Helkimo's Indices and Fricton's Craniomandibular Index in Korean Young Population

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CONTENTS

I. Introduction

"Craniomandibular disorders" (CMD) is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joints, or both[1]. The term is synonymous with the term "temporo-mandibular(TM) disorders" and once have been called as "Costen's syndrome", "TM syndrome" and so on[2]. Although traditionally viewed as one syndrome, current research supports the view that CMD are a cluster of related disorders in the masticatory system that have many features in common. The most frequent presenting symptom is pain, usually localized in the muscles of mastication, the preauricular area and temporomandibular joint and it is characteristically increased by the chewing or other jaw functions. Furthermore the pain is the major factor that motivates patients to seek doctors[3].

Although our understanding of the pathophysiology of CMD is growing[4], there is confusion over the prevalence of each condition as well as over the efficacy and appropriateness of the wide range of treatments suggested for CMD. Many studies have been performed in this field of CMD. But the results vary considerably from study to study because of lack of good methodological techniques, particularly in the area of measurement of the severity of the disorders[5].

To obtain and compare valid results from different studies, it is necessary to use consistent and reliable instruments to measure severity. Helkimo has been a pioneer in the development of indices to mearsure the severity of TMJ pain and dysfunction. In the epidemiologic study of Lapps in Sweden, he developed the Anamnestic Dysfunction Index (AI), Clinical Dysfunction Index(HDI), and Occlusal State Index(OSI)[6,7]. Since Helkimo's indices were designed for epidemiologic studies, they are of limited use in clinical outcome studies because they are not sensitive enough to measure small changes in the condition, and do not separate joint vs. muscle problems. But in the field of epidemiology for CMD, numerous studies have used these instrument.

To overcome the limits of Helkimo's indices, Fricton and Schiffman developed the Craniomandibular Index(CMI) which provides a standard measure of severity of problems in mandibular movement, TMJ noise, and muscle

and joint pain/tenderness for use in epidemiological and clinical outcome studies. The CMI was designed to have clearly defined objective criteria, simple clinical methods, and ease in scoring; it is divided into the Dysfunction Index(DI) and the Palpation Index (PI)[5]. So it enables the clinician to determine whether a craniomandibular problem exists or not and to differentiate joint problems from muscle problems.

In order to use the indices in the clinical studies of CMD, the epidemiological studies as well as the reliability and validity test for the indices should be preceded. The reliability and validity of Helkimo's indices and CMI have already been reported and many epidemiological studies have been performed using these indices [5-10]. But to the best of our knowlede, the epidemiological studies using Helkimo's indices and CMI in Korean population have rarely been reported.

The purpose of this study was (1) to evaluate Helkimo's Anamnestic Dysfunction Index(AI), Helkimo's Clinical Dysfunction Index(HDI), and Frictons Craniomandibular Index(CMI) in dental college students who are healthy and had no evidence of the craniomandibular disorders; and (2) to present criteria for determination of normal or CMD state in Korean young population.

II. MATERIALS AND METHODS

1. Materials

The present study is based on the data from 207 individuals (133 males and 74 females), who were students of Dental Collage, Seoul National University. The sexual and chronological distribution of the subjects is presented in Table 1.

All of the subjects had no evidence of distinct symptoms of craniomandibular disorders (CMD), such as TMJ pain, TMJ noise,

Table 1. Sexual and chronological distribution of the subjects.

Sex	Number	Age		
		Mean	Min.	Max.
Male	133	23.8	21	39
Female	74	22.9	20	31
Total	207	23.5	20	39

limitation of mandibular function, masticatory muscle pain and so on. And any individual who had history of CMD were excluded in the present study.

