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The Predictive Value of Gross Motor Development, Posture and Upper Quadrant Stability for TMD in Children and Young Adults: A Preliminary Study

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ABSTRACT
Purpose: This study investigated the relationship of onset of independent walking, upper quadrant stability and head posture and their value as predictors of temporomandibular dysfunction (TMD). Method: Quasiexperimental nonequivalent posttest design study of forty-seven subjects, ages 9 to 29, who were symptomatic or asymptomatic for TMD. Age of independent walking was recorded; temporomandibular joint (TMJ) function was examined; strength of upper quadrant musculature was tested; scapulae distances from corresponding spinous processes were measured; and standing posture was assessed. Results: Significant differences in age of onset of walking, rhomboid strength, scapulae distance from the spinous processes, and head posture were found between groups of subjects presenting with symptomatic and asymptomatic TMD. Age of walking, scapulae distance and forward head posture correctly predicted presence or absence of TMD in 81% of study subjects. Conclusions: Early independent walking may negatively affect scapular stabilization, contributing to excessive forward head posturing, and later onset of TMD. Further research is indicated.

INTRODUCTION

Temporomandibular joint dysfunction (TMD) is a common pathology affecting the functioning of the temporomandibular joint (TMJ). Millions of individuals suffer from TMD. [1,2] The disorder is characterized by TMJ pain, limitation and/or deviation of jaw movement, and audible sounds during opening and closing movements of the mouth, which may occur while chewing, swallowing, and making facial expressions.[2] There is little in the literature identifying clinical risk factors in children and young adults that may contribute to development of TMD. Health care providers frequently disagree as to the proper diagnosis and appropriate care for individuals with TMD. Physical therapists routinely screen developing children and young adults. They perform assessments and enact treatments of impairments, functional limitations and disabilities resulting from TMJ dysfunction. The *Guide to Physical Therapist Practice* recognizes preferred practice patterns (4B, 4D, 4E and 4H) associated with the clinical impairments related to TMD, which justify and delineate the utility of physical therapy treatment.[3] Furthermore, professional standards for physical therapists encourage proactive practice promoting wellness and preventative medical interventions.[3] To assure exercise of best practices in preventative care for TMD, knowledge of physical findings consistent with later onset of pathology allows practitioners to effectively intercede to prevent or reduce future dysfunction.

During normal development, most infants achieve the stereotypical motor milestones and develop postural control from practicing transitions between developmental positions repeatedly. The different systems affecting postural control mature at varying intervals.[2] In the early stages of development, the infant props him/herself on arms, in a position that permits the elevation of the chest from a surface. Spinal extension strengthens in the antigravity prone position and proceeds in a cephalic to caudal direction from the cervical to the thoracic spine promoting stability in the upper quadrant.

The sequential progression of cephalic to caudal strengthening influences the achievement of optimal biomechanical alignment necessary for efficient and effective motor function in the upper and lower quadrants, trunk and cervical regions.[4] Development of postural control in infancy and early childhood is critical for underlying stability for performance of mobility and skilled motor tasks throughout childhood, adolescence, and later on as adults.[5,6] Prone weight-bearing positions contribute to upper truncal and spinal stability, facilitate strengthening of glenohumeral and scapular muscles, and promote postural alignment.[7] Concurrently, dynamic movements occurring in the upper extremities, as the infant gains voluntary control, also affects upper quadrant strengthening and postural stability. The attainment of postural alignment is dependent on complex interactions between intact neurological and musculoskeletal systems resulting in balance between flexor and extensor muscle groups.[5,7] Postural alignment is difficult to achieve and maintain when imbalance exists between flexor and extensor muscles of the trunk.

