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An Investigation Into the Incidence of Psychogenic Factors Underlying the Temporomandibular Joint Pain/Dysfunction Syndrome

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AN INVESTIGATION INTO THE INCIDENCE OF PSYCHOGENIC FACTORS UNDERLYING THE TEMPOROMANDIBULAR JOINT PAIN/DYSFUNCTION SYNDROME

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Ernest William Small

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This thesis was prepared by Ernest William Small under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the School of Education and to the Graduate Council, and has been approved as partial fulfillment of the requirements for the degree of Master of Science in Education.

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CHAPTER I

INTRODUCTION

The Temporomandibular Joint Pain/Dysfunction Syndrome is a perplexing group of symptoms characterized by deep pain in the side of the face, usually elecited by movement of the lower jaw, which movement is limited and accompanied by noise from the joint.

It does not appear that there are any discernible, consistent, clinical findings to explain the symptoms on the basis of altered anatomy or physiology. It has been postulated that psychogenic factors are the underlying, consistent basis for the disorder.

I. THE PROBLEM

Statement of the problem. It was the purpose of this study to evaluate two standardized personality inventories as aids in the diagnosis of underlying psychogenic factors in the etiology of the Temporomandibular joint pain/dysfunction syndrome and in the differentiation of patients with and without psychogenic bases for their complaint.

Importance of the study. The number of patients with this syndrome is quite considerable. They average two per week in a ten doctor clinic. Initial evaluation and diagnostic examination involves approximately three hours

for each patient. Many of these patients appear to be anxious, overly concerned with bodily sensations, and all are in pain.

The treatment plan for patients with organic bases for the dysfunction differs from that for patients with functional bases. The former treatment plan may be of long duration and of considerable expense. The treatment plan for pain of a functional nature is quite different if the pain is recognized as such. Counseling of some patients to help them to gain insight into the problem may be all that is required for successful relief of the symptoms. Expense for the patient and time for the doctor and patient could be reduced by efficient, accurate evaluation of the bases for the patients' complaints.

Scope of the study. Fifty consecutive patients who presented themselves for treatment of facial pain associated with mandibular movement were selected for the study. Roentgenographic study of the temporomandibular joints on all fifty patients were within normal limits. There was no roentgenographic evidence of any organic disease involving the temporomandibular joints in any of the patients.

II. DEFINITIONS OF TERMS USED

Temporomandibular joint. The temporomandibular joint is the bilateral attachment of the mandible or lower jaw to

the pair of temporal bones of the skull.

Dysfunction. The partial disturbance, alteration, impairment, or abnormality in the functioning of an organ or part is termed a dysfunction.

Syndrome. A set of symptoms which occur together; that is, the constellation or sum of the signs of any morbid state, is called a syndrome.

Pain. Pain is the condition of distress or suffering. It was pointed out by Stuart Wolf that pain is a specific sensory experience, separate and distinct from all other sensations.[1] Pain is individual, subjective, solely the sufferer's to experience and to describe said Perry.[2]

The temporomandibular joint is designated the TMJ and the temporomandibular joint pain/dysfunction syndrome is designated the TMJ syndrome in the remainder of this study.

III. LIMITATIONS OF THE STUDY

Certain limitations were inherent in this study which cast some reservations on the validity of certain findings.

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[1]Stuart Wolf, Facial Pain and Mandibular Dysfunction ed. L. Schwartz and C. M. Chayes (Philadelphia: W. B. Saunders, 1968), p. 7.

[2]H. T. Perry, Jr., "The Symptomatology of Temporomandibular Joint Disturbance," Journal of Prosthetic Dentistry, XIX (March, 1968), 288.

In an objective review of the data, the following reservations should be borne in mind:

1. The data for this study were derived from a single group of patients, thereby preempting the use of a random sample from a large population. The findings in this investigation apply to the group studied and may not apply to or describe other individuals or groups.
2. The validity of the questionnaire was limited by the accuracy with which the patients recalled their medical histories and described their complaints. It was also limited by the accuracy of the examining doctor in evaluating the physical findings.
3. Efforts to achieve brevity in the questionnaire limited the amount of data collected, and perhaps resulted in some sacrifice of clarity.
4. The degree of validity and reliability inherent in the personality inventories utilized in this study further limited the validity of the study.
5. Misinterpretation of the questions in the inventories and the questionnaire may have resulted in erroneous responses.
6. Knowledge of the patients that they were being

given the personality inventories may have led to guarded, unnatural responses.

In the analysis of the data derived from the questionnaire, and in drawing conclusions from this study, efforts were made to minimize the influence of these limitations.

CHAPTER II

REVIEW OF THE LITERATURE

Considerable attention has been devoted to the TMJ syndrome and to the anatomy, physiology, and pathoses of the joint, in the professional literature. Similarly, there are many articles in the literature on the personality inventories utilized in this study. However, a search, by computer, through 640,000 selections of the world literature in the computer bank of the National Library of Medicine of the Public Health Service, failed to reveal a reference concerning the utilization of these personality inventories on patients with facial pain or the TMJ syndrome.

I. STUDIES ON TEMPOROMANDIBULAR JOINT PAIN/DYSFUNCTION SYNDROME

This joint, the TMJ, is the most complicated and complex joint in the human body, the only joint capable of dislocation without rupture of the joint capsule or without application of an external force. It is a joint capable of a multitude of movements and susceptible of many abnormal movements. Pain is the usual concomitant finding in abnormal movement of the TMJ.

Pain in the face is a symptom, not a disease. As Hurwitz pointed out, it is not ridiculed in our society and

can be expanded as the emotional needs of the patient dictate. He maintained that pain itself is shaped by the personality, suffering varying from slight discomfort to agony.[1] Underlying the pain may be body tissue damage or irritation, inner psychological conflict, or both said Friedman.[2]

The head and face are subject to more chronic, persistent, and recurring pain than other body areas and are fraught with more significance for the patient. Merritt called attention to the fact that the TMJ patient may well recognize that his problem is difficult to diagnose and to treat.[3]

The face and mouth have deep psychological meaning. While they are essential for the physiological functions of breathing, eating, and swallowing, they are also the first source of pleasure. In addition to speech they represent non-verbal desire, rage, self-defense, determination, and other emotions. The role of emotion in psychosomatic disorders such as headache, low back pain, and asthma is better understood than is its role in facial symptoms

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[1]L. J. Hurwitz, "Facial Pain of Non-Dental Origin," British Dental Journal (February 20, 1968), p. 167.

[2]A. P. Friedman, "Differential Diagnosis of Facial Pain," Dental Clinics of North America (Philadelphia: W. B. Saunders, 1966), p. 545.

[3]H. H. Merritt, Facial Pain and Mandibular Dysfunction (Philadelphia: W. B. Saunders, 1968), ed. L. Schwartz and C. M. Chayes, p. v.

according to Ruth Moulton.[4]

The sensation of pain begins with stimulation of nerve endings and proceeds, via neural pathways, to the perception of pain; which is, in the words of Moulton, "a value judgment of the cerebral cortex."[5] The threshold for perception of pain is constant in most people under similar circumstances; but, the reaction to original stimulation varies enormously. Anxiety alters response to pain or leads to an inference of pain when no lesion can be found as a basis for the pain.

A prominent cause of facial pain is dysfunction of the TMJ. Such dysfunction is common. Various surveys of routine dental patients have revealed subclinical involvement in 55 to 63 per cent of cases; 95 per cent of these, however, were unaware of their dysfunction stated Miller.[6]

Gerry has called particular attention to the fact that as in ambulatory gait, which is the most highly individual of all personal physical characteristics, there is a vast range of variation in mandibular movement or gait.[7] The

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[4]Ibid., p. 318. [5]Ibid., p. 320.

[6]Charles W. Miller, "The Temporomandibular Joint," Journal of the American Dental Association, XLIV (April, 1952), p. 387.

[7]Roger G. Gerry, "Mandibular Joint Disease of Kinesiopathic Origin," Journal Prosthetic Dentistry, XVI (March-April, 1966), p. 316.

extraordinary complexity of the TMJ and this great variety of movements make the incidence of dysfunction common.

The TMJ syndrome is usually characterized by a dull aching which is characteristic of deep pain. It is poorly localized but occasionally sharp, shooting pain is noted, anterior to the ear along the zygomatic arch into the tongue. Perry found that electromyography demonstrated a firing "spasm-like" discharge in supposedly "at rest" muscle which interpreted as proof of muscle spasm being the cause of deep pain.[8]

Horton, et al, have defined the vascular headache.[9] Sachs described facial pain due to eighth cranial nerve dysfunction.[10] Stemmer cited the role of dental pulpitis, periapical pathoses, traumatic arthritis, and rheumatoid arthritis in facial or ear pain.[11] He insisted that the TMJ syndrome was due to impingement of the auriculotemporal nerve while Cameron insisted that the pain was due to over-

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[8] H. T. Perry, Jr., "The Symptomatology of Temporomandibular Joint Disturbance," Journal Prosthetic Dentistry, XIX (March, 1968), p. 291.

[9] B. T. Horton, A. R. McLean, W. McK. Craig, "A New Syndrome of Vascular Headache; Results of Treatment with Histamine," Proceeding Staff Meeting Mayo Clinic, XIV (April, 1939), p. 257.

[10] E. Sachs, Jr., "The Role of the Nervus Intermedius in Facial Neuralgia," Journal Neurologic Surgery, XXVIII (January, 1968), p. 54.