2. Methods

All of the subjects were examined and recorded by the format of TMJ chart and questionnaire, which have been used in the Department of Oral Medicine & Oral Diagnosis, Seoul National University Hospital. The chart and questionnaire form includes the items of Helkimo's Questionnaire and Fricton's CMI. For the purpose of the evaluation of the Helkimo's Anamnestic Dysfunction Index(AI) and Clinical Dysfunction Index(HDI), the Fricton's Craniomandibular Index(CMI), the scores of variable parameters including EM(Sum of extraoral jaw muscle palpation), IM(Sum of intraoral jaw muscle palpation), NM(Sum of neck muscle palpation), MM(Sum of mandibular movement), TN(Sum of TMJ noise), TM(Sum of TMJ capsule palpation), PI (Palpation Index), DI(Dysfunction Index) were examined by one observer.

3. Statistical analysis

The data was analized by SPSS statistics package in an IBM personal computer and mean values with standard deviations for all parameters were calculated.

To evaluate the differences between male and female subjects, student t-test were performed for all parameters.

Ⅲ. RESULTS

Table2 and 3 show the mean and standard deviations of parameters in normal male and female subjects. The mean values of Helkimo's Anamnestic Dysfunction Index(AI), Clinical Dysfunction Index(HDI), Fricton's palpation Index(PI), Dysfunction Index(DI), and Craniomandibular Index(CMI) were 0.35, 0.71, 0.03, 0.05, and 0.04 in male subjects, and 0.42, 0.72, 0.02, 0.04, and 0.03 in female subjects.

Table 2. The mean and S.D. of variable parameters in normal male subjects (N=133).

Variable	Mean	Std Dev
EM	0.43	1.16
IM	0.21	0.76
NM	0.42	1.12
MM	0.63	1.13
TN	0.39	0.71
TM	0.27	0.85
HDI	0.71	0.69
AI	0.35	0.54
PI	0.03	0.07
DI	0.05	0.07
CMI	0.04	0.06

┌─ EM : Sum of extraoral jaw muscle palpation
├─ IM : Sum of intraoral jaw muscle palpation
├─ NM : Sum of neck muscle palpation
├─ MM : Sum of mandibular movement
├─ TN : Sum of TMJ noise
├─ TM : Sum of TMJ capsule palpation
├─ HDI : Helkimo's Dysfunction Index
├─ AI : Anamnestic Index
├─ PI : Palpation Index,
│   (EM+IM+NM)/36
├─ DI : Dysfunction Index,
│   (MM+TN+TM)/26
└─ CMI : Craniomandibular Dysfunction Index,
           (PI+DI)/2

Table 3 The mean and S.D. of variable parameters in normal female subjects (N=74).

Variable	Mean	Std Dev
EM	0.41	1.01
IM	0.09	0.50
NM	0.22	0.69
MM	0.65	0.94
TN	0.30	0.57
TM	0.19	0.63
HDI	0.72	0.65
AI	0.42	0.52
PI	0.02	0.05
DI	0.04	0.05
CMI	0.03	0.04

┌─ EM : Sum of extraoral jaw muscle palpation
├─ IM : Sum of intraoral jaw muscle palpation
├─ NM : Sum of neck muscle palpation
├─ MM : Sum of mandibular movement
├─ TN : Sum of TMJ noise
├─ TM : Sum of TMJ capsule palpation
├─ HDI : Helkimo's Dysfunction Index
├─ AI : Anamnestic Index
├─ PI : Palpation Index,
│   (EM+IM+NM)/36
├─ DI : Dysfunction Index,
│   (MM+TN+TM)/26
└─ CMI : Craniomandibular Dysfunction Index,
           (PI+DI)/2

Table 4 presents the comparison of variable parameters between male and female subjects. There was no statistically significant difference between male and female subjects in each parameter.

Ⅳ. DISCUSSION

Ultimately, the criteria for an epidemiological definition of CMD must come from the informed clinical opinion of experts in this field. But the clinical diagnoses by themselves are not

Table 4 The comparison of mean of variable parameters between male and female subjects

Variables	Male	Female	2−tail prob.	Signifi-cance
EM	0.4286	0.4054	0.886	n.s.
IM	0.2105	0.0946	0.240	n.s.
NM	0.4211	0.2162	0.155	n.s.
MM	0.6316	0.6486	0.912	n.s.
TN	0.3910	0.2973	0.328	n.s.
TM	0.2707	0.1892	0.474	n.s.
HDI	0.7143	0.7162	0.984	n.s.
AI	0.3534	0.4189	0.398	n.s.
PI	0.0294	0.0199	0.274	n.s.
DI	0.0497	0.0437	0.503	n.s.
CMI	0.0396	0.0318	0.293	n.s.