Muscle strength has been described as a control factor affecting developmental progression.[5,8] Weight-shifting of the trunk over a stable extremity is accompanied by corresponding changes in muscle length and muscle activations facilitating co-contraction in the muscles of the upper quadrant.[9] Other studies investigating the effects of closed-chain exercises on dynamic muscle strengthening and activation of synergistic muscle groups have reached similar conclusions.[10,11]

Sensory receptors, such as the muscle spindle, Golgi Tendon Organ (GTO) and joint receptors contribute to the activation, inhibition and co-activation of surrounding musculature. Combined action of the muscle spindle and the GTO reciprocally influence muscle force production and muscle length.[5] When resistance is applied to voluntary (striated) muscle, the increased load demand results in recruitment of greater numbers of motor units.[12] Weight-bearing is one method utilized therapeutically to amplify the demand and thus, recruit more motor units, which will ultimately increase muscle strength, better motor control, and improve joint stability.

Joint approximation achieved by the weight-bearing, activates joint receptors resulting in facilitation of postural extensors and stabilizers.[7,14] Studies confirm that closed-chain, weight-bearing activities, cause joint compression facilitating joint receptors resulting in added stability.[11,13,14] Similarly, scapula stability is promoted by closed-chain activities, such as upper extremity weight-bearing in developmental activities performed by infants and toddlers on their hands and knees, and hands and feet positions.[7,14] Such activities improve stability of the spine, upper and lower quadrant, by strengthening the corresponding muscles.

Scapulae and shoulder girdle stability of the trunk are provided by the surrounding musculature, such as the rhomboids and trapezi. During infancy, strengthening of these muscles is stimulated during closed-chain kinetic activities in prone developmental positions.[7] It follows that infants who spend less time performing closed-chain strengthening may be at risk for inadequate stability, impaired postural control, and malalignment with consequential clinical impairment and symptomology. Walking at early ages may shorten the time that normally developing infants spend statically and dynamically weight-bearing on the upper extremities. This may lead to inadequate strengthening of the upper quadrant musculature.[7] The long-term effects of the resultant weakness may substantially compromise the stability of the upper quadrant and consequently, affect upright postures, specifically, the alignment of the upper trunk, thoracic and cervical spines.[15,16] In contrast, greater time spent practicing closed-chain activities during motor development may result in adequate muscle control to promote correct postural alignment and stability around joints, permitting normal, pain-free movement.

Proper spinal alignment contributes to postural stability and joint integrity. In stance, normal alignment is achieved when a line visualized down the lateral aspect of the body passes midway between the mastoid process and anterior to the shoulder, hip, knee and ankle joints.[7] With other than normal postural alignment, the biomechanics of joint movements are altered leading to movement dysfunction and risk of abnormal clinical findings and perhaps, pathology.

Similarly, alterations in the length of the muscles and connective tissues of the head and neck, which may result from poor alignment, precipitate many of the clinical symptoms associated with mandible position and temporomandibular joint dysfunction.[22] Head and neck position may influence the tension in the area muscles, which in turn may affect the biomechanics and function of the mandible.[16] It has been established that forward head position and the alignment of the upper quarter contribute to TMD.[17,18] Forward head posture is often associated with changes in proximal musculoskeletal structures comprising of the cervical erector spinae, upper trapezi, levator scapulae, and anterior vertebral neck flexors and associated joints.[17,19] Muscles and soft tissue imbalances may affect the alignment and biomechanics of the upper quadrant structure causing hyperextension of the upper cervical spine, flattening of the lower cervical spine, elevation and forward protraction of the shoulders, and excessive thoracic kyphosis.[17] Forward head and cervical hyperlordosis cause the tempromandibular joint to become malaligned affecting occulsion.[20,21] These postural changes affect mandibular position, condyle position and masticatory musculature activity, thus, contributing to craniomandibular dysfunction.[20,21]

The overall purpose of this study was to identify clinical signs that can be used as predictors of TMD. Based on clinical observations, variables consisting of the onset of independent walking, upper quadrant muscle strength, distance of the scapulae from the spine, and head posture were examined. The questions we wanted to answer included: First, was there a difference in the ages when subjects began independent walking, head position, and upper quadrant muscle strength in persons who were symptomatic of TMD as compared to those who were asymptomatic? Second, can TMD be correctly predicted from the age someone began independent walking, the strength of their upper quadrant musculature, and head posture? In order to answer these questions, subjects were considered to have TMD if they had a history of unilateral or bilateral TMJ pain, clicking, deviations with mouth opening, and/or asymmetrical lateral movement. For purposes of this study, subjects were also considered as having TMD if any aspect of the screening process consisting of interview questions and a physical examination conducted by an experienced physical therapist indicated positive clinical signs of TMD.