[11] A. L. Stemmer, "Dental Otalgia," Laryngoscope, LXXVII (July, 1967), p. 1159.

closure of the bite. However, Harry Sicher has demonstrated that both of these views are anatomically untenable.[12] Webb and Lascelles,[13] Engel,[14] Henry Miller,[15] Hurwitz,[16] Kehoe,[17] Von Hagen,[18] and Friedman,[19] have set forth outstanding differential diagnosis studies on facial pain. John Whinery pointed out that the localization and projection of pain vary greatly from patient to patient.[20] Eric Kast made the observation that the assessment of pain is important in clinical medicine as a reflection of the degree of suffering. However, he also called attention to the fact that in

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[12]Harry Sicher, Oral Anatomy (St. Louis: C. V. Mosby, 1968), p. 497.

[13]H. E. Webb and R. G. Lascelles, "Facial Pain and Depression," Lancet, I (February, 1962), p. 355.

[14]G. L. Engel, "Primary Atypical Facial Neuralgia," Psychosomatic Medicine, XII (November-December, 1951), p. 375.

[15]Henry Miller, "Pain in the Face," British Medical Journal, II (June, 1968), p. 577.

[16]L. J. Hurwitz, "Facial Pain of Non-Dental Origin," British Dental Journal, CXXIV (February, 1968), p. 167.

[17]M. J. Kehoe, "Facial Pain," American Journal Psychiatry, XXIII (June, 1967), p. 1577.

[18]K. O. Von Hagen, "Facial Pain and Depression," Journal American Medical Association, XLXV (October, 1957), p. 773.

[19]A. P. Friedman, op. cit., p. 546.

[20]J. G. Whinery, "Examination of Patients with Facial Pain," Journal Oral Surgery, XXVI (February, 1968), p. 110.

pathological pain the degree of pain is only remotely related to input intensity. Verbal and non-verbal expression of pain form a Gestalt requiring observer evaluation.[21] Dachi gave an excellent system for the rapid evaluation of the patient in pain.[22] In relation to this Winnie and Collins pointed out that one of the most important functions of a pain clinic was the offering of a measure of differentiating sympathetic from somatic and central pain, whether the latter was psychogenic or organic.[23]

Modern life has seriously disturbed the balance between physical activity and emotional outlet stated Kraus.[24] There is no balance between exercise and tension. The normal organism responds to irritation in many ways, notably tensing of muscles. Muscles work by contracting. Giving up tension and relaxing is physiological. If muscles do not relax and residual tension remains, there is gradual increase to the point of severe spasm and pain which causes

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[21]E. C. Kast, "Clinical Measure of Pain," Medical Clinics of North America (Philadelphia: W. B. Saunders, March, 1968), p. 23.

[22]S. F. Dachi, "Rapid Evaluation of the Patient in Pain," Dental Clinics of North America (Philadelphia: W. B. Saunders, March, 1969), p. 3.

[23]A. P. Winnie and V. J. Collins, "Differential Neural Blockade in Pain Syndromes of Questional Etiology," Medical Clinics of North America (Philadelphia: W. H. Saunders, January, 1968), p. 123.

[24]Hans Kraus, "Facial Pain," Dental Clinics of North America (Philadelphia: W. B. Saunders, 1966), p. 553.

further contraction and pain. This was called a tensional charley-horse by Ruth Moulton.[25]

Facial pain may be symbolic of repressed rage and anger for which punishment is desired was expressed by Friedman.[26] Some patients hold the jaw forward for improved appearance; others speak thus. Clenching, grinding, gritting, lip-licking, tongue-thrusting were noted as abnormal patterns of behavior by Whinery.[27] While tongue-thrusting to obtain an anterior closure of the mouth may be adaptive behavior Berry also noted that clenching, bruxing and the like were non-adaptive behavior.[28]

Updegrave said that comprehensive roentgenographic study of the TMJ was essential prior to any clinical treatment, making the point that negative findings were of great value in diagnosis.[29]

Husted noted that there was general agreement that

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[25]Ruth E. Moulton, "Emotional Factors in Non-Organic Temporomandibular Joint Pain," in Facial Pain and Mandibular Dysfunction, ed. L. Schwartz and C. M.Chayes, (Philadelphia: W. B. Saunders, 1968), p. 615.

[26]A. P. Friedman, op. cit., p. 550.

[27]J. C. Whinery, op. cit., p. 113.

[28]D. C. Berry, "Facial Pain Related to Muscle Dysfunction," British Journal Oral Surgery, XXIV (march, 1967), p. 223.

[29]W. J. Updegrave, "Interpretation of Temporomandibular Joint Radiographs," Dental Clinics North America (Philadelphia: W. B. Saunders, 1968), p. 567.

surgical treatment of TMJ syndrome was rarely indicated, a departure from previous contentions.[30]

II. STUDIES ON NON-PSYCHOLOGICAL TREATMENT OF THE SYNDROME

While Stemmer relied on splinting of the bite to limit weight-bearing forces on the TMJ Cameron insisted on bite-opening devices to correct the underbite as his treatment of choice.[31] Treatment by a similar approach was advocated also by Miller.[32] Hans Kraus used drugs to relieve the pain, gentle limbering exercises and anesthetic sprays or injections; but, primarily upon other muscle groups than the TMJ.[33] Permanent oral rehabilitation by reconstruction of an opened bite as a follow-on to the use of bite-opening devices has been advocated by great numbers of practitioners on the basis of pain relief from splints. Sicher had reservations about this approach on a physiological and anatomical basis.[34]

For many years various surgical procedures including condylectomy, meniscectomy, and condylotomy were

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[30]E. Husted, "Surgical Management of Temporomandibular Joint Disorders," Dental Clinics North America (Philadelphia: W. B. Saunders, 1968), p. 601.

[31]B. M. Cameron, "Underbite and TMJ Pain," American Journal of Ortho-Psychiatry, IX (1967), p. 7; and Stemmer, op. cit., p. 1163.

[32]Miller, op. cit., p. 578. [33]Kraus, op. cit., p. 553.

[34]Sicher, op. cit., p. 500.

championed.[35] Husted noted that these procedures had fallen into disrepute.[36]

III. STUDIES ON PSYCHOLOGICAL TREATMENT OF THE SYNDROME

Von Hagen found marked benefits in the treatment of facial pain with electro-convulsive therapy and suggested the desired benefit was produced by relieving depression.[37] But Miller pointed out that in 50 per cent of his patients drugs relieved the depression but the pain persisted.[38] Webb and Lascelles used drugs to relieve depression with good results in relief of pain vis a vis placebo.[39]

While he admitted that psychogenic pain cannot be distinguished from physical pain, since both are "real," Friedman called attention to the fact that pain may be relieved by distraction, suggestion, hypnosis, and placebo as well as by drugs.[40] Moulton suggested consistent, slow, minimal, conservative treatment in a rational, cooperative atmosphere since most of her patients had life-long problems,

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[35]Fred A. Henny, "Surgical Procedures for the Relief of Pain," International Dental Journal, XVIII (March, 1968), p. 9.

[36]Husted, op. cit., p. 777.

[37]Von Hagen, op. cit., p. 777.

[38]Miller, op. cit., p. 580.

[39]Webb and Lascelles, op. cit., p. 356.

[40]Friedman, op. cit., p. 550.

showed rage, resentment, and controlled anger to avoid conflict.[41] Kehoe cautioned that psychosomatic relief or removal carried a grave risk of precipitating a more serious disorder; but, he suggested that symptomatic relief may be achieved without jeopardy in selected patients.[42] Engel noted consideration be given to prudently not removing symptoms if serious psychic illness is suspected to obviate the possibility of precipitating either psychosis or suicide.[43]

IV. STUDIED ON THE PERSONALITY INVENTORIES

The two inventories used in this study were well known standardized instruments: the Minnesota Multiphasic Personality Inventory (MMPI),[44] and the Cornell Medical Index (CMI).[45] Studies on their validity, reliability, normative data, and applicability are numerous in the literature. It was not the purpose of this study to consider these factors and they were not reviewed here. In addition,

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[41]Moulton, op. cit., p. 620.

[42]Kehoe, op. cit., p. 1581.

[43]Engel, op. cit., p. 396.

[44]S. R. Hathway and J. C. McKinley, Minnesota Multiphasic Personality Inventory Manual (New York: Psychological Corporation, 1951), pp. 1-31.

[45]A. Weider, H. G. Wolff, K. Brodman, B. Mittlemann, and D. Wechsler, Cornell Index Manual (New York: Psychological Corporation, 1949), pp. 1-8.

the Taylor Manifest Anxiety Scale (TAS), which is built into the Minnesota Multiphasic Personality Inventory (MMPI) was also utilized.[46]

V. SUMMARY

The TMJ syndrome is characterized by deep pain, usually in the side of the face, limited mandibular motion, and noise from the TMJ. The patients frequently show vicarious habits such as jaw thrusting forward, clenching, bruxing, unilateral chewing, and voluntary "popping" of the TMJ. There is usually tenderness to palpation over the TMJ. Discrepancies are frequently noted in the manner in which the patient's teeth meet when biting. No consistent physical findings on an anatomical basis are apparent. Study of the TMJ by roentgenography is almost invariably within normal limits. While the character of the pain may vary from constant to intermittent, sharp to dull, the patients invariably present with pain for which they seek treatment. To the patient the pain is real.

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[46]Janet Taylor, "The Manifest Anxiety Scale," Psychological Abstracts, XXVII (July, 1953), p. 28.

