Number of sessions with same category	subject numbers	%
3 sessions	10	50
2 sessions	10	50
0 session	0	0

DISCUSSION

TMJ dysfunction means different things to different people. To some, it is identified by a set of signs and symptoms. To others, it is identified by an instrument that records changes in essentially one symptom, i.e., electromyographic (EMG) recording changes in action potentials in muscles.

It is recognized that TMJ dysfunction is a syndrome of multiple signs and symptoms. Probably, however, not all signs and symptoms need to be identified and recorded to make a determination that TMJ dysfunction exists or, more importantly, but it is absent. Procedures and/or instruments probably will not be capable of recording all signs and svmptoms simultaneously and be an effective research and diagnosis instrument. A more practical and detailed approach could be developed if efforts could be concentrated on one of symptoms. An instrument that records one symptom could be very effective in diagnosing TMJ dysfunction, provided the symptom selected was the first to appear in the beginning dysfunction and the last to disappear in the treatment. Such an instrument monitoring this symptom could indicate when dysfunction was initiated and when it had disappeared because of treatment. As a result of this philosophy, TMJ dysfunction has been defined in terms of the presence of a single symptom such as EMG muscle potential or EMG detected dysfunction. With the utilization of EMG, the muscle action potentials are the indicators of the presence or absence of TMJ dysfunction. More recently, the EMG silent period has been used to define TMJ dysfunction. Muscle symptoms are used mainly to identify TMJ dysfunction.[8-10, 27-30]

TMJ dysfunction is reflected mainly in the muscles. The muscle responces caused many symptoms such as pain, headaches, incoordinate mandibular movements, and limited movements due to muscle spasm. Muscles respond to noxious stimuli, such as dysfunction to occlusal interferences, by spasm and contraction. For coordinated mandibular movements to occur, muscles need to be free of spasm. If muscle spasm is present, mandibular movement is limited. It is apparent that incoordinated movement is one of the first symptoms to appear and it remains after most clinically detectable signs and symptoms have disappeared. Therefore, incoordinated mandibular movement is the symptom to monitor. A pantograph is an instrument designed to record mandibular movement. Therefore, pantographic tracings of mandibular movements quantified by the pantographic reproducibility index (PRI) can be an effective measure of the presence or absence of TMJ dysfunction by monitoring the incoordinated mandibular movements.[13]

The original studies, started in 1975 by Clayton etc.,[14] on the validity of the PRI were done with the M-Pantograph. The Pantronic was developed and clinically evaluated for articular settings in 1982. The Pantronic PRI was developed in 1983 and 1984 by Clayton etc..[31] Recent research in 1984 by Beard etc.[22] has shown that the P-PRI is comparable to the M-PRI. Use of the M-pantograph involves more time, and the scoring of the tracings requires extratime and another person. The Pantronic was used for this study.

To establish a baseline for TMJ dysfunction present at a given time period, four sets of pantographic tracings and PRI scores were used in this study. The four P-PRI scores were averaged to give the dysfunction category. The means and the standard deviations increased as the PRI scores increased, and the categories became more severe. Because the clutches were stable, the pantograph secure, and the operator consistent in guiding the subject, increased PRI scores likely arised from muscle incoordination of the subjects.

Beard etc. (1986)[23)] reported that if scores continue to increase while making a series of four Pantronic-PRI recordings, the stability of the recording assembly must be verified. If these are stable, the elevation in scores may be related to muscle fatigue and incoordination. If the scores progressively decrease, then a learning process or muscle relaxation process may be occuring. The Pantronic PRI scores of 4 recordings were stable relatively in this study. Therefore the elevation in scores seemed due to muscle incoordination of each subject.

Shields etc. (1978)[15)] studied to determine whether PRI scores correlated with scores of the clinical dysfunction of Helkimo (HDI), which measures anamnestic symptoms and clinical findings. The PRI was correlated with muscle pain and the occlusion/articulation state ($p < 0.001$). As a result of their study, PRI dysfunction categories were eastablished as none, 0 to 15; slight, 16 30; moderate, 31 to 60; and severe, 61 to 144.