METHODOLOGY

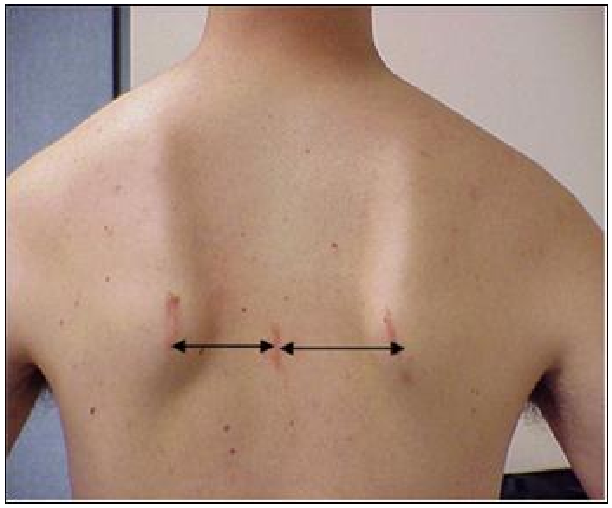
Subjects

A total of sixty-seven volunteers participated in this study. All subjects gave written informed consent. Children signed an assent form in addition to the parental informed consent. All forms and tests used had approval of the Institutional Review Board (IRB) at Nova Southeastern University, Fort Lauderdale, Florida. Participants were screened for presence or absence of common TMD symptomology. A questionnaire and physical examination form (see Appendix A), developed and commonly used by the NSU dental clinic to screen for TMD, was modified for our study and utilized by one of two physical therapist researchers, who performed all measurements for the study. A first physical therapist with over 25 years experience assessing and treating patients with TMD, conducted the screening and physical examinations. Questions inquired as to limited or painful mouth opening; clicking or locking of the jaw; pain with chewing; previous injury to the jaw, head or neck; and previous treatment for TMD. Physical examination was inclusive of palpation of TMJ during mouth opening and lateral deviation movements. Of those screened, 22 were found to clearly have positive TMJ symptoms, (mean age = 22.5; range 12-28 years) and 25 subjects were clearly symptom-free (mean age 22.6; range between 9-29 years). An additional 20 volunteers denied TMD symptoms but displayed inconsistent symptomology during physical examination. These subjects were excluded from the study as not meeting inclusion criteria. Our 47 subjects ranged in ages from 9 to 29 years (9 children from 9-18 years of age; 38 adults from 19-29 years of age). In addition to the clear absence or presence of clinical signs and symptoms of TMD, subjects were asked to consult with their parents or directly access their childhood/medical records wherein was documented information identifying the age in months, they began independent walking. Exclusion criteria included history of trauma to their TMJ, neuromuscular disorder, pathology or orthopedic surgery involving the TMJ, cervical spine, the upper quadrant area, thoracic spine or lower extremities.

Measurements

Demographic data, age of onset of independent walking, and measurements of jaw movement during mouth opening and lateral deviations were recorded on the screening form. This was followed by a physical examination of the TMJ, inclusive of palpation and recording measurements of jaw movement during mouth opening and lateral deviations on the form. Researcher 1 performed all physical examinations. Measurements of scapulae distance in millimeters from the inferior angles to the corresponding spinal processes were recorded (Figure 1) with the upper extremities in three positions (arms hanging at sides; hands resting on iliac crests; and arms held at 90 degrees of abduction and internal rotation).