CHAPTER III

METHOD AND PROCEDURE OF RESEARCH

I. THE POPULATION

Fifty consecutive patients who had been referred for diagnosis and treatment of the TMJ syndrome were selected for this study. No restrictions on age or sex were imposed. All were military personnel or their dependents. The patients were all interviewed, examined, and treated by one investigator. The patients were interviewed and administered the personality instruments by the same clinical psychologist.

Twenty-six of the fifty consecutive patients in this study were females with ages ranging from two girls of fourteen years to a woman of fifty-four years. The range of the twenty-four male patients was nineteen to forty-seven years.

For the purposes of the study the patients were assigned numbers from 1 to 50 in the order in which they presented themselves initially to this investigator for treatment.

II. THE INSTRUMENTS

Temporomandibular joint history. A copy of this instrument is Appendix A. The TMJ history is a two page

instrument including many questions concerning the patient's medical history, ental history, and clinical evaluation of his present status. It also supplied the format for the clinical examination performed by the investigator.

Certain areas of the questionnaire or history and of the clinical examination, which was completed in a dental chair with mouth mirror and adequate lighting, were irrelevant to this study and are not commented on further. These areas, such as past medical history concerning venereal disease, tuberculosis, previous surgery, overbite, overjet, freeway space, gingivitis, tooth condition, were included in the history or the clinical examination to aid in disguising more pertinent areas to this study and to allow completion of a general clinical evaluation of each patient in the search for other pathology; since the examination was being performed at an opportune time for a general evaluation of the patient's oral condition. Data excerpted for study were: character of pain, presence of tenderness, unilateral mastication, mandibular protrusion, bruxing, clenching, voluntary popping, limitation of mandibular motion, and location of pain. Each of these factors were considered of importance to the study.

Minnesota Multiphasic Personality Inventory. This questionnaire is a psychometric instrument designed ultimately to provide, in a single test, scores on all the

more important aspects of personality. There are 550 statements, plus 16 duplications, totalling 566, which cover a wide range of subject matter; such as physical condition, morale, social attitudes, all of which statements may be answered by "yes," "no," or "cannot say." Personality characteristics may be assessed on the basis of scores on nine clinical scales developed originally for use in the inventory. While the scales are named according to the abnormal manifestations of the symptom complex, they have been shown to have meaning within the normal range. Individual scoring templates are used for each scale from the machine scored answer sheet. The MMPI was developed at the University of Minnesota and is published by the Psychological Corporation.

Many scales have been developed for use in the MMPI. However, this study utilized the four validity scales: Question, Lie, F, and K, plus the nine clinical scales. These are: 1 or Hs for hypochondriasis, 2 or D for depression, 3 or Hy for hysteria, 4 or Pd for psychopathic deviation, 5 or Mf for masculine/feminine interest, 6 or Pa for paranoia, 7 or Pt for psychasthenia, 8 or Sc for schizophrenia, and 9 or Ma for hypomania. The Taylor Manifest Anxiety Scale is also considered in this study. The TAS is a selected group of 45 items in the 550 statements of the MMPI. Brackbill and Little have shown high correlations

between the TAS and the nine clinical scales with a TAS-Pt correlation of .92.[1] Coleman and Collett have pointed out that only the MMPI of all personality tests has been shown to have validity.[2]

Profiles for all fifty patients were constructed. Scores on the actual scales will be presented in table form in Chapter IV. The actual profiles are not included in this study but may be constructed if desired from data herein.

Cornell Medical Index. This questionnaire was developed at Cornell University and is published by the Psychological Corporation. It consisted of 101 questions designed to be answered "yes" if the patient could answer yes and "no" if the patient had to answer no. The "normal" answers would all be "no." It was considered particularly damaging to answer "no" to questions 20, 69, 82, and 87. Other "loaded" questions were present and are indicated.

Form N2 was used in this study. The 101 questions were scaled: Fa for fear and inadequacy, Dep for depression, NA for nervousness and anxiety, NC for neurocirculatory

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[1]G. Brackbill and K. B. Little, "MMPI Correlates of the Taylor Manifest Anxiety Scale," Journal of Consulting Psychology, XVIII (1954), p. 433.

[2]W. Coleman and D. M. Collett, "Development and Application of Structured Tests of Personality," Review Educational Research (February, 1959), p. 58.

symptoms, SR for startle reaction, PS for psychosomatic symptoms, HY for hypochondriasis and asthenia, GI for gastrointestinal symptoms, SS for sensitivity and suspiciousness, and TP for troublesome psychopathy. A total score of all "no" answers was also used as well as the answers to the above listed key questions.

III. THE METHODOLOGY

The same sequence of events was followed for each patient. After initial clinical examination and completion of the TMJ History, the patient was referred for roentgenography of the TMJ's and administration of the MMPI, CMI, and TAS by the Clinical Psychologist.

Upon the return of the patient but before the results of the latter studies were available, all patients were treated according to a fixed routine or regimen. The treatment plan was not predicated upon the psychometric tests inasmuch as the results of such testing were not available until the treatment had been implemented.

The treatment plan consisted of patient-applied heat intermittently to the TMJ area, mastication of a soft diet with chewing limited to the same side of the mouth as the pain if the pain were unilateral, limitation of mouth opening to three-fourths inch in the anterior area, tongue exercises designed to add strength to the suprahyoid musculature of the

neck, technic development to prevent yawning, mild analgesics and muscle relaxants, and finally, most importantly, counseling of the patient to help him gain some insight into the problem he himself is quite possibly creating. Evaluation of treatment effectiveness was predicated upon the finding of pain relief.

Data is presented in tabular form. Selected background data of less than primary import was placed in the Appendix. Comparison studies were done correlating treatment plan effectiveness with the physical findings, and the MMPI, CMI, and TAS battery results.

The statistical technic deemed appropriate for examining the frequency data in the study was Chi square (x^2). The technic of Chi square was used to compare the fifty patients on the basis of their physical findings both as a total group and as a group evidencing the neurotic triad of the MMPI.

A further statistical analysis was performed using the *t*-ratio or *t*-test of the significance of the difference between sample means on the MMPI, the CMI, and the TAS; that is, the means of the "normal" patients compared to the means of the "abnormal" patients.

CHAPTER IV

FINDINGS

I. PHYSICAL FINDINGS

The pertinent physical findings noted in the clinical examination and TMJ History are summarized in Table I for the female patients and in Table II, page 25, for the male patients.

While all patients complained of pain the locale varied from face, ears, jaw, and head to a majority of twenty-eight with TMJ pain. Closely associated with the presence of pain but essential to be distinguished from it was the tenderness to palpation by the investigator. The examiner was able to elicit pain and tenderness to palpation in thirty-five patients.

The character of the pain differed in the patients. Pain was characterized as dull or sharp, constant or intermittent. Thirty-five patients complained of dull pain while twenty-nine suffered intermittent pain.

Limitation of motion refers to the patient's inability to drop his lower jaw to its usual depression. This limitation of motion was the result of the patient splinting or voluntarily restricting the use or motion of his mandible to prevent the increase in pain accompanying wider depression. It is important to point out once more that roentgenographic

TABLE I

PHYSICAL FINDINGS IN TWENTY-SIX FEMALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS

		Physical Findings							
Patient	Age	Pain Locale/ ? Tenderness	Pain Type	Motion Limited	Unilateral Chewing	Joint Noise	Bruxer/ Clencher	Thruster	Voluntary "Popper"
1	37	Face/Tender	C-S*	no	yes	yes	yes	no	no
4	39	Face/No	C-D	no	yes	no	no	yes	no
6	36	Ears/Tender	C-D	yes	yes	yes	yes	yes	yes
7	50	Jaw/Tender	I-S	yes	no	yes	no	yes	yes
9	14	Jaw/No	I-S	yes	no	no	yes	yes	no
14	31	Ear/Tender	C-D	no	no	no	no	yes	yes
16	39	Head/Tender	C-D	no	no	yes	no	yes	no
18	41	TMJ/No	I-S	no	yes	yes	no	yes	no
19	37	TMJ/Tender	I-D	no	no	yes	yes	yes	no
20	16	TMJ/No	I-D	no	no	yes	no	yes	yes
21	34	Face/Tender	C-D	yes	no	no	no	yes	no
22	45	Face/No	I-D	no	yes	no	no	yes	no
24	27	TMJ/Tender	I-D	yes	yes	no	yes	yes	no
26	21	TMJ/Tender	C-D	no	yes	yes	no	yes	yes
27	29	Face/Tender	C-S	yes	yes	no	yes	yes	no
28	14	TMJ/No	I-D	no	yes	yes	yes	yes	yes
30	16	TMJ/No	C-S	yes	yes	no	no	yes	no
32	22	TMJ/Tender	I-D	no	yes	yes	yes	yes	yes
35	54	Ear/Tender	C-D	yes	no	no	yes	yes	no
36	39	TMJ/Tender	C-D	no	yes	no	no	yes	yes
37	47	TMJ/Tender	I-D	no	no	yes	no	no	no
38	34	TMJ/Tender	I-D	no	yes	yes	yes	yes	yes
39	45	Ear/Tender	C-D	no	no	no	no	yes	no
41	31	TMJ/No	I-D	no	no	yes	no	no	no
47	20	TMJ/Tender	I-D	no	no	yes	no	yes	yes
49	25	Face/Tender	C-D	yes	no	no	no	yes	no

*Pain type: C = Constant; I = Intermittent; D = Dull; S = Sharp.