＊n.s. : not−significant(p>0.05)

dependable indicators of disease for scientific study. Therefore specific criteria should be formulated for making diagnoses, whenever it is possible[11]. For this purpose many indices have been developed and Helkimo's indices and Fricton's CMI are generally accepted among them.

In order to use the indices in making diagnosis, or evaluation of treatment efficacy, the indices of normal healthy population should be needed as a criteria for determination of normal status. For this reason, many studies for normal population have been performed using Helkimo's indices and Fricton's CMI. But epidemiological data has rarely been reported for Korean population using Helkimo's indices and Fricton's CMI.

In the present study, the authors tried to investigate the criteria to differentiate CMD patients from normal population for the craniomandibular disorders. For this, the authors evaluated various indices such as Helkimo's Anamnestic Dysfunction Index and Clinical Dysfunction Index, and Fricton's Craniomandibular Index for normal healthy subjects. The results are presented in table 2 and 3.

There was no statistical difference between male and female subjects in all parameters. It is the same to the several other epidermiological investigation. They reported that craniomandibular disorders occur with nearly equal prevalence in males and females[7,8,11,12].

Compaired to the results of Fricton's study[10], the CMI of normal subjects in the present study was lower than that ot Fricton's. There was no difference in the DI but great difference in the PI from Fricton's.

The PI in the present study was much lower than that of Fricton's and it caused the CMI to be low. We can suspect some factors that caused the differences. One factor is that, entire evaluation of the PI relied on asking the subject, "Does it hurt?". "Hurt" may have differnet meanings on diffrent persons and creat inconsistency over time. The pain is a subjective experience influenced by the age, cultural and social background, personality, previous pain experience, and so on. And there are great differences of cultural and social background between American and Korean population. Another factor is the inherent amount of variability in palpation techniques[13]. For example, the amount of palpation pressure or the location of palpated area might be different. Furthermore simple comparison of the result of the present study with other clinical data is not meaningful because the indices are recorded from specific age group(dental college students, mean age 23.5 years) in the present study

It is necessary to use Helkimo's indices and Fricton's CMI for making a diagnosis and determination of prognosis or treatment efficacy. But for using the indices clinically, the normal values should be investigated in all age groups. And the determination of disorder using the indices should be based on the data which

can be matched sexually and chronologically. Therefore further studies are needed in the epidemiological studies for all age groups in Korean population for using Helkimo's indices and Fricton's CMI as a diagnostic and evaluation tool for CMD.

V. Conclusion

To evaluate Helkimo's Anamnestic Dysfunction Index(AI), Helkimo's Clinical Dysfunction Index(HDI), and Friction's Craniomandibular Index(CMI) in Korean young population, clinical examinations were performed in 207 dental college students who were healthy and had no evidence of the craniomandibular disorders.

The obtained results were as follows;

1. The mean values of the Helkimo's Anamnestic Index(AI), Clinical Dysfunction Index(HDI), Fricton's Palpation Index(PI), Dysfunction Index(DI), and Craniomandibular Index(CMI) were 0.35, 0. 71, 0.03, 0.05, and 0.04 in male subjects.
2. The mean values of the Helkimo's Anamnestic Index(AI), Clinical Dysfunction Index(HDI), Fricton's Palpation Index(PT), Dysfunction Index(DI), and Fricton's Craniomandibular Index(CMI) were 0.42, 0. 72, 0.02, 0.04, and 0.03 in female subjects.
3. There was no statistically significant difference between male and female subjects in each parameter.
4. The palpation index (PI) observed in Korean young population was lower than that in American population.

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