Figure 1: Markings on inferior angle of scapula and corresponding spinal process in preparation for measurement of scapulae distance from corresponding spinal process



Scapula winging was determined by measuring, in millimeters, the distance of the inferior angles from the posterior thoracic wall. For this measurement, the arms were positioned in full shoulder internal rotation, with the dorsum of the hands positioned over the lumbar area. An observational posture examination was performed and a photograph of the relaxed standing posture was taken for all subjects. Anterior head position was recorded as nominal data. Subjects were assigned to one of two groups: normal alignment or forward head posture. A subject was considered to have forward head posture based on a photograph of the subject's to the shoulder and mid-thoracic trunk (Figure 2).lateral views, where a line from the external meatus fell anterior to a line traveling down anteriorly.

Figure 2: Forward head posture determined by drawing a straight line down from the external meatus; the line falls anterior to the shoulder and mid-thoracic trunk

Muscle strength of the rhomboids, lower trapezi, and serratus anterior muscles were graded in accordance with standard muscle testing protocols used by clinicians as outlined by Kendall.[22] The average of three maximal efforts, for each muscle by subjects, was evaluated as having MMT grades of 0-5 and for statistical purposes of this study, assigned corresponding numerical value, such that MMT grades of 5/5 = 5.0; 5 minus/5 = 4.75; 4 plus/5 = 4.25, 4/5 = 4.0; 4 minus/5 = 3.75; 3 plus/5 = 3.25; 3/5 = 3.0; 3

minus = 2.75; 2 plus = 2.25. The averages of muscle strength measurements for each subject per muscle tested were then collapsed into two groups. For this study, “good” muscle strength was defined as a score of 4 or greater; “weak” muscle strength was defined as a score of 3.75 or lower.

The second physical therapist performed the postural screening and muscle testing for all subjects. Each therapist was blinded to measurements taken and data recorded by the other as well as subject group assignment.

Data Analysis

Descriptive statistics were used for demographics of sample size, number of adults and children. Differences in ages of independent walking and scapulae distance in groups with and without TMD were analyzed using a 2-tailed t-test. A Mann-Whitney U test was used to determine differences in muscle strength data obtained from the two subject groups. Differences in head posture were analyzed by Chi-Square. Age of walking, head posture and scapulae distance data were analyzed for predictive value using a correlation matrix for independent variables. Probability ratios that the three variables can predict TMD were determined by logistic regression statistics.

RESULTS

Data were compiled and assigned to groups based on presence or absence of clinical signs and symptoms of TMD in subject participants. Descriptive statistics were used to describe the characteristics of the study subjects assigned to either the group with TMD or without TMD (Table 1). Our first research question as to whether there was a difference in the ages when subjects began independent walking, head posture, and upper quadrant strength in persons who presented with clinical symptoms as compared to those who were asymptomatic was answered. The mean walking age for the 22 subjects with TMD pathology was 10.0 months (SD 1.995), as compared to 11.8 months (SD 1.668) for the 25 subjects exhibiting normal, asymptomatic TMD function. Comparison of the average means of walking age between the subject groups (with and without TMD) was analyzed using a 2-tailed t-test with alpha set at the .05 level. The results of the t-test showed there was a significant difference between the groups as to the age of walking, with p=.002 (Table 2). Our results demonstrate a significantly higher prevalence of TMD pathology in our subjects, who began walking independently before the accepted motor milestone range of 12 to 15 months.[23]

Table 1: Demographic Data

TMD[a]	Subjects' age	Male	Female	N
Symptomatic	Mean: 22.5 SD: 4.718	4	18	22
Non Symptomatic	***Mean: 22*** ***SD: 5.678***	5	20	25
Totals	***NA***	9	38	47

[a]TMD = Temporomandibular Dysfunction

Table 2: Group Statistics
Difference in Walking Age and TMD

TMD[a]	N	Mean Walking Age	Std. Deviation	Sig. (2-tailed)
Non Symptomatic	25	11.8 mo.	2.021	.002
Symptomatic	22	10.0 mo.	1.668	.002

[a]TMD = Temporomandibular Dysfunction Comparison of means t-test (relating walking age to TMD pathology)
Alpha value set at < .05

Of the 22 subjects with positive TMD symptoms, the frequency of forward head posture (cervical hyperlordosis) was found in 16 of the 22 subjects with TMD and 9 of the 25 subjects without TMD. Head position in the two subject groups was analyzed using a Chi-Square test, with significance set at the .05 level (Table 3).