TABLE II

PHYSICAL FINDINGS IN TWENTY-FOUR MALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS

		Physical Findings							
Patient	Age	Pain Locale/ ? Tenderness	Pain Type	Motion Limited	Unilateral Chewing	Joint Noise	Bruxer/ Clencher	Thruster	Voluntary "Popper"
2	37	Face/No	C-D*	yes	no	yes	no	no	no
3	21	Ear/No	C-D	yes	no	no	no	no	no
5	20	Jaw/Tender	I-S	no	yes	yes	no	yes	no
8	28	Neck/Tender	C-D	yes	yes	yes	yes	no	yes
10	20	TMJ/Tender	I-D	no	no	yes	yes	yes	yes
11	21	TMJ/Tender	C-D	yes	yes	yes	no	yes	no
12	31	Ear/No	I-D	yes	no	yes	yes	no	no
13	22	TMJ/Tender	I-D	no	no	yes	no	yes	yes
15	24	Ear/Tender	I-D	no	no	yes	yes	yes	yes
17	21	TMJ/Tender	I-S	no	yes	no	no	no	yes
23	36	TMJ/No	I-S	no	yes	yes	no	yes	yes
25	21	TMJ/Tender	C-D	yes	no	yes	yes	yes	no
29	37	TMJ/Tender	I-D	yes	yes	yes	no	yes	yes
31	20	TMJ/Tender	I-D	yes	no	yes	yes	yes	yes
33	46	TMJ/Tender	C-D	yes	yes	yes	no	yes	yes
34	38	TMJ/No	I-D	yes	yes	yes	yes	no	yes
40	20	TMJ/Tender	I-S	yes	no	yes	no	no	yes
42	19	TMJ/Tender	C-S	yes	no	no	no	yes	no
43	39	Ear/Tender	I-S	yes	no	no	no	yes	yes
44	32	TMJ/No	I-D	no	no	no	no	no	no
45	23	TMJ/Tender	C-D	no	no	yes	yes	yes	yes
46	24	Ear/No	I-S	yes	yes	no	no	yes	no
48	21	TMJ/Tender	I-D	no	yes	yes	yes	yes	no
50	47	Face/Tender	I-S	yes	yes	no	yes	no	no

*Pain type: C = Constant; I = Intermittent; D = Dull; S = Sharp.

examination disclosed no organic TMJ disease in any patient. It was noted that 50 per cent of the patients had no mandibular motion limitation.

A slim majority of twenty-six were noted to use bilateral mastication. The remaining twenty-four chewed on one side of their mouth only.

A common finding in TMJ syndrome is a crackling, snapping noise, frequently audible across the room, emanating from one or both TMJ's as the patient opens his mouth or excurses the mandible. Thirty-one patients noted TMJ noise.

Clenching is the forceful biting of the teeth together, frequently seen in anger, frustration, determination, and like emotions. Bruxing is grinding of the teeth without a food bolus or other chewing substance present. It is seen frequently in sleep as well as while awake. The mechanism of clenching and bruxing is similar. As important physical findings they were grouped together in Tables I and II, pages 24 and 25. Twenty patients exhibited these habits.

Thrust is the habit pattern of projecting the mandible forward of its usual anatomic position. Thirty-eight patients showed thrusting.

The final physical finding considered is that of voluntary "popper." It is to be noted that this finding is not necessarily synonymous with noise in the TMJ. Some patients were noted to have noise from the TMJ upon

mandibular movement whether or not they attempted to produce the noise. Patients who voluntarily produced the noise or gave a history of so doing numbered twenty-three. These patients could do this at will and not necessarily accompanied by this self-induced pain.

Using the Chi square test for significance it was found that a significant difference to the .01 level was noted in patients exhibiting the pattern of thrusting, tenderness to palpation, and the experience of dull pain as compared to those not thrusting, non-tenderness to palpation, or those with sharp pain. These findings are indicated in Table III. A negative correlation was found in the incidence of clenching and bruxing.

II. PSYCHOLOGICAL DATA

Minnesota Multiphasic Personality Inventory findings. It was recognized that the true clinical usefulness and significance of the MMPI lies in the profile of each individual's score on each subscale. Therefore the totals of all patients' scores on any subscale is an artificial statistic as far as identifying any one patient as being different. However, as a means of identifying a group of patients as being statistically different from another group, it proved to be useful.

Table IV, page 29, listing female patients, and

TABLE III

COMPARISON OF FIFTY TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS ON THE BASIS OF PHYSICAL FINDINGS

Physical Findings	N	Per cent	Patients (N=50) x^2
Thrust	38	76	13.38[a]
Non-thrust	12	24	13.38[a]
Tenderness	36	72	8.82[a]
Non-tenderness	14	28	8.82[a]
Dull pain	35	70	7.72[a]
Sharp pain	15	30	7.72[a]
Noise	31	62	2.42
No noise	19	38	2.42
Intermittent pain	29	58	0.98
Constant pain	21	42	0.98
TMJ pain	28	56	0.50
pain elsewhere	22	44	0.50
Unilateral chewing	24	48	0.02
Bilateral chewing	26	52	0.02
Limited motion	24	48	0.02
Free motion	26	52	0.02
Clenching	17	34	4.50[b]
Non-clenching	33	66	4.50[b]
Bruxing	12	24	13.38[a]
Non-bruxing	38	76	13.38[a]

[a]This value was significant at the p .01 level of confidence.

[b]This value was significant at the p .05 level of confidence.

TABLE IV

CLINICAL SCALE SCORES ON THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY FOR TWENTY-SIX FEMALE TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

Patient Number	Minnesota Multiphasic Personality Inventory Clinical Scale Score													
	L	F	K	1	2	3	4	5	6	7	8	9	TAS	AGE
1	7	6	13	26	29	34	25	43	17	28	24	18	24	37
4	9	7	22	34	28	38	23	32	7	28	33	18	14	39
6	4	7	14	11	18	22	19	35	6	22	19	16	12	36
7	6	6	13	27	29	35	26	47	17	28	24	20	25	50
9	2	7	13	14	22	25	21	40	9	37	36	24	27	14
14	2	8	14	19	20	23	21	37	11	34	33	22	24	31
16	8	5	9	28	32	43	25	35	17	28	34	19	25	39
18	4	2	20	14	17	24	21	35	9	23	22	12	11	41
19	5	3	12	20	20	29	19	36	8	20	18	15	16	37
20	3	3	23	13	16	28	31	37	10	29	34	19	6	16
21	3	9	8	25	37	32	32	36	17	46	45	19	41	34
22	8	1	24	15	21	27	25	34	9	26	27	17	11	45
24	2	7	8	10	19	16	13	44	7	26	25	18	22	27
26	6	1	21	22	20	28	21	26	8	30	30	17	10	21
27	5	2	18	24	23	32	23	40	11	32	27	14	22	29
28	6	8	17	13	16	19	19	29	7	21	25	19	8	14
30	4	13	14	22	30	31	44	38	15	42	44	24	25	16
32	4	1	19	14	14	23	19	41	12	25	28	22	16	22
35	2	1	15	19	26	27	28	41	12	22	23	14	13	54
36	4	12	7	30	39	34	32	31	14	47	46	24	31	39
37	4	3	24	19	18	24	20	35	12	25	28	16	7	47
38	7	1	22	18	25	25	22	38	6	26	28	13	10	34
39	5	5	11	20	24	35	24	43	10	28	27	20	21	45
41	2	1	18	18	19	31	23	44	12	31	24	19	29	31
47	5	2	26	13	17	20	24	35	6	30	31	20	8	20
49	9	3	19	25	26	34	24	46	10	35	32	20	23	25

Table V listing male patients give the subscale score of each patient on the MMPI and include the TAS score of each patient.

While any particular subscale score may be beyond the range of "normal" limits, it is the total profile on all the scales that is significant for inferential diagnosis of the personality of any patient. No specific interpretation was placed on the figures of Tables IV and V. They are supplied for construction of a profile if desired by the reader.

The range of MMPI subscale scores, including the TAS is shown in Table VI, page 32. Male and female patients are in separate colums of the single table. The TAS may be considered separately from the profile subscales in the determination of personality characteristics.

Cornell Medical Index findings. The CMI subscales are given in Table VII, page 33, for female patients, and in Table VIII, page 34, for male patients. For convenience the subscale names are repeated here: FA is for fear and inadequacy, Dep for depression, NA for nervousness and anxiety, NC for neurocirculatory symptoms, SR for startle reaction, PS for psychosoatic symptoms, HY for hypochondriasis and asthenia, GI for gastrointestinal symptoms, SS for sensitivity and suspiciousness, and TP for troublesome psychopathy.