The variability of symptoms and responses of the subject at different times has been noted. Diagnosis and treatment must be based on a time-related program. The clinical examination (HDI) and recording (PRI) must be accomplished at the same time. The examinations will probably have to be repeated during the course of experiment in order to accurately assess the results. In this study, the HDI examination and the P-PRI recording were accomplished at the same time. Also four consecutive pantographic recordings were performed to assess the dysfunction accurately in each session.

Lederman etc. (1982)[32,33)] compared the clinical signs and symptoms with PRI categories. At 0.1 level, there was a positive relationship (X^2) of PRI categories with headaches, tracing attempts, restricted movements, muscle sensitivity, wear facets, and total number of occlusal interferences. The PRI also indicated the presence of TMJ dysfunction in 70% patients with no subjective complaints, indicating that patients do not always know that they have TMJ dysfunction. The PRI was more reliable than clinical and subjective signs and symptoms in detecting TMJ dysfunction, especially in the slight dysfunction categories. It was hoped that detection of slight or moderate dysfunction using the paintronic PRI will initiate treatment and warn the dentist that there could be a risk to the patient if further restorative treatment were to be performed. The author concluded that the ability of Pantronic PRI was more sensitive than that of HDI in detection of TMJ dysfunction, especially slight or moderate dysfunction.

Beards etc. (1986)[23)] reported that the Pantronic was more consistent than the M-pantograph within sessions and over time in recording PRI dysfunction, and operators with varing experience need not cause P-PRI fluctuations with dysfunction-free patients. In this study, scores of subjects remained relatively stable over the experimental time period (up to 4 weeks). Although scores fluctuated, the dysfunction categories remained the same. Because the experimental time was short and the numbers of subjects were small, it was some probem to acknowledge the results.

Mongini etc. (1982)[34)] studied the factors influencing the pantographic tracings of mandibular border movements. They concluded that articular and neuromuscular factors influence the tracing patterns of mandibular border movements, and internal derangement of TMJ with condyle disk incoordination leads to typical pantographic tracings.

Shotwell etc. (1980)[35)] reported that edentulous patiets with reasonable size of ridges could give reproducible tracings using clutches on custom base plates cemented to the ridges with zinc oxide and eugenol.

Lederman etc. (1983)[36)] reported that because the occlusion of the control patients was not changed during the study period, most changes in the PRI TMJ dysfunction scores could be a attributed to stress. Because the PRI TMJ dysfunction score is a measure of neuromuscular control, it was not surprising that psychic stress could alter muscular coordination.[37)] Other authors have assumed that psychologic factors can alter not only the ability to tolerate occlusal discrepancies but also the tolerance threshold for the entire masticatory neuromuscular complex.[38,39)] Some stressful situations were related directly to unusual PRI score increases. It was assumed that all subjects were under psychological stress due to the examination during session 2 which was period of the 1st semester final examination. Really the P-PRI scores of session 2 were higher than those of other sessions.

Crispin etc. (1978)[16] studied to determine the effect of occlusal (occlusal splints and occlusal aadjustments) on PRI scores. Occlusal adjustment procedures used in their study established stable occlusal stops at centric relation. The working, balancing, and protrusive contacts were adjusted to eliminate posterior tooth contacts. A canine guidance was established where possible. Four sets of tracings were recorded. A statistically significant (0.01 and 0.05 levels) reduction in PRI scores occurred as a result of occlusal therapy, and pantographic reproducibility (coordination) improved with therapy. Their study indicates that pantographic recordings and PRI scores provide a graphic and guantitative method to determine the need for occlusal therapy and to monitor its success.

Beard etc. (1980)[40] scored 468 tracings for 20 patients who used occlusal splints only over a 5- to 12-month period. When PRI scores showed no dysfunction, the occlusal splints were removed without changes to the occlusion. All of the PRI scores (dysfunction) increased when the splints were removed, indicating that the occlusal splints is therapy and not treatment. Their study also confirmed that patients with high PRI scores and long histories of TMJ dysfunction require longer treatment times.