Table 3: Difference in Head Posture
(TMD and Forward Head Crosstabulation; Chi-Square test)

TMD	Normal head posture	Forward head posture	Total N
Non symptomatic	16	9	25
Symptomatic	6	16	22
Total N	22	25	47

F = 6.340 (df1). Statistically significant at alpha <.012 level

Based on our study, subjects with TMD were significantly more likely to have forward head posture (p=.012) than subjects without TMD. The average means of bilateral scapulae distance from the spine in asymptomatic and symptomatic study subjects were analyzed using 2-tailed t-tests with alpha set at the .05 level. Significant differences comparing left and right scapulae distance existed in the groups, with p = .002 (left) and p = .006 (right) (Table 4). The average mean distance of the scapulae from the spinal processes in subjects with TMD was significantly greater than in subjects without TMD pathology.

Muscle strength of the serratus anterior, lower trapezius and rhomboid muscles in the subject groups was compared using the Mann-Whitney U Test, significance set at p=.05. Our results support significant differences in the strength only in the rhomboid muscles of subjects, with p=.0009 (left) and p=.019 (right) (Table 5). We found no significant differences in strength in the other upper quadrant muscles tested.

Table 4: Scapula Distance and TMD
Independent Sample T-Test Results

	TMD	Subjects	Mean	SD	t	Sig. (2-tailed)
L. Scapula Distance	No TMD[a]	25	6.048 cm	1.740	-2.883	0.006*
	TMD[a]	22	7.322 cm	1.199	-2.951	
R. Scapula. Distance	No TMD[a]	25	6.096 cm	1.838	-3.264	0.002*
	TMD[a]	22	7.568 cm	1.112	-3.365	

Significant level set at p<.05:n=47
[a]TMD=Temporomandibular Dysfunction

Table 5: Muscle Strength and TMD
Mann-Whitney Test

Muscle Strength	TMD[a]	Subjects	Mean Rank[b]	Sig.[c] (2-tailed)
R Rhomboid	No TMD	25	20.88	.019
	TMD	22	27.55	
L Rhomboid	No TMD	25	20.38	.009
	TMD	22	28.11	
R Lower Trapezius	No TMD	25	21.78	.167
	TMD	22	26.52	
L Lower Trapezius	No TMD	25	23.72	.863
	TMD	22	24.32	

n=47
[a]TMD = Temporomandibular Dysfunction
[b]Mean rank: lower mean ranking number indicates stronger muscle
[c].Statistical level of significance: p<05, Mann-Whitney U Test

We were able to answer our second and third research inquiries. This study revealed a relationship among the variables: age of independent walking, the strength of their upper quadrant musculature and head posture in our subjects. The data further support that TMD can be correctly predicted from the age an individual began independent walking, the strength of their upper quadrant musculature and head posture. Logistic regression analysis was used to determine whether the variables of age of walking, scapula distance, and forward head position, could predict the presence or absence of TMD in our study subjects. Of our initial 47 subjects, we were able to predict the presence of TMD or no TMD in 39 of the subjects. Of the 25 subjects without TMD, our model (using the variables of age of walking, forward head posture, and increased scapulae distance) predicted 21 of the group not to have TMD. Of the 22 subjects with TMD, our model correctly predicted 18 members of the group to be positive. In our subjects, the model using the variables of age of walking, scapula distance, and forward head position was accurate in predicting group membership 81% of the time (Table 6a).