The "no's" column indicates the "no" answers to

TABLE V

CLINICAL SCALE SCORES ON THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY FOR TWENTY-FOUR MALE TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

Patient Number	Minnesota Multiphasic Personality Inventory Clinical Scale Score													
	L	F	K	1	2	3	4	5	6	7	8	9	TAS	AGE
2	7	6	12	14	23	25	23	25	11	26	15	13	18	37
3	5	6	19	17	27	25	31	16	12	29	33	15	12	21
5	4	2	16	13	31	25	33	25	8	33	28	25	15	20
8	0	5	18	18	10	24	24	24	5	27	23	20	11	28
10	3	6	18	15	14	27	24	16	11	23	21	26	6	20
11	4	1	23	18	19	27	32	26	9	24	26	13	5	21
12	6	4	24	14	22	24	28	21	7	26	26	19	5	31
13	3	7	8	14	15	22	18	23	10	30	34	27	25	22
15	4	9	11	10	24	24	26	33	13	28	23	17	24	24
17	7	4	27	16	17	24	24	23	12	28	30	20	3	21
23	4	0	21	24	21	33	23	22	10	30	25	20	20	36
25	5	4	12	18	18	31	24	20	7	21	27	27	7	21
29	7	4	11	21	28	22	16	29	9	28	17	17	19	37
31	4	9	7	19	25	25	22	23	16	39	50	30	34	20
33	3	3	15	18	17	17	19	29	13	27	22	10	15	46
34	6	4	26	16	23	24	29	21	9	28	30	17	5	38
40	8	2	15	16	14	25	19	21	7	28	22	20	20	20
42	5	7	10	17	26	25	30	27	18	40	43	25	29	19
43	7	1	15	8	12	18	20	22	12	20	16	25	9	39
44	5	0	19	12	19	23	26	21	9	22	21	18	6	32
45	2	11	6	6	21	12	19	21	8	22	27	20	16	23
46	8	5	19	15	17	18	27	16	6	23	32	26	7	24
48	2	3	19	14	16	19	18	16	5	25	22	21	5	21
50	6	2	18	17	22	29	25	20	10	24	26	17	5	47

TABLE VI

RANGE OF CLINICAL SCALE SCORES IN THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY FOR FIFTY TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

MMPI Scale		Range of Fifty Temporomandibular Joint Syndrome Patients' Scale Scores	
		Male (N=24)	Female (N=26)
L	Validity	0 to 8	2 to 9
F	Validity	0 to 11	1 to 13
K	Validity	6 to 27	7 to 26
1	Hypochondriasis	6 to 24	10 to 34
2	Depression	10 to 31	16 to 39
3	Hysteria	12 to 33	16 to 43
4	Psychopathic Deviation	16 to 33	13 to 44
5	Masculine/feminine Interest	16 to 33	26 to 47
6	Paranoia	5 to 18	6 to 17
7	Psychasthenia	20 to 40	20 to 47
8	Schizophrenia	12 to 24	18 to 46
9	Hypomania	13 to 30	12 to 24
TAS	Taylor Anxiety	3 to 34	6 to 41

TABLE VII

SUBSCALE SCORES IN THE CORNELL MEDICAL INDEX FOR TWENTY-SIX FEMALE TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

Patient Number	Cornell Medical Index Subscale Score											
	FA	Dep	NA	NC	SR	PS	HY	GI	SS	TP	Total	No's
1	6	3	2	1	1	5	3	5	1	0	27	20,69,82
4	2	0	1	5	1	3	2	3	0	0	17	
6	2	0	1	1	0	2	0	2	0	0	8	
7	6	4	2	1	0	6	2	5	1	0	27	20,69,82
9	9	0	4	0	5	3	3	0	1	1	26	69
14	1	0	5	1	2	2	1	6	1	0	19	20
16	12	3	5	4	4	8	4	2	2	2	46	69,82
18	1	0	0	0	1	2	0	2	0	0	6	
19	3	0	1	2	1	2	1	1	0	0	11	82
20	0	0	0	0	0	0	0	0	0	0	0	
21	16	6	4	2	6	5	6	5	4	6	61	20,69,82
22	0	0	0	0	0	1	0	1	0	0	2	
24	2	1	1	1	2	2	2	3	0	1	15	
26	0	0	1	0	0	0	1	2	0	1	5	
27	4	1	3	0	3	2	2	1	1	0	17	69
28	2	1	2	0	0	1	1	0	0	0	7	
30	4	1	2	2	1	1	2	2	1	2	18	
32	2	0	1	0	0	0	1	1	0	0	5	
35	3	1	1	0	0	0	2	3	0	0	10	
36	12	4	4	2	4	6	3	3	2	5	55	20,82
37	0	0	0	0	0	0	0	1	0	0	1	82
38	0	0	0	0	0	1	1	0	0	0	2	
39	1	0	2	3	1	3	0	0	0	1	11	69
41	3	0	3	0	3	1	2	4	0	0	16	
47	1	0	0	0	0	0	1	1	0	0	3	
49	1	0	1	1	1	4	4	3	0	1	16	87

TABLE VIII

SUBSCALE SCORES IN THE CORNELL MEDICAL INDEX FOR TWENTY-FOUR MALE TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

Patient Number	Cornell Medical Index Subscale Score											
	FA	DEP	NA	NC	SR	PS	HY	GI	SS	TP	Total	No's
2	0	0	1	2	0	0	1	2	0	0	6	
3	7	3	1	2	4	1	1	2	2	2	25	20
5	1	0	0	0	0	0	0	1	1	1	4	82,87
8	3	0	0	0	2	3	1	2	0	0	11	
10	1	1	1	0	0	1	1	0	0	0	5	
11	0	0	0	0	0	1	0	1	0	0	2	
12	0	0	1	1	1	0	0	1	0	1	5	87
13	3	1	1	1	3	0	0	1	2	1	13	81,82
15	0	2	3	0	1	1	1	0	0	1	9	20,81,87
17	0	0	0	0	0	0	0	2	0	0	2	69
23	2	1	2	2	0	2	2	4	0	0	15	20,69
25	2	0	2	0	2	3	1	1	0	2	13	
29	1	0	3	0	0	1	2	4	0	0	11	
31	6	3	4	2	1	3	3	2	1	1	26	82
33	3	2	1	1	2	1	1	1	1	1	14	
34	0	0	0	0	0	0	0	1	0	0	1	
40	3	1	1	0	0	1	1	0	1	0	8	69,82,87
42	3	3	1	0	1	0	1	0	0	2	11	69
43	1	0	0	0	0	0	0	0	0	0	1	
44	0	1	0	0	0	0	1	1	0	0	3	20
45	7	2	2	1	1	2	1	1	1	2	20	20,87
46	0	0	0	0	1	0	0	1	0	1	3	
48	1	0	0	2	0	1	2	1	0	0	7	
50	0	0	0	0	0	2	0	1	0	0	3	

certain questions deemed significant in the CMI. Unlike the MMPI, wherein scale scores are positive numbers at different levels depending on the scale, the CMI ideal score on any subscales and on the total of all scales would be zero. The desired score would be zero.

A very wide range from zero to 16 was noted in the FA scale in the female patients compared to zero to 7 in the males. Marked sex difference in total subscale scores was noted also in the NA scale with total female scores of 46 compared to a total of 24 in the male patients; in the PS scale with total female scores of 60 compared to a total of 23 in the males; in the HY scale with total female scores of 44 compared to male scores of 20; and in the CI scale with females scoring a total of 56 to the male total of 30. Less marked difference occurred in the NC scale with females scoring 26 to males scoring 14, in the SR scale with females scoring 36 to males scoring 19, in the SS scale with females leading 14 to 9 and the TP scale with the females leading the males 20 to 15. Females outscored in all scales.

III. RELATIONSHIPS OF PHYSICAL AND PERSONALITY CHARACTERISTICS

The neurotic triad, or "psychosomatic valley," is a relative elevation of the MMPI 1 and 3 scales with depression of the 2 scale. Applying the Chi square test to relate

physical findings occurring in the twenty-eight patients demonstrating the neurotic triad, the only significant relations, to the .05 level of significance, were thrust, tenderness to palpation, and non-bruxing. These findings are detailed in Table IX.

On the basis of the MMPI profiles and CMI scores, the personality characteristics of the fifty patients were determined by the Clinical Psychologist. Ten of the fifty patients were categorized as "normal" in the personality integration. The remaining forty patients were categorized as "abnormal." These two groups, in the remainder of the study were then labelled as the "normal" group and as the "abnormal" group. The basis for the division of these groups was the MMPI, the CMI, and the TAS scores. The physical findings and the TMJ History were not made available to the Clinical Psychologist nor were her findings made known to the treating clinician. The personality characteristics are summarized in Tables X and XI, pages 38 and 39.

Patients numbered 2, 10, 11, 12, 22 34, 37, 44, 48, and 50 were considered "normal." Of these ten patients eight were male and two were female. Thus twenty-four of twenty-six female patients were considered "abnormal" and sixteen of the twenty-four male patients were considered "abnormal."

TABLE IX

COMPARISON OF FIFTY TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS ON THE BASIS OF PHYSICAL FINDINGS AND NEUROTIC TRIAD

Physical Findings	Patients	Physical Findings	Patients	Chi Square
Thrust	21	Non-thrust	7	6.04[a]
Tenderness	21	Non-tender	7	6.04[a]
Non-bruxer	8	Bruxer	20	4.32[a]
Non-clencher	9	Clencher	19	2.89
Noise	18	No-noise	10	1.75
Dull pain	18	Sharp pain	10	1.75
Intermittent pain	16	Constant pain	12	0,32
Limited motion	10	Non-limited motion	18	1.75
TMJ pain	15	Pain elsewhere	13	0.036
Unilateral chewing	15	Bilateral chewing	13	0.036

[a]This value was significant at the p .05 level of confidence.