Ten patients with moderate-to-severe PRI dysfunction were selected for treatment of TMJ dysfunction with occlusal splint therapy and occlusal adjustment by Lerderman etc. (1983).[36] There was a statistically significant difference between changes in PRI scores of experimental subjects and the control subjects at the 0.004 level (paired t test). The study concluded that the occlusal splint therapy can be used effectively to reduce TMJ dysfunction. Their study also indicated that occlusal adjustment was corrective and that the PRI can be used to determine the success of occlusal splint therapy and occlusal adjustment.

The PRI was used in an epidermiologic study to determine treatment success and prevalence of TMJ dysfunction in 50 patients who were restored with fixed restorations.[32]

The PRI can be used in research to determine the level of the TMJ dysfunction.[41,42] In study of Benett movement, the amount of movement was determined before and after treatment of TMJ dysfunction.[43,44] The PRI was used to determine the presence of dysfunction before and after treatment.[45]

The PRI was also used to study the effect of anesthetics on TMJ receptors.[46] The PRI was reduced after anesthetizing the TMJ, indicating that joint receptors are involved in making coordinated mandibular movements.

The Pantronic PRI provides a quick means of detecting the presence or, more importantly, the absence of TMJ dysfunction. The procedure can be done in 20-30 minutes. The P-PRI can be used to determine (1) the presence or absence of TMJ dysfunction; (2) the success of treatment modalities such as occlusal splints, occlusal adjustments, and restorative treatments; (3) the prevalence of TMJ dysfunction; and (4) the level of TMJ dysfunction on experimental patients.

CONCLUSION

The author investigated the Pantronic PRI scores for detection of TMJ dysfunction using the Pantronic in 20 subjects who were male students of the school of dentistry, Seoul National University selected according to sampling criteria and came to the following conclusions.

1. According to the HDI, 20 subjects were divided into 2 groups, the DiO and the DiI, it was appeared that 45% of the subjects had some degree of TMJ dysfunction in each session.
2. According to the P-PRI, 20 subjects were categorized into 3 categories, the none, the slight and the moderate, it was appeared that 82% of the subjects had some degree of TMJ dysfunction in each session.
3. The ability of the P-PRI was more sensitive than that of the HDI in detection of TMJ dysfunction ($p < 0.01$).
4. The P-PRI scores were consistent within each session and among sessions.

5. The results suggested that the P-PRI, a measure of reproducibility of border tracings, could be an aid to detect TMJ dysfunction and could be used to assess the severity of TMJ dysfunction.

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국 문 초 록

악관절 기능장애의 진단을 위한 Pantronic PRI에 관한 연구

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악관절 기능장애의 증상들 및 징후들 중의 하나인 하악운동의 부조화를 Pantongraphic Reproducibility Index (PRI)에 의하여 정량적으로 평가할 수 있는 Pantograph가 개발된 이래 많은 연구가 보고 되었으나 국내에서는 PRI에 대한 연구가 미비한 편이며, 특히 Pantronic PRI에 관한 연구는 전무하였다. 이에 저자는 선정기준에 적합한 서울대학교 치과대학에 재학중인 4학년 남학생 20명을 대상으로 Pantronic (Denar Corp., Anaheim, Calif.)을 사용하여 하악 한계운동의 재현도를 나타내는 Pantronic PRI를 측정하여 분석한 결과 다음과 같은 결론을 얻었다.

1. 20명의 피검자들은 Helkimo의 임상적 기능장애 지수에 의해 DiO 군과 DiI군으로 분류되었으며, 이들 중 45%가 악관절 기능장애를 가지고 있는 것으로 진단되었다.
2. 20명의 피검자들은 Pantronic PRI에 의해 None, Slight 및 Moderate Category로 분류되었으며, 이들 중 82%가 악관절 기능장애를 가지고 있는 것으로 진단되었다.
3. Pantronic PRI의 악관절 기능장애에 대한 감지력은 Helkimo의 임상적 기능장애 지수에 비해 더 예민하였다. ($p < 0.01$).
4. Pantronic PRI 점수들은 시간경과에 따라 반복 기록되었을 때 각 실험 시기내에서 및 실험 시기 사이에서 일관성이 있었다.
5. 하악 한계 운동의 재현도를 나타내는 Pantronic PRI는 악관절 기능장애를 진단하고 그 정도를 평가하는데 사용될 수 있겠다.