Table 6a: Prediction of TMD Based on Age of Independent Walking, Scapulae Distance and Head Posture

Subjects	Observed	Predicted	Percent Correct
No TMD[a]	25	21	80.8
TMD	22	18	81.8

n=47; from the 47 initial subjects we predicted 81.8% who would have TMD and 80.8% who would not have TMD, based on our regression analysis
[a]TMD = Temporomandibular Dysfunction

Table 6b: Logistic Regression Table for Probability of TMD

Variable	B	Std. Error	Wald test	df	Significance (p- value)	Exp(B) Odds Ratio
Age of Indep. Walking	-.543	.238	5.215	1	.022[a]	0.581[b]
Forward Head	-1.722	.886	3.776	1	.052[a]	0.179[b]
Scapula Position	.363	.155	5.463	1	.019[a]	1.438[b]

[a]Statistical level of significance: p = .05, Logistic Regression
[b]Probabilty based on 3 variables collected on evaluation: age of independent walking, distance of scapulae from spine, and head posture

Odds ratios, as demonstrated in Table 6b, derived from our data demonstrated that: 1) the odds of having TMD are less likely the later independent walking begins; 2) odds are less likely to develop TMD the reduced degree of forward head position; and 3) the odds are more likely to develop TMD the greater the scapulae distance.

DISCUSSION

The results of this study support the hypothesis that age of walking may be beneficial as a predictive factor for onset of TMD symptoms in later childhood and early adulthood. As to whether there was a difference in the age of independent walking in persons with clinical symptomology of TMD, we found that a significant number of our study subjects with TMD walked independently at early ages, prior to the typical motor milestone of 12 months.[23] In comparison, subjects without TMD symptoms began independent walking closer to the walking motor milestone. With respect to our research inquiry as to whether there would be differences in head posture and scapulae position in subjects with TMD, our data indicated greater frequency of cervical hyperlordotic posturing (forward head position) and greater scapulae distances from corresponding spinal processes in subjects with TMD as compared to those without TMD. Our results confirm earlier studies linking forward head posture to the presence of TMD.[17,19,20] From our muscle strength data, rhomboid strength was significantly weaker in subjects with TMD. There were no significant differences in other upper quadrant, scapular stabilizers tested (i.e. serratus anterior and lower trapezius). Our results of upper quadrant weakness support earlier study findings by Passero et al who found correlation between musculature of the upper quarter and TMJ dysfunction.[16] We further found a correlation between the variables of independent walking, head posture, and upper quadrant strength in relationship to the development of TMD. Last, we found that in our subjects, early independent walking, forward head posture and greater scapulae distances had value as predictors of TMD. Based on our results, we theorize that early walking and reduced time spent weight-bearing on the upper extremities during infancy may have a detrimental effect on the development of upper trunk stability as observed by postural alignment changes of forward head and scapulae positioning on the posterior rib cage, and malalignment of the TMJ.

In our study, the average age reported for independent walking in subjects without TMD was comparable to the typical milestone. In comparison, subjects with TMD on the average began walking almost two months earlier. We theorize that early independent walking shortens the time the child would spend creeping. The preference for upright walking rather than creeping in early-walking infants, would decrease the exposure to the potential benefits to upper quadrant strengthening achieved through weight-bearing. Subsequently, this reduces the upper quadrant stability, which is needed for postural control and proper alignment, and can lead to forward head posture, malalignment of the TMJ and positive signs and symptoms of TMD.

As a result of this preliminary study, it may not be advisable for parents to stimulate and encourage upright postures before infants are truly ready for them and have developed sufficient upper quadrant strength and stability to independently assume and maintain postural alignment in such position. In our society, it is common to position infants in upright positions before they have the appropriate stability. The use of mobility devices such as baby-walkers and ringed-walkers, and even jumpers, may actually contribute to upper quadrant instability, since the infant is unlikely to prefer the all-fours position for locomotion and play after experiencing the freedom to move in an upright position, having their hands free. Parents desirous of stimulating gross motor advancement in infants, not exhibiting delays, should be educated as to the potentially negative effects of such activities. They should find comfort in the fact that their child is not an early walker and may be further developing upper quadrant stability while spending longer times creeping. Our conclusions may appear contrary to the conclusion reached by Leonard, which supports incorporating upright postures early in development before the second year of life, for the purpose of promoting and preserving central pattern generation (CPG) of stepping leading to normal gait.[24] This study can be distinguished from ours in that Leonard's subjects had neurological deficits and did not examine the effects of early upright positioning on posture, strength or presence of TMD.