TABLE X

SUMMARY OF PERSONALITY CHARACTERISTICS OF TWENTY-SIX FEMALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS EVIDENCED BY MINNESOTA MULTIPHASIC PERSONALITY INVENTORY AND CORNELL MEDICAL INDEX

No.	Characteristics	Age	TAS	CMI	Neurotic Triad
1	Poor appetite, paranoid	37	24	27	yes
4	Schizoid	39	14	17	yes
6	Depression	36	12	8	no
7	Severe anxiety, paranoid	50	25	27	yes
9	Severe anxiety, poor appetite	14	27	26	no
14	Loner, anxiety	31	24	19	yes
16	Poor appetite, paranoid	39	25	46	yes
18	Hostility, instability	41	11	6	yes
19	Hostility, instability	37	16	11	yes
20	Instability	16	6	0	no
21	Schizoid, paranoid, depressed	34	41	61	no
22	Normal	45	11	2	yes
24	Anxiety, depression	27	22	15	no
26	Confused identity	21	10	5	yes
27	Passive insecurity	29	22	17	yes
28	Confused identity, passive	14	8	7	yes
30	Instability	16	25	18	no
32	Inconsistent, seclusive	22	16	5	yes
35	Inadequate	54	13	10	no
36	Disabling anxiety	39	31	55	no
37	Normal	47	7	1	yes
38	Passive insecurity	34	10	2	no
39	Anxiety, poor appetite	45	21	11	yes
41	Anxiety, poor appetite	31	29	16	yes
47	Pathologically anxiety-free	20	8	3	no
49	Schizoid	25	23	16	yes

NOTE: TAS indicates the score on the Taylor Anxiety Scale of the Minnesota Multiphasic Personality Inventory. CMI indicates the score total on the Cornell Medical Index. The Neurotic Triad indicates elevation of Scales 1 and 3 with relative depression of Scale 2 of the MMPI.

TABLE XI

SUMMARY OF PERSONALITY CHARACTERISTICS OF TWENTY-FOUR MALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS EVIDENCED BY MINNESOTA MULTIPHASIC PERSONALITY INVENTORY AND CORNELL MEDICAL INDEX

No.	Characteristics	Age	TAS	CMI	Neurotic Triad
2	Normal	37	18	6	no
3	Lability, instability	21	12	25	no
5	Depressed instability	20	15	4	no
8	Anxiety	28	11	11	yes
10	Hyperactivity-Normal	20	6	5	yes
11	Normal	21	5	2	yes
12	Normal	31	5	5	no
13	Anxiety, Seclusiveness	22	25	13	yes
15	Depressed anxiety	24	24	9	no
17	Marked defensive anxiety	21	3	2	yes
23	Depressed psychosomaticism	36	20	15	yes
25	Hysterical hostility	21	7	13	yes
29	Depressed anxiety	37	19	11	no
31	Severe schizoid, hostility	20	34	26	no
33	Depression	46	15	14	no
34	Normal	38	5	1	no
40	Poor appetite, anxiety	20	20	8	yes
42	Severe anxiety	19	29	11	no
43	Hyperactivity, paranoid	39	9	1	yes
44	Normal	32	6	3	no
45	Neurotic anxiety	23	16	20	no
46	Hostility, seclusiveness	24	7	3	yes
48	Normal	21	5	7	yes
50	Normal	47	5	3	yes

NOTE: TAS indicated the score on the Taylor Anxiety Scale of the Minnesota Multiphasic Personality Inventory. CMI indicated the score total on the Cornell Medical Index. The Neurotic Triad indicates elevation of Scales 1 and 3 with relative depression of Scale 2 of the MMPI.

IV. RELATIONSHIPS OF TREATMENT RESPONSE AND PERSONALITY CHARACTERISTICS

The results of treatment are shown in Table XII for the twenty-six female patients. It was found that one of the two "normal" female patients responded to the standardized treatment. This was patient 22. The other female patient, 37, did not respond to treatment and continued to have pain.

Table XIII, page 42, summarizes the results of treatment for the twenty-four male patients. It was found that one of the eight male patients considered to be "normal" responded to the standardized treatment and became free of pain. This was patient 48. A second patient, 10, gave a fair response and was slowly relieved of pain. Of the remaining six patients considered "normal," four required surgical procedures to relieve the pain and two required prosthetic appliances. The four surgical patients were 2, 11, 44, and 50. The patients requiring prostheses were 12 and 34.

It was found that all patients who were considered "abnormal" on the basis of the MMPI, CMI, and TAS responded to the standardized treatment and were rendered free of pain.

The two "normal" female patients exhibited the MMPI "neurotic triad," but had TAS scores of 7 and 11 and CMI scores totalling 2 and 11. The eight "normal" male patients exhibited the MMPI neurotic triad in four cases. The TAS

TABLE XII

RESULTS OF TREATMENT IN TWENTY-SIX FEMALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Patient	Pain Duration	Response to Past Treatment	Past Treatment	Results of Current Treatment
1	15 years	unfavorable	equilibration	good response- free of pain
4	2 years	unfavorable	splints	good response- free of pain
6	1 month	unfavorable	analgesics	good response- free of pain
7	3 weeks	-	no treatment	good response- free of pain
9	9 months	-	no treatment	good response- free of pain
14	1 year	unfavorable	analgesics	good response- free of pain
16	3 days	unfavorable	analgesics	good response- free of pain
18	2 months	slight improvement	equilibration	good response- free of pain
19	"years"	unfavorable	equilibration	good response- free of pain
20	1 month	-	no treatment	good response- free of pain
21	"years"	unfavorable	loss of all teeth	good response- free of pain
22*	1 month	-	no treatment	good response- free of pain
24	9 months	unfavorable	analgesics	good response- free of pain
26	"years"	-	no treatment	good response- free of pain
27	3 months	unfavorable	splints	good response- free of pain
28	6 months	-	no treatment	good response- free of pain
30	4 weeks	-	no treatment	good response- free of pain
32	18 months	-	no treatment	good response- free of pain
35	6 months	-	no treatment	good response- free of pain
36	1 year	-	no treatment	good response- free of pain
37*	6 months	unfavorable	equilibration	poor response- persistent pain
38	5 years	unfavorable	analgesics	good response- free of pain
39	4 months	unfavorable	analgesics	good response- free of pain
41	7 years	some alleviation	equilibration	good response- free of pain
47	6 months	unfavorable	equilibration	good response- free of pain
49	18 months	-	no treatment	good response- free of pain

*indicates patients categorized as "normal" by the Clinical Psychologist.

TABLE XIII

RESULTS OF TREATMENT IN TWENTY-FOUR MALE TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Patient	Pain Duration	Response to Past Treatment	Past Treatment	Results of Current Treatment
2*	1 month	unfavorable	analgesics	required surgery to free of pain
3	2 years	unfavorable	analgesics	good response-free of pain
5	"years"	unfavorable	analgesics	good response-free of pain
8	3 weeks	unfavorable	analgesics	good response-free of pain
10*	1 year	unfavorable	bite adjustment	fair response-slow pain relief
11*	18 months	-	no treatment	required surgery to free of pain
12*	6 years	unfavorable	splints	required prostheses for relief
13	1 year	unfavorable	analgesics	good response-free of pain
15	2 months	unfavorable	analgesics	good response-free of pain
17	1 year	some improvement	bite adjustment	good response-free of pain
23	6 months	-	no treatment	good response-free of pain
25	3 weeks	unfavorable	analgesics	good response-free of pain
29	6 months	unfavorable	analgesics	good response-free of pain
31	3 months	unfavorable	analgesics	good response-free of pain
33	3 days	-	no treatment	good response-free of pain
34*	5 weeks	-	no treatment	required prostheses for relief
40	2 weeks	unfavorable	analgesics	good response-free of pain
42	7 months	unfavorable	analgesics	good response-free of pain
44*	"years"	-	no treatment	required surgery to free of pain
45	3 years	-	no treatment	good response-free of pain
46	4months	unfavorable	bite adjustment	good response-free of pain
48*	5 months	-	no treatment	good response-free of pain
50*	2 years	unfavorable	bite adjustment	required surgery to free of pain

*indicates patients categorized as "normal" by the Clinical Psychologist.

was 18, well elevated in case 2, the other seven were either 5 or 6 on the TAS. The CMI range for the eight was 1 to 7 with a mean of 4, all very much in the normal range. These figures are seen in Tables IX and X on pages 37 and 38 respectively.

The total CMI mean score for the "normal" group was found to be 3.5 while the total CMI mean score for the "abnormal" group was found to be 15.35. The total CMI mean score for all fifty patients was 12.62. These findings are presented in Table XIV. The difference in the total CMI mean scores for the "normal" and the "abnormal" were significant to the .01 level of significance on the basis of the t-test findings shown in Table XV, page 45.

The ten "normal" patients had a mean TAS of 7.30 while the "abnormal" group showed a mean TAS score of 18.23. The difference in the TAS mean scores of the "normal" group and the "abnormal" group were significant to the .01 level of significance on the basis of the t-test findings shown in Table XV, page 45.

An analysis using the t-test was done on the differences in the mean scores of the "normal" and "abnormal" groups on all of the subscales of the MMPI. The only significant difference in the means of the two groups was found, to the .05 level of significance, in the F scale. The F scale is a validity scale for the whole inventory. A

TABLE XIV

MEANS OF CORNELL MEDICAL INDEX SUBSCALES
IN FIFTY TEMPOROMANDIBULAR JOINT
SYNDROME PATIENTS

Patient Groups	Cornell Medical Index Subscales									
	FA	DEP	NA	NC	SR	PS	HY	GI	SS	TP
"normal"	0.2	0.2	0.3	0.5	0.1	0.6	0.5	1.0	0.0	0.1
"abnormal"	3.33	1.05	1.63	0.88	1.35	1.9	1.45	1.9	0.58	0.85
total	2.7	.88	1.36	0.80	1.1	1.64	1.26	1.72	0.46	0.70

The TOTAL CMI Mean score was 12.62.
The TOTAL CMI Mean score for the normal group was 3.5.
The TOTAL CMI Mean score for the abnormal group was 15.35.