Our study utilized a sample of convenience consisting of young adults (college-age students) and only a small number of children and adolescents. Many of the subjects, in both symptomatic and asymptomatic groups, were in their early twenties and led typically active lifestyles participating in recreational sports activities and/or fitness routines. No information was gathered regarding the duration, frequency or types of exercises and activities performed by subjects, which may have affected upper trunk strength and postural alignment.

The sample size was smaller than originally anticipated since many of the potential subjects, who claimed to be normal and asymptomatic, when screened, exhibited one or more of the commonly accepted clinical signs that may over time result in TMD. The two physical therapists who took all measurements, were blinded to each other's examination findings, but not in all cases as to whether or not a subject had TMD. Knowledge of this information may have influenced the results. However, the therapists, having about 50 years of experiences between them performing similar measurements on various patient populations, took care to obtain objective and repeatable measurements. To minimize discrepancies in muscle grading, an average of three maximal efforts by each subject was recorded to minimize bias and error.

In many instances, we relied upon verbal reporting to provide us with the age at which their child began to walk independently. It is possible a parent may have inaccurately recalled and thus reported incorrectly, the onset of independent walking and this may have skewed our results. A number of the subjects in both groups had been treated with orthodontic bracing, which may have affected the alignment of the TMJ. In all cases, such bracing was completed years earlier, during adolescence. Therefore, it was felt that the bracing would have a remote, if any, influence on our results.

CONCLUSIONS

Our results demonstrated that subjects exhibiting TMD, on average, started to walk at an earlier age than those who did not exhibit clinical signs or symptoms consistent with TMD. Additionally, those subjects with clinical TMD may have some upper quadrant weakness in the rhomboids, which may explain the greater scapulae displacement on the posterior chest wall with arm movements. This upper quadrant weakness may have also been a factor contributing to the development of the forward head posturing observed in our subjects. Our findings of hyperlordosis of the cervical spine confirm and support results of earlier studies, which indicated the presence of forward head posturing in persons with TMD.

Although a significant difference of 1.8 months (10.0 vs. 11.8 months) found in subjects with respect to age at onset of walking is generally not considered clinically relevant, in terms of later onset of TMD our study seems to indicate otherwise.

From our results, infants who spend shorter times in quadruped, consequently reduce benefits obtained from closed-chain strengthening of the upper quadrant musculature. This may place these infants at higher risk of ensuing upper quadrant instability and developing postural changes related to TMD. The variables of age of walking, forward head posture and abducted scapulae position appear to be promising predictors of later onset of TMD.

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Appendix A

SCREENING QUESTIONS

Please answer the following questions to the best of your ability

1. Your age:_______
2. Your gender: Male____ Female_____
3. At what age did you start walking? __________
4. Do you have difficulties opening your mouth? Y / N
5. Do you have "clicking" or any other sound when you move your jaw? Y / N
6. Does your jaw get "stuck", "locked" or "go out"? Y / N
7. Do you have pain in or about the ears or cheeks? Y / N
8. Do you have pain when chewing, yawning, or when opening your mouth? Y / N
9. Does your bite feel comfortable or unusual? Y / N
10. Have you ever had injury to your jaw, head or neck? Y / N
11. Have you ever had arthritis? Y / N
12. Have you previously been treated for temporomandibular disorder? Y / N

If you have answered "Y" to any of the questions, please provide details.
Thank you for your cooperation.

SCREENING TEST

Name:______________________
Date of Birth: ________________
Male: _______ **Female**:________

Anterior teeth: **Horizontal Overlap** ________mm
Vertical Overlap ________mm

Range of movement: ______mm (R); __________mm (L); Opening _________mm

TMJ Sounds: __None __Right __Left
Muscle Pain: __No __Yes
Joint Pain: __No __Yes __Right Side __Left Side