TABLE XV

t-TEST ANALYSIS OF SIGNIFICANCE OF MEAN DIFFERENCES IN NORMAL AND ABNORMAL GROUPS IN TAS AND CMI SCORES

Patient Groups	TAS Mean	CMI Mean	STD	t-Test Value
"normal"	7.300		7.1484	2.9267[a]
"abnormal"	18.225		17.9436	
"normal"		3.5000	3.1180	4.5200[a]
"abnormal"		15.3500	15.0306	

[a]This value was significant at the p .01 level of confidence.

high F score means an invalid MMPI. It is to be noted that the norms are 6 to 7 significant responses of the sixty-four items in the scale. The "abnormal" group mean F scale was 4.97 while the "normal" group mean was 2.7. These low F scores indicate rational, relatively pertinent records showing response conformity. These findings are noted in Table XVI.

The means of CMI subscales are shown in Table XIV, page 44. These are followed with Table XVII, page 48, reflecting the MMPI subscale means for comparison. The remaining Tables showing data of minor significance and statistical analyses are contained in Appendix B.

V. SUMMARY

All fifty patients complained of pain. Ten patients were grouped as "normal" while the remaining forty were categorized as "abnormal." The ten normals were two women and eight men. One woman responded to the standardized treatment plan and one woman did not respond. Of the eight normal men four required surgical treatment, two required prostheses, and two responded to standardized treatment, although one responded slowly. The forty patients classed as "abnormal" all responded to the standardized conservative treatment plan.

The two normal females exhibited the neurotic triad of

TABLE XVI

t-TEST ANALYSIS OF SIGNIFICANCE OF MEAN DIFFERENCES IN NORMAL AND ABNORMAL GROUPS IN MMPI SUBSCALE SCORE

MMPI Scale	"Normal" Mean	"Abnormal" Mean	"Normal" STD	"Abnormal" STD	*t*-Test Value
L	4.7000	4.7500	4.3957	4.2742	0.0309
F	2.7000	4.9750	2.2583	4.5036	2.1823[a]
K	20.7000	15.1750	21.2861	14.8533	-0.7382
1	15.4000	18.2250	15.6791	17.9436	0.4732
2	19.7000	22.2250	20.2317	21.9959	0.3318
3	24.9000	26.4500	25.7144	26.2757	0.1623
4	24.0000	23.8500	24.7655	23.6420	-0.0165
5	23.5000	32.0750	24.2383	31.9732	0.8964
6	9.2000	10.8500	9.1554	10.4696	0.4738
7	24.9000	29.2750	25.7144	29.1371	0.4483
8	24.2000	29.1000	24.9764	28.9599	0.5141
9	17.7000	19.7500	18.1227	19.4886	0.3014

[a]This value was significant at the p .05 level of confidence.

TABLE XVII

MEANS OF MINNESOTA MULTIPHASIC PERSONALITY INVENTORY SCALES IN FIFTY TEMPOROMANDIBULAR JOINT SYNDROME PATIENTS

MMPI Scales	MEAN Subscale Scores of Fifty Patients		
	Total (N=50)	"Normal" (N=10)	"Abnormal" (N=40)
L	4.74	4.70	4.75
F	4.52	2.70	4.98
K	16.28	20.70	15.18
1	17.66	15.40	18.23
2	21.72	19.70	22.23
3	26.14	24.90	26.45
4	23.88	24.00	23.85
5	30.36	23.50	32.08
6	10.32	9.20	10.60
7	28.40	24.90	29.28
8	28.12	24.20	29.10
9	19.34	17.70	19.75
TAS*	16.04	7.30	18.23

*Taylor Anxiety Scale

the MMPI. Four of the eight normal males also exhibited the neurotic triad. Thus six of the ten normal patients showed the triad while twenty-eight of the total of fifty patients showed the triad.

A mean of 9 was found for the normal female patients on the TAS. A mean of 6.9 was found for the normal male patients. The mean for the ten normal patients on the TAS was found to be 7.3.

A mean of 1.5 was found for the normal female patients on the CMI total score. A mean of 4.0 was found for the eight normal male patients on the CMI total score. Thus the mean CMI total for the ten normal patients was 3.5.

The finding of a mean of 18.23 for the forty abnormal patients on the TAS was noted. A mean of 15.35 was found for the forty abnormal patients on the CMI total score. The normal group showed an elevated K scale mean of 20.70 as opposed to the abnormal group score of 15.18. This difference was not significantly supported in the t-test however.

Frequency distribution tables of the MMPI and CMI scores are presented in Tables XVIII and XIX, Appendix B.

The neurotic triad of the MMPI did not correlate with an elevated TAS nor with an elevated CMI total; the twenty-two patients with negative neurotic triads scored a higher TAS mean. See Table XX, Appendix B, for these findings.

Using a TAS of 11 as the normal/abnormal division, a difference was found between TAS means and all CMI subscales with only one patient with a CMI/TAS of less than 10.

The CMI and TAS scales were significantly different for the normal group and distinguished these patients as different from the abnormal group.

Response to treatment correlated highly with distinction between the groups: the "abnormal" group responded 100 per cent to conservative therapy, which included counseling these patients to help them to gain insight into the problem. Of the "normal" patients, only three of the ten responded to the conservative treatment, four eventually requiring surgery and two prostheses for the relief of their pain. One "normal" patient was not helped.

The "Normal" group showed a mean of 46 years age for the females and 30.9 for the males. The "abnormal" group had a mean of 31.3 years for the female age and male age mean of 26.6 as noted in Table XXV, Appendix B.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

I. CONCLUSIONS

On the basis of the MMPI profile, the TAS score, and the CMI score, a Clinical Psychologist characterized fifty consecutive TMJ pain syndrome patients as "normal" (ten patients) or as "abnormal" (forty patients) in personality characteristics.

On the basis of response to conservative treatment: counseling, corrective exercises, and noxious habit inhibition, the patients were divided into two categories. Forty-three responded to the conservative treatment and became free of pain. Of the remaining seven, four responded to surgery, two to prostheses, and one failed to respond. All forty "abnormal" patients and three "normal" patients responded to conservative therapy.

It was concluded that the MMPI, the TAS, and the CMI, as a battery, were highly effective in separating these two categories of patients with facial pain who were without apparent physical bases.

It was concluded that the "neurotic triad" was ineffective as a means of separating the two groups.

It was suggested by the findings that in 80 per cent of fifty consecutive TMJ pain syndrome patients with facial

pain, all who exhibited "abnormal" personality characteristics in the test battery of MMPI, TAS, and CMI, psychogenic factors were underlying the disorder.

Six per cent of the "normal" patients responded to conservative treatment. Whether or not a psychogenic basis underlay their disorder was not proved. While 14 per cent failed to respond to counseling therapy it was strongly inferred that there was an organic basis to their disorder inasmuch as the test battery denoted them all as "normal" and six of the seven did respond to surgery or prosthesis therapy.

II. RECOMMENDATIONS

It was the recommendation of the investigator that a larger series of patients be studied inasmuch as the findings of this study apply only to fifty patients.

It was also recommended that the CMI and TAS alone be investigated without the full MMPI profile in the hope that the interpretation difficulties of the profile be eliminated if the TAS/CMI battery proved discriminatory.

It was further recommended that more objectivity be injected into a future study be having the interpretation of the TAS/CMI and MMPI battery done by a Clinical Psychologist other than the one who administered the battery. A further recommendation in the same vein would apply to the clinical

examiner and diagnostician/therapist being two different investigators. Thus the treatment phase would be divorced from the diagnosis phase.

It would appear from this study that further investigation is warranted into the field of personality testing in patients presenting with facial pain due to other than obvious clinical causes.

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TEMPOROMANDIBULAR JOINT HISTORY

Date_____ Referred by:_____

Name_____ Age____ Sex____ Race_____

Chief Complaint:

History of Complaint: Present General Health:

Past Medical History:

Venereal Disease_____	Regional Infections_____	Previous
Tuberculosis_____	Bursitis_____	Surgery____
Rheumatic Fever_____	Edema of Joints_____	Head & Neck
Arthritis_____	Neuralgia_____	Injuries___

Previous Treatment:
Results of Treatment:
Examination:

Maximum Depression_____	Pain on Maximum Depression_____
Deviation on Depression___	Pain on Lateral Excursion_____
Left Lateral Excursion____	Pain on Clenching_____
Right Lateral Excursion___	Pain on Clenching When Bite
Type Depression_____	Open_____
Same Side_____	ContraLateral Side_____

Location of Pain____TMJ____Masseter____Internal Pterygoid____Mandible____Neck____Ear____Temporal Area_____ Throat____Other____

Type of Pain:
Severe___Moderate___Slight___Continuous___Intermittent_____
Spasmodic___Sharp___Dull___Burning___

Abnormality Perceived by Examiner:
Pain____ Noise____ Tenderness____
Where Occurs:
Beyond tubercle:___ At Tubercle___ Between Tubercle and Rest___ Between Rest and Initial Contact___ Between Initial and Closure___
Limitation of Motion_____

Abnormal Habits:

Unilateral Mastication___	Voluntary "Popping"_____
Protrusion-Thrust_____	Grinding Particular Area_____
Bruxism_____	Other_____
Clenching_____	

Dentition:
Missing Teeth_____
Reason for Loss_____ Length of Time to Replace_____
Prematurities_____ Deviation Due to_____
Occlusion Class___ Overbite___ Overjet___ Freeway Space_____
Midline Deviation___ Type Prosthesis_____ Adequacy_____

Soft Tissue:
Cingivitis_____ Impactions_____ Cheek Biting_____
Impingement_____

Roentgenographic Findings_____

Clinical Impressions_____

Treatment Plan and Response:

TABLE XVIII

FREQUENCY DISTRIBUTION OF CLINICAL SCALE SCORES OF THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY IN FIFTY TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Raw Scores + K	Minnesota Multiphasic Personality Inventory Clinical Subscales										
	K	1	2	3	4	5	6	7	8	9	TAS
50-54									1		
45-49						2		2	2		
40-44				1	1	8		2	2		
35-39			2	3		11 (1)		3	1		1
30-34		2	3	9	6	4 (1)		8	12 (1)	1	2
25-29	3 (1)	5	10	16	11 (5)	8 (2)		22 (6)	15 (5)	7 (1)	7
20-24	10 (4)	7	14 (5)	14 (5)	21 (4)	13 (4)		13 (4)	12 (3)	15 (1)	9
15-19	17 (4)	19 (6)	16 (4)	6 (4)	10 (1)	4 (2)	7		5 (1)	20 (6)	7 (1)
10-14	13 (1)	15 (4)	5 (1)	1 (1)	1		20 (4)			7 (2)	9 (1)
5-9	7	2					23 (6)				14 (8)
0-4											1

NOTE: The number of patients indicated in parentheses are those categorized as "normal" in the MMPI profile by the Clinical Psychologist. Nine of these ten normal patients had K scores above the mean of all fifty patients. The mean for N=50 patients and N=10 patients in each of the scales is indicated:

N=50	16.28	17.66	21.72	26.14	27.88	30.36	10.32	28.40	28.12	19.34	16.04
N=10	20.70	15.40	19.70	24.90	24.00	23.50	9.20	24.90	24.20	17.70	7.30

TABLE XIX

FREQUENCY DISTRIBUTION OF CORNELL MEDICAL INDEX SCORES IN FIFTY TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Number of Significant Answers	N = 50* Cornell Medical Index Subscales									
	FA	DEP	NA	NC	SR	PS	HY	CI	SS	TP
16	1									
15										
14										
13										
12	2									
11										
10										
9	1									
8						1				
7	2									
6	3	1			1	2	1	1		1
5				1	1	2		3		1
4	2	2	4	1	3	1	2	3	1	
3	8	5	4	1	3	6	4	5		
2	6	3	8	9 (2)	5	9 (2)	10 (1)	10 (1)	4	6
1	10 (2)	10 (2)	16 (3)	10 (1)	13 (1)	13 (4)	18 (3)	18 (8)	11	12 (1)
0	14 (8)	29 (8)	16 (7)	28 (7)	24 (9)	16 (5)	15 (6)	10 (1)	34 (10)	30 (9)

*Numbers in parentheses indicate the distribution of the ten "normal" patients classified on the basis of their MMPI profiles.

TABLE XX

A COMPARISON OF TAYLOR ANXIETY SCALE SCORES WITH CORNELL MEDICAL INDEX SIGNIFICANT "NO" SCORES IN FIFTY TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Significant CMI number	Patients Answering "No"	Mean TAS	TMPI "Normal" in total
20-Do you usually feel cheerful and happy?	10	22.3	1 (TAS=6)
69-Is your appetite good?	11	21.64	
82-Have you usually been treated fairly?	11	23.90	1 (TAS=7)
87-Do you make friends easily?	6	19.14	1 (TAS=5)

TABLE XXI

MINNESOTA MULTIPHASIC PERSONALITY INVENTORY NEUROTIC TRIAD, CORNELL MEDICAL INDEX, AND TAYLOR ANXIETY SCALE SCORES IN FIFTY TEMPOROMANDIBULAR JOINT PAIN PATIENTS

TMJ Patients		Mean TAS	CMI Total Score Mean
Positive Neurotic Triad ("Psychosomatic Valley")	(N=28)	14.89	11.20
Negative Neurotic Triad	(N=22)	17.87	27.75
Positive and Negative	(N=50)	16.04	12.98
TAS of 11 and greater	(N=33)	20.91	*
TAS of 10 and smaller	(N=17)	6.59	*

NOTE: Borderline anxiety is eleven on the TAS and also on the CMI.

*Of fifty patients, twenty-five were below 11 on the CMI and twenty-five of fifty were above the 11 on the CMI.

TABLE XXII

COMPARISON OF CORNELL MEDICAL INDEX AND TAYLOR ANXIETY SCALE SCORES ON THE BASIS OF THE PHYSICAL FINDINGS IN FIFTY PATIENTS WITH TEMPOROMANDIBULAR JOINT PAIN SYNDROME

Physical Findings in N=50 patients	Mean TAS	Mean CMI	Total CMI "No's"
Thrust (N=38)	16.82	13.63	29
Non-thrust (N=12)	12.08	10.33	11
Joint Noise (N=31)	12.00	10.55	26
No Noise (N=19)	18.16	16.59	14
Brux/Clench (N=20)	14.40	10.85	13
Non-brux/clench (N=30)	13.47	13.90	27
Unilateral chewer (N=24)	14.12	10.41	11
Bilateral chewer (N=26)	18.31	15.08	29
Joint Tenderness (N=36)	15.38	14.31	33
No Tenderness (N=14)	13.57	9.57	7
Voluntary "Popper"(N=23)	16.39	11.73	20
Non-popper (N=27)	15.74	13.77	20
Limitation of Motion (N=24)	15.04	14.08	17
No Limitation (N=26)	17.13	11.69	23

TABLE XXIII

COMPARISON OF TAYLOR ANXIETY SCALE SCORES WITH CORNELL MEDICAL INDEX SUBSCORES IN TEMPOROMANDIBULAR JOINT PAIN PATIENTS

Cornell Medical Index Subscales	Mean TAS of 11 and up N=33	Mean TAS of 10 and down N=17
FA- Fear, anxiety	3.96	0.35
D - Depression	1.27	0.12
NA- Nervous, anxious	1.90	0.20
NC- Neurocirculatory	1.12	0.18
SR- Startle reaction	1.54	0.24
PS- Psychosomatic	2.24	0.47
HY- Hysteria, asthenia	1.67	0.47
GI- Gastrointestinal	2.21	0.76
SS- Sensitivity, Suspiciousness	0.73	0.00
TP- Troublesome Psychopath	0.91	0.29
Number of No's	1.09	0.24

NOTE: A score of 11 on the TAS is used as the indication of borderline anxiety.

TABLE XXIV

COMPARISON OF TAYLOR ANXIETY SCALES AND CORNELL MEDICAL INDEX SCALES WITH "11" AS DIVISION POINT FROM "NORMALCY" IN FIFTY PATIENTS WITH TEMPOROMANDIBULAR JOINT PAIN

Test Scores	Fifty TMJ Patients
TAS of 11 and Up with CMI of 11 and Up	24
TAS of 11 and Up with CMI of 10 and Less	10
TAS of 10 and less with CMI of 11 and Up	15
TAS of 10 and Less with CMI of 10 and less	1

TABLE XXV

COMPARISON OF PAIN CHARACTER WITH TAYLOR ANXIETY SCALE AND CORNELL MEDICAL INDEX SCORES IN FIFTY PATIENTS WITH TEMPOROMANDIBULAR JOINT PAIN SYNDROME

TMJ Patients' Pain Character (N=50)	Mean TAS	Mean CMI
Sharp Pain (N=15)	16.40	12.33
Dull Pain (N=35)	15.60	13.06
Constant Pain (N=21)	18.95	19.57
Intermittent Pain (N=29)	13.93	7.93

NOTE: One of the fifteen Sharp Pain patients was an MMPI "Normal." Nine of the Dull Pain, two of the Constant Pain, and eight of the Intermittent Pain patients were so categorized.

TABLE XXVI

AGE COMPARISON OF FIFTY TEMPOROMANDIBULAR JOINT PAIN/DYSFUNCTION PATIENTS

Patients	Mean Age		
	All Patients	Male	Female
Total (N=50)	30.22	27.83 (N=24)	32.42 (N=26)
MMPI "Normals"* (N=10)	33.90	30.90 (N=8)	46.00 (N=2)
MMPI "Abnormals" (N=40)	29.43	26.63 (N=16)	31.29 (N=24)

*MMPI 'Normals" indicates those patients characterized as such by the Clinical Psychologist interpreting the Minnesota Multiphasic Personality Inventory profiles. The same factors apply to those patients characterized as abnormal.

TABLE XXVII

LOCATION OF DESCRIBED PAIN IN FIFTY TEMPOROMANDIBULAR JOINT PATIENTS

Area of Pain	Fifty TMJ Pain/Dysfunction Patients	
	Male (N=24)	Female (N=26)
Face	2 (2)*	5 (1)*
Ear(s)	5 (1)*	5
Jaw	1	2
Neck	1	
Head		1
TMJ	15 (5)*	13 (1)*

*Patients indicated in parentheses are those total of ten categorized as "normal" in the Minnesota Multiphasic Personality Inventory Profile.

Date Due